Print ISSN: 2233-4165 / Online ISSN: 2233-5382
doi:http://dx.doi.org/10.13106/ijidb.2018.vol9.no1.25

# Donor Country's Fiscal Status and ODA Decisions before and after 2008 Global Financial Crisis

Hyeonmi Ahn*, Danbee Park**

Received: December 15, 2017. Revised: January 8, 2018. Accepted: January 15, 2018

## Abstract

**Purpose** – The purpose of this study is to empirically investigate the impact of donor's fiscal status on aid decisions before and after the 2008 global financial crisis. The effects on aid can change depending on the donor country's fiscal status and the period of financial crisis.

**Research design, data, and methodology** – A fixed effect regression and dynamic panel GMM is conducted using a comprehensive dataset combining 31 donor and 167 recipient countries during 1996-2015. The key explanatory variable is central government debt-to-GDP ratio of donor country. Recipient countries' GNI per capita, population, governance indicators, and bilateral trade-to-GDP ratio between donor and recipient countries are included as control variables.

**Results** – We can confirm the relationship between donor country's fiscal status and aid flow. The cyclical component of government debt is found to have a negative impact on grant decisions particularly after the 2008 global financial crisis. This effect becomes larger in the countries with high government debt-to-GDP ratio. ODA decisions from the countries with low financial constraint do not significantly affected by the recipient countries' factors such as GNI, population, and governance indicator.

**Conclusions** – Based on the empirical results of this study, the source of aid should be diversified by incorporating private sector and innovative financing sources.

**Keywords:** ODA, Grant, Loan, Fiscal Status, Global Financial Crisis.

**JEL Classifications**: O10, H63, F35.

## 1. Introduction

Official development assistance ("ODA") began to be offered as part of the Marshal Plan which was implemented as part of post-WWII reconstruction efforts (Ehrenfeld, 2004). ODA systems and details differ according to economic and geopolitical conditions across the countries. Established in 1960, the Development Assistance Committee ("DAC") develops agendas to support developing countries and to restructure international aid frameworks. Recently, aid effectiveness has emphasized source of funds from emerging donor countries and broadened the range of development financing (Mawdsley, 2014).

Despite these efforts, the 2008 global financial crisis and the 2011 European fiscal crisis have caused a challenging status to the global aid market. Even though there is an increasing demand for aid money, there is a shortage in supply due to donors' financial conditions. Dang, Knack, and Rogers (2013) and Frot (2009) found that donors reduced their aid outlays due to the financial crises.

This study examines the impact of donor fiscal status on aid flow over time and whether the marginal effect of donor fiscal status differs depending on the donor country's fiscal status and the financial crisis. We construct a comprehensive OECD-DAC aid commitment dataset during the periods from 1996 to 2015 to investigate the relationship including the 2008 global financial crisis ("GFC") period. This paper analyzes the changes in overall aid patterns and the

* First Author, Lecturer, School of Economics, Yonsei University, Korea.
** Corresponding Author, Assistant Professor, Department of Economics and International Trade, Kangwon National University, Korea. Tel: +82-33-250-6185, E-mail: park530@kangwon.ac.kr

increased importance of donor country's fiscal status with regard to aid allocation after the 2008 GFC. Then, the difference in the impact of government debt on aid donations is analyzed by separating sample countries into two categories according to their debt levels.

The analysis results of this paper provide several contributions to the foreign aid literature. First, it provides empirical evidence that grants are adversely affected by the financial difficulties of donor countries after the 2008 GFC. This is the first study to provide empirical results based on comprehensive dataset. Second, the negative effect of national debt on grant amount is found to be changed according to the national debt-to-GDP ratio. The Hodrick-Prescott filter is used to decompose the central government debt-to-GDP ratio into trend and cyclical components. Even after trend component is controlled using Hodrick-Prescott ("HP") filter, the negative impact of government debt on grants becomes larger particularly after the 2008 GFC and for high-debt countries.

The rest of the paper is organized as follows. Section 2 introduces recent trends in the sources of aid flow. Section 3 reviews the related literature. Section 4 presents the data and empirical methods used in this study. Section 5 presents the study's empirical results. Section 6 concludes with the policy implications of this study.

## 2. Literature Review

Foreign aid effectiveness and economic growth is one of the important foreign aid research fields. Chenery and Strout (1966) develop the two-gap model to explain the determinants of economic development, which refers to the investment-saving and import-foreign exchange earnings gaps. Based on this model, other studies have discussed the positive relationship between foreign aid and economic growth both theoretically and empirically by including additional factors (Hansen & Tarp, 2000; Burnside & Dollar, 2000; Easterly, 2003). However, Rajan, and Subramanian (2005) fail to find evidence of a relationship between aid inflows and economic growth. Overall, foreign aid has been shown to be positively correlated with economic growth in recipient countries.

Another part of foreign aid study is determining the factors that influence foreign aid. Maizels and Nissanke (1984) address motivations between donors' interests and recipients' needs. Johansson (2010) distinguishes between grants and loans and investigates the recipient country factors that determined aid composition. Claessens, Cassimon, and Van Campenhout (2009) investigate how aid allocation decisions are made over time. All of these researches found that the major determinants are poverty, policy and institutional environment, grant size, and national debt burden.

Mendoza, Jones, and Vergara (2009) find that economic and financial conditions are negatively correlated with grants of official development assistance and discuss the possibility of negative impact of GFCs. Dang et al. (2013) investigate how financial crises and economic conditions in donor countries affect international aid flows to estimate the effects of GFCs. Dabla-Norris, Minoiu, and Zanna (2015) examine the relationship between business cycle and development aid grants and found that bilateral aid flows are, on average, positively correlated with business cycles.

Marchesi and Missale (2013) find that high level of debt in recipient country is negatively correlated with both bilateral and multilateral aid flows. However, not many studies have examined how fiscal status affects donor country's behavior. As an exception, Faini (2006) theoretically and empirically examines the importance of fiscal policy as one the determinants of foreign aid.

However, the time periods examined in previous studies' only cover as late as 2008 and no study has provided empirical evidence from real world data from including the GFC. Zhang, Zhang, and Tao (2016) show the importance of risk tolerance capacity in financial system to economic growth and that fiscal status is related to risk tolerance, especially during the crisis periods. It is necessary to investigate determinants of foreign aids by separating sample periods and countries depending on the fiscal status.

## 3. Data and Empirical Model

### 3.1. Data and Variables

The sample in this study covers 31 donor and 167 recipient countries during the 1996–2015 period. OECD/DAC data is used as measurements of ODA flows and is investigated by donor-recipient-year. Donor countries are major DAC members including United States, Japan, Germany, France, and United Kingdom those who have government debt to GDP ratio data. We subdivide total donors into high, middle, and low debt countries. List of the donor countries included in our sample is reported in <Table 1>, and government debt to GDP level is shown in Appendix <Figure 1>. Other macroeconomic variables are taken from the World Bank Development Indicators. OECD/DAC suggests that aid data on a commitment basis has better quality than data on disbursement. We use commitment amounts instead of actual disbursement amounts to maintain data accuracy and investigate donors' decision-making processes (Berthélemy, 2006).

**<Table 1>** List of donor countries categorized by government debt to GDP ratio

| High debt countries | Middle debt countries | Low debt countries |
|---|---|---|
| Japan, Greece, Iceland, Italy, Belgium, Hungary, Portugal, Slovenia, Austria, France | Ireland, United States, United Kingdom, Spain, Slovak Republic, Turkey, Netherlands, Germany, Poland | Sweden, Canada, Denmark, Finland, New Zealand, Czech Republic, Korea, Switzerland, Norway, Austria, Luxembourg, Estonia |

Note: Based on the average of central government debt to GDP ratio over the total periods, upper one third of donor countries are classified as high debt countries (government debt to GDP ratio is greater than 60%) and lower one third of countries are classified as low debt countries (government debt to GDP ratio is less than 50%).

