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Is Foreign Aid a Vanguard of FDI? A Gravity-Equation Approach

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Is Foreign Aid a Vanguard of FDI? A Gravity-Equation Approach [*]

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Abstract

This paper investigates whether and how foreign aid facilitates foreign direct investment (FDI) flows into less developed countries. We employ a large data set of source-recipient country pairs and conduct gravity equation-type estimation. Our empirical methodology enables us to distinguish among three effects of aid on FDI: a positive "infrastructure effect," a negative "rent-seeking effect," and a positive "vanguard effect," which is specific to the same source-recipient country pair of aid and FDI. According to our empirical analysis, foreign aid in general does not necessarily have an infrastructure, rent-seeking, or vanguard effect. However, we find robust evidence that foreign aid from Japan has a vanguard effect, while aid from other donor countries reveals no such effect. This vanguard effect seems to be peculiar to the Japanese foreign aid.

Keywords: Aid; Foreign Direct Investment

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1 Introduction

Whether foreign aid facilitates economic growth of the recipient country has been of great interest to policy-makers and academic researchers. Recently, the causal nexus between aid and growth has been examined empirically to a great extent. In particular, Burnside and Dollar (2000) find that foreign aid improves income growth of the recipient country when the country is in a healthy policy environment. This has led to a consensus among development practitioners, the World Bank in particular, that foreign aid should be provided to countries implementing good policies. However, subsequent studies such as Hansen and Tarp (2001); Easterly, Levine, and Roodman (2003); and Rajan and Subramanian (2005) find that the results of Burnside and Dollar (2000) are not robust to alternative specifications or estimation methods. Therefore, whether foreign aid affects growth is still an open question.

Although the direct effect of foreign aid on growth may not be clear, 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. In this paper, we will investigate the role of aid in promoting FDI. There are two lines of existing literature related to our study. First, recent empirical studies find a positive effect of FDI on income growth, although the effect is often found to be subject to the host country's conditions, such as the level of education and technology (see Todo and Miyamoto, 2006; Girma, 2005; Li and Liu, 2005; Javorcik, 2004; Xu, 2000; and Borensztein et al., 1998 among many others). Given those academic studies, the role of aid in promoting private investment has come to the fore in the policy discussion among government officials and development practitioners (OECD, 2006). Therefore, if foreign aid is associated with a rise in FDI in the recipient country, aid may have an indirect effect on income growth at least in some less developed countries (LDCs).

Second, there are few studies, such as Harms and Lutz (2006) and Karakaplan et al. (2005), which examine directly the relation between foreign aid and FDI, using aggregate data on FDI and foreign aid for each recipient LDC. Harms and Lutz (2006) find that the effect of aid on FDI is generally insignificant but significantly positive for countries in which private agents face heavy regulatory burdens. Karakaplan et al. (2005) also find an insignificant effect of aid on FDI, but in contrast to the finding of Harms and Lutz (2006), their results suggest that good governance and developed financial markets lead to a positive effect of aid.[1]

[1] Harms and Lutz (2006) and Karakaplan et al. (2005) both use governance indices constructed by an earlier version

This paper extends these existing studies on the impact of foreign aid on FDI by using disaggregated data on FDI and aid, i.e., data for each source-recipient country *pair* during the period 1995-2002. This country-pair dataset allows us to employ gravity equation-type estimation that is often used in recent studies on determinants of FDI such as Egger and Winner (2006); Mody, Razin and Sadka (2003); Carr, Markusen and Maskus (2001), and Wei (2000).

We presume that there are possibly multiple channels through which aid affects FDI, and the ambiguous effect of aid found may reflect the amalgamation of positive and negative effects of aid. Harms and Lutz (2006) argue that foreign aid has a positive "infrastructure effect" by improving economic and social infrastructure in the recipient country and a negative "rent-seeking effect" by encouraging unproductive rent-seeking activities.

In addition to these two effects of aid, this paper proposes that aid has a positive "vanguard effect," through which foreign aid from a particular donor country promotes FDI from the same country but not from other countries. There may be several reasons for this vanguard effect. For example, by providing aid, the information on the local business environment of the recipient country can be exclusively transmitted to firms of the donor country. Also, the fact that the government provides aid may reduce the recipient country's investment risks perceived subjectively by firms of the donor country. Furthermore, aid may bring business practices, rules, and systems that are specific to the donor country into recipient countries in advance of private investment.

We distinguish between the infrastructure and the rent-seeking effect by differentiating between foreign aid for infrastructure and non-infrastructure. In addition, we test the presence of the vanguard effect by estimating the effect of aid from a particular donor country, rather than the total aid from all donor countries, on FDI from the donor. It should be noted that the use of country-pair data enables us to investigate the vanguard effect, and thus the decomposition of the three effects of aid on FDI is a major contribution of this paper.

