Does Korea Follow Japan in Foreign Aid? Relationships between Aid and Foreign Investment

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Abstract

Korea, an emerging donor country, highly considers its economic relations to recipients when allocating its aid. Such practices were preceded by Japan before the 1990s. We expect those similar practices between the two countries will make resemblance in aid outcomes. On a macro level we show similarities in aid allocations by type, region, income, and sector. The similarities are ascertained also at a micro level by our statistical analysis on the relationships between aid and FDI. The analysis based on FDI gravity model and panel dynamic system GMM estimation shows that only aids from Korea and Japan create more inflow of FDI to their recipient developing countries. Those contrast with other donors' aids which are not related to FDI or substitute for FDI.

Keywords: foreign aid, foreign direct investment (FDI), aid allocation, aid typology, Korea, Japan
JEL Categories: F35, F21, O19

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1. Introduction

Now, Korea is one of foreign aid donors, though it is not yet a member of the Development Assistance Committee (DAC) of the OECD. Korea's giving of official development assistance (ODA) started in 1987 with the establishment of the Economic Development Cooperation Fund (EDCF), which aimed at providing concessional loans to developing countries. Later, with the introduction of the organization for technical cooperation, the Korea International Cooperation Agency (KOICA) in 1991, the framework for foreign aid was built up in Korea. In 2006 Korea's total foreign aid amounted to US$513 million, which was approximately ten times as large as in 1991. Compared to the aid from DAC members, the size of Korea's aid is still small. Korean government, however, plans to increase its size progressively and become a member of the DAC in 2012.

Under the circumstances, which direction or what goals Korea's aid should go for has been much discussed and, nevertheless, its direction or goal has not been determined yet. The Ministry of Foreign Affairs and Trade and NGOs insist that presently, Korea's foreign aid is biased toward the pursuit of national economic interests and, therefore, the humanitarian elements should be strengthened. On the other hand, the Ministry of Finance and Economy and enterprises insist that the foreign aid continues to be helpful to exports and foreign investment by Korean enterprises.

The foreign aid intrinsically has two sides: the international practices of humanitarianism on one hand, and the means of pursuing national interests on the other hand. Such a dispute, therefore, can be seen not only in Korea, but in most donor countries. Only the outcome of how both sides are mixed varies across the donors, which is determined by their own economic, social, and historical backgrounds. The foreign aid by DAC members can be classified into types according to their features. Korea's aid also is supposed to find its own shape and finally fall into one of the types.

In many respects, Korea's foreign aid until now shows a strong similarity to Japan's aid in the past. This may be revealed by the allocation of aid funds from the two countries, which will be shown in section 2. Previously, Japan's aid, in particular before the 1990s,

was characterized by the strong ties with its external economic relations such as foreign trade and investment, which used to cause some criticism from international society.

This paper was initiated from the question of whether Korea's foreign aid will follow Japan's previous path. First, we will review the similarity in aid fund allocations between Korea in the 2000s and Japan in the 1980s using basic statistics. Furthermore, we will focus on the relationships between ODA and FDI and whether there is any similarity between the two countries' aid in respect to their relationships. In case a donor allocates its aid money across developing countries considering its external economic relations, its ODA can be expected to have some relationship to its FDI. Therefore, we can expect that some relationships between ODA and FDI will be found in the cases of Japan and Korea because it is usually believed that Japan's aid was allocated with consideration to its economic ties with the recipients, and Korea also seems to copy Japan's experience.

2. Basic comparison between Korea's and Japan's foreign aid

2.1. Aid allocation

The total amount of Korea's foreign aid has increased gradually for the last 17 years and reached US$513 million in 2006, which is shown in Figure 1. This is larger than aid of Portugal or Greece, and is a little less than aid of Finland. The share of ODA in GNI also was as low as 0.02% in 1990, but increased to hover around 0.06% in the 2000s. This level, however, is still much lower compared with most of the DAC members. The share of DAC members, on average, in 2006 was 0.31%, which was about five times as high as that of Korea.

In 2006 Japan provided foreign aid of $11.2 billion on a net disbursement basis. This size accounted for 0.25% of its GNI. Japan was the third largest donor in the world following the United States and the United Kingdom. The size of Korea's foreign aid is very tiny in terms of total amount or the share in GNI compared with that of Japan. Its total amount is only about one-twentieth, and its share in GNI is about one-fourth of Japan's aid.

Despite a big difference in their sizes, Korea's aid allocation shows a lot of similarities to Japan's to a surprising extent. In particular, Korea's allocation is closer to that of Japan in the second half of the 1980s than now. Table 1 shows the basic picture of aid fund allocations in Korea and Japan. The recent allocation in Korea are compared to those of two periods in Japan, the second half of 1980s and the latest years. The second half of 1980s is selected because Japan's national income per capita during that period was at a similar level to the present one of Korea in nominal value, approximately US$20,000. In 1988 Japan's national income per capita reached more than US$20,000 for the first time. In order to avoid the problem of annual volatility in aid allocation, we used five-year averages in every case.

