The Effects of Foreign Aid as a Trigger for Foreign Direct Investment

-The case in Asian Countries-

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Abstract

This paper investigates whether and how Japanese foreign aid facilitates Japanese foreign direct investment (FDI) flows into less developed countries in Asia. We employ a data set of source-recipient country pairs and conduct a multiple regression analysis. By separating the Japanese foreign aid in sectors, the analysis enables us to examine the effect of foreign aid by each sector on FDI. According to our empirical analysis, in general, the effect of foreign aid on FDI did not differ between sectors, while a strong relation between foreign aid for the Social Infrastructure and Services sector and FDI was seen in Malaysia. This relation between foreign aid for the Social Infrastructure and Services sector and FDI seems to be peculiar to Malaysia.

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Introduction

One of the key questions among international scholar is: whether foreign aid facilitates economic growth of the recipient country. Although the direct effect of foreign aid on growth may not be clear, on hindsight, foreign aid may still promote growth of the recipient country indirectly, for example, by facilitating domestic investments, physical infrastructure investments, and foreign direct investment (FDI hereafter) inflows.

There have not been a large numbers of studies done on the relationship between aid and FDI flows, however, the most cited literature done by Kitamura and Todo [2007] concludes that there is robust evidence that foreign aid from Japan has a vanguard effect on FDI, while aid from other donor countries does not have such effect.

One of the remaining issue is whether the relation between foreign aid and FDI inflow differs according to which sector the foreign aid is allocated to (for example, in a recent literature, Godo [2007] claims that education contributed to the East Asian Economic Miracle. If this phenomenon can be adapted to other regions, we can assume that foreign aid to Social Infrastructure including education may result in FDI increase.).

In this paper we investigate the relationship between Japan's foreign aid and countries of Developing Asia selected i.e. Indonesia, Malaysia, Thailand, Philippines and Vietnam. In order to see the relation between aid and FDI, we employ a data set of source-recipient country pairs and conduct a multiple regression analysis. By separating the Japanese foreign aid in sectors, the analysis enables us to examine the effect of foreign aid by each sector on FDI.

To address the issue, this paper would be divided in 5 sections. Previous studies on linkages on foreign aid and FDI and past and recent Japanese foreign aid allocation are reviewed in Section1. Methodology and Data set used for the empirical analysis are explained, respectively in Section2 and 3. Statistical outcomes of our analysis and investigation of the impact of foreign aid on FDI are shown in Section 4. Finally, we will conclude and recommend areas for future research and improvements in Section 5.

1. Current Trends, Issues and Previous Studies

Before we analyze the relationship between foreign aid and foreign direct investment (FDI), it is necessary to show that

(i) FDI promotes economic development

(ii) Foreign aid promotes FDI

In this Section, we will examine recent economic trends in developing Asia and Japan's foreign allocation. In addition, we will review previous studies addressing the

issues above. As a result, previous studies have proven that FDI has a Cloud-in effect in Asian countries (See 1-3). Another study has concluded that Japan's foreign aid has a vanguard effect on FDI (See 1-4). Based on these studies, through Section 2 to Section 6, we will investigate the relationship between Japan's foreign aid and FDI in countries of Developing Asia selected i.e. Indonesia, Malaysia, Thailand, Philippines and Vietnam.

1-1Economic trends in Asian Countries

Although the latest Asian Development Bank (ADB) report[1] claims that the pace of expansion of developing Asia[2] is slowing[3], as a total, developing Asia's economic performance in the last few decades has been impressive. As a group, the region has grown at an average rate of 7% since 1980[4]. Exports to the world have grown from $162billion in 1980 to $2.3trillion in 2005[5]. The region now accounts for a quarter of world exports. In recent years, this strong export growth has been marked by a rapid increase in intraregional trade, with its share rising from 35% in 1980 to 55% in 2005 if Japan is included, and from 22% to 45% excluding Japan[6].

The initial growth in trade was sparked by Asia's Newly- Industrialized economies (NIEs)-South Korea; Hong Kong, China; Taipei, China; and Singapore- and then the middle-income Association of Southeast Asian Nations (ASEAN) members. Much of this is due to rapid trade liberalization in these economies since the 1980s within the WTO and APEC frameworks. Most economies not only reduced tariffs and nontariff barriers but also simplified customs, rules and regulations[7]. Notable is the fact that

[1] Asian Development Outlook 2012, ADB.
[2] Refers to the 44 developing member countries of the Asian Development Bank and Brunei Darussalam, an unclassified regional member. Excludes Japan.
[3] Growth of developing Asia is now expected to slide from 7.2% in 2011 to 6.1% in 2012, with a bounce back to 6.7% in 2013. (Asian Development outlook 2012, ADB)
[4] Asian Development Outlook 2005, ADB.
[5] Computation based on the data on direction of trade, International Monetary Fund,2006.
[6] East Asia includes 15 economies including the 10 ASEAN members (Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam); the People's Republic of China; South Korea; Taipei, China; and Japan.
[7] Dollar & Kraay [2001]

the expansion of East Asian trade has been accompanied by a rapid rise in FDI. Multinational enterprises (MNEs) began to establish production networks across East Asia through FDI generating trade in capital goods, parts, components, semi-finished and finished manufactures across East Asia.

The factors that contributed to the rise of the East Asian economies are many and varied, given the diversity of their political, social and economic backgrounds. However, some common features can be discerned.

The political stability is worth mentioning. Such stability was accompanied by legal, judicial, and administrative procedures that provided a predictable and stable environment for private business decisions. They put in place consistent fiscal, monetary, and exchange-rate policies that brought price stability and low interest rates. In addition, there was the high savings rate of the people that allowed any budget deficit to be financed smoothly. The export-led strategy, meanwhile, resulted in healthy balance of payments and large foreign exchange reserves. As a result of sound and coordinated policies for short-term stability and long-term industrial restructuring, full employment was reached, real per capita income rose, and absolute poverty disappeared.

In time, as a consequence of rising real wages, the East Asian economies moved on to higher levels of comparative advantage, transferring the labor-intensive stages of manufactured exports to the developing countries, now emerging markets, in Southeast Asia. The full flowering of international subcontracting and global division of labor, facilitated by the liberalization of trade and investment, helped countries of developing Asia begin their transformation into industrializing economies.

1-2Japan's foreign aid allocation

One other important factor of the rise of East Asian NIEs and the emerging markets of developing Asia has been Japan's foreign aid or official development assistance (ODA). This took the form largely of soft loans to major social overhead capital and grants for technical assistance. Appendix Graph1shows that Japan has been the top donor of Asia's foreign aid. Appendix Graph 2 shows that among the Asian countries,

ASEAN countries were the top recipients of Japan's foreign aid.

In recent years, the Japan Institute of International Affairs (JIIA) has been involved with research on experiences in Asia's development. In one of the initial products of this research, namely a report titled 'Significance of ODA in ASEAN External Relations', Ryokichi Hirono states as the following:

In order to assist these developing countries in East Asia and in particular ASEAN to promote outward-oriented industrialization policies, Japan, far more than any other industrial country, concentrated its official development assistance (ODA) in the region and steadfastly increased its aid program focused on the development and improvement of the economic infrastructures such as highways, ports, power generation and distribution and irrigation facilities as well as such social infrastructures as education, health and sanitation. The Japanese aid programs thus contributed a great deal to the expansion and modernization of productive capacity and including physical and human resource development and to constant rises in productivity of agricultural and industrial sectors in ASEAN countries.('Changing Japanese Development Cooperation Policy toward ASEAN in the Postwar Period7,P13).

As this example shows, the view that evaluates the role played by Japanese ODA in the development of East Asian economies positively, has been supported in Japan.

Kawai and Takagi [2004] argue that as a trading nation, it is the interest of Japan to help promote the economic development of its trading partners, particularly in neighboring Asia. Japan's foreign aid had allowed Southeast Asia to build needed physical infrastructure facilities like roads, ports, and airports. Foreign aid corrected the limitations posed by the absence of long-term credit supportive of major capital projects with long gestation periods. Grants and technical cooperation, at the same time, helped in the establishment of social infrastructure, such as, school buildings and hospitals, and in raising capacity to undertake public investment projects. Moreover, by coming up with even softer loans for environmental projects, Japan's foreign aid is contributing to the attainment of sustainable development objectives.

OECD/ DAC's peer review on Japan [2003] is in accordance with Kawai and Takagi [2004] in the opinion that Japan has promoted FDI into the Asian region based on its view that economic growth is the main driver of development.

1-3Previous Studies on the linkages on FDI and economic development

Many policy makers and academics contend that FDI can have important positive effects on a host-country's development. Given the appropriate host-country policies and a basic level of development, FDI can trigger technology spillovers, assist human capital formation, contribute to international trade integration, help create a more competitive business environment and enhance enterprise development. All of these contribute to higher economic growth, which is the most potent tool for alleviating poverty in developing countries. Moreover, beyond the strictly economic benefits, FDI may help improve environmental and social conditions in the host country by, for example, transferring technologies and leading to more socially responsible corporate policies.