To preview the results, we find that foreign aid in general does not necessarily promote FDI, a result consistent with Harms and Lutz (2006) and Karakaplan et al. (2005). However, we also find that the quality of governance does not significantly affect the effect of aid on FDI, a result inconsistent with either of the two existing studies. As to the final role of foreign aid on FDI, the vanguard effects, which have not been investigated in the existing studies, we find no general evidence of such effects. We then further examine possible differences among donor

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of Kaufmann et al. (2006). A notable difference between these two studies is the time period covered: 1988-1999 in Harms and Lutz (2006) and 1960-2004 in Karakaplan et al. (2005).

countries. Our results show that foreign aid from Japan has a vanguard effect, while the effect of aid from all other countries on FDI is weak. In other words, aid from Japan promotes FDI from Japan to the same recipient country, while having no impact on FDI from other countries. The size of the vanguard effect for Japanese aid is substantial, since we find that the increase in Japanese FDI in East Asia is mostly attributed to the increase in Japanese aid.

The rest of the paper is organized as follows. Section 2 specifies the econometric model, whereas Section 3 describes the data and variables. Section 4 shows the estimation results, which is followed by concluding remarks in Section 5.

2 The Econometric Model

2.1 Estimation equation

To estimate the impact of foreign aid on FDI, we incorporate foreign aid variables to gravity equation-type regression. Our gravity-equation framework can be regarded as an extension of Harms and Lutz (2006) and Karakaplan et al. (2005), who examine the impact of foreign aid on FDI by employing the total amount of aid from all donor countries to each recipient country as the key independent variable and the total amount of FDI inflows to the recipient as the dependent variable. In contrast, our gravity-equation framework allows us to use foreign aid and FDI between each source-recipient country pair for estimation.

In particular, we employ a simplified version of Egger and Winner (2006) and Carr, Markusen and Maskus's (2001) econometric specification that is based on the knowledge-capital (KK) model developed by Markusen (2002). The KK model suggests that the size of the host country's economy should positively affect the extent of *horizontal* multinationals that produce their products for the host-country market,[2] whereas the size of the home country's economy should positively affect the extent of *vertical* multinationals that export their products to the home-country market. The KK model also suggests that a larger difference in skilled labor abundance between the home and the host country provides a greater incentive for firms in the home country to relocate labor-intensive production processes to the host country and hence raises the extent of horizontal FDI. In addition, following Egger and Winner (2006); Mody, Razin, and Sadka (2003); and Wei (2000), we assume that geographic

[2] The horizontal model of multinational enterprises typically explains FDI between similarly endowed countries (i.e., between developed countries), but it can be applied to FDI from a developed country to a less developed country when the less developed country imposes trade restrictions so that export from the developed country to the less developed country may not be possible.

distance between the home and host country impedes FDI flows. Accordingly, we postulate the following gravity equation:

$$\ln FDI_{ijt} = \beta_1 \ln AID_{jt} + \beta_2 \ln GDP_{it} + \beta_3 \ln GDP_{jt} + \beta_4 \ln DIST_{ij} + \beta_5 SKDIF_{ijt} + \beta_6 x_{jt} + \alpha_{ij} + \alpha_t + \varepsilon_{ijt}, \quad (1)$$

where subscripts i, j, and t denote respectively the source and the recipient country of FDI and foreign aid and the time period. The dependent variable, $\ln FDI_{ijt}$, is the stock of inward FDI from country i to j, following Egger and Winner (2006) and Wei (2000). Since the size of FDI stock should be determined by the size of the stock of foreign aid, rather than its flows, our key independent variable, $\ln AID_{ijt}$, is the stock of foreign aid from country i to j at time t. As we will explain below, we will experiment with several alternative measures of foreign aid for estimation. Note that first-differencing equation (1) implies that foreign aid flows affect FDI flows, a relation that is examined by Harms and Lutz (2006) and Karakaplan et al. (2005). $GDP_{i(j)}$ represents GDP of country i (j), $DIST_{ij}$ the geographic distance between i and j, and $SKDIF_{ij}$ a measure of skilled-labor abundance in country i relative to j. Vector x includes other control variables such as a measure of country j's quality of governance that relates to FDI inflows employed in Egger and Winner (2006), a measure of openness of country j employed in Mody, Razin, and Sadka (2003), and a dummy variable for sharing a common official language employed in Péridy (2004). α_{ij}, α_t, and ε_{ijt} are country-pair-specific fixed effects, year-specific effects, and an error term.

2.2 How does foreign aid affect FDI?

Harms and Lutz (2006) argue that foreign aid has two effects on FDI flows. On the one hand, foreign aid improves the recipient country's infrastructure, including "encompassing roads, telephone lines and electricity as well as less measurable items like education or a reliable and well-functioning bureaucracy" and hence raises the marginal product of capital in the country. Therefore, foreign aid encourages FDI inflows to the recipient country of aid. We label this positive effect of aid as the "infrastructure effect."