We can easily find out some similarities between Korea and Japan in aid fund allocation. First, Japan's aid is characterized by a large share of loans in bilateral aid in the past and now. Korea's aid also shows the same features, which is shown in the share of loans, 41%. Though its share is not as high as the 63% of Japan in the late 1980s, it is much higher than the average of DAC members, 14%. In addition, if we look at the period of 1998–2001 instead of the latest year when a large amount of Korea's aid temporarily went to Afghanistan and Iraq for war recovery, Korea's share of loans goes up to 69%, which is slightly higher than Japan's share in the late 1980s. In the regional distribution, the two countries show similarities in the high concentration in the Asian region. The 76% of Korea's bilateral aid was provided to developing Asian countries, and similarly, 67% of Japan's aid was given to Asia in the late 1980s. Contrastingly, the shares of aid to Africa by Korea and Japan are as low as 8% and 10% respectively, compared to the DAC average of 29%.

In terms of aid recipients by income we can see a similarity between Korea's and Japan's aid. Korea's aid is characterized by the high ratio of the aid to the middle income countries. In the period 2002–2006 Korea provided 52% of its bilateral aid to the lower-middle-income countries, which contrasts with 30% of the DAC average. When we reasonably expect that the unallocated income countries are likely to fall into lower income groups, its share of aid to three lower income groups including LDCs, other LICs, and the unallocated income countries is 21% points lower than the DAC average. Therefore, Korea's aid allocation by recipients' income is preceded by that of Japan. The

recipient by income in Table 1 shows how close Korea's distribution is to that of Japan in the late 1980s.

In the allocation by sector, Korea seems to be much different from Japan and instead closer to the DAC average. One of traditional features of Japanese aid distinct from other DAC members' is its emphasis on economic infrastructure in the recipient countries. In the late 1980s, more than half of its bilateral aid was allocated in the economic infrastructure sector, and also, in the most recent five years, 45% of its aid went to the same sector. During the most recent five years, Korea showed much different proportions from those of Japan. The economic infrastructure sector accounted for only 29%, whereas about two-thirds of its aid went to the social infrastructure sector. Such a partition, however, is an unusual and temporary outcome which arises from a sharp increase in urgent war relief aid to Afghanistan and Iraq after 2002. During the five years before 2002, the economic infrastructure accounted for 46%, which was instead higher than its social infrastructure share and was as high as Japan's economic infrastructure share.

Finally, in terms of aid-tying, Korea's aid is much different from Japan's. Most of Korea's bilateral aid of the most recent five years, 97% was provided with the condition of tying, which is in sharp contrast to other donors' practices of aid untying. Only 8% of Japanese aid was given with the condition of tying during the last five years. The proportion of tied aid in Japan's aid had been higher than the DAC average until 1981, but after the peak of 74% in 1980, its proportion sharply declined to 32% on average in the late 1980s. Korea's common practice of aid tying seems to be very unusual, even with the comparison to the Japan's past.

In summary, except for size and aid tying, Korea's aid has a close similarity to Japan's aid of the late 1980s in many respects such as aid allocation by type, sector, region, and income. The similarities between the two countries' aid include a high proportion of loans, the regional concentration in Asia, a high share of aid to the middle-income countries, and the emphasis on the economic infrastructure sector.

2.2. Aid typology

The similarity in aid allocations between Korea and Japan implies that Korea's aid practice, in general, will possibly follow Japan's past one. How the aid funds of a certain country are allocated might well reveal the nature or the goals that the country tries to achieve through its aid. Park (2007) tentatively classified 21 DAC donor countries into four groups according to the features of their aid practice. The classification was based on an ample store of previous studies on aid allocations by individual donors (Shraedor, Hook, and Taylor 1998; Alesina and Dollar 2000; Berthelemy and Tichit 2004, etc.).

Their aid practices could be grouped into four types: humanitarianism, ex-colony management, economic relation, and national security. Donors of the humanitarianism type give relatively significant consideration to the necessity of the recipients in allocating their aid. All the Scandinavian countries are included in this group. These countries have in common a strong tradition of social democracy. The countries of the ex-colony management type provide their foreign aid with the aim of maintaining the political and economic relationships with its recipients, mostly former colonies. France, Belgium, Australia, Portugal, and the UK fall under this category. They allocated more than half of their total aid to the countries that were their former colonies. The aid of the economic-relation type is one in which aid allocations are deeply related to economic ties between a donor and its recipients. Donors of this type tend to provide most of their aid to poor countries to which they have strong ties in terms of trade or overseas investment. Japan, Austria, Italy, Spain, New Zealand, and Canada are classified as this group. These donors are characterized as middle powers in international politics and are relatively new donors, with the exception of Japan. Finally, the foreign aid of the US can be defined as national-security-type aid. As for the US, the containment of communism, peace in the Middle East, and anti-terrorism have been primary goals of its foreign aid policy.

On the basis of the observation that until now Korea has shown a resemblance of past Japan in aid allocations, it is a most feasible prediction that Korea's will go close to the economic relation type to which Japan belongs. We, therefore, can expect to find features in common between Korea and Japan in aspects other than aid allocations.

3. Further Comparison: The Relationship between Aid and Foreign Investment

If we can safely say that both Korea and Japan belong to the same category of economic relation aid and that they highly take into account the economic ties with the recipients, the two countries' aid may have some relationships with their foreign investment unlike aid from other donors. Therefore, beyond the basic comparison in aid, this paper will go further in addressing the question of whether the analogy between the two can be found in the relationship between aid and foreign investment. In particular, we will focus on whether Korea's and Japan's aid draw in foreign direct investment into the recipient developing countries, and whether the effects, if any, can not be found from aid by other donors. If such a phenomenon is discovered, we can suppose that aid of that type is more conducive to investment promotion of the recipients than those of other types.