Recently, however, the special merits of FDI have begun to be questioned. Fueling this debate in that empirical evidence for FDI generating positive spillovers for host countries is ambiguous at both the micro and macro levels. Although this is beyond the scope of this paper, I would like to introduce some of the previous studies.

From a review of micro data on spillovers from foreign-owned to domestically owned firms, Gorg and Greenwood[2001] conclude that the effects are mostly negative. Surveying the macro empirical research, Lipsey [2002] concluded that there is no consistent relation between the size of inward FDI stocks or flows relative to GDP and growth. He further argues that there is need for more consideration of the different circumstances that obstruct or promote. Work done by Borensztein et al.[1998], Xu[2000], and Alfaro et al[2003] suggests that educational level, development of local financial markets, and other local conditions play an important role in allowing the positive effects of FDI to materialize.

Agosin and Mayor[2000] claims that in evaluating the impact of FDI on development, it is necessary to investigate whether multinational enterprises (MNEs)

crowd in domestic investments (as, for example, when their presence stimulates new downstream or upstream investments that would not have taken place in their absence), or whether they have the opposite effect of displacing domestic producers or pre-empting their investment opportunities.

Their empirical results tell us that over a long period of time (1970-1996), Crowd-In has been strong in Asia[8]. Although it is unable to test for what types of policies will maximize the contribution of FDI to total investment, Agosin and Mayor [2010] suggest that it was because Asian countries have been successful in adopting screening policies to ensure that FDI does not displace domestic firms, or that MNEs contribute new technologies or introduce new products to the country's export basket. Crowd-In may also take place in countries with low domestic investment rates, where MNEs invest in sectors that domestic investors are unable to enter because of technological or capital requirements that domestic firms cannot meet.

1-4Previous Studies on the linkages on foreign aid and FDI

There have not been a large numbers of studies done on the relationship between aid and FDI flows, but among the most cited literature were done by Kimura and Todo [2010] that found that there is robust evidence that foreign aid from Japan has a vanguard effect on FDI, while aid from other donor countries does not have such effect.

They argued that information on the business environment of a recipient's country is often inaccessible to foreign firms, unless they actually engage in business activities in the country. They pointed out that through foreign aid, information may spill over to companies and firms of the donor country by the government. Therefore, through foreign aid, information could be easily accessible by Japanese companies and firm in making their business decision. This information is considered as one of the important factors that could lead to FDI. In summary, they conclude that the vanguard effect of Japanese aid is likely to be purposely generated by the close interaction between the public and private sector.

[8] Results for other regions were as follows; Crowd-Out has been the norm in Latin America and African countries appear almost in balance as regards both Crowd-Out and Crowd-In.

2. Hypothesis and Methodology

The paper's hypothesis is as below.

H1: 'The relation between foreign aid and FDI inflow differs according to which sector the foreign aid is allocated to.

To estimate the impact of foreign aid on FDI from the same country, we employ a data set of source-recipient country pairs and conduct a multiple regression analysis. Since previous study conducted by Kimura and Todo [2010] has proven that Japan has a vanguard effect on FDI, we select Japan as a donor country (/investing country). The host-countries are selected from Developing Asia (i.e. Indonesia, Malaysia, Philippines, Thailand and Malaysia[9]) since it can be assumed that these countries have a strong economic relationship with Japan both by foreign aid and FDI. By separating the Japanese foreign aid in sectors, the analysis enables us to examine the effect of foreign aid by each sector on FDI. To analyze the effect of foreign aid policy on MIE's FDI incentive, we examine relation between aid inflow and FDI inflow. Accordingly we postulate the following equation:

$$\ln FDI_{ijt} = \ln AID_{ijt} + \ln GDP_{jt} + \ln WGI_{jt}$$

Where subscripts i, j, and t denote respectively the source and the recipient country of FDI and foreign aid and the time period.

2-1Dependent Variable

In this paper, the dependent variable $\ln FDI_{ijt}$ is the FDI inflow from Japan to the recipient country j during 1996-2011. While Kimura and Todo [2010] employed foreign aid stock to explain FDI stock , we will employ foreign aid inflow and FDI inflow to see whether foreign aid policy have an effect on MIE's FDI incentive.

2-2Independent Variables

[9] Data were available in these 5 countries.

Meanwhile, the independent variable ln*AIDijt* is the foreign aid flow from Japan to the recipient country j during 1996-2011. To examine the effect of foreign aid by each sector on FDI, we will separate foreign aid in sectors (namely AID Total, AID Total Sector Allocable, AID Social Infrastructure & Services, AID Economic Infrastructure & Services, and AID Production Sector & Services). ln*GDPjt* represents GDP per capita during 1996-2011, and ln *WGIjt* represents policy indicators during 1996,1998,2000, 2002-2011 of country j. GDP per capita of country j is used as a proxy of economic development level. FDI are attracted or deterred by the level of economic development within a country and respond differently at different stages of modernization. We will use World Governance Indicator (WGI) (namely Political Stability and Absence of Violence, and Government Effectiveness) as policy indicators of country j.

The list of data is shown in Appendix Table 1. Data sources and definitions are explained in the next section.

3. Data

3-1 FDI

- **FDI inflow from Japan (Data source: OECD DAC Data statistics)**

FDI is defined as investment by a resident entity in one economy that reflects the objective of obtaining a lasting interest in an enterprise resident in another economy. The lasting interest implies the existence of a long-term relationship between the direct investor and the enterprise and a significant degree of influence by the direct investor on the management of the enterprise. The ownership of at least 10% of the voting power, representing the influence by the investor, is the basic criterion used.

3-2 Foreign aid

- **AID Total (Data source: OECD DAC Data statistics)**

AID Total consists of disbursements of loans made on concessional terms (net of repayments of principal) and grants by official agencies of the members of the OECD Development Assistance Committee (DAC), by multilateral institutions, and by non-DAC countries to promote economic development and welfare in countries and territories in the DAC list of foreign aid recipients. It includes loans with a grant

element of at least 25 percent (calculated at a rate of discount of 10 percent).

- **AID Total Sector Allocable (Data source: OECD DAC Data statistics)**

Total sector-allocable aid is the sum of aid that can be assigned to specific sectors or multi-sector activities.

- **AID Social Infrastructure & Services (Data source: OECD DAC Data statistics)**

Aid for Social Infrastructure and Services refer to efforts to develop the human resources potential of aid recipients. Aid for education, health, water supply and sanitation, government and civil society are included. [10]

- **AID Economic Infrastructure & Services (Data source: OECD DAC Data statistics)**

Aid for Economic Infrastructures and Services refer to assistance for networks, utilities, services that facilitate economic activity.

- **AID Production Sector (Data source: OECD DAC Data statistics)**

Aid for Production Sector refers to contributions to all directly productive sectors meaning agriculture, industry and mining, and trade policies and tourism.

3-3 Government Indicators

- **Political Stability and Absence of Violence (Data source: World Bank)**

Political Stability and Absence of Violence measures perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically motivated violence and terrorism.

- **Government Effectiveness (Data source: World Bank)**

Government effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures,

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[10] World Bank's definition in World Development Indicator 2008 is as follows; **Education** includes general teaching and instruction at all levels, as well as construction to improve or adapt educational establishments. **Health** covers assistance to hospitals, clinics, other medical and dental services, public health administration, and medical insurance programs. **Population** covers all activities related to family planning and research into population problems. **Water supply** and sanitation cover assistance for water supply and use, sanitation, and water resources development. **Government and civil society** include assistance to strengthen government administrative apparatus and planning and activities promoting good governance and civil society.

the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.

3-4 Economic development level

GDP per capita (Data Source: World Bank)

GDP per capita is gross domestic product divided by midyear population. GDP is the sum of 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. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.

4. Estimation Results

To examine the effect of foreign aid by each sector on FDI and to avoid multicollinearity, the regression analyses are made for each sector of aid. Further on, we tried 2 types of government indicators to see which of them is related to FDI incentives. For each of these analyses, 4 types of analysis are made, one not considering time lag with missing data replenished[11], one not considering time lag with missing data not replenished, one considering 1 year time lag with missing data replenished, one considering one year time lag with missing data not replenished. In total, 40 analyses are made for each of the 5 countries.

In summary, the results suggest that Japan's foreign aid in total has a positive effect on FDI from Japan, being consistent with Todo and Kimura [2010]. Other variables, GDP per capita and Political stability of the recipient country also showed a positive effect on FDI inflow, mostly consistent with the theoretical prediction. In most cases, R square and Adjusted R square showed higher rates when 1year time lag is considered, suggesting that the foreign aid policy have an effect on the FDI incentive from the same country a year later.

[11] Missing data of government indicators 1997, 1999, 2001 are replenished by taking the medium of the year before and the year later.