On the other hand, foreign aid may encourage unproductive rent-seeking behaviors in the recipient country, leading to a drop in total factor productivity. For example, when aid is provided, private firms might engage more in competition for rents from the aid and less in activities for improving their productivity such as training and R&D activities. Consequently, provision of foreign aid may reduce the marginal product of capital of the recipient and thus

discourage FDI inflows to the recipient. We refer to this negative effect as the "rent-seeking effect."[3]

In addition to these two effects suggested by Harms and Lutz (2006), this paper proposes another effect of foreign aid on FDI, an effect generated by information flows, donor country-specific business systems, or "quasi government guarantee" associated with foreign aid. Mody, Razin, and Sadka (2003) theoretically suggest and empirically find that information on the host economy should play a significant role in driving FDI flows, since FDI is risky to investors. In other words, information on the business environment of the host country, such as information on the skill level of local labor, conditions of infrastructure, quality of bureaucrats, and explicit and implicit business rules and government regulations, are often inaccessible to foreign firms, unless they actually engage in business activities in the host country. However, by engaging in activities funded by foreign aid, firms and government agencies of the donor country can obtain information on local conditions of the recipient country, and this information may spill over to other firms of the donor country. Also, the fact that the government provides aid may reduce investment risks perceived subjectively by firms investing in the recipient country. In other words, foreign aid provides a "quasi government guarantee" to private firms and thus encourages FDI. Furthermore, it is possible that foreign aid from a particular donor country may introduce to the recipient country business practices, rules, and systems of the donor country. If the donor's business systems become the *de facto* standard in the recipient country, the standard is likely to promote FDI from the donor while impeding FDI from other countries. In these cases, foreign aid acts as a "vanguard" of FDI, and we refer to this as the "vanguard effect."

It should be noted, however, through this vanguard effect, foreign aid from donor country *i* to recipient country *j* should promote FDI flows from country *i* to *j*, but not FDI from other countries to country *j*, assuming information is not easily available for firms of other countries through foreign aid provided by donor country *i*. In this regard, the vanguard effect is different from other two effects, namely the infrastructure and rent-seeking effects, through which foreign aid by donor country *i* to recipient *j* should affect FDI from any country to recipient *j*.

To decompose the three effects of foreign aid, we use several alternative measures of foreign aid in our estimation. We first employ the total amount of foreign aid for infrastructure

[3] Svensson (2000) argues that foreign aid and windfalls are on average associated with higher corruption in countries which suffer from powerful competing social groups.

and for non-infrastructure from all donor countries: $\sum_i AID\_INF_{ijt}$ and $\sum_i AID\_NonINF_{ijt}$, where AID_INF_{ijt} and AID_NonINF_{ijt} denote respectively the amount of foreign aid stock for infrastructure and other purposes from country i to j. Under the infrastructure and the rent-seeking hypothesis, foreign aid for infrastructure has a positive infrastructure effect as well as a negative rent-seeking effect, while foreign aid for non-infrastructure has only a rent-seeking effect. Therefore, the difference between the coefficients of the two types of foreign aid may indicate the size of the infrastructure effect.

In order to test the presence of the vanguard effect, we next employ the size of foreign aid from the home country of FDI, or country i, to the host country j, rather than the total foreign aid from all donor countries as used before. Under the vanguard hypothesis, the stock of infrastructure and non-infrastructure aid from country i to j, AID_INF_{ijt} and AID_NonINF_{ijt}, respectively, has a positive effect on FDI from i to j but no effect on FDI from other countries. Table 1 summarizes the characteristics of the three types of effect of foreign aid on FDI to be tested.

2.3 Estimation Method

We employ two types of estimation method. First, we start with ordinary least squares (OLS) estimation using robust standard errors adjusted for correlations within each country-pair. The OLS estimators are consistent only when all regressors are orthogonal to the error term. However, there are two reasons why the orthogonality assumption may not hold in our FDI regression. First, as Egger (2005, 2002) argues, the error term may include unobserved country-pair specific effects that are correlated with regressors employed. Second, some of the regressors, such as foreign aid variables and GDP, are likely to be correlated with shocks that affect FDI. Many existing studies estimating income-growth regression on foreign aid argue possible simultaneity biases due to endogeneity of foreign aid variables and in fact find that OLS estimators are very different from estimators correcting for endogeneity (Roodman, 2003; Hansen and Tarp, 2001; Burnside and Dollar, 2000; Boone, 1996). It is highly possible that foreign aid variables are also endogenous in FDI regression, since income growth and FDI flows are likely to be determined simultaneously.

Second, in order to correct for biases arising from omitted variables and possible correlation between the error term and explanatory variables, we employ the system generalized

method of moments (GMM) estimation developed by Blundell and Bond (1998).[4] The system GMM estimation corrects for biases due to fixed effects by first-differencing and endogeneity by using lagged endogenous regressors as instruments. We test whether instruments are orthogonal to the error term using the Hansen *J* statistic and whether the error term is auto-correlated using the Arellano-Bond statistic.[5] In the system GMM estimation, all regressors except distance, the common-language dummy, and year dummies are considered to be endogenous. We use as instruments the two-year lagged endogenous regressors in the estimation of the first-differenced equation and their one-year lagged first-differenced regressors in the estimation of the level equation. We employ the one-step robust estimator of the system GMM.