3.1. Literature Review

The relationships between official flows and private flows have continuously been a concern in development economics. For instance, international financial organizations such as World Bank and IMF have been very interested in whether multinational lending has a catalytic effect or a crowding-out effect on private capital flow. Regarding the issue, some theoretical and empirical studies were suggested and World Bank (2000, p.98) provides a brief survey of those studies.

There are, however, very few studies about the relationships between bilateral aid and private foreign investment. Alesina and Dollar (2000) compare determinants of aid allocation and FDI location choice using pooled country data, and conclude that aid and FDI are determined by different factors. Strategic factors such as political allies and colonial ties play a significant role in aid allocation, while in the location choice of FDI economic factors such as the enforceability of contracts and openness are considered often. Berthelemy and Tichit (2004) deal with the relationships between aid and FDI more directly. They analyze the determinants of aid allocation by donor and don't find a significant relationship between aid and FDI flows in most of the donor countries. In

contrast, trade relations appear to be reflected in aid allocation. Their causality is in the opposite direction of ours, because they investigate whether donors take into account their overseas investment distribution when providing aid.

Returning to our causality direction from official aid to private capital flows, theoretically we can not determine whether aid will catalyze or dampen private foreign investment. On a theoretical basis, it has both effects: aid may raise the productivity of private capital by financing public infrastructure investments, but it may also have an adverse impact by creating rent-seeking opportunities. Selaya and Sunesen (2008) gain the same result, indeterminacy of aid effect on private investment by distinguishing aid for financing complementary inputs and aid for physical capital transfers.

Empirical studies on the effect of aid on foreign investment show confusing outcomes just as they support the theoretical conclusion. Harms and Matthias (2006) find that controlling for countries' institutional environments, higher aid has no effect on private foreign investment. Unexpectedly, however, the effect is strictly positive when investors face a substantial regulatory burden. Selaya and Sunesen (2008) show different outcomes from those of Harms and Matthias (2006). Their results show that aid invested in complementary inputs such as social and economic infrastructure draws in foreign capital, while aid directly invested in physical capital crowds out private foreign investments.

Both of the above empirical studies are based on the analysis of total aid and total private flows of each recipient. Recently, empirical analyses based on more micro-level data are being attempted by using data of donor-recipient pairs instead of the total values of each recipient. Concretely, while the previous study is to check whether total aid to recipient *j* increases total foreign investment flows to recipient *j*, the recent one is to check whether bilateral aid from donor *i* to recipient *j* attracts bilateral investment from *i* to *j*. Using pooled data by pair and the gravity model of bilateral FDI, Mayer (2006) examines the catalyzing effect of bilateral aid to bilateral foreign investment. The outcomes are not very clear and sometimes inconsistent with the theoretical basis. The bilateral aid appears to have a positive, significant impact on bilateral FDI when only the year fixed effect is imposed, but the significance disappears when the country fixed effect is added. If aid is limited to the aid for economic infrastructure, the impact of bilateral aid

loses its significance and, instead, total economic infrastructure aid received is strongly associated with foreign investment.

Kimura and Todo (2007) use a similar methodology but gain different results. The effect of the total stock of foreign aid from all donor countries to country *j* on FDI from county *i* to *j* is positive but insignificant.[1] Also, after separating infrastructure and non-infrastructure aid, the results are the same.[2] To pool the pair data for five donors and control for fixed effects and endogeneity, the results indicate that foreign aid has no significant effect on FDI from the donor country.[3] They go further to investigate the effect by donor separately. Only the positive effect of Japanese aid for infrastructure is robust and significant in their estimation, while aid from other donor countries reveals no such effect. Only in Japanese aid is the so-called vanguard effect found, which arises when foreign aid from a particular donor country promotes FDI from the same country but not from other countries. Kimura and Todo (2007) are in the same line with Blaise (2005), which shows that Japanese aid flows did have a significant positive impact on private investors' location choices in China. Kimura and Todo (2007) show originality by including a donor dummy and its interaction terms in the estimation, which reveals the aid effect on foreign investment varying according to donor.

3.2. Configuration of aid and foreign investment in Korea and Japan

Figure 2 shows the trend of overseas investments from Korea and Japan respectively. It is noticeable that the periods chosen for comparison coincide with a booming period of foreign investment in both countries, the second half of 1980s and the years after 2002 in Japan and Korea, respectively. Also, they were the periods when both countries accumulated large foreign reserves and started to increase their foreign aids significantly. This coincidence seemingly implies some possible relationship between aid and FDI in the two countries.

Table 3 shows the top ten host countries of aid and foreign investment from Korea and Japan. Several developing countries, at the same time, are included in the top

[1] This result is consistent with Harms and Matthias (2006) based on data of total values by recipient.
[2] This result is inconsistent with Selaya and Sunesen (2008) based on data of total values by recipient.
[3] This result is consistent with Mayer (2006) under the condition of the country fixed effect.

recipient groups of both FDI and aid. In 1989, five countries out of Japan's top ten aid recipients were also top-ten host countries for Japan's foreign investment. In 2004 the number reduced to three countries. In the case of Korea as a donor, three developing countries appear in both top ten lists in 2004. It is not obvious whether such overlapping of major receiving countries in FDI and aid indicates a significant relationship between aid and investment. More sophisticated analysis is necessary to certify the relationship.