4-1 Estimation Results by Country

4-1-1 Results on Indonesia

The R Square and Adjusted R Square results of the 40 regression analyses are shown in Appendix Table 2. We will rely on the result using GDP per Capita (x6) and Political Stability and Absence of Violence (x7) as other independent variables with no time lag in consider and missing data not replenished, since R Square and Adjusted R Square was at its highest rate than the other results.

We start with the estimation of the impact of foreign aid on FDI, using foreign aid flow (independent variables x1-5) from Japan to Indonesia as the key independent variable. According to the regression results in Appendix Table 7, the effect of total foreign aid flow from Japan to Indonesia (x1) on FDI flow from Japan to Indonesia (y) is positive but weak. This evidence suggests that the total effect of foreign aid on FDI inflow is not substantial. Foreign aid allocated for Social Infrastructure and Services (x3) and Economic Infrastructure and Services (x4) also had a positive but weak effect on FDI, while Foreign aid allocated for Production Sector (x5) showed weak and negative effect on FDI inflow. However, correlation coefficient of the two variables showed a positive relation [12] suggesting that the results on Table 7 may be insignificant. Since the regression result using (x3), (x4) and (x5) all showed weak effect on FDI inflow, we cannot tell which sector the aid is allocated to triggers the FDI inflow.

Results on other independent variables are as follows; while Political Stability and Absence of Violence (x7) had a positive effect on FDI, result on the effect of Indonesia's GDP per capita (x6) on FDI inflow showed a negative effect, which did not follow the theoretical prediction. Since the two variables are correlated[13], we can conclude that Table 7 may be biased due to multicollinearity.

The reason why foreign aid and FDI showed weak relation may be due to the effect of the two economic crises. After the Asian currency crisis on 1997, Japan's foreign aid

[12] The correlation coefficient of the two is 0.420
[13] The correlation coefficient of the two is 0.808

expanded from 45.47 US million dollars on 1997 to 2888.88 US million dollars on 1998 to overcome the crisis while on contrast, Japan's FDI dropped from 2549.58 US million dollars on 1997 to 1052.78 US million dollars on 1998. Japan's FDI also declined after the Lehman crisis on 2008 while foreign aid increased. This is contrary from the theoretical prediction, which presumes that FDI increases in conjunction with the increase in foreign aid.

4-1-2 Results on Malaysia

The R Square and Adjusted R Square results of the 40 regression analyses are shown in Appendix Table 3. We will rely on the result using GDP per Capita (x6) and Political Stability and Absence of Violence (x7) as independent variables with 1year time lag in consider and missing data not replenished since R square was at its highest rate here than the other results.

We start with the estimation of the impact of foreign aid on FDI, using foreign aid flow (independent variables x1-5) from Japan to Malaysia as the key independent variable. According to the regression results in Appendix Table 8, the effect of total foreign aid flow from Japan to Malaysia (x1) on FDI flow from Japan to Malaysia (y) is positive. Foreign Aid for Total Sector Allocable (x2) and Foreign Aid Allocated for Social Infrastructure and Services (x3) also had a positive and significant effect on FDI inflow. The t Stat results of other 2 independent variables, GDP per Capita (x6) and Political Stability and Absence of Violence (x8), showed high rate, which suggests that they have an effect on FDI.

However, regression result of Foreign Aid Allocated for Economic Infrastructure (x4) and Production Sector (x5) showed different results. R square was respectively 0.2955 and 0.1900, and Adjusted R Square was respectively -0.1273 and -0.2959. This result suggests that there are little relation between foreign aid allocated to these sectors and FDI inflow.

The results tell us that efforts to develop the human resources potential had an effect on FDI inflow. Godo [2007] claims that during the East Asian Economic Miracle, education contributed in building resources that are capable for industrialization in

Japan, Korea and Taiwan. Through the 1980's Malaysia has invited FDI through industrialization. We may assume that attempts for building human resources through foreign aid have attracted FDI.

4-1-3 Results on Philippines

The R square and Adjusted R Square results of the 40 regression analyses are shown in Appendix Table 4. We will rely on the result using GDP per Capita (x6) and Government Effectiveness (x8) as other independent variables with no time lag in consider and missing data not replenished since R square and Adjusted R square was at its highest rate than the other results.

We start with the estimation of the impact of foreign aid on FDI, using foreign aid flow (independent variables x1-5) from Japan to Philippines as the key independent variable. According to the regression results in Appendix Table 9, the effect of total foreign aid flow from Japan to Philippines (x1) on FDI flow from Japan to Philippines (y) is positive but weak. The result on foreign aid for Total Sector Allocable (x2), foreign aid for Social Infrastructure and Services (x3) and foreign aid for Economic Infrastructure and Services (x4) also showed low R square rate, suggesting that the result is insignificant.

However, the result on foreign aid for Production Sector (x5) shows that it has a positive and significant effect on FDI inflow. The correlation coefficient of the two variables also showed that it has a positive relation[14]. From the past, Japan's foreign aid for the Philippines has been allocated to the production sector for the purpose to attract FDI. The latest Country Assistance Program for the Republic of the Philippines[15] formulated by the Ministry of Foreign Affairs (MOFA) states that it is essential that the Philippines provides investment incentives by specifying business sectors in which the Philippines has comparative advantage (electronics industries, business process outsourcing, tourism, etc.) and that Japan will cooperate in these areas. This Japanese foreign aid policy might have attracted Japanese FDI.

[14] The correlation coefficient of the two is 0.482
[15] Published in 2008.

Other regression results are as follows: GDP per Capita of the Philippines (x6) has a positive effect on FDI, while Government effectiveness of the Philippines (x8) showed little effect.

4-1-4 Results on Thailand

The R square and Adjusted R Square results of the 40 regression analyses are shown in Appendix Table 5. We will rely on the result using GDP per Capita (x6) and Government Effectiveness (x8) as other independent variables with 1year time lag in consider and missing data replenished since it showed a significant rate.

We start with the estimation of the impact of foreign aid on FDI inflow, using foreign aid flow (independent variables x1-5) from Japan to Thailand as the key independent variable. According to the regression results in Appendix Table 10, the effect of total foreign flow from Japan to Thailand (x1) on FDI inflow from Japan to Thailand (y) is positive but weak. The result on foreign aid on Social Infrastructure and Services (x3), Economic Infrastructure and Services (x4), and Production Sector (x5) also showed positive but weak effect on FDI inflow. Since the regression result using (x3), (x4) and (x5) all showed weak effect on FDI inflow, we cannot tell which sector the aid is allocated to triggers the FDI inflow.

Result on other variables, GDP per Capita of Thailand (x6) and Government Effectiveness of Thailand (x8) showed positive and significant effect on FDI inflow in all five results. Especially, GDP per Capita showed strong effect.

The regression result using the same independent variables (x1-x5, x6, x8) with 1year time lag in consider but missing data not replenished showed lower R square but the t Stat showed the same trend. However, the result not considering time lag showed low t Stat meaning that the FDI incentive is affected by the foreign aid flow of the previous year.

4-1-5 Results on Vietnam

The R square and Adjusted R Square results of the 40 regression analyses are shown in Appendix Table 6. We will rely on the result using GDP per Capita (x6) and Government Effectiveness (x8) as other independent variables with 1year time lag in consider and missing data not replenished since the result showed a significant rate.

We start with the estimation of the impact of foreign aid on FDI inflow, using foreign aid flow (independent variables x1-5) from Japan to Vietnam as the key independent variable. According to the regression results in Appendix Table 11, the effect of total foreign flow from Japan to Vietnam (x1) on FDI inflow from Japan to Vietnam (y) is positive but weak. The result on Economic Infrastructure and Services (x4) also showed positive but weak effect on FDI. The result on foreign aid on Social Infrastructure and Services (x3) and Production Sector (x5) showed weak and negative effect on FDI inflow, not following the theoretical prediction.

Since the independent variables foreign aid on Social Infrastructure and Services (x3) and GDP per Capita (x6), foreign aid on Production Sector (x5) and GDP per capita (x6) are correlated[16], however, we can conclude that Table 11 may be biased due to multicollinearity. Therefore, we conducted a correlation analysis for each of the foreign aid sectors on FDI inflow. Although the results show that foreign aid have a positive effect on FDI inflow, the effect was weak that we cannot tell which sector the aid is allocated to triggers the FDI inflow.

Result on other variables, GDP per Capita of Vietnam (x6) and Government Effectiveness of Vietnam (x8) showed positive and weak effect on FDI in all five results. However, results in other regression analysis showed significant relation between GDP per Capita and FDI inflow.

[16] The correlation coefficient were respectively 0.46 and 0.79.