3 Data

3.1 Sample

Since FDI stock is constructed by the perpetual inventory method using data on FDI flows from 1985, as we will explain later, we confine our analysis to the period of 1995-2002. We also limit our sample to country pairs for which the source country is one of the top five donor countries (France, Germany, Japan, the United Kingdom, and the United States), and the recipient country is one of the low- or middle-income countries according to the World Bank's classifications in 1994. In order to construct a balanced panel data set, we exclude country-pairs if FDI flows for the country pairs are not continuously available from 1995 to 2002.[6] Accordingly, our estimation is based on balanced panel of 80 source-recipient country pairs during the period 1995-2002, involving five donors and 29 recipient countries.[7]

3.2 Variables

Our dependent variable $\ln FDI_{ijt}$ is the natural logarithm of the stock of FDI flows from country *i* to LDC *j*. The amount of FDI flows for each home-host country pair is represented by gross FDI outflows from country *i* to *j* reported by country *i*, taken from OECD's *International Direct Investment Statistics* (available at http://miranda.sourceoecd.org/).[8] To construct real FDI,

[4] Note that using a fixed-effects model does not correct for endogeneity even if we use lagged variables as regressors.
[5] System GMM is estimated by using a Stata command of xtabond2 developed by David Roodman.
[6] In addition, we exclude former Yugoslav and Soviet republics from the set of our recipient countries.
[7] The complete list of the country pairs used in this paper is shown in Appendix Table 1.
[8] In the dataset, OECD defines direct investment as the sum of new capital outflows and reinvested earnings. Direct investment comprises financing by an entity resident in a reporting country which has the objective of obtaining or

nominal FDI flows are divided by the ratio of GDP of the host country in constant U.S. dollars[9] to that in current U.S. dollars, both taken from World Bank's *World Development Indicators 2006* (WDI). We construct real FDI stock from real FDI flows, assuming that the depreciation rate of FDI stock is 5 percent and applying the perpetual inventory method to FDI data from 1985.

Data on bilateral foreign aid are taken from the OECD's *Creditor Reporting System* (CRS) that provides detailed information on each activity funded by foreign aid.[10] In particular, we aggregate the committed amount of bilateral foreign aid funded to each activity to construct the total inflows of foreign aid from donor country i to recipient country j in year t. We exclude from our foreign aid variables foreign aid activities coded as 600 ("action relating to debt") or 900 in the CRS dataset. Aid for action relating to debt is mostly spent on debt forgiveness and may not be related to the three types of effect of foreign aid on FDI discussed earlier: the infrastructure, rent-seeking, and vanguard effects. Aid of code 900 is excluded since this class of aid includes "administrative costs of donors" and "spending in the donor country for heightened awareness/interest in development co-operation" that are clearly not related to our focus.

Using the data on foreign aid flows from 1973 deflated by the constant-current GDP ratio of the recipient country, we construct the stock of real foreign aid from country i to country j in year t, AID_{ijt}, and the total foreign aid from all donor countries to country j, $\sum_i AID_{ijt}$, by the perpetual inventory method assuming a depreciation rate of 5 percent.

In addition to the total amount of bilateral foreign aid, we distinguish between foreign aid for infrastructure and for non-infrastructure to highlight the infrastructure effect of aid. Since Harms and Lutz (2006) suggest that "infrastructure" should be broadly defined and include economic and social infrastructure, we define foreign aid for infrastructure as the sum of foreign aid for "social infrastructure," "economic infrastructure," "production activities," and "multi-sector/cross-cutting" classified in the CRS dataset. In contrast, foreign aid for non-infrastructure is defined as the sum of "commodity aid and general programme assistance" and "humanitarian aid." The large part of the "commodity aid" is food aid, whereas the "general programme assistance" corresponds to general budget support and does not include

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retaining a lasting interest in an entity resident in an aid recipient country. "Lasting interest" implies a long-term relationship where the direct investor has a significant influence on the management of the enterprise, reflected by ownership of at least 10% of the shares of the enterprise, or the equivalent in voting power or other means of control.

[9] The base year is 2000.

[10] CRS contains detailed information on individual aid activities of most of the 23 members of the OECD's Development Assistance Committee (DAC) as well as those of multilateral development banks and UN agencies. The whole dataset is available at http://www.oecd.org/dataoecd/20/29/31753872.htm.

sector-specific programme assistance. The "humanitarian aid" is defined as assistance during and in the aftermath of emergencies. Therefore, "commodity aid and general programme assistance" and "humanitarian aid" are less likely to improve the level of infrastructure in the recipient country but more likely to be related with unproductive rent-seeking activities. We construct the stock of each type of foreign aid using the same method as before. We take a log of those aid stock variables, after adding one,[11] to create our key regressors related to foreign aid.