3.3. Model

In this section, using statistical methods, we will examine whether aid in general has a catalyzing effect on foreign investment and, furthermore, whether aid from Korea or Japan in particular has such an effect as distinguished from aid by other donors. For this estimation, we employ the gravity model of FDI and bilateral country pair data instead of aggregate data of recipients. We choose seven donor countries (the United States, the United Kingdom, the Netherlands, Japan, South Korea, Germany, and France) which are supposed to represent each type of aid according to Table 2. First, in order to check whether the catalyzing effect of aid exists across all donors, we will estimate with pooled country pair data. Then, we will estimate with bilateral data by donor to see whether there are differences in the effect among donors.

We present a formal model to estimate the effect of foreign aid on FDI flows. To provide information on how foreign aid affects FDI, we make use of the knowledge-capital model developed by Markusen (2002). Following the spirit of existing work on the empirics of FDI, we begin with a basic specification. Assume the following FDI determination equation in country *i* in year *t*.

$$f_{it} = \alpha_1 + (\alpha_2 - 1)F_{it-1} + \beta' X_{it} + \eta_i + \omega_t + v_{it}, \qquad (1)$$

where f_{it} is FDI flows into country i in year t, and F_{it-1} represents accumulated stock of FDI flows until year $t-1$, which reflects the accumulation effect. X_{it} represents a vector of other independent variables and α_1, α_2, and β' are the parameters to be estimated. ω_t

is the time-specific effect, as a fixed, unknown constant, which is equivalent to putting time dummies in the regression. η_i reflects country-specific effect and v_{it} is a well-defined stochastic error-term.

Traditional studies on FDI decisions show four main factors: agglomeration effects, institution effects, production cost effects, and market access effects. First, agglomeration effects might be due to positive linkages between projects. One incentive is the spillover effects created by research and development. The second is confidence and the possibility that firms cluster. For example, firms are not sure as to whether a particular country (region) is a good location for FDI and thus take the success of one firm as a signal of underlying national (regional) characteristics. A third incentive arises from the supply of intermediate goods (see Fujita et al., 1999 for a general overview).

Second, most countries have tried to attract FDI via favorable economic policies, which are called institution effects. They include various institutional reforms, the establishment of special economic zones, and construction of new roads. For China, Chen (1996) and Cheng and Kwan (2000) show that special economic zones and infrastructure (road) lead to lower setup costs for new, local establishments in host countries and thus promote FDI.

Third, lower production costs may contribute to attracting multinationals. Switching from direct exports to local production will bring cost savings through lower factor costs, lower transport costs, and no trade barriers. Obviously, local production can save through avoiding transport costs and trade barriers such as tariffs and other non-trade barriers. Furthermore, for example, local production with collaboration with local firms through joint ventures can decrease the costs of dealing with foreign regulations, taxes, and administration. Theoretical modeling based on distinct firms with increasing returns to scale predicts that FDI is more likely to replace exports the larger is the market, because the plant-specific fixed costs may be spread over more units of output as the market size increases.[4] In addition, a significant part of multinational activity tends to take the form

[4] Conventional neoclassical models of MNEs view exports and FDI as substitutes, particularly in the manufacturing sector. In addition, if FDI is directed to industries in which the home country has comparative advantages, then imports and FDI are likely to be positively related. In particular, new products require specific skills and knowledge so that effective maintenance and support can be provided. The home country may also find quality supervision more effective if it directly

of firms shifting a state of their production process to low-cost locations. The economic analysis of this shift is based on the idea that different parts of the production process have different input requirements. For example, it may be profitable to move production of labor-intensive goods to labor-abundant countries, while the headquarter services are left in the home country (Helpman, 1984, 1985; Helpman and Krugman, 1985).

Fourth, there is a market access effect. Larger markets in terms of per capita income will tend to have more local firms, and consequently more intense competition than smaller markets. This will lead to a lower price and will be particularly damaging to the profitability of exporting, tipping a firm's decision in favor of local production (Horstmann and Markusen 1987; Markusen and Venables, 1999).

To shed light on this issue, the choice of control variables is based on the list of determinants on FDI location that are reviewed in related literature. The first group of independent variables is country characteristics. We used the GDP of recipient countries. We expect that FDI flow correlates positively with GDP, consistent with a market-seeking FDI theory. As the second variable, this specification used the difference of per capita GDP between source and recipient countries. We expect its coefficient to be positive in FDI flow, because the factor proportion hypothesis says that firms may decide to relocate the stages of production abroad to take advantage of factor price differences.

The second independent variable is the lagged value of accumulated FDI. This variable reflects agglomeration effects. The third group of independent variables measures perceived costs of exporting to the host country. *DISTij* is the geographic distance between i and j, and *TARi* is the average tariff rate for the country. These control variables reflect trade-off relations between FDI and direct exports. As is clear, switching from direct exports to local production provides cost savings by avoiding transport costs, trade barriers such as tariffs, and non-trade barriers.

The fourth group of independent variables is the institutional environment variable that reflects the institution effect, which plays an important role in attracting FDI. As an institutional environment variable, corruption indices of recipient countries are used.

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controls the network. Hence, whether exports and FDI are substitutes or complements needs to be resolved empirically.