5.Concluding remarks

This paper investigates whether and how Japanese foreign aid facilitates Japanese foreign direct investment (FDI) flows into less developed countries in Asia. We employ a data set of source-recipient country pairs and conduct a multiple regression analysis. Our empirical methodology enables us to examine the effect of foreign aid by each sector on FDI by conducting a regression analysis for each of the sector the foreign aid is allocated to. According to our empirical analysis, a relation can be seen between foreign aid from Japan and FDI inflow from Japan, following the theoretical prediction and previous studies done by Todo and Kimura[2010]. Further on, our results indicate that in general, the effect of foreign aid on FDI inflow did not differ between sectors, while a strong relation between foreign aid for the Social Infrastructure and Services sector and FDI inflow can be seen in Malaysia. This relation between foreign aid for the Social Infrastructure and Services sector and FDI seems to be peculiar to Malaysia. We may assume that attempts for building human resources through foreign aid have attracted FDI. As a next step, whether FDI attracted by foreign aid has led to the economic growth of aid recipient countries will be among future research interests.

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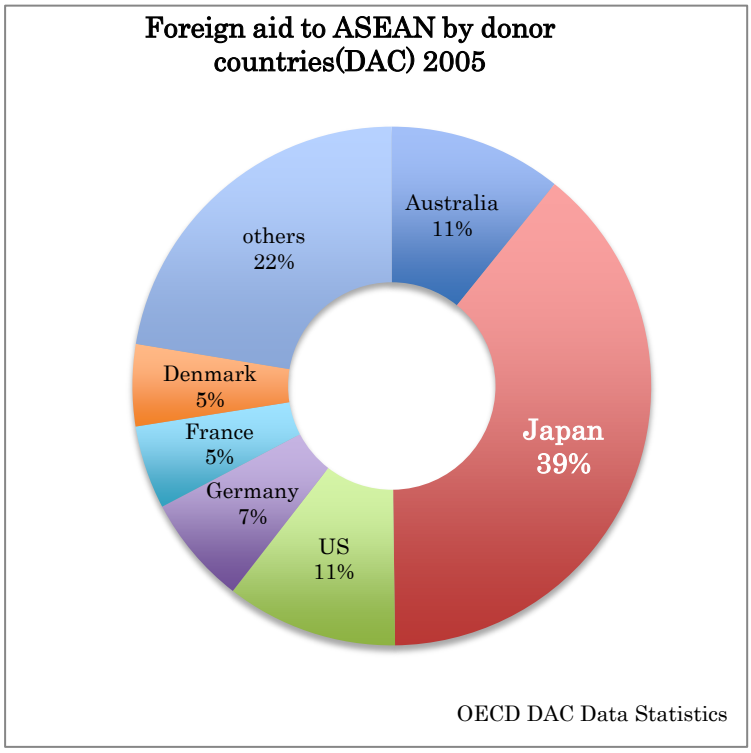
Appendix

Graph 1



Graph2

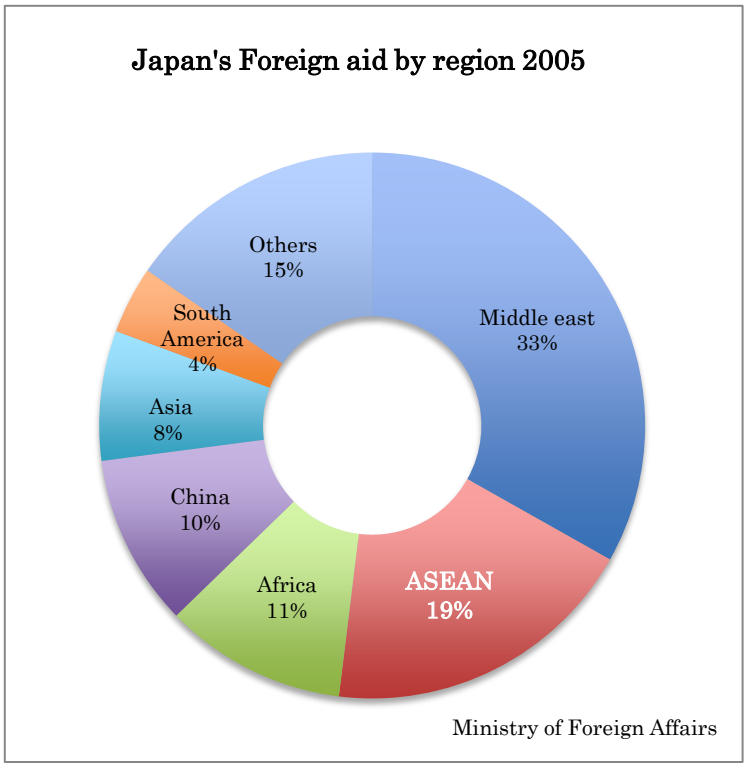

Japan's Foreign aid by region 2005
Others
15%
South
America
4%
Middle east
33%
Asia
8%
China
10%
Africa
11%
ASEAN
19%
Ministry of Foreign Affairs

Table 1

Dependent Variable and Independent Variables

y:FDI inflow from Japan
x1:Aid Total All Sectors
x2:Aid Total Sector Allocable
x3:Aid Social Infrastructure and Services
x4:Aid Economic Infrastructure and Services
x5:Aid Production Sector
x6:GDP per Capita
x7:Political Stability and Absence of Violence
x8:Government Effectiveness

Table 2

Results of Indonesia (R Square and Adjusted R Square)

Indonesia										
Time lag not considered, missing data replenished										
Independent Variables	x1,x6,x7	x2,x6,x7	x3,x6,x7	x4,x6,x7	x5,x6,x7	x1,x6,x8	x2,x6,x8	x3,x6,x8	x4,x6,x8	x5,x6,x8
R Square	0.40514	0.40479	0.40985	0.40739	0.48133	0.36259	0.29042	0.27728	0.31138	0.27841
Adjusted R Square	0.24291	0.24246	0.24889	0.24577	0.33988	0.18876	0.09690	0.08017	0.12357	0.08161
Time lag not considered, missing data not replenished										
Independent Variables	x1,x6,x7	x2,x6,x7	x3,x6,x7	x4,x6,x7	x5,x6,x7	x1,x6,x8	x2,x6,x8	x3,x6,x8	x4,x6,x8	x5,x6,x8
R Square	0.52902	0.56520	0.43177	0.57351	0.42927	0.13552	0.36411	0.23688	0.10337	0.24018
Adjusted R Square	0.32717	0.37885	0.18824	0.39072	0.18467	−0.18866	0.12566	−0.04929	−0.28090	−0.04476
Time lag considered(1 year), missing data replenished										
Independent Variables	x1,x6,x7	x2,x6,x7	x3,x6,x7	x4,x6,x7	x5,x6,x7	x1,x6,x8	x2,x6,x8	x3,x6,x8	x4,x6,x8	x5,x6,x8
R Square	0.32023	0.46068	0.33415	0.57013	0.31748	0.08349	0.23889	0.12980	0.17927	0.16096
Adjusted R Square	0.11630	0.29888	0.13440	0.44117	0.11272	−0.19146	0.01056	−0.13126	−0.06695	−0.09076
Time lag considered(1 year), missing data not replenished										
Independent Variables	x1,x6,x7	x2,x6,x7	x3,x6,x7	x4,x6,x7	x5,x6,x7	x1,x6,x8	x2,x6,x8	x3,x6,x8	x4,x6,x8	x5,x6,x8
R Square	0.28174	0.02436	0.02394	0.13133	0.04376	0.18814	0.20974	0.01527	0.47673	0.00907
Adjusted R Square	−0.07740	−0.46345	−0.46410	−0.30301	−0.43436	−0.15980	−0.12894	−0.40676	0.21509	−0.41562

Table 3

Results of Malaysia (R Square and Adjusted R Square)

Malaysia										
Time lag not considered, missing data replenished										
Independent Variables	x1,x6,x7	x2,x6,x7	x3,x6,x7	x4,x6,x7	x5,x6,x7	x1,x6,x8	x2,x6,x8	x3,x6,x8	x4,x6,x8	x5,x6,x8
R Square	0.08216	0.08214	0.08030	0.08842	0.08038	0.08440	0.08437	0.08225	0.08816	0.08198
Adjusted R Square	−0.16817	−0.16819	−0.17053	−0.16019	−0.17042	−0.16531	−0.16534	−0.16805	−0.16053	−0.16839
Time lag not considered, missing data not replenished										
Independent Variables	x1,x6,x7	x2,x6,x7	x3,x6,x7	x4,x6,x7	x5,x6,x7	x1,x6,x8	x2,x6,x8	x3,x6,x8	x4,x6,x8	x5,x6,x8
R Square	0.05548	0.05535	0.05001	0.06001	0.10375	0.07564	0.07541	0.06128	0.07578	0.15574
Adjusted R Square	−0.41678	−0.41698	−0.42498	−0.40998	−0.34438	−0.38654	−0.38688	−0.40808	−0.38633	−0.26639
Time lag considered(1 year), missing data replenished										
Independent Variables	x1,x6,x7	x2,x6,x7	x3,x6,x7	x4,x6,x7	x5,x6,x7	x1,x6,x8	x2,x6,x8	x3,x6,x8	x4,x6,x8	x5,x6,x8
R Square	0.37052	0.36965	0.61870	0.20503	0.20686	0.18936	0.18880	0.58558	0.08295	0.07079
Adjusted R Square	0.18167	0.18055	0.50431	−0.03346	−0.03109	−0.05384	−0.05456	0.46125	−0.19216	−0.20798
Time lag considered(1 year), missing data not replenished										
Independent Variables	x1,x6,x7	x2,x6,x7	x3,x6,x7	x4,x6,x7	x5,x6,x7	x1,x6,x8	x2,x6,x8	x3,x6,x8	x4,x6,x8	x5,x6,x8
R Square	0.70151	0.70078	0.86340	0.29546	0.19008	0.32118	0.32027	0.79390	0.02774	0.02060
Adjusted R Square	0.52241	0.52125	0.78144	−0.12727	−0.29588	−0.08611	−0.08756	0.67024	−0.55562	−0.56705