Real GDP, real GDP per capita, and the trade share (the ratio of the sum of exports and imports to GDP) of the source and the recipient country are taken from WDI. The measure of the relative skill level of the source country to the recipient is defined as the difference between the log of GDP per capita of the two countries.[12] Distance between two countries is defined as the distance between the capital cities of these countries and constructed from the longitude and latitude of the two cities taken from the NIJIX's website (http://www.nijix.com). The common-language dummy, which denotes 1 if the two countries share the same official language and 0 otherwise, is based on CIA's *World Fact Book*. For the governance indicator, we use data from Kaufmann et al. (2006). In particular, we use the index of the regulatory quality denoted as *Kaufmann*1, following Harms and Lutz (2006), or the sum of six indices for the level of voice and accountability, the political stability, the government effectiveness, the regulatory quality, the rule of law, and the control of corruption denoted as *Kaufmann*2, following Karakaplan et al. (2005). Our governance indices are normalized so that the minimum is 0 with a higher score indicating a higher level of governance.[13]

3.3 Descriptive Statistics

Figure 1 shows the trend in the net disbursement of foreign aid of the largest five donor countries during the period 1985-2005. It is indicated that aid from the United States had a decreasing trend until the late 1990s but drastically increased in the 2000s. Japan was the largest donor in several years in the late 1990s, but subsequently reduced its aid mostly due to the increasing government budget deficit. Consequently, Japanese aid was the second largest in recent years, being similar in size to aid from France, Germany, and the United Kingdom. Table

[11] The unit of FDI and aid variables is 1,000 U.S. dollars.
[12] Instead of GDP per capita, we could use the level of education measured, for example, by the secondary enrollment ratio. However, we do not employ this because of data limitations.
[13] Since the governance indicators of Kaufmann et al. (2006) are available only for 1996, 1998, 2000, and 2002, we manipulate data for 1997, 1999, and 2001 from the average of the nearest two years and data for 1995 from the trend during the period 1996-1998.

2 presents the share of each of the top five donors in the total foreign aid from the OECD's Development Assistance Committee (DAC) countries. Since the sum of these five countries account for about 70 percent of aid, our focus on those countries in the estimation can be justified.

Characteristics of foreign aid vary substantially across donor countries. Figure 2 shows the share of aid by sector for each donor country during the period 1985-2005. Most notably, Japan spent substantially more on economic infrastructure than other donors and less on non-infrastructure such as general programme assistance, emergency aid, and debt relief, whereas the United States spent more on general programme assistance, or budget support to the recipient government. As we will argue later, these variations may lead to differences in the aid effect among donor countries.

Finally, Table 3 presents summary statistics of the dependent and independent variables used in the estimation.

4 Estimation Results

4.1 Benchmark results

In all specifications below, we first performed estimation incorporating the trade share, the governance index, and the common-language dummy, as suggested by Harms and Lutz (2006); Egger and Winner (2006); Péridy (2004); and Mody, Razin, and Sadka (2003). However, since these variables are not statistically significant in any specification, we drop those variables as regressors. Egger and Winner (2006) also find corruption does not have a significant effect on FDI in the case of LDCs. In addition, since we find non-linearity in the effect of the difference in the skill level between the two countries, *SKDIF*, after experimenting with several alternative specifications, we include the square of this variable as an additional regressor.[14]

We start with the estimation of the impact of foreign aid on FDI, using the total aid stock from all donor countries to each recipient country, $\sum_i AID_{ijt}$, as the key independent variable. The OLS and GMM results are presented in columns 1 and 2 of Table 4. The *p* value of the Hansen *J* statistic and the Arellano-Bond statistic shown in the last two rows implies that the instruments are orthogonal to the error term and that the error term is not auto-correlated in the system GMM estimation. Since this is the case for all the system GMM estimations below except for some estimation, we will rely more on the GMM results than the OLS results.

[14] Without its square term, *SKDIF* has mostly no significant effect on FDI.

According to the GMM results in column 2 of Table 4, the effect of the total stock of foreign aid from all donor countries to country *j* on FDI from country *i* to *j* is positive but insignificant. This evidence suggests that the total effect of foreign aid on FDI is not substantial.

Results on other control variables are mostly consistent with the theoretical prediction. The source and the recipient country's GDP have a positive and significant effect on FDI, supporting the prediction of the KK model of multinationals. Geographic distance always affects FDI negatively and significantly, supporting our gravity-type specification. The effect of the relative skill level of the home country to the host, *SKDIF*, is positive and significant, while the effect of its square is negative and significant. These results suggest that the effect of the difference of the relative skill level is inverted U-shaped. In light of the KK model's prediction that a large difference in the skill level between the developed home country and the less developed host country facilitates vertical FDI, the results are consistent with this prediction for relatively rich LDCs but inconsistent for least developed countries (LLDCs). This inconsistency in the case of LLDCs implies that a very low skill level in the host country can be a barrier to FDI inflows for LLDCs. Since these results on other control variables will hold in most specifications below, we will henceforth focus on results on foreign aid variables we choose.

Next, we follow Harms and Lutz (2006) and Karakaplan et al. (2005) and test whether the quality of governance of the recipient country affects the effect of foreign aid on FDI by including the interaction term between the aid stock and an index of governance taken from Kaufmann et al. (2006). As the governance index, we use either the index for regulatory burden, which is found to affect the size of the aid effect by Harms and Lutz (2006), or the sum of the six indices of governance used in Karakaplan et al. (2005). The GMM results reported in columns 4 and 6 of Table 4 suggest that the effect of foreign aid is smaller when the quality of governance is higher, being consistent with Harms and Lutz (2006) but inconsistent with Karakaplan et al. (2005). However, either the coefficient of aid or the coefficient of its interaction with the governance index is not significant. The difference in estimation results between the existing studies and this paper probably comes from the difference in the datasets used: The datasets used in Harms and Lutz (2006) and Karakaplan et al. (2005) are based on data for each recipient country, while our dataset is based on data for each source-recipient country pair. In any case, the two existing studies and this paper reached results contradicting one another, and thus whether the quality of governance affects the effect of foreign aid on FDI is still ambiguous.