Finally, we used bilateral exports between source and recipient countries as independent variables. According to FDI literature, there are still debates about the relationship between FDI and exports. There are theoretical reasons to suggest both substitution and complementary effects.[5]

3.4. Estimation method

Give equation (1), we employ the Generalized Method of Moments (GMM) framework to estimate the impact of foreign aid on FDI. Since FDI flows f_{it} can be rewritten as $F_{it} - F_{it-1}$, equation (1) can be rewritten as a dynamic panel regression form:

$$\begin{aligned} F_{it} &= \alpha_1 + \alpha_2 F_{it-1} + \beta' X_{it} + u_{it}, \\ u_{it} &= \eta_i + \omega_t + v_{it},\ i = 1,2,...,N, t = 1,2,...,T. \end{aligned} \tag{2}$$

This equation is a dynamic panel regression with a lagged dependent variable on the right-hand side.

It is important to ascertain the serial correlation property of the disturbances in our dynamic model, which is crucial for formulating an appropriate estimation procedure. And, the issue of reverse causality should be addressed. We have to deal with the potential endogeneity issue of both the lagged dependent variable and the explanatory variables arising from the feedback effects of FDI on control variables that are lagged accumulated stock of FDI and other economic and institutional factors in our study. These econometric issues should be properly considered for a model specification and its estimation.

Following Holtz-Eakin et al. (1988), Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998), the above-mentioned econometric issues under a generalized method of moments (GMM) framework are considered.

[5] Lipsey and Weiss (1981), Graham (1996), and Kawai and Urata (1998) find that affiliates' sales positively correlated with exports and foreign production. In particular, Lipsey, Ramstetter, and Blomstrom (2000) using Japanese manufacturing firms find that parent companies' exports from Japan to a foreign region are positively related to production in that region by the affiliates of that parent.

The GMM approach starts with the first-differenced version of equation (2).

$$\Delta F_{it} = \alpha_2 \Delta F_{it-1} + \beta' \Delta X_{it} + \Delta u_{it}, \; i = 1,2,...,N, t = 1,2,...,T, \tag{3}$$

The country-specific effects are eliminated by the difference and Δ represents the first difference of each variable.

Under the assumption of serially uncorrelated level residuals, values of F lagged two periods or more qualify as instruments in the first-differenced system, implying the following moment conditions:

$$E[F_{it-s} \Delta u_{it}] = 0 \quad for \, t = 3,...,T \text{ and } s \geq 2. \tag{4}$$

In addition, we make use of the explanatory variables as additional instruments as follows.

Here, the issue of endogeneity due to reverse causality becomes critical. For strictly exogenous explanatory variables, both past and future ΔX are valid instruments:

$$E[\Delta X_{it-s} \Delta u_{it}] = 0 \quad for \, t = 3,...,T \text{ and all } s. \tag{5}$$

But using conditions (5) for $s < 2$ will lead to inconsistent estimates if reverse causality exists in the sense that $E[X_{is} u_{it}] \neq 0$ for $s \geq t$. Instead, one may assume X to be weakly exogenous, i.e., $E[X_{is} u_{it}] = 0$ for $s < t$, which implies the following subset of conditions (5):

$$E[\Delta X_{it-s} \Delta u_{it}] = 0 \quad t = 3,...,T \text{ and } s \geq 2. \tag{6}$$

Equations (4)–(6) imply a set of linear moment conditions to which the standard GMM methodology applies. The consistency of the GMM estimator hinges on the validity of these moment conditions, which, in turn, depends on maintained hypotheses of the level residuals being serially uncorrelated and the strictly or weakly exogeneity of the explanatory variables. It is therefore essential to ensure that these assumptions are

justified by conducting specification tests (Arellano and Bond, 1991).

It should be noted that the first-differencing operation not only eliminates unobserved country-specific effects, but also time-invariant explanatory variables for which only cross-sectional information is available. In addition, under a random-effect model, the first-differenced GMM estimator can suffer from serious efficiency loss, for there are potentially informative moment conditions that are ignored in the first-difference equation (Blundell and Bond, 1998). Thus, additional moment conditions that make use of information in the level equation (1) can be useful information.

Following Blundell and Bond (1998), we augment the first-differenced moment conditions (4)–(6) by the level moment conditions:

$$E[u_{it}\Delta F_{it-1}] = 0 \quad t = 3,...,T, \tag{7}$$

which amounts to using lagged differences of F as instruments in the level equation (1).

In addition, for strictly exogenous explanatory variables, the appropriate level moment conditions would be

$$E[u_{it}\Delta X_{it-s}] = 0 \quad t = 3,...,T, \text{ and all } s. \tag{8}$$

For weakly exogenous explanatory variables, the level moment conditions are

$$E[u_{it}\Delta X_{it-s}] = 0 \quad t = 3,...,T, \text{ and all } s \geq 1. \tag{9}$$

The dynamic panel system GMM estimator is obtained by imposing both the set of moment conditions (7)–(9) and (4)–(6). By exploiting more moment conditions, the system GMM estimator is more efficient than the first-differenced GMM estimator that uses only a subset (4)–(6).

3.5. Data

Bilateral FDI flows are drawn from UNCTAD, which covers 249 countries from 1968

to 2003. Since the data for foreign aid covers seven donor countries from the limited period from 1980 to 2006, we limit our sample to the period from 1980 to 2003 covering the seven donor countries and twenty-four recipient countries (Appendix Table 1).

The foreign aid data used in this paper are taken from the OECD.dat database. The data contains the bilateral foreign aid funded to each activity. The dataset provides two types of bilateral foreign aid: the total amount of foreign aid and loans. In this paper we used the total amount of foreign aid. The data is available in annual series from 1980 to 2006. Other independent variables are taken from the World Bank: GDP, per capita GDP, exports, and mean tariffs. Distance between two countries is defined as the geographical distance between the capital cities of these countries (kilometers), from Jon Haveman's website.[6]

For institutional environment variables, we use corruption Indices, constructed by the International Country Risk Guide (ICRG). The data set has a feature of a panel structure consisting of 3,816 annual observations clustered by 168 country pair groups from 1980 to 2003. The number of observations varies per year and summary statistics for all of the data used in the estimation are presented in Table 4.