Table 4

Results of Philippines (R Square and Adjusted R Square)

Philippines										
Time lag not considered, missing data replenished										
Independent Variables	x1,x6,x7	x2,x6,x7	x3,x6,x7	x4,x6,x7	x5,x6,x7	x1,x6,x8	x2,x6,x8	x3,x6,x8	x4,x6,x8	x5,x6,x8
R Square	0.33977	0.40224	0.25288	0.32442	0.37569	0.35849	0.40270	0.25144	0.35823	0.38865
Adjusted R Square	0.15971	0.23922	0.04912	0.14017	0.20542	0.18353	0.23980	0.04729	0.18320	0.22192
Time lag not considered, missing data not replenished										
Independent Variables	x1,x6,x7	x2,x6,x7	x3,x6,x7	x4,x6,x7	x5,x6,x7	x1,x6,x8	x2,x6,x8	x3,x6,x8	x4,x6,x8	x5,x6,x8
R Square	0.43076	0.49972	0.57493	0.43995	0.65459	0.47034	0.52377	0.57719	0.48542	0.68535
Adjusted R Square	0.21729	0.31211	0.41553	0.22994	0.52506	0.27172	0.34519	0.41864	0.29245	0.56735
Time lag considered(1 year), missing data replenished										
Independent Variables	x1,x6,x7	x2,x6,x7	x3,x6,x7	x4,x6,x7	x5,x6,x7	x1,x6,x8	x2,x6,x8	x3,x6,x8	x4,x6,x8	x5,x6,x8
R Square	0.25021	0.24710	0.26783	0.24680	0.24680	0.26763	0.26238	0.29179	0.25679	0.25571
Adjusted R Square	0.02528	0.02123	0.04818	0.02083	0.02084	0.04792	0.04110	0.07933	0.03383	0.03242
Time lag considered(1 year), missing data not replenished										
Independent Variables	x1,x6,x7	x2,x6,x7	x3,x6,x7	x4,x6,x7	x5,x6,x7	x1,x6,x8	x2,x6,x8	x3,x6,x8	x4,x6,x8	x5,x6,x8
R Square	0.47048	0.44805	0.40535	0.44480	0.46705	0.52186	0.50795	0.46786	0.49069	0.51014
Adjusted R Square	0.24354	0.21150	0.15049	0.20686	0.23864	0.31694	0.29707	0.23980	0.27242	0.30020

Table 5

Results of Thailand (R Square and Adjusted R Square)

Thailand										
Time lag not considered, missing data replenished										
Independent Variables	x1,x6,x7	x2,x6,x7	x3,x6,x7	x4,x6,x7	x5,x6,x7	x1,x6,x8	x2,x6,x8	x3,x6,x8	x4,x6,x8	x5,x6,x8
R Square	0.59419	0.59369	0.59724	0.59761	0.61738	0.59916	0.59935	0.59915	0.60242	0.66719
Adjusted R Square	0.48351	0.48287	0.48739	0.48787	0.51303	0.48984	0.49009	0.48983	0.49398	0.57642
Time lag not considered, missing data not replenished										
Independent Variables	x1,x6,x7	x2,x6,x7	x3,x6,x7	x4,x6,x7	x5,x6,x7	x1,x6,x8	x2,x6,x8	x3,x6,x8	x4,x6,x8	x5,x6,x8
R Square	0.56795	0.56817	0.56298	0.58036	0.61353	0.60624	0.60622	0.60377	0.61792	0.71854
Adjusted R Square	0.38279	0.38309	0.37568	0.40051	0.44789	0.45858	0.45856	0.43396	0.47464	0.59792
Time lag considered(1 year), missing data replenished										
Independent Variables	x1,x6,x7	x2,x6,x7	x3,x6,x7	x4,x6,x7	x5,x6,x7	x1,x6,x8	x2,x6,x8	x3,x6,x8	x4,x6,x8	x5,x6,x8
R Square	0.68272	0.68625	0.67381	0.68986	0.67168	0.73127	0.73413	0.74951	0.70699	0.72961
Adjusted R Square	0.58754	0.59213	0.57595	0.59681	0.57318	0.65066	0.65437	0.67436	0.61909	0.64850
Time lag considered(1 year), missing data not replenished										
Independent Variables	x1,x6,x7	x2,x6,x7	x3,x6,x7	x4,x6,x7	x5,x6,x7	x1,x6,x8	x2,x6,x8	x3,x6,x8	x4,x6,x8	x5,x6,x8
R Square	0.71816	0.71816	0.72357	0.71852	0.71926	0.60426	0.60522	0.68538	0.62937	0.62774
Adjusted R Square	0.57724	0.57724	0.58536	0.57778	0.57890	0.43466	0.43602	0.52807	0.47053	0.44161

Table 6

Results of Vietnam (R Square and Adjusted R Square)

Vietnam										
Time lag not considered, missing data replenished										
Independent Variables	x1,x6,x7	x2,x6,x7	x3,x6,x7	x4,x6,x7	x5,x6,x7	x1,x6,x8	x2,x6,x8	x3,x6,x8	x4,x6,x8	x5,x6,x8
R Square	0.71739	0.71321	0.70064	0.73062	0.76002	0.72207	0.72045	0.71193	0.72966	0.75009
Adjusted R Square	0.64032	0.63499	0.61899	0.65715	0.69457	0.64627	0.64421	0.63336	0.65593	0.68193
Time lag not considered, missing data not replenished										
Independent Variables	x1,x6,x7	x2,x6,x7	x3,x6,x7	x4,x6,x7	x5,x6,x7	x1,x6,x8	x2,x6,x8	x3,x6,x8	x4,x6,x8	x5,x6,x8
R Square	0.74213	0.73460	0.72046	0.74399	0.78968	0.74833	0.74439	0.73527	0.74754	0.78036
Adjusted R Square	0.64543	0.63507	0.61564	0.64798	0.71081	0.65395	0.64854	0.63599	0.65287	0.69800
Time lag considered(1 year), missing data replenished										
Independent Variables	x1,x6,x7	x2,x6,x7	x3,x6,x7	x4,x6,x7	x5,x6,x7	x1,x6,x8	x2,x6,x8	x3,x6,x8	x4,x6,x8	x5,x6,x8
R Square	0.72584	0.71870	0.73848	0.70987	0.73865	0.71976	0.72087	0.74242	0.73479	0.72021
Adjusted R Square	0.64359	0.63431	0.66003	0.62283	0.66024	0.63568	0.63713	0.66515	0.65523	0.63628
Time lag considered(1 year), missing data not replenished										
Independent Variables	x1,x6,x7	x2,x6,x7	x3,x6,x7	x4,x6,x7	x5,x6,x7	x1,x6,x8	x2,x6,x8	x3,x6,x8	x4,x6,x8	x5,x6,x8
R Square	0.73828	0.73303	0.77391	0.71526	0.74464	0.76501	0.76548	0.79536	0.78235	0.76477
Adjusted R Square	0.62612	0.61862	0.67701	0.59324	0.63520	0.66429	0.66497	0.70766	0.68907	0.66396

Table 7

Regression Results of Indonesia

◆results using independent variables x1,x6,x7
No time lag

Regression Statistics	
Multiple R	0.7273374
R Square	0.5290197
Adjusted R Square	0.327171
Standanrd Error	503.52478
Obsevations	11

y:FDI inflow from Japan
x1:Aid Total All Sectors
x2:Aid Total Sector Allocable
x3:Aid Social Infrastructure and Services
x4:Aid Economic Infrastructure and Services
x5:Aid Production Sector
x6:GDP per Capita
x7:Political Stability and Absence of Violence
x8:Government Effectiveness

ANOVA

	df	SS	MS	F	Significance F
Regression	3	1993466.001	664488.7	2.6208724	0.13260784
Residual	7	1774760.446	253537.2		
Total	10	3768226.447			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
intercept	4027.7242	1403.462759	2.869848	0.0239972	709.062113	7346.386
x1	0.2894934	0.234172096	1.236242	0.2562378	-0.2642356	0.843222
x6	-0.883359	0.374176933	-2.36081	0.0502817	-1.7681469	0.001429
x7	1635.55	651.8366751	2.509141	0.0404477	94.2011421	3176.899