**<Table 2>** Definitions and sources of variables

| Variable name | Definition | Source |
|---|---|---|
| (Dependent variables) | | |
| Grant | Bilateral grant commitment per population of recipient country in constant US$ | OECD/DAC aid statistics |
| Loan | Bilateral loan commitment per population of recipient country in constant US$ | OECD/DAC aid statistics |
| (Independent variables) | | |
| GNI per capita | Recipient's GNI per capita in constant US$ | World Bank World Development Indicators |
| Population | Population of recipient country | World Bank World Development Indicators |
| Bilateral trade to GDP | Total bilateral export and import values of manufacturing and service to GDP | OECD statistics on International Trades |
| Governance Indicators | Recipient's governance indicators average of 6 World Bank indicators | World Bank Worldwide Governance Indicators |
| Government debt to GDP | Cyclical component of donor's central government debt to GDP | World Bank World Development Indicators |

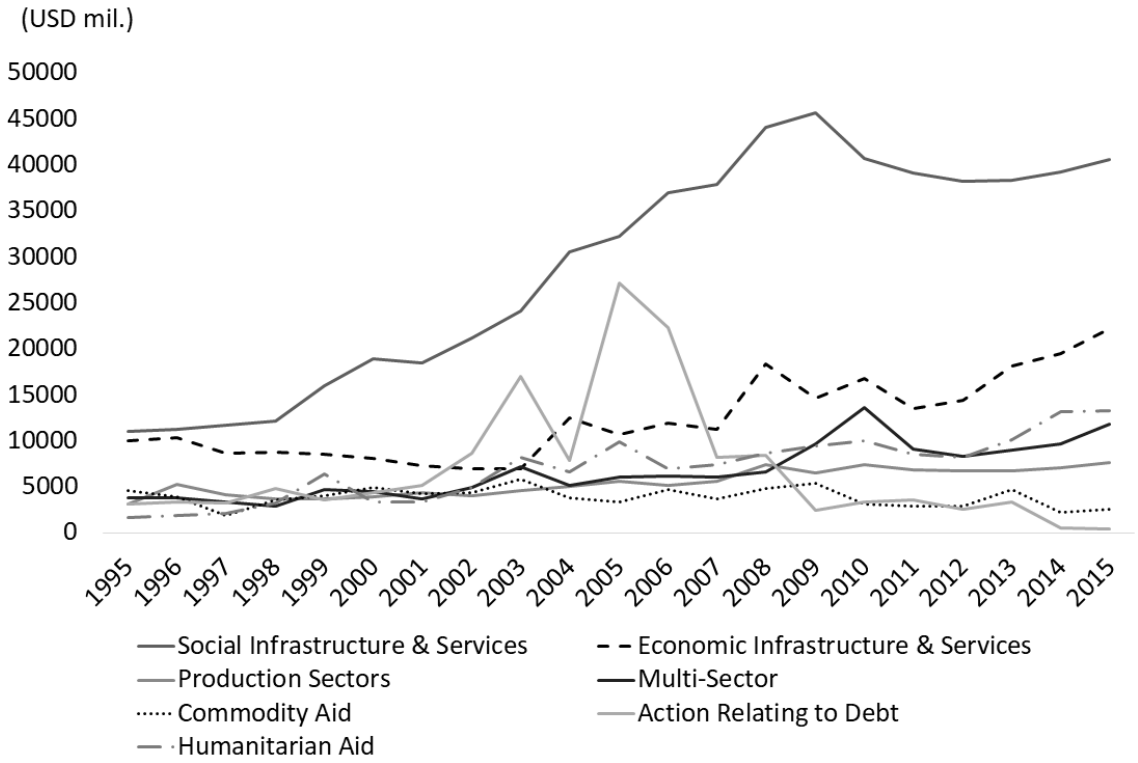
The dependent variables in this study are the log values of ODA grants and loans per capita. Following Arndt, Jones, and Tarp (2010), zero-values in ODA flows are retained by taking a semi-log transformation of the data. 80 observations in grant data are zeros out of a total of 10,648 observations and 9,422 observations in loan data are zeros out of a total of 10,648. The most significant difference between grants and loans is that loans must be repaid while grants faced no such requirement. For this reason, grants are generally considered as true ODA and evidence of greater generosity. Grants account for more than half of total ODA flows from all donor countries except Japan.

The independent variables are broadly categorized as either donor or recipient countries' variables. Recipient variables are GNI per capita to measure income level of recipient country, population to measure country size, and a governance indicator to measure the importance of governance to aid flow. The governance indicator is an agglomeration of six World Bank indicators: Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption. Donor country's variables are bilateral trade-to-GDP ratio and the cyclical component of central government's debt-to-GDP ratio. Bilateral trade is measured as the sum of total trade flows between donor and recipient countries in manufacturing and service industries using OECD data. Central government debt-to-GDP ratio is the key explanatory variable in this paper and is taken from World Bank data. Dabla-Norris, Minoiu, and Zanna (2015) calculate the output gap using an HP filter to measure the business cycle and its effect on foreign aid. A more specific measure is adopted to represent aid decision-making and the cyclical component of central government debt-to-GDP ratio using the HP filter. The cyclical component of government debt varies significantly across donor countries (see Appendix <Figure 2>). Definitions and sources of the variables are reported in <Table 2>.

<Table 3> shows the summary statistics of the dependent and independent variables before taking log transformations. The average value of grant per capita is USD 1.30 and the loan per capita is USD 0.40, which is significantly smaller than grant per capita. The recipient countries' average GNI per capita is USD 4,109 and the national population is 100 million. The bilateral trade-to-GDP ratio is 0.21%. The average value of the six governance indicators is -0.41 with a range of -2.0 to 1.25. The average government debt-to-GDP ratio was 70.8%, which had a relatively wide range of 5.42% to 196.6%.

**<Table 3>** Summary statistics

| Variable | Obs. | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| Grant per capita (USD) | 10,648 | 1.27 | 8.52 | 0.00 | 553.92 |
| Loan per capita (USD) | 10,648 | 0.40 | 4.96 | 0.00 | 299.74 |
| GNI per capita (USD) | 9,313 | 4,109 | 3,776 | 216 | 23,427 |
| Population (1,000) | 10,648 | 100,000 | 266,000 | 47 | 1,370,000 |
| Bilateral trade to GDP (%) | 10,650 | 0.21 | 0.60 | -0.01 | 11.93 |
| Governance indicator | 10,650 | -0.41 | 0.55 | -2.00 | 1.25 |
| Government debt to GDP (%) | 10,602 | 70.80 | 31.88 | 5.42 | 196.64 |




Source: OECD/DAC CRS statistics.

**<Figure 1>** Sectoral Distribution of ODA Flows

## 3.2. Stylized Facts in ODA Flows

The OECD Creditor Reporting System (“CRS”) reports on the distribution of ODA flows by sector. <Figure 1> shows ODA flows by sector during the 1995–2015 period. The sectors displayed in the figure are social infrastructure and services, economic infrastructure and services, production sectors, general aid, commodity aid, action relating to debt, and humanitarian aid. Social infrastructure and services sector accounts for 40% of total aid. The number of actions relating to debt shows a peak in 2005 due to the Paris Club debt relief operations.

<Figure 2> panel A displays the average grant and loan determined by total ODA flows from selected donor countries over the 20-year sample period. The United States is the largest donor with an annual average ODA outflow of USD 80 billion and the second largest donor is Japan with an annual average ODA outflow of USD 47 billion. The United States, Japan, Germany, France, and the United Kingdom are the top 5 donors and accounts for 72% of all ODA flows from all DAC countries. The motivations for providing aid are generally in support of foreign policy and building political relationships (Radelet, 2006). Japan has a relatively low grant ratio (36.7%) compared to France (67.7%), Germany (70.7%), and the United States (97.2%). Schraeder, Hook, and Taylor (1998) describes that Japan’s primary motivation for aid is focused on business and trade.