3.6. Estimation results

The estimation results for equation (2) are reported in Table 5. Table 5 presents the estimation results by fixed- and random-effect panel models, and dynamic panel system GMM estimation. Economic variables are shown to be significant independent of the estimation methods, although the size of coefficients is different.

First, accumulated stock of FDI is positively and significantly correlated with current FDI flows, implying positive linkages among projects: spillover effects, cluster confidence, and uses of intermediate goods. Second, the difference of per capita GDP between source and recipient countries is positive in FDI flow. This result supports the factor proportion that multinationals arise to take advantage of international factor-price differences.

[6] http://www.macalester.edu/research/economi cs/PAGE/HAVEMAN.

Third, there is a positive correlation between recipient countries' GDP and FDI at a 1% significance level. This result is very consistent with our expectation. This indicates that FDI flows are more attractive in larger markets, which is consistent with market-seeking FDI. The horizontal FDI states that, given moderate to high trade costs and plant-level as well as firm-level scale economies, multinational activity will occur between similar countries. The fixed costs of two-plant firms are less than double those of a single-plant firm, and therein lies the motive for multinational production.

Fourth, exports show a positive coefficient, although it is not significant. The conventional view of the tradeoff in relation between FDI and exports is not supported empirically. Some companies establish subsidiaries that can produce the same products as their parent company. This production results in lower transport costs that direct exports from the parent country, no tariffs, and the seller can more easily adapt to the host country's tastes, customs, and legal requirements. Thus, establishment might result in lower exports directly from the parent country and thus there is substitution between local production and exports. However, there are several reasons to be complementary (Caves et al., 2002). Graham and Krugman (1993) argue that, for some industries, foreign investment is likely to be complementary to trade. Baldwin (1990) suggests that downstream services are typically associated with the level of export sales from the parent country to the host country. Some of these facilities can be set up by locals, although parent country involvement may be beneficial.

Fifth, the tariff level that reflects the trade barrier shows positive and significant effects. This implies that multinationals tend to invest more in the countries with higher tariff rates because they can avoid trade barriers.

Sixth, the institution environment effect is shown to be negative and significant throughout the whole model specifications. This justifies the view that better institutions, i.e., an environment favorable to foreign multinationals, plays a significant role in promoting FDI.

Finally the foreign aid variables of interest, which are the most important variables throughout this study, present that the coefficient for foreign aid is negatively correlated with bilateral FDI flows. The coefficient, however, is not significant. This indicates that there is no empirical evidence that the more foreign aid to a recipient country creates

higher investment to the country in general.

Considering possible endogeneity of independent variables, column (3) of Table 5 shows the estimation results of the panel system GMM estimation. The foreign aid is still negatively correlated with FDI, but insignificant. This means foreign aid does not play positive roles in attracting FDI, generally in the sense that the data used are pooled for all seven donors. Furthermore, the model specification satisfies specification tests and AR tests.

Some of the findings, so far, suggest that foreign aid does not create FDI. This analysis cannot catch, however, the impact of foreign aid on FDI flows by each of seven donor countries. Therefore, we further investigate whether foreign aid from each of donor countries actually promotes FDI. As discussed in the previous section, we simply guess that there is different impact by each of four types of foreign aid. Based on this assumption, for example, aid of an economic relation type is highly connected with trade or FDI flows.

Estimates for each of seven donor countries are reported in Table 6. Columns (1) and (2) present the estimation results by fixed- and random-effect panel models, while column (3) shows those of the dynamic panel system GMM estimation. The impact of foreign aid on FDI flows shows different results between donor countries. As the estimates in Table 6 indicate, in the random effect panel model, column (2), the foreign aid from Germany and France has significant negative impact on bilateral FDI flows. After controlling endogeneity problems, however, the coefficient of the GMM method for these countries has no significant impact on FDI.

Interestingly, bilateral foreign aid from Japan and South Korea has significant impacts on bilateral FDI flows for all methods. This indicates that foreign aid from Japan and South Korea creates bilateral FDI. In contrast, foreign aid from the Netherlands is negatively and significantly correlated with bilateral FDI for all estimation methods. This means that foreign aid from the Netherlands is likely to be substitute for FDI.

As discussed in the previous section, on a theoretical basis, it is not obvious whether foreign aid increases or reduces countries' attractiveness for foreign investors. The empirical evidence in this paper shows that foreign aid does not promote bilateral FDI in

general. There are different impacts for each donor country according to foreign aid types. Japanese and Korean foreign aid increase bilateral FDI flows, while that from the Netherlands reduces FDI flows.

4. Conclusion

Korea's current foreign aid has shown close similarities to that of Japan in the 1980s. This similarity is very clear in aid fund allocations by type, region, income, and sector. Such similarity is found also in the micro level, the relationship between official aid flows, and private capital flows.

In general, we can't find a positive effect of aid on foreign investment inflow, which is consistent with the previous results. However, our results show that only aid from Korea and Japan is followed by more inflow of foreign investment. The effect is stronger for Korean aid than Japanese aid. In contrast, for the other donors, aid is closer to the substitute for private foreign investment than the complement to it. Aid from the Netherlands belonging to humanitarianism type shows the substitute effects very clearly.