◆results using independent variables x2,x6,x7
No time lag

Regression Statistics	
Multiple R	0.7517961
R Square	0.5651974
Adjusted R Square	0.3788535
Standanrd Error	483.79962
Obsevations	11

y:FDI inflow from Japan
x1:Aid Total All Sectors
x2:Aid Total Sector Allocable
x3:Aid Social Infrastructure and Services
x4:Aid Economic Infrastructure and Services
x5:Aid Production Sector
x6:GDP per Capita
x7:Political Stability and Absence of Violence
x8:Government Effectiveness

ANOVA

	df	SS	MS	F	Significance F
Regression	3	2129791.909	709930.6	3.033087	0.10249666
Residual	7	1638434.537	234062.1		
Total	10	3768226.447			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
intercept	2907.7701	1618.260506	1.796849	0.1154154	-918.80797	6734.348
x2	0.7046179	0.471014406	1.495958	0.1783218	-0.4091542	1.81839
x6	-0.738958	0.378541108	-1.95212	0.0918801	-1.6340654	0.15615
x7	1215.1761	625.6272257	1.942332	0.0932143	-264.19724	2694.549

◆results using independent variables x3,x6,x7
No time lag

Regression Statistics	
Multiple R	0.6570897
R Square	0.4317669
Adjusted R Square	0.1882384
Standanrd Error	553.07336
Obsevations	11

y:FDI inflow from Japan
x1:Aid Total All Sectors
x2:Aid Total Sector Allocable
x3:Aid Social Infrastructure and Services
x4:Aid Economic Infrastructure and Services
x5:Aid Production Sector
x6:GDP per Capita
x7:Political Stability and Absence of Violence
x8:Government Effectiveness

ANOVA

	df	SS	MS	F	Significance F
Regression	3	1626995.45	542331.8	1.7729627	0.23962415
Residual	7	2141230.997	305890.1		
Total	10	3768226.447			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
intercept	3969.1341	1925.812203	2.061018	0.0782474	-584.6881	8522.956
x3	0.5843958	2.22990738	0.262072	0.8008107	-4.6884972	5.857289
x6	-0.87095	0.453123581	-1.9221	0.0960322	-1.942417	0.200517
x7	1340.1667	790.6483538	1.695022	0.133894	-529.41953	3209.753

◆results using independent variables x4,x6,x7

No time lag

Regression Statistics	
Multiple R	0.7573025
R Square	0.5735071
Adjusted R Square	0.3907245
Standanrd Error	479.15426
Obsevations	11

y:FDI inflow from Japan
x1:Aid Total All Sectors
x2:Aid Total Sector Allocable
x3:Aid Social Infrastructure and Services
x4:Aid Economic Infrastructure and Services
x5:Aid Production Sector
x6:GDP per Capita
x7:Political Stability and Absence of Violence
x8:Government Effectiveness

ANOVA

	df	SS	MS	F	Significance F
Regression	3	2161104.779	720368.3	3.1376453	0.0962782
Residual	7	1607121.667	229588.8		
Total	10	3768226.447			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
intercept	4389.1302	1323.621913	3.316	0.0128353	1259.26168	7518.999
x4	0.7854336	0.505117081	1.554954	0.1639073	−0.4089785	1.979846
x6	−0.973387	0.356389648	−2.73124	0.029286	−1.8161146	−0.13066
x7	1814.0185	648.085172	2.799043	0.0265607	281.540596	3346.496

◆results using independent variables x5,x6,x7

No time lag

Regression Statistics	
Multiple R	0.6551881
R Square	0.4292714
Adjusted R Square	0.1846734
Standanrd Error	554.28649
Obsevations	11

y:FDI inflow from Japan
x1:Aid Total All Sectors
x2:Aid Total Sector Allocable
x3:Aid Social Infrastructure and Services
x4:Aid Economic Infrastructure and Services
x5:Aid Production Sector
x6:GDP per Capita
x7:Political Stability and Absence of Violence
x8:Government Effectiveness

ANOVA

	df	SS	MS	F	Significance F
Regression	3	1617591.865	539197.3	1.7550081	0.24288958
Residual	7	2150634.582	307233.5		
Total	10	3768226.447			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
切片	4616.149	2319.415002	1.990221	0.0868629	−868.39594	10100.69
x5	−0.425106	2.187259546	−0.19436	0.8514177	−5.5971527	4.746941
x6	−1.006411	0.598550996	−1.68141	0.136567	−2.4217589	0.408938
x7	1548.1033	893.3355928	1.732947	0.1267048	−564.29967	3660.506

Table 8

Regression Results of Malaysia

◆results using independent variables x1,x6,x7
1year time lag

Regression Statistics	
Multiple R	0.83756014
R Square	0.70150699
Adjusted R Square	0.52241119
Standanrd Error	599.312932
Obsevations	9

y:FDI inflow from Japan
x1:Aid Total All Sectors
x2:Aid Total Sector Allocable
x3:Aid Social Infrastructure and Services
x4:Aid Economic Infrastructure and Services
x5:Aid Production Sector
x6:GDP per Capita
x7:Political Stability and Absence of Violence
x8:Government Effectiveness

ANOVA

	df	SS	MS	F	Significance F
Regression	3	4220609.29	1E+06	3.9169	0.087891984
Residual	5	1795879.955	359176		
Total	8	6016489.245			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
intercept	-3686.9013	1538.532208	-2.396	0.0619	-7641.824234	268.0217
x1	1.85889335	0.62237888	2.9868	0.0306	0.259017508	3.458769
x6	0.56539334	0.216805979	2.6078	0.0478	0.00807583	1.122711
x7	3187.02081	1262.619367	2.5241	0.0529	-58.64559543	6432.687

◆results using independent variables x2,x6,x7
1year time lag

Regression Statistics	
Multiple R	0.8371267
R Square	0.70078111
Adjusted R Square	0.52124977
Standanrd Error	600.041206
Obsevations	9

y:FDI inflow from Japan
x1:Aid Total All Sectors
x2:Aid Total Sector Allocable
x3:Aid Social Infrastructure and Services
x4:Aid Economic Infrastructure and Services
x5:Aid Production Sector
x6:GDP per Capita
x7:Political Stability and Absence of Violence
x8:Government Effectiveness

ANOVA

	df	SS	MS	F	Significance F
Regression	3	4216242.002	1E+06	3.9034	0.088397733
Residual	5	1800247.242	360049		
Total	8	6016489.245			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
intercept	-3686.8526	1540.772766	-2.393	0.0622	-7647.535103	273.8299
x2	1.85720738	0.622994739	2.9811	0.0308	0.255748421	3.458666
x6	0.56583037	0.217194042	2.6052	0.0479	0.007515315	1.124145
x7	3188.34352	1264.388522	2.5216	0.0531	-61.87064441	6438.558

◆results using independent variables x3,x6,x7
1year time lag

Regression Statistics	
Multiple R	0.92919439
R Square	0.86340222
Adjusted R Square	0.78144355
Standanrd Error	405.42301
Obsevations	9

y:FDI inflow from Japan
x1:Aid Total All Sectors
x2:Aid Total Sector Allocable
x3:Aid Social Infrastructure and Services
x4:Aid Economic Infrastructure and Services
x5:Aid Production Sector
x6:GDP per Capita
x7:Political Stability and Absence of Violence
x8:Government Effectiveness

ANOVA

	df	SS	MS	F	Significance F
Regression	3	5194650.161	2E+06	10.535	0.013344129
Residual	5	821839.0832	164368		
Total	8	6016489.245			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
intercept	-2078.9485	862.2905297	-2.411	0.0608	-4295.536887	137.6399
x3	2.90642939	0.576469643	5.0418	0.004	1.424566999	4.388292
x6	0.35985418	0.12626485	2.85	0.0358	0.03528005	0.684428
x7	1384.23771	816.0905316	1.6962	0.1506	-713.5897894	3482.065

◆results using independent variables x4,x6,x7
1year time lag

Regression Statistics	
Multiple R	0.54355848
R Square	0.29545582
Adjusted R Square	−0.1272707
Standanrd Error	920.747794
Obsevations	9

y:FDI inflow from Japan
x1:Aid Total All Sectors
x2:Aid Total Sector Allocable
x3:Aid Social Infrastructure and Services
x4:Aid Economic Infrastructure and Services
x5:Aid Production Sector
x6:GDP per Capita
x7:Political Stability and Absence of Violence
x8:Government Effectiveness

ANOVA

	df	SS	MS	F	Significance F
Regression	3	1777606.741	592536	0.6989	0.591743891
Residual	5	4238882.503	847777		
Total	8	6016489.245			

	Coefficients	Standard Error	t Stat	P−value	Lower 95%	Upper 95%
intercept	−3808.278	3584.465852	−1.062	0.3366	−13022.44079	5405.885
x4	2.629743	2.775446288	0.9475	0.3869	−4.504768812	9.764255
x6	0.58501087	0.483156057	1.2108	0.2801	−0.656981315	1.827003
x7	4249.03315	3030.515985	1.4021	0.2198	−3541.156197	12039.22