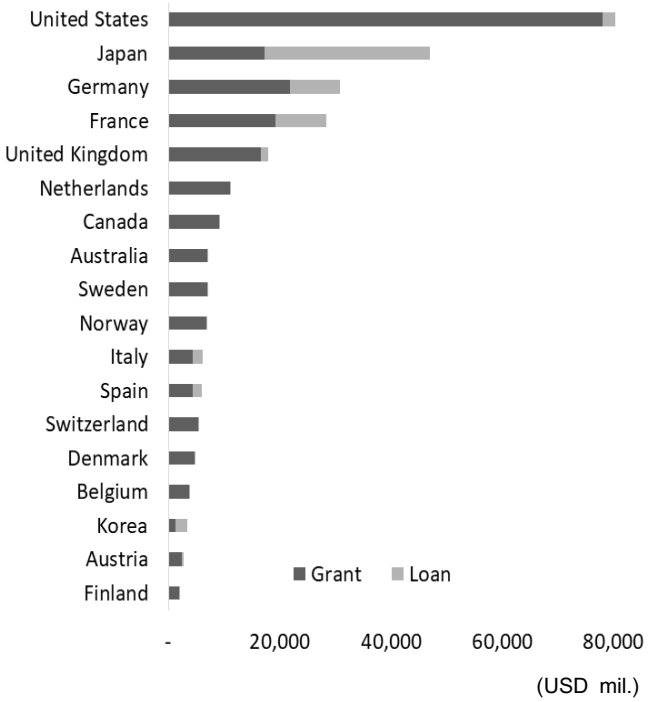
<Figure 2> panel B and C show the average grant

amount and total ODA flows before and after the 2008 GFC based on 5-year average values. Overall ODA levels remain almost same while grants shrink, especially from European donors.

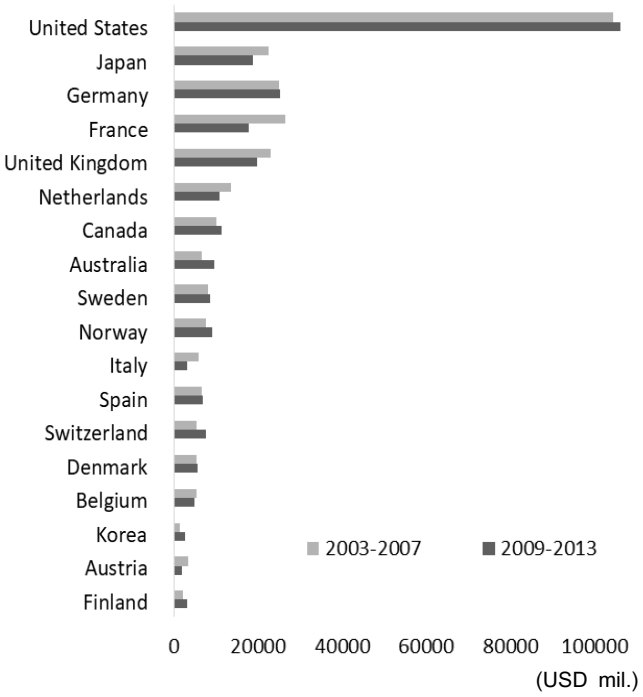
<Figure 3> panels A and B show the top five donor countries' government debt-to-GDP and grant ratios, respectively. Government debt-to-GDP ratios turn out to increase rapidly after the 2008 GFC, especially in the United Kingdom and the United States while grant ratios decrease everywhere except in the United States.

In <Figure 4> we draw a scatter plot to visualize the relationship between government debt-to-GDP ratio and grant amount. The y-axis is the weighted average value of grant per capita by donor country and the x-axis is the cyclical component of the government debt-to-GDP ratio. The sample period and countries are divided into pre- and post-2008 GFC and high and low government debt ratio groups, respectively, to determine whether there are structural differences between theses subgroups.

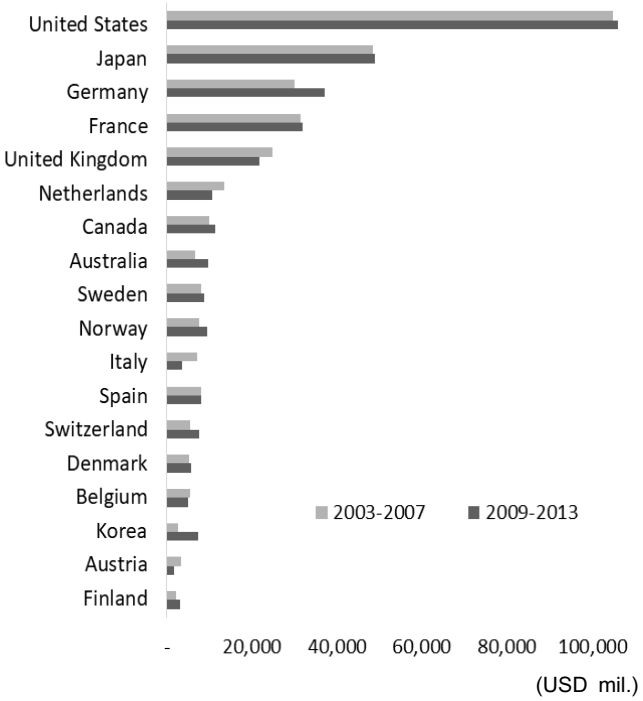
We can find that grant amount is negatively correlated with government debt. Interestingly, this relationship becomes stronger in the right panels. The slopes are -0.242 and -0.892 in low- and high-debt countries, respectively. We can make a conjecture that foreign aid decisions are affected by national debt burdens. The slopes for the pre- and post-2008 GFC groups are -0.185 and -0.302, respectively, which indicated that government debt became more crucial in making aid decisions after the GFC.