Therefore, we further investigate whether foreign aid promotes FDI through each of the three channels discussed in Section 2.2, the infrastructure, rent-seeking, and vanguard effects. First, in order to isolate the rent-seeking effect from the infrastructure effect, we distinguish between foreign aid for infrastructure and aid for non-infrastructure. Since foreign aid for non-infrastructure is unlikely to be associated with the infrastructure effect, the effect of aid for non-infrastructure purely represents the rent-seeking effect, while the effect of aid for infrastructure represents the combination of the two effects of aid. The OLS and GMM results from using both aid for infrastructure and non-infrastructure are reported in columns 1 and 2 of Table 5, respectively. The OLS results show that aid for infrastructure is positively correlated with FDI, while aid for non-infrastructure is negatively correlated, supporting the theoretical prediction. However, after controlling for fixed effects and endogeneity, we find in the GMM results that the effect of aid for either infrastructure or non-infrastructure is insignificant. We further test whether the difference in size between the effects of the two types of aid, which may represent the size of the purified infrastructure effect, is zero by a Wald test. The *p* value of the Wald test is 0.495, suggesting that no such infrastructure effect exists.[15]

Since the two types of aid stock are correlated,[16] models 1 and 2 of Table 5 may be biased due to multicollinearity. We thus estimate the effect of each of the two types of aid separately, but our GMM estimation again leads to insignificant effect of aid for infrastructure and non-infrastructure (columns 4 and 6 of Table 5).

Furthermore, in order to highlight the vanguard effect that takes place when foreign aid promotes transfers of information on the local business environment from the recipient to the donor country, we regress bilateral FDI stock on aid stock from the home country of FDI in particular, AID_{ijt}, rather than total aid stock from all donor countries, $\sum_i AID_{ijt}$, as we used above. The GMM results reported in Table 6 indicate that foreign aid has no significant effect on FDI from the donor country. This is the case even when we distinguish between aid for infrastructure and non-infrastructure.[17] This evidence demonstrates that foreign aid from a particular donor country does not promote FDI from the donor, rejecting the presence of the vanguard effect of aid.

In summary, our results suggest that foreign aid does not promote FDI either by

[15] We also break down "infrastructure" into social infrastructure, economic infrastructure, production, and multi-sector. However, we find no significant effect of either sub-category of aid for infrastructure.
[16] The correlation coefficient of the two is 0.659.
[17] Although we find that the effect of aid is positive and significant in the OLS estimations, those estimates are likely to be biased due to country-pair specific fixed effects and endogeneity.

supplying economic/social infrastructure in the host country (no infrastructure effect) or by providing information on business environment in the host country (no vanguard effect), nor does it shrink FDI by encouraging unproductive rent-seeking activities (no rent-seeking effect).[18]

4.2 Results by donor/home country

So far, we have assumed that the effect of foreign aid on FDI does not vary across donor countries. However, this assumption may not hold, since objectives, methods, and modality of foreign aid vary substantially across donors. Therefore, we now relax this assumption. Specifically, we first examine whether foreign aid from each of the five donor countries promotes bilateral FDI from any donor country to the recipient country of aid. In other words, this estimation tests whether aid from a particular donor country has a distinct infrastructure or rent-seeking effect compared with aid from other countries and thus encourages or discourages FDI from all countries to the recipient of aid from the donor country.

Columns 1 and 2 of Table 7 report OLS and GMM results, respectively, using the stock of aid from each donor country as regressors. *JPN*, *USA*, *GRB*, *FRA*, and *DEU* denote Japan, the United States, the United Kingdom, France, and Germany, respectively. The GMM results indicate that aid from any donor country has no significant impact on FDI at the 5-percent level. In addition, we examine the effect of aid for infrastructure and non-infrastructure separately, employing both types together (columns 3 and 4), only aid for infrastructure (columns 5 and 6), or only aid for non-infrastructure (columns 7 and 8), and we again find no effect of aid in most cases. Although the effect of aid for non-infrastructure from the United States is negative and significant at the 5-percent level in column 4, it is insignificant in column 8. The same argument can be applied to the effect of aid for non-infrastructure from Germany. In other words, no robust effect of aid can be detected here.

It should be noted that the *p* value of the Hansen *J* statistic is close to 1 in all the GMM estimations in Table 7. According to Roodman (2006), a high *p* value is obtained when there are too many instruments, and in that case the Hansen *J* statistics test is weak. However, since we have found in Table 5 that the lagged foreign aid variables are orthogonal to the error term, the lagged foreign aid variables for each donor country used in Table 7 as instruments are also likely to be orthogonal to the error term. Therefore, we conclude that biases due to too

[18] Harms and Lutz (2006) and Karakaplan et al. (2005) also find no significant effect of aid on FDI in most specifications in which the interaction term between aid and governance is not included.

many instruments may not be large in the GMM estimations in Table 7.