Our results imply that Korean aid practices have already come very close to the economic relation type, which includes Japan, and both countries' aid works as a vanguard for their investors in the developing countries. Now, it is an open question how such a role of aid will be assessed by international society.

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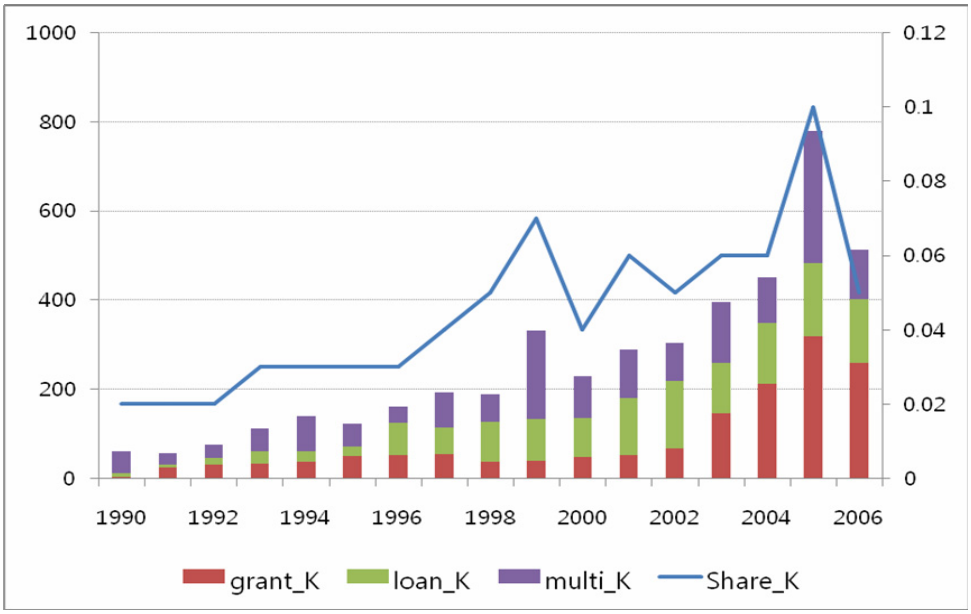
Figure 1. Evolution of Korea's ODA

(unit: mil.US$, %)



Sources: OECD.dat.

Table 1. Comparisons between Korea and Japan in aid allocations

(unit: %)

		Korea	Japan		DAC Average
		2002–2006*	1985–1986	2002–2006	2002–2006
Size					
	Total (US$ mil.)	488	7,892	15,426	4,294
	Share in GNI	0.06	0.3	0.23	0.28
Type					
	Grants	59 (31)	37	53	87
	Loans	41 (69)	63	47	13
By region					
	Europe	4	2	1	4
	Africa	8	16	10	29
	America	5	8	7	9
	Asia	76	67	60	33
	unspecified	7	7	22	25
By income					
	LDCs	24	21	16	26
	other LICs	14	12	19	10
	LMIC	52	53	39	30
	UMICs	3	6	4	3
	unallocated	7	8	22	30
By sector					
	Social Infra	63 (45)	23	36	58
	Economic Infra	29 (46)	51	45	21
	Others	8 (9)	26	19	21
Tying					
	Share of tying	97	32	8	8

*Values in parenthesis indicate the average of the years from 1998 to 2001. These are presented to correct a shock arising from a temporary rise in the aid to Afghanistan and Iraq after 2002.
Sources: OECD.stat.

Table 2. Typology of Foreign Aid

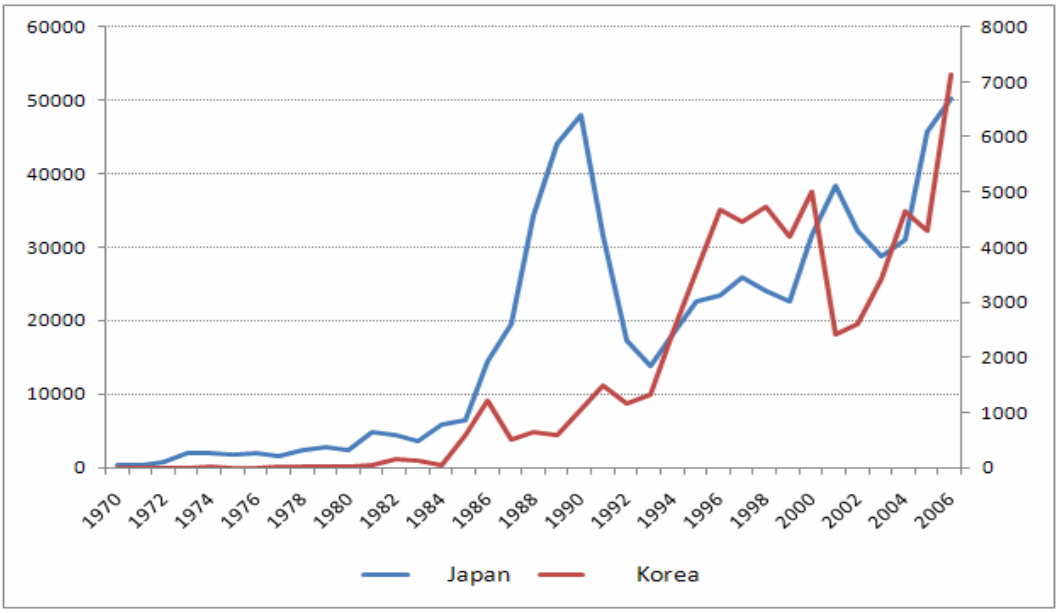
Size (per GNI) / Type	Over 0.5%	0.3–0.5%	Below 0.3%
Humanitarianism	Denmark, Sweden, Norway, Netherlands	Finland, Germany, Swiss, Ireland	
Ex-colony Management	France	Belgium	United Kingdom, Australia, Portugal
Economic Relation		Canada, Austria	Japan, Italy, Greece, New Zealand, Spain
National Security			United States

* The size of aid as a percentage of GNI is as of 2004.