A. Average ODA by donor countries



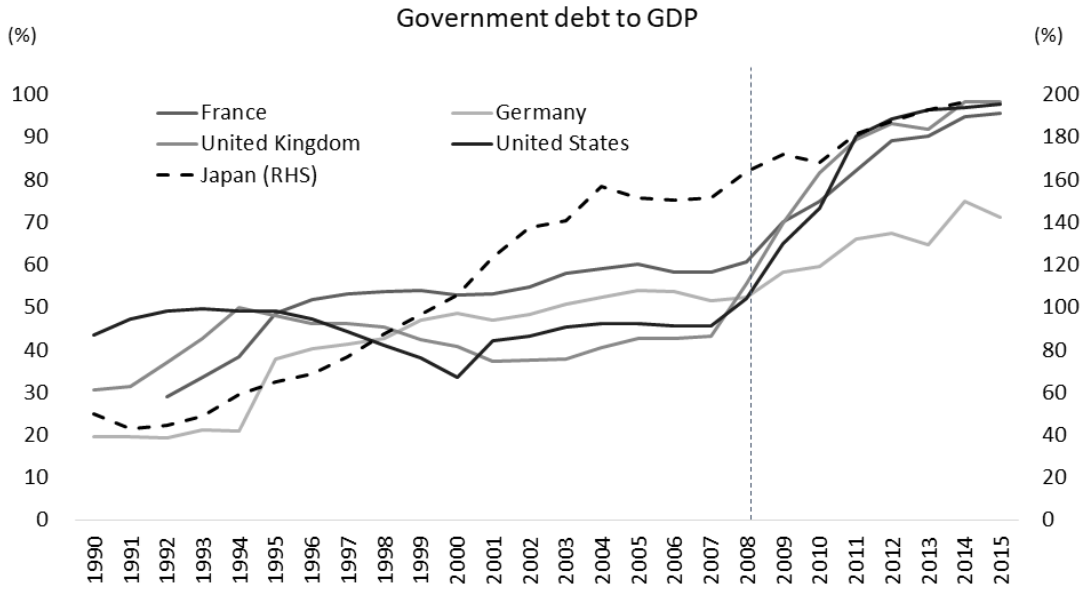

B. Average grant before and after 2008 GFC



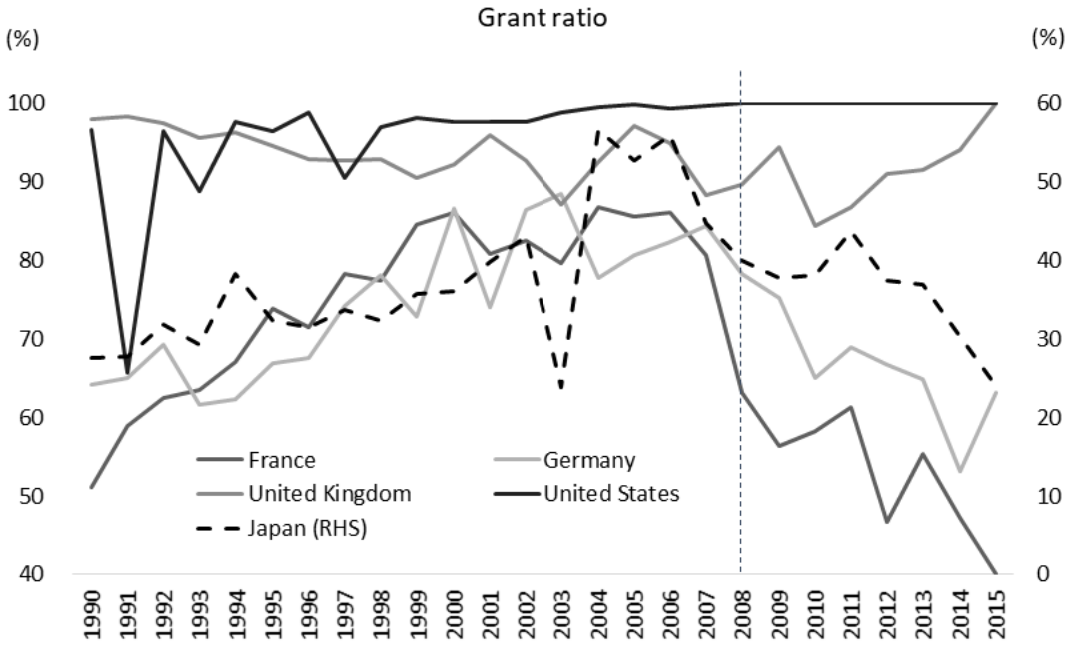

C. Average ODA before and after 2008 GFC

Source: OECD/DAC aid statistics and author's calculation.

**<Figure 2>** Average ODA by donor countries before and after 2008 GFC



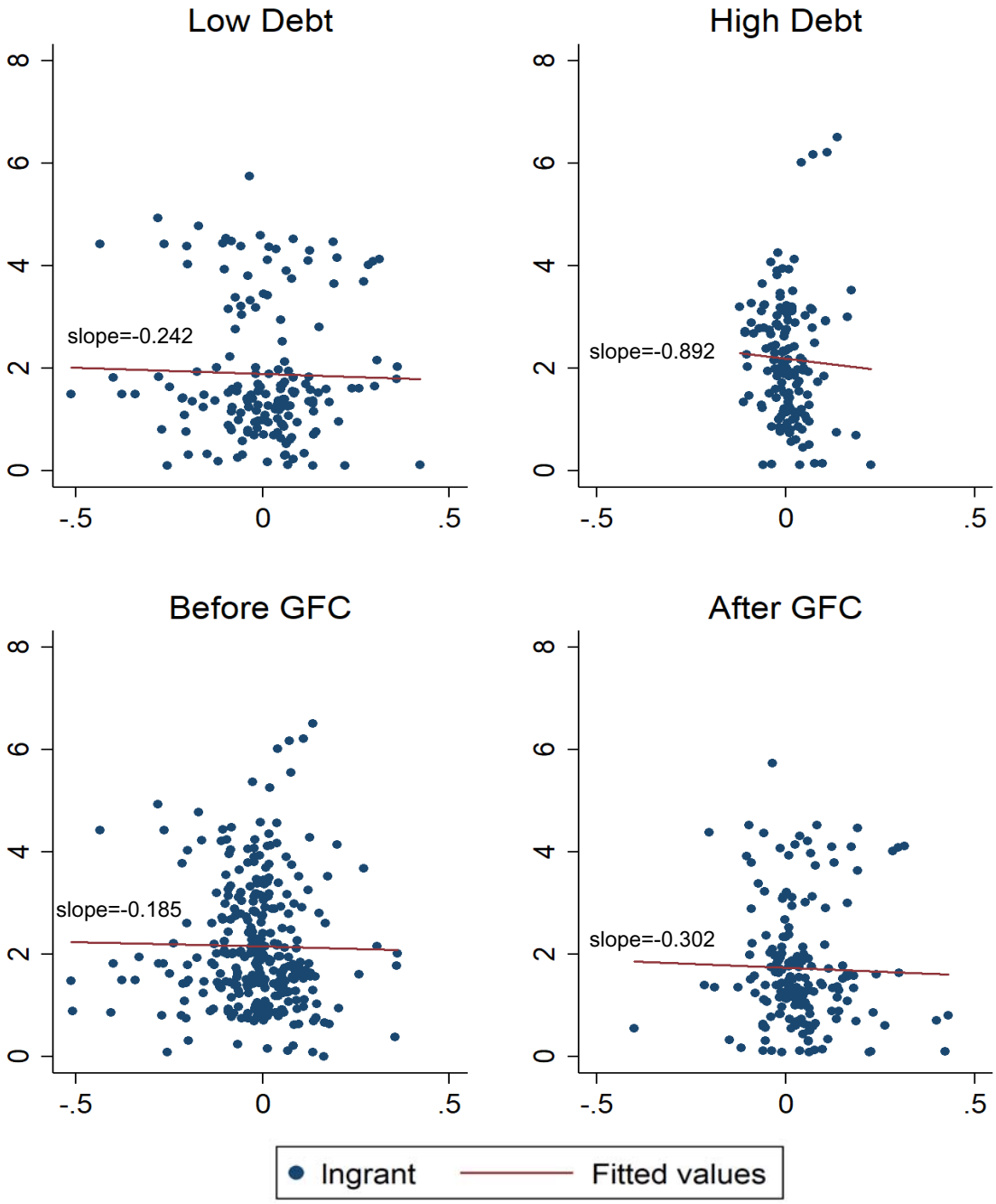

A. Government debt to GDP ratio




B. Amount of grant to total ODA ratio

Note: We use the secondary vertical axis on the right side since the Japan shows deviated values from other countries' average level of government debt to GDP in panel A and grant ratio in Panel B.
Source: OECD/DAC aid statistics and author's calculation.

**<Figure 3>** Government debt to GDP and grant ratio of top 5 donor countries




Note: Y-axis represents log of weighted average value of grant per capita. Weights are calculated by donor country i's grant divided by total grant. X-axis stands for cyclical component of government debt to GDP ratio decomposed by Hodrick-Prescott filter. Low debt and high debt countries are constructed based on <Table 1>. Before GFC and after GFC stands for the subsample periods based on the 2008 global financial crisis.