We further estimate the effect of foreign aid from each of the five donor countries on FDI from the donor country of aid. This should be different from the estimation performed just above (Table 7) in that we are now testing whether aid from a certain donor country promotes FDI from the donor in particular. We do this by including the interaction term between aid stock from each donor country and a dummy variable which takes one if the FDI under consideration comes from the donor country of the aid under consideration; zero otherwise.[19] The results reported in Table 8 indicate that aid from Japan and the United Kingdom has a positive and significant effect on FDI from the respective countries (columns 1 and 2). When we use aid for infrastructure and non-infrastructure separately as a regressor (columns 3-8), we find a significant effect in the case of Japanese aid for infrastructure (columns 4 and 6) that is similar in size to the effect of Japanese aid of all types (column 2). In contrast, the effect of Japanese aid for non-infrastructure is insignificant in column 4 but positive and significant in column 8, suggesting that this result is not robust to alternative specifications. Employing a similar argument, the effect of UK aid does not seem to be robust. Therefore, only the positive effect of Japanese aid for infrastructure is robust and significant in our estimation.

This evidence, combined with the previous evidence found in Table 7 that aid from Japan does not promote FDI in general, supports the vanguard hypothesis of foreign aid in the case of Japanese aid. In other words, while foreign aid has no infrastructure or rent-seeking effect, foreign aid from Japan in particular is likely to facilitate flows of information on the local business environment of the recipient country to Japan, promoting FDI from Japan. However, this positive effect of Japanese aid is limited to FDI from Japan: i.e., Japanese aid has no effect on FDI from other countries.

The effect of Japanese aid on own FDI is substantial in size. The log of the total FDI stock from Japan to the six East Asian countries in our sample[20] increases from 10.80 in 1997 to 10.97 in 2002, whereas the corresponding aid stock increases from 10.83 to 11.04. Using the coefficient of the Japanese aid stock in column 2 of Table 8, 0.742, we conclude that 92 percent of the increase in Japanese FDI in East Asia during the period 1997-2002 is attributable to the increase in Japanese aid.

Since the *p* value of Hansen *J* statistics in Table 8 is close to 1 as in Table 7, there may be too many instruments again. To avoid these possible biases, we drop the aid variables except

[19] Consequently, the variable for, for example, Japanese aid is zero unless the source country of FDI is Japan.
[20] China, the Republic of Korea, Indonesia, Malaysia, the Philippines, and Thailand

for that for Japan to lower the number of regressors and thus the number of instruments. Although we do not show the results from this modification for brevity, we find no change in the effect of Japanese aid compared with the results in Table 8. The p value of the Hansen J statistic is about 0.2, indicating that there are not too many instruments in the GMM estimations.

4.3 Robustness checks

To check the robustness of the results, we experiment with several alternative specifications. First, we employ a dynamic equation for FDI stock by adding the lagged FDI stock as an additional regressor. Second, we use first-lagged variables as regressors. By doing so, we can alleviate possible endogeneity and incorporate possible time lags between the recognition of conditions represented by the regressors and the decision of FDI. Finally, we reconstruct stock of FDI and foreign aid by assuming a depreciation rate of 10 percent, rather than 5 percent used in the benchmark estimation.

Appendix Tables 2-4 show the results from the three alternative specifications above, although to save space, we only show representative results corresponding to the benchmark results from GMM estimation reported in columns 2 of Tables 4-8. These results indicate that foreign aid has no significant effect on FDI in any specification when we assume that the aid effect does not vary in size among donor countries. In addition, Japanese aid always has a positive and significant effect on FDI from Japan, while the results on the donor country-specific effect of aid for other donors are not robust. In contrast, the negative effect of aid from Germany on FDI from any country found in column 2 of Table 7 is insignificant in the dynamic specification. In summary, these results from the alternative specifications are consistent with the benchmark results, except for the result for German aid.

4.4 Why is Japanese aid so special?

According to those findings above, we conclude that foreign aid from any donor country has no infrastructure or rent-seeking effect on FDI. Aid from Japan has a vanguard effect, promoting FDI from Japan, while aid from other countries has no vanguard effect. This evidence emphasizes a distinct feature of Japanese aid compared to aid from other countries. Now the remaining question is: why is Japanese aid so special? In this subsection, we introduce the discussion about the characteristics of Japanese foreign aid.

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. 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. Arase (1994) claims that there is close coordination between the public and private sectors when Japanese aid is provided, and that one of the major objectives of Japanese aid has been promotion of Japanese FDI since the mid-1980s. According to Arase (1994), the DAC asked the Japanese government about the objectives of aid in 1991 and found,

> *MITI (the Ministry of International Trade and Industry) and EPA (the Economic Planning Agency) continued to champion the use of ODA (official development aid) to facilitate the restructuring of the Japanese economy and the creation of a "horizontal division of labor" in Asia. And the private sector allied with the economic ministries by advocating "three-into-one" ODA that would link Japanese FDI, trade, and ODA to develop the economies of recipients. (Arase, 1994, p. 190)*

Kawai and Takagi (2004) also state that in the early years of Japan's official assistance programs, economic considerations played an important part in policy making and the preference of the business community are voiced through the Ministry of Economy, Trade and Industry (METI).[21] These arguments support the vanguard effect of Japanese aid through the transmission of information between the public and the private sector.