Sources: Park (2007).

Figure 2. Fluctuation of Overseas Investment Flows from Korea and Japan

(unit: mil. US $)



Sources: UNCTAD.

Table 3. Top 10 host countries of FDI and Aid from Japan and Korea

Japan				Korea	
1989		2004		2004	
FDI	Aid	FDI	Aid	FDI	Aid
Thailand	**Indonesia**	**China**	**China**	**China**	Iraq
Malaysia	**China**	Thailand	Iraq	**Vietnam**	**Vietnam**
Indonesia	**Thailand**	Korea	Vietnam	Slovakia	**China**
Korea	**Philippines**	Taiwan	**Malaysia**	Peru	Cambodia
Taiwan	Bangladesh	Mexico	**Philippines**	**Indonesia**	Afghanistan
China	India	**Philippines**	Sri Lanka	Thailand	Bangladesh
Brazil	Sri Lanka	Indonesia	Afghanistan	India	**Indonesia**
Myanmar	**Pakistan**	Brazil	Kazakhstan	Malaysia	Sri Lanka
Philippines	Nigeria	Czech	Pakistan	Poland	Philippines
Pakistan	Kenya	**Malaysia**	Uzbekistan	Libya	Albania

Sources: Ministry of Finance and Economy Korea; Ministry of Finance Japan; OECD.dat.

Table4. Data Description

		Mean	Standard deviation
lnFDIij	Log of F 야 stock from country i to j	0.749648	2.452518
lnODAij	Log of aid stock from country i to j	1.652899	2.148234
lnGDPi	Log of GDP of donor country i	27.78015	1.069315
lnGDPj	Log of GDP of recipient country j	24.00601	1.638917
lnEXPij	Log of export from country i to j	18.90843	2.321851
lnDiff_PGDP	Difference in log of Per Capita GDP between i and j	9.543745	0.771756
lnCorruptionj	Log of Corruption index in country j	0.692524	0.597787
lnDISij	Log of distance between I and j	8.488311	0.504878
lnTARj	Log of tariff rates in country j	0.956205	1.299249

Table 5. Impact of foreign aid on bilateral FDI flows

	(1)	(2)	(3)
	Fixed effect	Random effect	GMM
Lagged Accu. FDIij	0.044	0.058	0.541
	(0.011)***	(0.012)***	(0.043)***
ODAij	-0.014	-0.032	-0.015
	(0.022)	(0.022)	(0.017)
GDPj	0.721	0.547	0.211
	(0.013)***	(0.089)***	(0.086)***
Diff. Per Capita GDPij	0.138	0.208	0.126
	(0.078)*	(0.069)***	(0.068)*
DISij		-0.348	
		(0.305)	
TARj	0.165	0.222	0.025
	(0.029)***	(0.029)***	(0.012)**
EXPij	0.007	0.019	0.031
	(0.043)	(0.041)	(0.038)
Institutional ENVj	-0.194	-0.176	-0.069
	(0.059)***	(0.059)***	(0.032)**
Obs.	3646	3646	2878
R-sq	0.09	0.09	
AR(1)			0.000
AR(2)			0.065
Hansen test			0.000

Table 6. Impact of foreign aid on bilateral FDI flows by donor country
Depend. Var. = bilateral FDI

	(1)	(2)		(3)	
	Fixed effect	Random effect	Obs.	GMM	Obs.
ODAij					
Germany	-0.095	-0.149	537	-0.024	428
	(0.069)	(0.065)**		(0.043)	
France	-0.053	-0.144	524	-0.041	409
	(0.076)	(0.073)**		(0.069)	
United Kingdom	0.108	0.069	524	0.032	410
	(0.075)	(0.074)		(0.052)	
Japan	0.063	0.013	537	0.003	419
	(0.039)**	(0.011)*		(0.002)*	
Korea	0.147	0.137	458	0.062	368
	(0.059)**	(0.057)**		(0.036)*	
Netherlands	-0.141	-0.132	539	-0.029	433
	(0.052)***	(0.051)**		(0.021)*	
United States	-0.046	-0.057	527	0.011	411
	(0.053)	(0.052)		(0.038)	

Appendix Table 1
Country List

	Donor country	Recipient country
1	France	Bolivia
2	Germany	Brazil
3	Japan	Chile
4	Korea	Costa Rica
5	Netherlands	Algeria
6	United Kingdom	Indonesia
7	United States	India
8		Cambodia
9		Kazakhstan
10		Sri Lanka
11		Myanmar(Burma)
12		Mongolia
13		Mexico
14		Malaysia
15		Nepal
16		Peru
17		Philippines
18		Pakistan
19		Singapore
20		El Salvador
21		Thailand
22		Turkey
23		Venezuela
24		Zimbabwe