**<Figure 4>** Government debt to GDP ratio and Grant by Donor Countries

### 3.3. Empirical Model

We investigate the determinants of bilateral grants and loans considering donor country's fiscal status. A basic regression with a panel fixed effect model is adopted using panel data for a sample of 31 donor and 167 recipient countries for the 1996–2015 period. By using a fixed effect model, potential time-invariant historical, geopolitical, and former colonial relationships can be controlled (Claessens et al., 2009). Yoo (2016) also focuses on the diversity of economic structure and development stage among countries in analyzing the effectiveness of foreign capital flows. The empirical model is following:

$$Y_{ijt} = \alpha + \beta X_{-1} + \gamma Z_{jt-1} + \delta T_{ijt-1} + \epsilon_{ijt} \quad (1)$$

where Yijt is the log-transformed grant or loan per capita; Xit indicates variables from recipient countries including income level as measured by GNI per capita, population, and the average value of the six World Bank governance indicators; and Tijt is the bilateral trade-to-GDP ratio between donor and recipient countries. These variables have been used in previous aid allocation studies. Zjt is the cyclical component of the central government debt-to-GDP ratio of donor countries, which is the key variable in this study. Choi (2017) shows that financial constraints can influence the behavior of international trade flows. Since the government debt ratio measure the financial constraint by government, it is expected to have a negative relationship with ODA flow. All explanatory variables are included with a year lag to control the potential endogeneity problems and to reflect relevant information at the time of decision-making.

We estimate a dynamic panel model using the difference GMM estimator proposed by Arellano and Bond (1991) to check robustness of our results. A lagged dependent variable is added as an additional explanatory variable to account for the sustainability of aid flow.

## 4. Results

### 4.1. Results for the 2008 GFC

The effect of donor country's fiscal status on aid flow considering the 2008 GFC is investigated by separating the sample period into pre- and post-2008 GFC periods. The GFC can be understood as a crucial event to cause changes in aid flows. Yang (2017) discusses that global financial crisis has brought warns on potential risk in the financial market. This potential risk is closely related to financial constraint faced by firms and central government. <Table 4> reports the results from basic panel regression methods. Dependent variables are log transformed grants per capita (columns 1, 3, and 5) and loans per capita (columns 2, 4, and 6). Columns 1 and 2 display the results for the total sample period, while columns 3 and 4 are for the pre-2008 GFC period and columns 5 and 6 are for the post-2008 GFC period.

Interestingly, donor country's fiscal status affects grant and loan allocation differently. The cyclical component of the government debt-to-GDP ratio negatively impacts grant decisions in columns 1 and 5, while government debt has no effect in columns 2, 4, and 6. This negative relationship between government debt and grant is only significant in the post-GFC group, which meant that the increase in the government debt-to-GDP is a crucial factor in determining grant flows after the GFC. Recipient country income level and size negatively affected grant flows in the sample period, which was consistent with findings from other studies.

**<Table 4>** Basic panel regression results

| | (1) | (2) | | (3) | (4) | | (5) | (6) |
|---|---|---|---|---|---|---|---|---|
| | **Total** | | | **Before GFC** | | | **After GFC** | |
| Dependent Variables | Grant | Loan | | Grant | Loan | | Grant | Loan |
| GNI per capita | -0.176*** | -0.0074 | | -0.1387** | -0.0244 | | -0.352*** | 0.0262 |
| | (0.0330) | (0.0355) | | (0.0612) | (0.0657) | | (0.0836) | (0.0950) |
| Population | -0.271*** | 0.1692** | | 0.0955 | -0.0222 | | -0.2645 | 0.1536 |
| | (0.0632) | (0.0681) | | (0.1328) | (0.1427) | | (0.1469) | (0.1669) |
| Bilateral trade_GDP | 0.0613 | -0.0622 | | -0.0315 | -0.1163 | | -0.0311 | -0.0044 |
| | (0.0359) | (0.0387) | | (0.0712) | (0.0765) | | (0.0708) | (0.0805) |
| Governance indicator | -0.0264 | -0.04 | | 0.0128 | -0.0661 | | -0.0369 | -0.0701 |
| | (0.0254) | (0.0274) | | (0.0378) | (0.0406) | | (0.0592) | (0.0673) |
| Govt_debt_GDP | -0.161*** | -0.0209 | | 0.0531 | -0.1305 | | -0.191*** | -0.0165 |
| | (0.0301) | (0.0324) | | (0.0698) | (0.0750) | | (0.0545) | (0.0620) |
| Observations | 8,189 | 8,189 | | 4,165 | 4,165 | | 4,024 | 4,024 |
| # of group | 1,027 | 1,027 | | 790 | 790 | | 943 | 943 |

Note: Robust standard errors in parentheses. *** p<0.01 and ** p<0.05. Sample with before GFC includes the period from 1995 to 2008, while the after GFC includes the period from 2009 to 2015.

Recipient countries' income turns out to have a negative impact on grant in columns 1, 3, and 5. However, recipient countries' income does not have a significant impact on loan level in columns 2, 4, and 6. In other words, low income countries receive more grants, but does not receive more loans. Radelet (2005) argues that it is rational to provide grants to the poorest countries rather than loans. Knack (2000) argues that recipient countries' income and population are the important determinants of aid. In terms of country size, countries with small population receive more aid per capita while the countries with large population receive more loans. The coefficients of bilateral trade and governance indicator are statistically insignificant both grant and loan and across the all sample period. These are consistent with the results of Johansson (2010). Zebua (2016) also does not include quality of governance as a significant determinants of foreign capital inflow.

A dynamic panel regression analysis with lagged dependent variable using difference GMM estimators is performed to conduct a robustness check.

As shown by the results in <Table 5>, changes in government debt have no impact on grant decision-making before the GFC but have a negative effect after the GFC. This result confirms the results of the basic regression in <Table 4> which show that donor countries' fiscal status affects the decision whether to give grants after the GFC.

Lagged dependent variable is positively associated with current grant flow in total sample period and after GFC sample in column 1 and 5. Since the budgetary decision on ODA does not change in a single year, we can find the persistent pattern through dynamic panel analysis. The recipient countries' income has a negative impact on grant in total sample period and subsample with after the GFC consistent with the results in <Table 5>. The absolute value of the coefficient becomes larger compared to basic panel regression results in <Table 5>. Population variable and bilateral trade do not have significant impacts on ODA flows. Governance indicator turn out to be negatively associated with loan in column 2 and 4. We can make a conjecture that governance indicator is more important in determining loan rather than grant. The different coefficients between fixed effect panel model and dynamic panel model are observed in the empirical results of Xu, Saksena, and Holly (2011) as well. However, we can still confirm our main results supporting the relationship between donor countries' government debt and grant flows.

## 4.2. Results from High and Low Government Debt Countries

Donor countries were grouped according to their central government debt-to-GDP ratios based on their median average government debt-to-GDP levels (see <Appendix Figure 1> for detailed information).

**<Table 5>** Dynamic panel regression results

| | (1) | (2) | | (3) | (4) | | (5) | (6) |
|---|---|---|---|---|---|---|---|---|
| | **Total** | | | **Before GFC** | | | **After GFC** | |
| Dependent Variables | Grant | Loan | | Grant | Loan | | Grant | Loan |
| Dependent variable_lag(1) | 0.107*** | 0.0517 | | 0.0244 | 0.125 | | 0.123*** | -0.043 |
| | (0.0360) | (0.0592) | | (0.0610) | (0.0933) | | (0.0453) | (0.0796) |
| GNI per capita | -0.507*** | 0.0404 | | -0.2073 | 0.0992 | | -0.594*** | 0.085 |
| | (0.1030) | (0.1481) | | (0.1199) | (0.2409) | | (0.1729) | (0.1380) |
| Population | -0.1836 | -0.1128 | | 0.0432 | -0.1177 | | -0.087 | -0.372 |
| | (0.1458) | (0.2282) | | (0.2584) | (0.3833) | | (0.2180) | (0.3570) |
| Bilateral trade_GDP | 0.0194 | -0.1389 | | 0.0421 | -0.2365 | | -0.0058 | -0.065 |
| | (0.0489) | (0.0761) | | (0.0888) | (0.2079) | | (0.0513) | (0.0465) |
| Governance indicator | -0.0659 | -0.1471* | | -0.0059 | -0.2050** | | -0.0934 | -0.1324 |
| | (0.0572) | (0.0810) | | (0.0705) | (0.1009) | | (0.0972) | (0.1243) |
| Govt_debt_GDP | -0.242*** | -0.01 | | 0.1098 | -0.1451 | | -0.205*** | 0.0403 |
| | (0.0531) | (0.0437) | | (0.1033) | (0.1584) | | (0.0554) | (0.0481) |
| Observations | 6,711 | 6,711 | | 3,211 | 3,211 | | 3,500 | 3,500 |
| AR(2) | 0.146 | 0.563 | | 0.508 | 0.471 | | 0.215 | 0.0615 |

Note: Robust standard errors in parentheses. *** p<0.01 and ** p<0.05. Sample with before GFC includes the period from 1995 to 2008, while the after GFC includes the period from 2009 to 2015. The model is estimated with one-step first difference GMM taken lagged dependent variable as endogenous and other regressors as exogenous variable. We use lags of endogenous variables as instruments.