◆results using independent variables x5,x6,x7
1year time lag

Regression Statistics	
Multiple R	0.43597683
R Square	0.1900758
Adjusted R Square	−0.2958787
Standanrd Error	987.208209
Obsevations	9

y:FDI inflow from Japan
x1:Aid Total All Sectors
x2:Aid Total Sector Allocable
x3:Aid Social Infrastructure and Services
x4:Aid Economic Infrastructure and Services
x5:Aid Production Sector
x6:GDP per Capita
x7:Political Stability and Absence of Violence
x8:Government Effectiveness

ANOVA

	df	SS	MS	F	Significance F
Regression	3	1143589.004	381196	0.3911	0.765091608
Residual	5	4872900.241	974580		
Total	8	6016489.245			

	Coefficients	Standard Error	t Stat	P−value	Lower 95%	Upper 95%
切片	−1128.7086	2103.953953	−0.536	0.6146	−6537.094383	4279.677
x5	−28.896848	80.02301685	−0.361	0.7328	−234.6025614	176.8089
x6	0.27415194	0.346149067	0.792	0.4643	−0.61565256	1.163956
x7	2193.28182	2067.475696	1.0609	0.3373	−3121.333652	7507.897

Table 9

Regression Results of Philippines

◆results using independent variables x1,x6,x8
no time lag

Regression Statistics	
Multiple R	0.6858152
R Square	0.4703425
Adjusted R Square	0.2717209
Standanrd Error	206.5072
Obsevations	12

y:FDI inflow from Japan
x1:Aid Total All Sectors
x2:Aid Total Sector Allocable
x3:Aid Social Infrastructure and Services
x4:Aid Economic Infrastructure and Services
x5:Aid Production Sector
x6:GDP per Capita
x7:Political Stability and Absence of Violence
x8:Government Effectiveness

ANOVA

	df	SS	MS	F	Significance F
Regression	3	302955.938	100985.3	2.368033	0.14663634
Residual	8	341161.786	42645.22		
Total	11	644117.724			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
intercept	10.756633	263.152575	0.040876	0.968396	-596.07429	617.58756
x1	0.1501792	0.20589828	0.729386	0.486569	-0.324623	0.6249815
x6	0.3524646	0.15502553	2.27359	0.052595	-0.005025	0.7099541
x7	607.41129	763.038526	0.796043	0.448982	-1152.1587	2366.9813

◆results using independent variables x2,x6,x8
no time lag

Regression Statistics	
Multiple R	0.7237225
R Square	0.5237743
Adjusted R Square	0.3451897
Standanrd Error	195.81413
Obsevations	12

y:FDI inflow from Japan
x1:Aid Total All Sectors
x2:Aid Total Sector Allocable
x3:Aid Social Infrastructure and Services
x4:Aid Economic Infrastructure and Services
x5:Aid Production Sector
x6:GDP per Capita
x7:Political Stability and Absence of Violence
x8:Government Effectiveness

ANOVA

	df	SS	MS	F	Significance F
Regression	3	337372.325	112457.4	2.932919	0.09940079
Residual	8	306745.399	38343.17		
Total	11	644117.724			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
intercept	-118.4122	284.332856	-0.41646	0.688025	-774.08498	537.26051
x2	0.2579871	0.21140223	1.220361	0.257077	-0.2295073	0.7454815
x6	0.4156638	0.15861412	2.620598	0.030622	0.04989898	0.7814286
x7	487.35268	731.150763	0.666556	0.52381	-1198.684	2173.3894

◆results using independent variables x3,x6,x8
no time lag

Regression Statistics	
Multiple R	0.7597322
R Square	0.5771931
Adjusted R Square	0.4186405
Standanrd Error	184.50523
Obsevations	12

y:FDI inflow from Japan
x1:Aid Total All Sectors
x2:Aid Total Sector Allocable
x3:Aid Social Infrastructure and Services
x4:Aid Economic Infrastructure and Services
x5:Aid Production Sector
x6:GDP per Capita
x7:Political Stability and Absence of Violence
x8:Government Effectiveness

ANOVA

	df	SS	MS	F	Significance F
Regression	3	371780.286	123926.8	3.640389	0.06389282
Residual	8	272337.439	34042.18		
Total	11	644117.724			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
intercept	378.93938	274.5356	1.380292	0.204836	-254.14085	1012.0196
x3	-4.343193	2.64898397	-1.63957	0.139726	-10.451761	1.7653755
x6	0.2676093	0.14473656	1.848941	0.101642	-0.0661538	0.6013724
x7	814.07665	692.195063	1.17608	0.273372	-782.12803	2410.2813

◆results using independent variables x4,x6,x8
no time lag

Regression Statistics	
Multiple R	0.6967199
R Square	0.4854187
Adjusted R Square	0.2924507
Standanrd Error	203.54697
Obsevations	12

y:FDI inflow from Japan
x1:Aid Total All Sectors
x2:Aid Total Sector Allocable
x3:Aid Social Infrastructure and Services
x4:Aid Economic Infrastructure and Services
x5:Aid Production Sector
x6:GDP per Capita
x7:Political Stability and Absence of Violence
x8:Government Effectiveness

ANOVA

	df	SS	MS	F	Significance F
Regression	3	312666.766	104222.3	2.51554	0.13203283
Residual	8	331450.958	41431.37		
Total	11	644117.724			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
intercept	-60.90669	291.981192	-0.2086	0.839975	-734.21653	612.40314
x4	0.2414766	0.27307314	0.884293	0.402332	-0.3882312	0.8711843
x6	0.4149612	0.17370632	2.388867	0.043933	0.01439373	0.8155287
x7	647.02052	752.776844	0.859512	0.41507	-1088.886	2382.927

◆results using independent variables x5,x6,x8
no time lag

Regression Statistics	
Multiple R	0.8278568
R Square	0.6853468
Adjusted R Square	0.5673519
Standanrd Error	159.16725
Obsevations	12

y:FDI inflow from Japan
x1:Aid Total All Sectors
x2:Aid Total Sector Allocable
x3:Aid Social Infrastructure and Services
x4:Aid Economic Infrastructure and Services
x5:Aid Production Sector
x6:GDP per Capita
x7:Political Stability and Absence of Violence
x8:Government Effectiveness

ANOVA

	df	SS	MS	F	Significance F
Regression	3	441444.022	147148	5.808272	0.02085511
Residual	8	202673.703	25334.21		
Total	11	644117.724			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
切片	-70.20323	194.221131	-0.36146	0.727116	-518.07796	377.6715
x5	2.0218498	0.80159149	2.522294	0.035681	0.17337649	3.8703231
x6	0.3569074	0.11899685	2.999302	0.01709	0.08250022	0.6313147
x7	537.81003	588.867991	0.913295	0.387783	-820.12199	1895.7421

Table 10

Regression Results of Thailand

◆results using independent variables x1,x6,x8
1year time lag

Regression Statistics	
Multiple R	0.8551452
R Square	0.7312733
Adjusted R Square	0.6506553
Standanrd Error	399.88174
Obsevations	14

y:FDI inflow from Japan
x1:Aid Total All Sectors
x2:Aid Total Sector Allocable
x3:Aid Social Infrastructure and Services
x4:Aid Economic Infrastructure and Services
x5:Aid Production Sector
x6:GDP per Capita
x7:Political Stability and Absence of Violence
x8:Government Effectiveness

ANOVA

	df	SS	MS	F	Significance F
Regression	3	4351430.412	1450477	9.070843	0.00334095
Residual	10	1599054.03	159905.4		
Total	13	5950484.443			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
intercept	−1343.149	665.2002994	−2.01917	0.071079	−2825.3078	139.0095
x1	0.4499047	0.343240995	1.310755	0.219243	−0.3148839	1.214693
x6	0.5940853	0.148193834	4.008839	0.002483	0.26388881	0.924282
x7	3725.9543	1554.023125	2.397618	0.037468	263.374968	7188.534

◆results using independent variables x2,x6,x8
1year time lag

Regression Statistics	
Multiple R	0.8568144
R Square	0.7341309
Adjusted R Square	0.6543702
Standanrd Error	397.74992
Obsevations	14

y:FDI inflow from Japan
x1:Aid Total All Sectors
x2:Aid Total Sector Allocable
x3:Aid Social Infrastructure and Services
x4:Aid Economic Infrastructure and Services
x5:Aid Production Sector
x6:GDP per Capita
x7:Political Stability and Absence of Violence
x8:Government Effectiveness

ANOVA

	df	SS	MS	F	Significance F
Regression	3	4368434.45	1456145	9.204164	0.00317193
Residual	10	1582049.992	158205		
Total	13	5950484.443			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
intercept	−1373.595	667.5425157	−2.05769	0.066645	−2860.9728	113.782
x2	0.5149047	0.379178367	1.357949	0.204328	−0.3299573	1.359767
x6	0.5855042	0.147651129	3.965457	0.002663	0.25651697	0.914491
x7	3822.4109	1573.354184	2.429466	0.035483	316.759266	7328.062