**<Table 6>** Basic panel regression for high and low government debt countries

| | (1) | (2) | | (3) | (4) | | (5) | (6) |
|---|---|---|---|---|---|---|---|---|
| | Total | | | Low debt | | | High debt | |
| Dependent Variables | Grant | Loan | | Grant | Loan | | Grant | Loan |
| GNI per capita | -0.176*** | -0.0074 | | -0.1274 | -0.0038 | | -0.145*** | 0.0031 |
| | (0.0330) | (0.0355) | | (0.1016) | (0.0158) | | (0.0415) | (0.0608) |
| Population | -0.271*** | 0.1692** | | 0.0042 | 0.0398 | | -0.485*** | 0.2563** |
| | (0.0632) | (0.0681) | | (0.2102) | (0.0327) | | (0.0766) | (0.1122) |
| Bilateral trade_GDP | 0.0613 | -0.0622 | | -0.0508 | -0.0101 | | 0.0527 | -0.1388** |
| | (0.0359) | (0.0387) | | (0.0867) | (0.0135) | | (0.0443) | (0.0649) |
| Governance indicator | -0.0264 | -0.04 | | 0.0528 | 0.0119 | | 0.0246 | -0.0860* |
| | (0.0254) | (0.0274) | | (0.0739) | (0.0115) | | (0.0325) | (0.0476) |
| Govt. debt_GDP | -0.161*** | -0.0209 | | -0.1443** | -0.0141 | | -0.252*** | -0.0606 |
| | (0.0301) | (0.0324) | | (0.0623) | (0.0097) | | (0.0862) | (0.1263) |
| Observations | 8,189 | 8,189 | | 1,115 | 1,115 | | 4,263 | 4,263 |
| # of group | 1,027 | 1,027 | | 232 | 232 | | 461 | 461 |

Note: Robust standard errors in parentheses. *** p<0.01 and ** p<0.05. Upper one third of donor countries are classified as high debt countries (government debt to GDP ratio is greater than 60%) and lower one third of countries are classified as low debt countries (government debt to GDP ratio is less than 50%).

**<Table 7>** Dynamic panel regression for the countries with high and low government debt

| | (1) | (2) | | (3) | (4) | | (5) | (6) |
|---|---|---|---|---|---|---|---|---|
| | Total | | | Low debt | | | High debt | |
| Dependent Variables | Grant | Loan | | Grant | Loan | | Grant | Loan |
| Dependent variable_lag(1) | 0.1065*** | 0.0517 | | -0.249*** | -0.0810** | | 0.1146** | 0.0424 |
| | (0.0360) | (0.0592) | | (0.0643) | (0.0412) | | (0.0495) | (0.0693) |
| GNI per capita | -0.507*** | 0.0404 | | -0.571*** | -0.0608 | | -0.526*** | -0.0992 |
| | (0.1030) | (0.1481) | | (0.1857) | (0.0423) | | (0.1368) | (0.2359) |
| Population | -0.1836 | -0.1128 | | -0.2599 | 0.0495 | | -0.2169 | 0.0733 |
| | (0.1458) | (0.2282) | | (0.4490) | (0.0723) | | (0.1881) | (0.3218) |
| Bilateral trade_GDP | 0.0194 | -0.1389 | | 0.0519 | 0.0365 | | 0.0382 | -0.2256 |
| | (0.0489) | (0.0761) | | (0.0577) | (0.0601) | | (0.0578) | (0.1536) |
| Governance indicator | -0.0659 | -0.1471 | | -0.1084 | -0.0222 | | -0.0374 | -0.2693 |
| | (0.0572) | (0.0810) | | (0.1744) | (0.0214) | | (0.0816) | (0.1422) |
| Govt_debt_GDP | -0.242*** | -0.01 | | -0.0842 | -0.0033 | | -0.434*** | -0.2671 |
| | (0.0531) | (0.0437) | | (0.1707) | (0.0182) | | (0.1468) | (0.3080) |
| Observations | 6,711 | 6,711 | | 764 | 764 | | 3,608 | 3,608 |
| AR(2) | 0.146 | 0.563 | | 0.368 | 0.319 | | 0.15 | 0.94 |

Note: Robust standard errors in parentheses. *** p<0.01 and ** p<0.05. Upper one third of donor countries are classified as high debt countries (government debt to GDP ratio is greater than 60%) and lower one third of countries are classified as low debt countries (government debt to GDP ratio is less than 50%). The model is estimated with one-step first difference GMM taken lagged dependent variable as endogenous and other regressors as exogenous variable. We use lags of endogenous variables as instruments.

By comparing the coefficients of government debt and GDP in columns 1, 3, and 5 and 2, 4, and 6, respectively in <Table 6>, the effects of the cyclical component of government debt on aid are seen to be negative and significant only for grant decision. The government debt coefficient becomes larger for high debt countries (-0.252) than for low debt countries (-0.144). This result indicates that the marginal effect of government debt on grant decision-making is larger for high-debt countries.

However, we cannot find the negative impact of recipient countries' income level and population on grant in low debt countries in column 3 and 4. In other words, ODA decisions made by donors with less financial constraint do not significantly bind to the recipient countries' factors. It is consistent with the phenomenon that investment decisions made by the firms with less financial constraint are relatively less restricted by external factors (Cleary, 1999; Almeida & Campello, 2007). Bilateral trade and governance indicator do not significantly affect both grant and loan except loan in high debt countries.

A dynamic panel model using difference GMM estimators is reported in <Table 7> as a robustness check.

By comparing the coefficients in columns 3 and 5, the negative impact of government debt on grants can be seen to have been statistically insignificant in low debt countries. This result strengthens the results of the basic regression in

<Table 6> indicating that the cyclical component of the government debt-to-GDP ratio has a negative impact only for high debt countries.

Similar to the results posted in <Table 5>, lagged dependent variable is positively associated with current grant flow in total sample countries and high debt countries, but the coefficients have negative values in low debt countries. No persistence of ODA in low debt countries can be explained by volatility of development aid (Bulíř & Hamann, 2008). Low debt countries are relatively small donors it can be volatile in their aid outflow. Recipient countries' income continues to have a negatively significant impact on grant, while other explanatory variables do not have significant impact in determining ODA flows.

## 5. Conclusion

This paper empirically investigates the determinants of ODA flow focused on donor country's fiscal condition by separating the sample period and countries into pre- and post-2008 GFC and high and low government debt-to-GDP ratio groups, respectively. Donor country's fiscal status is shown to significantly influence grant, but not loan, size after the 2008 global financial crisis. The negative impact of the government debt-to-GDP ratio is larger for high debt countries. In other words, the size of grants is shown to be more dependent on donor fiscal status than loans and the adverse effect of government debt on grant decision-making is stronger following the GFC and for high debt countries. Moreover, most developed countries which have historically been major donors have high government debt-to-GDP ratios.