◆results using independent variables x3,x6,x8
1year time lag

Regression Statistics	
Multiple R	0.8657399
R Square	0.7495056
Adjusted R Square	0.6743572
Standanrd Error	386.07814
Obsevations	14

y:FDI inflow from Japan
x1:Aid Total All Sectors
x2:Aid Total Sector Allocable
x3:Aid Social Infrastructure and Services
x4:Aid Economic Infrastructure and Services
x5:Aid Production Sector
x6:GDP per Capita
x7:Political Stability and Absence of Violence
x8:Government Effectiveness

ANOVA

	df	SS	MS	F	Significance F
Regression	3	4459921.13	1486640	9.973682	0.00237431
Residual	10	1490563.313	149056.3		
Total	13	5950484.443			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
intercept	−1321.382	581.0357114	−2.27418	0.046241	−2616.0101	−26.7536
x3	4.5674531	2.84855689	1.603427	0.139922	−1.7795272	10.91443
x6	0.6453498	0.146110077	4.416874	0.0013	0.31979629	0.970903
x7	3326.7811	1242.256468	2.678015	0.023172	558.861188	6094.701

◆results using independent variables x4,x6,x8
1year time lag

Regression Statistics	
Multiple R	0.8408267
R Square	0.7069896
Adjusted R Square	0.6190865
Standanrd Error	417.55882
Obsevations	14

y:FDI inflow from Japan
x1:Aid Total All Sectors
x2:Aid Total Sector Allocable
x3:Aid Social Infrastructure and Services
x4:Aid Economic Infrastructure and Services
x5:Aid Production Sector
x6:GDP per Capita
x7:Political Stability and Absence of Violence
x8:Government Effectiveness

ANOVA

	df	SS	MS	F	Significance F
Regression	3	4206930.749	1402310	8.042828	0.00508114
Residual	10	1743553.693	174355.4		
Total	13	5950484.443			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
intercept	-1009.61	590.2066095	-1.7106	0.117942	-2324.6725	305.4521
x4	0.3776254	0.436941247	0.864248	0.407704	-0.5959403	1.351191
x6	0.5702114	0.157949746	3.610081	0.004767	0.21827745	0.922145
x7	3081.6537	1471.943564	2.093595	0.062749	-198.04092	6361.348

◆results using independent variables x5,x6,x8
1year time lag

Regression Statistics	
Multiple R	0.8541741
R Square	0.7296133
Adjusted R Square	0.6484974
Standanrd Error	401.11489
Obsevations	14

y:FDI inflow from Japan
x1:Aid Total All Sectors
x2:Aid Total Sector Allocable
x3:Aid Social Infrastructure and Services
x4:Aid Economic Infrastructure and Services
x5:Aid Production Sector
x6:GDP per Capita
x7:Political Stability and Absence of Violence
x8:Government Effectiveness

ANOVA

	df	SS	MS	F	Significance F
Regression	3	4341552.887	1447184	8.994691	0.00344233
Residual	10	1608931.556	160893.2		
Total	13	5950484.443			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
切片	-1375.368	693.0092131	-1.98463	0.07529	-2919.4888	168.7527
x5	1.9960897	1.555775519	1.283019	0.228423	-1.4703942	5.462574
x6	0.6748358	0.160329661	4.209051	0.001803	0.31759901	1.032073
x7	3532.5505	1469.209758	2.404388	0.037037	258.947164	6806.154

Table 11

OMS Results of Vietnam

◆results using independent variables x1,x6,x8
1year time lag

Regression Statistics	
Multiple R	0.874646
R Square	0.765006
Adjusted R Square	0.664294
Standanrd Error	202.905
Obsevations	11

y:FDI inflow from Japan
x1:Aid Total All Sectors
x2:Aid Total Sector Allocable
x3:Aid Social Infrastructure and Services
x4:Aid Economic Infrastructure and Services
x5:Aid Production Sector
x6:GDP per Capita
x7:Political Stability and Absence of Violence
x8:Government Effectiveness

ANOVA

	df	SS	MS	F	Significance F
Regression	3	938189.0793	312729.7	7.595978	0.01323601
Residual	7	288193.0219	41170.43		
Total	10	1226382.101			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
intercept	387.2997	533.1345906	0.726458	0.49113	-873.36328	1647.96269
x1	0.038744	0.273401859	0.14171	0.891302	-0.607749	0.68523633
x6	0.553102	0.647337911	0.854425	0.421145	-0.9776089	2.08381292
x7	1315.346	997.3862007	1.318793	0.228744	-1043.0978	3673.78937

◆results using independent variables x2,x6,x8
1year time lag

Regression Statistics	
Multiple R	0.874917
R Square	0.765479
Adjusted R Square	0.66497
Standanrd Error	202.7004
Obsevations	11

y:FDI inflow from Japan
x1:Aid Total All Sectors
x2:Aid Total Sector Allocable
x3:Aid Social Infrastructure and Services
x4:Aid Economic Infrastructure and Services
x5:Aid Production Sector
x6:GDP per Capita
x7:Political Stability and Absence of Violence
x8:Government Effectiveness

ANOVA

	df	SS	MS	F	Significance F
Regression	3	938770.0096	312923.3	7.616034	0.01314585
Residual	7	287612.0916	41087.44		
Total	10	1226382.101			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
intercept	376.1194	470.8285582	0.798846	0.450629	-737.21327	1489.45199
x2	0.088544	0.478366121	0.185097	0.858401	-1.0426118	1.21970045
x6	0.518953	0.695060823	0.74663	0.479607	-1.1246046	2.16251076
x7	1341.796	990.7607646	1.354309	0.217726	-1000.9809	3684.57297

◆results using independent variables x3,x6,x8
1year time lag

Regression Statistics	
Multiple R	0.891832
R Square	0.795365
Adjusted R Square	0.707664
Standanrd Error	189.3452
Obsevations	11

y:FDI inflow from Japan
x1:Aid Total All Sectors
x2:Aid Total Sector Allocable
x3:Aid Social Infrastructure and Services
x4:Aid Economic Infrastructure and Services
x5:Aid Production Sector
x6:GDP per Capita
x7:Political Stability and Absence of Violence
x8:Government Effectiveness

ANOVA

	df	SS	MS	F	Significance F
Regression	3	975420.8063	325140.3	9.069055	0.00827395
Residual	7	250961.2948	35851.61		
Total	10	1226382.101			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
intercept	-10.4661	535.2966322	-0.01955	0.984946	-1276.2415	1255.30932
x3	-0.71416	0.693143247	-1.03032	0.337139	-2.3531816	0.92486509
x6	1.135202	0.584355222	1.942658	0.09317	-0.2465782	2.5169829
x7	745.573	845.0168443	0.882317	0.406882	-1252.5743	2743.72034

◆results using independent variables x4,x6,x8
1year time lag

Regression Statistics	
Multiple R	0.884503
R Square	0.782346
Adjusted R Square	0.689066
Standanrd Error	195.2752
Obsevations	11

y:FDI inflow from Japan
x1:Aid Total All Sectors
x2:Aid Total Sector Allocable
x3:Aid Social Infrastructure and Services
x4:Aid Economic Infrastructure and Services
x5:Aid Production Sector
x6:GDP per Capita
x7:Political Stability and Absence of Violence
x8:Government Effectiveness

ANOVA

	df	SS	MS	F	Significance F
Regression	3	959455.2033	319818.4	8.387048	0.01020507
Residual	7	266926.8979	38132.41		
Total	10	1226382.101			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
intercept	273.5366	432.7151467	0.63214	0.547378	-749.67217	1296.74529
x4	0.49973	0.65653213	0.761166	0.471417	-1.0527221	2.05218145
x6	0.427887	0.423838042	1.009553	0.346325	-0.5743306	1.43010481
x7	1571.656	860.3607299	1.826741	0.110472	-462.77335	3606.08634

◆results using independent variables x5,x6,x8
1year time lag

Regression Statistics	
Multiple R	0.874513
R Square	0.764774
Adjusted R Square	0.663962
Standanrd Error	203.0051
Obsevations	11

y:FDI inflow from Japan
x1:Aid Total All Sectors
x2:Aid Total Sector Allocable
x3:Aid Social Infrastructure and Services
x4:Aid Economic Infrastructure and Services
x5:Aid Production Sector
x6:GDP per Capita
x7:Political Stability and Absence of Violence
x8:Government Effectiveness

ANOVA

	df	SS	MS	F	Significance F
Regression	3	937904.5608	312634.9	7.586185	0.01328033
Residual	7	288477.5404	41211.08		
Total	10	1226382.101			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
切片	316.3438	502.9969124	0.628918	0.549367	-873.0549	1505.74249
x5	-0.16379	1.42789073	-0.11471	0.911898	-3.5402152	3.21263493
x6	0.668188	0.471668072	1.416648	0.199515	-0.44713	1.78350555
x7	1187.086	820.6344006	1.446546	0.191273	-753.40643	3127.57758