It becomes harder to secure ODA budget due to the extension of nationalism even without global recession. With this backdrop, there should be an increased awareness among major donor nations that the development aid is an effective way to increase global welfare through investment in international public goods. At the same time, major donors should make an effort to bring emerging donors such as China, Brazil, India, and the United Arab Emirates into the partnership.

More specifically, increasing loan sizes would be a practical alternative for increasing overall aid volume. Japan is a fine example that is the second largest donor after United States despite the highest level of loan to ODA ratio. Donors try to reduce debt levels to maintain their foreign aid spending. Cohen, Jacquet, and Reisen (2006) suggested that modern development finance focused on techniques such as granting subsidies and engaging the private sector. Government budgets as traditional sources of aid are not sustainable, so innovative financing can diversify foreign aid sources. Addison, Mavrotas, and McGillivray (2005) also suggest the implementation of innovative sources of development finance such as Tobin's tax. Limitations in traditional sources of financing can be overcome by diversifying funding sources.

Future studies should take into account CRS posts to generate more detailed aid statistics, including each aid flow's sector and project name. This information can be utilized to investigate which sectors and projects are more sensitive to donor fiscal status and changes in aid flows. On the other hand, we can take into account multilateral aid from international organization to find more efficient and effective coordination among donors.

## References


Addison, T., Mavrotas, G., & McGillivray, M. (2005). Development assistance and development finance: Evidence and global policy agendas. *Journal of International Development, 17*(6), 819-836.

Almeida, H., & Campello, M. (2007). Financial constraints, asset tangibility, and corporate investment. The *Review of Financial Studies, 20*(5), 1429-1460.

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies, 58*(2), 277-297.

Arndt, C., Jones, S., & Tarp, F. (2010). Aid, growth, and development: have we come full circle?. *Journal of Globalization and Development, 1*(2), 1-27.

Berthélemy, J. C. (2006). Bilateral donors' interest vs. recipients' development motives in aid allocation: Do all donors behave the same?. *Review of Development Economics, 10*(2), 179-194.

Bulíř, A., & Hamann, A. J. (2008). Volatility of development aid: From the frying pan into the fire?. *World Development, 36*(10), 2048-2066.

Burnside, C., & Dollar, D. (2000). Aid, Policies, and Growth. *American Economic Review, 90*(4), 847-868.

Chenery, H. B., & Strout, A. M. (1966). Foreign Assistance and Economic Development. *The American Economic Review, 56*(4), 679-733.

Choi, H. (2017). A Study on the Relationship between Financial Constraints and Exports. *Review of International Money and Finance*, *7*(2), 163-182.

Claessens, S., Cassimon, D., & Van Campenhout, B. (2009). Evidence on changes in aid allocation criteria. *The World Bank Economic Review, 23*(2), 185-208.

Cleary, S. (1999). The Relationship between Firm Investment and Financial Status. *The Journal of Finance, 54*(2), 673-692.

Cohen, D., Jacquet, P., & Reisen, H. (2006). Beyond grants versus loans: How to use debt for development. Financing Development. Paper prepared for the UNU/WIDER Conference on Aid. *Principles, Policies*

*and Performance, June,* 16-17.

Dabla-Norris, E., Minoiu, C., & Zanna, L. F. (2015). Business cycle fluctuations, large macroeconomic shocks, and development aid. *World Development, 69,* 44-61.

Dang, H. A., Knack, S., & Rogers, F. H. (2013). International aid and financial crises in donor countries. *European Journal of Political Economy, 32*, 232-250.

Easterly, W. (2003). Can foreign aid buy growth?. *The Journal of Economic Perspectives, 17*(3), 23-48.

Ehrenfeld, D. (2004). Foreign aid effectiveness, political rights and bilateral distribution. *Journal of Humanitarian Assistance.* Retrieved December 2, 2017 from https://sites.tufts.edu/jha/archives/75

Faini, R. (2006). *Foreign aid and fiscal policy.* CEPR Discussion Paper No. 5721. Retrieved December 2, 2017 from https://ssrn.com/abstract=923901

Frot, E. (2009). *Aid and the financial crisis: Shall we expect development aid to fall?.* Stockholm: Stockholm School of Economics.

Hansen, H., & Tarp, F. (2000). Aid effectiveness disputed. *Journal of International Development, 12*(3), 375-398.

Johansson, P. (2010). Grants or loans? Determinants of aid composition. Mimeo. Retrieved December 2, 2017 from http://www.umb.no/statisk/ncde-2009/pernilla_johansson_grants_vs_loans.pdf

Knack, S. (2001). Aid dependence and the quality of governance: Cross-country empirical tests. *Southern Economic Journal*, 310-329.

Maizels, A., & Nissanke, M. K. (1984). Motivations for aid to developing countries. *World Development, 12*(9), 879-900.

Marchesi, S., & Missale, A. (2013). Did high debts distort loan and grant allocation to IDA countries?. *World Development, 44*, 44-62.

Mawdsley, E., Savage, L., & Kim, S. M. (2014). A 'post-aid world'? Paradigm shift in foreign aid and development cooperation at the 2011 Busan High Level Forum. *The Geographical Journal, 180*(1), 27-38.

Mendoza, R. U., Jones, R., & Vergara, G. (2009). *Will the global financial crisis lead to lower foreign aid? A first look at United States ODA.* Fordham University, Department of Economics, Fordham Economics Discussion Paper Series. Retrieved December 2, 2017 from http://ftp.web.fordham.edu/ECONOMICS_RESEARCH/PAPERS/dp2009_01_mendoa_jones_vergara.pdf

Radelet, S. (2005). Grants for the world's poorest: How the World Bank should distribute its funds. *Center for Global Development Notes.* Retrieved December 2, 2017 from http://cgdev.org.488elwb02.blackmesh.com/sites/deault/files/2681_file_Grants_for_the_Poorest_Final1.pdf

Radelet, S. (2006). A primer on foreign aid. C*enter for Global Development,* Working Paper No.92. Washington, DC. Retrieved December 2, 2017 from https://ssrn.com/abstract=983122 or http://dx.doi.org/10.2139/ssrn.983122

Rajan, R. G., & Subramanian, A. (2008). Aid and Growth: What Does the Cross-Country Evidence Really Show?. *The Review of Economics and Statistics, 90*(4), 643-665.

Schraeder, P. J., Hook, S. W., & Taylor, B. (1998). Clarifying the foreign aid puzzle: A comparison of American, Japanese, French, and Swedish aid flows. *World Politics, 50*(2), 294-323.

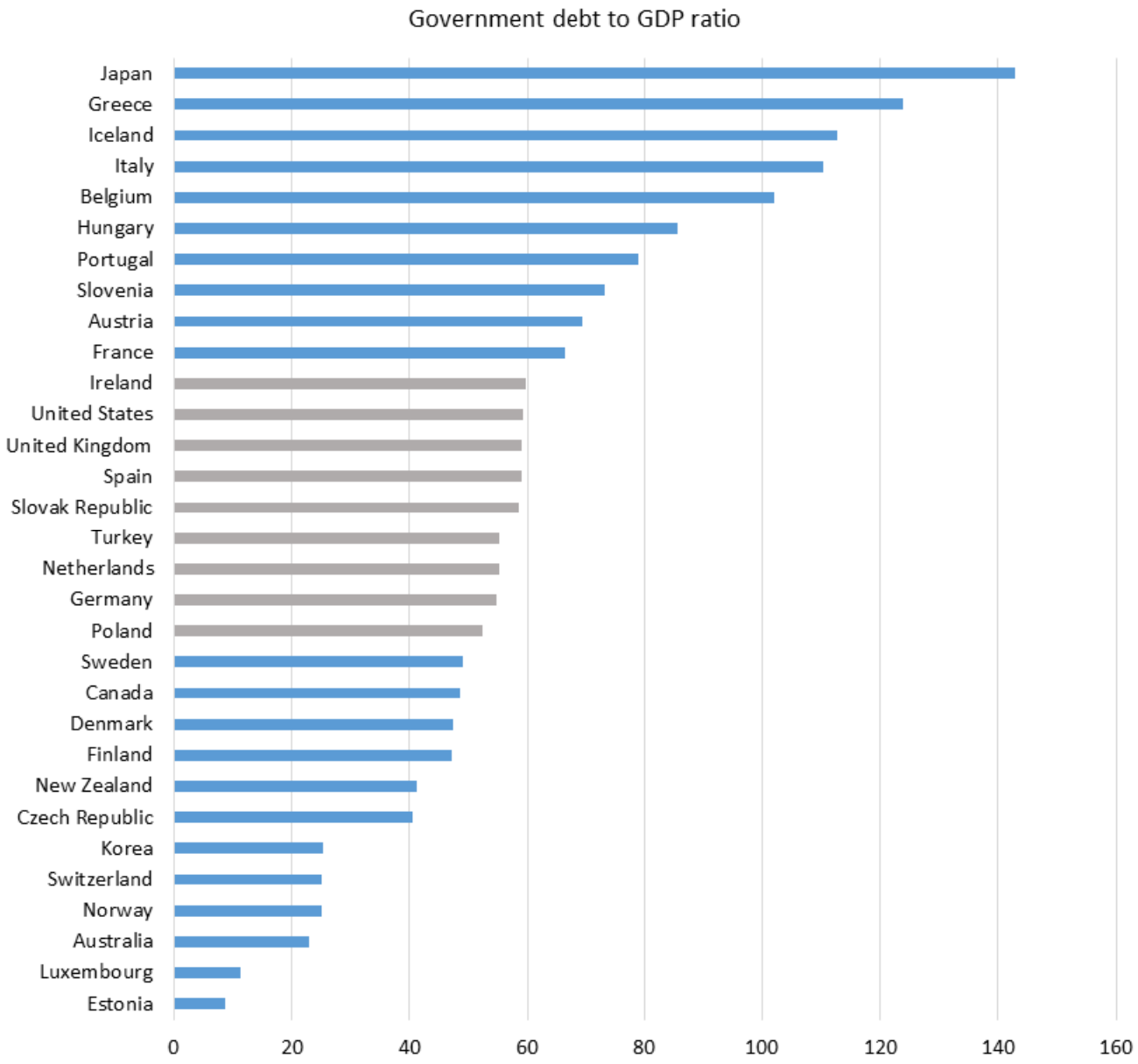
Xu, K., Saksena, P., & Holly, A. (2011). *The determinants of health expenditure: A country level panel data analysis.* Geneva: World Health Organization (WHO).

Yang, D. (2017). Analyzing Deep Deviation from Covered Interest Rate Parity for US dollar in the Advanced Financial Market after Global Financial Crisis and its Potential Risk. *Review of International Money and Finance, 7*(1), 265-298.

Yoo, J. G. (2016). An Economic Effect Analysis of ASEAN FTA on FDI Flows into the ASEAN Countries. *Journal of Distribution Science, 14*(1), 39-49.

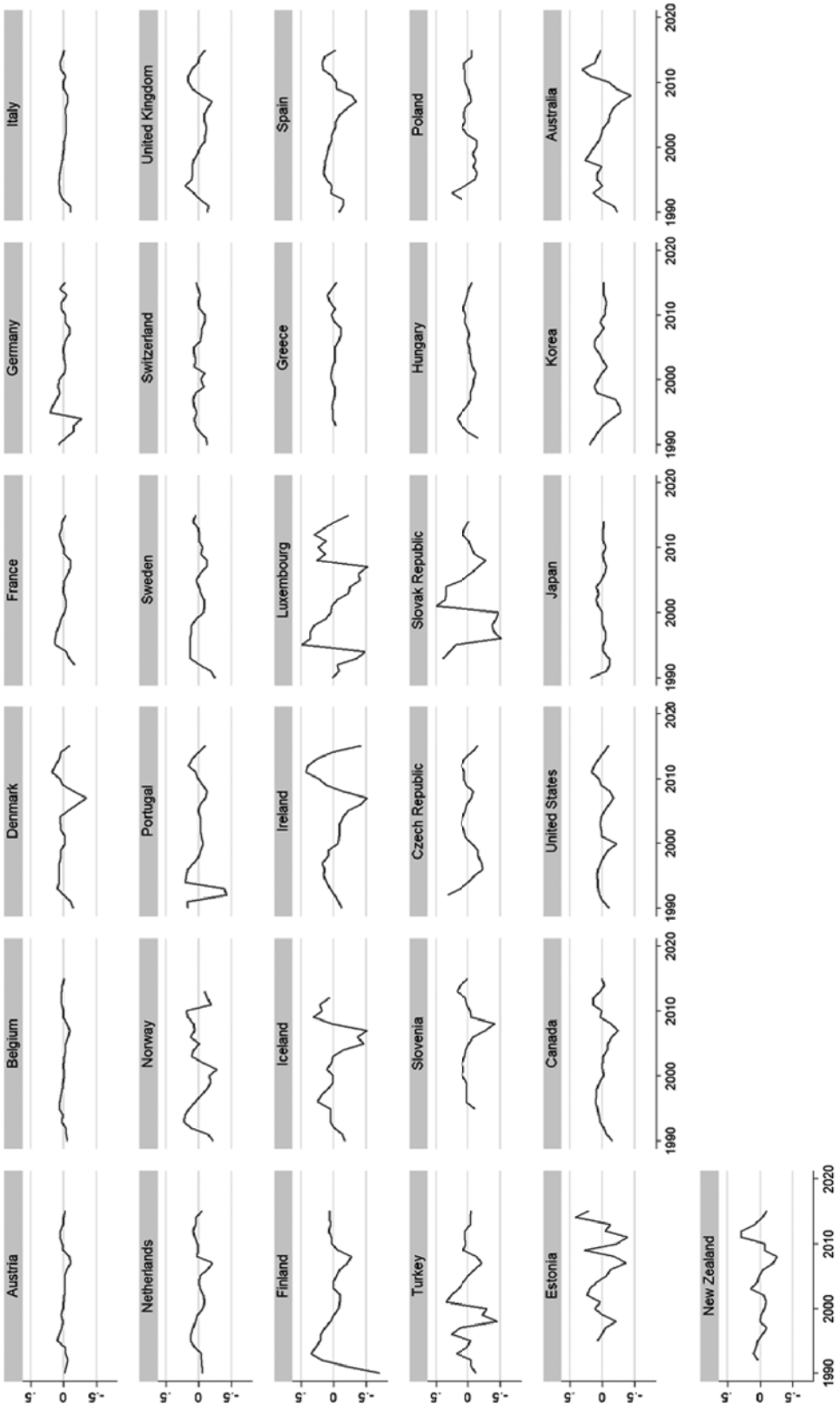
Zebua, H. I. (2016). Determinants of Bilateral Foreign Direct Investment Intra-ASEAN: Panel Gravity Model. *The East Asian Journal of Business Management, 6*(1), 19-24.

Zhang, L., Zhang, S., & Tao, N. (2016). Financial System Risk Tolerance Capacity and Economic Growth: Evidence from a Cross-country Analysis. *Global Economic Review, 45*(2), 97-115.




Note: Bar chart represents the average of central government debt to GDP ratio over the total periods. Based on the average values, upper one third of donor countries are classified as high debt countries (government debt to GDP ratio is greater than 60%) and lower one third of countries are classified as low debt countries (government debt to GDP ratio is less than 50%).

**<Appendix Figure 1>** Country classification of high and low government debt




Note: Cyclical components are decomposed by using HP filter, which is commonly used a linear filter proposed by Hodrick and Prescott.

**<Appendix Figure 2>** Cyclical components of donor's government debt to GDP