In addition, since the private sector in Japan relies on the government to a large extent, the fact that the Japanese government provides foreign aid to a particular country should reduce that recipient country's risks perceived subjectively by Japanese firms. An example of this "quasi government guarantee" provided through foreign aid can be observed in Japanese aid to India. In 1998, in response to India's nuclear test, the Japanese government stopped the provision of its new public loan to India. Accordingly, Japanese private firms also receded from making new investment in India.

In summary, the vanguard effect of Japanese aid is likely to be purposely generated by the close interaction between the public and private sector.

[21] METI advocates the successful experience of Japan's economic cooperation as the "Japan's ODA model". See the Interim Report of the Subcommittee on Economic Cooperation, Industrial Structure Council, the Ministry of Economy, Trade and Industry (2006).

5 Conclusion

This paper investigates whether and how foreign aid facilitates FDI flows into LDCs, applying data for each source-recipient country pair to gravity equation-type estimation. Our empirical methodology enables us to distinguish between three effects of aid on FDI: a positive "infrastructure effect" by improving infrastructure and thus the marginal product of capital; a negative "rent-seeking effect" by encouraging unproductive rent-seeking activities; and a positive "vanguard effect" by transmitting tacit information on the business environment of the recipient country, by reducing country risk with the provision of a "quasi government guarantee," and by setting donor country-specific business standards in advance of private investment. Our results indicate that foreign aid in general does not necessarily have an infrastructure, rent-seeking, or vanguard effect. However, we find robust evidence that foreign aid from Japan has a vanguard effect, while aid from other donor countries has no such effect. In other words, Japanese aid promotes FDI from Japan, while having no impact on FDI from other countries. Our finding is consistent with Blaise (2005) who finds that Japanese aid in China has a positive and significant impact on the locational choice of Japanese private investors in China, using province-level data for China. As a next step, whether this aid-FDI nexus has led to the economic growth of aid recipient countries will be among future research interests.

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Figure 1　Amount of Foreign Aid by Top 5 Donors

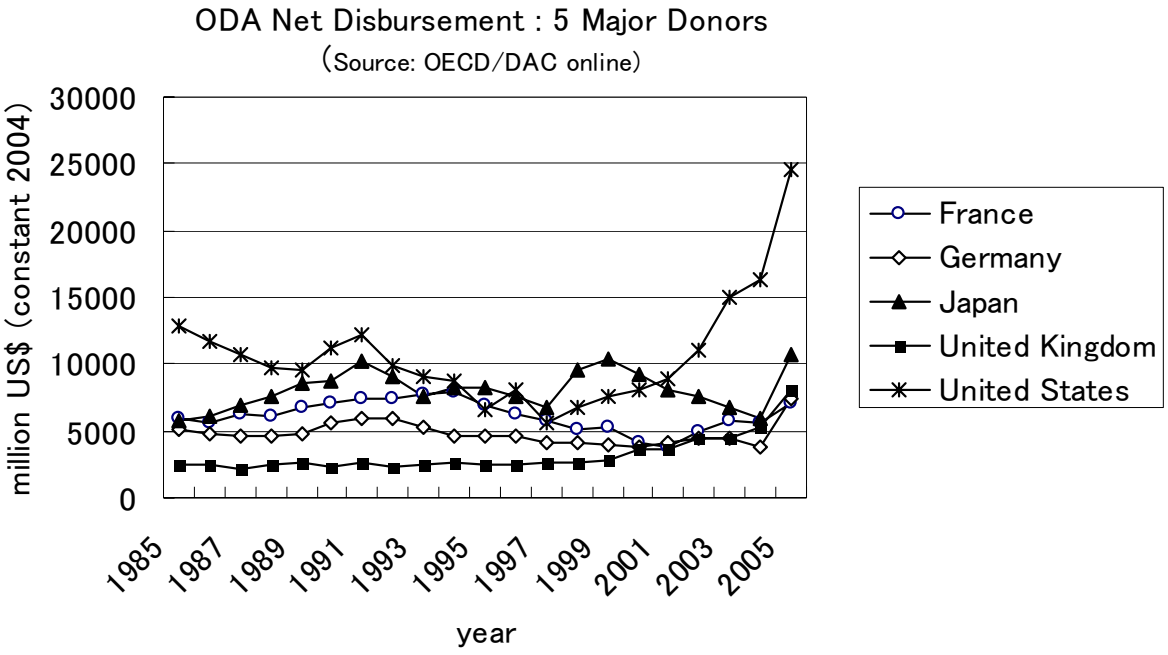

Figure 2　Sectoral Share of Total Foreign Aid by Donor

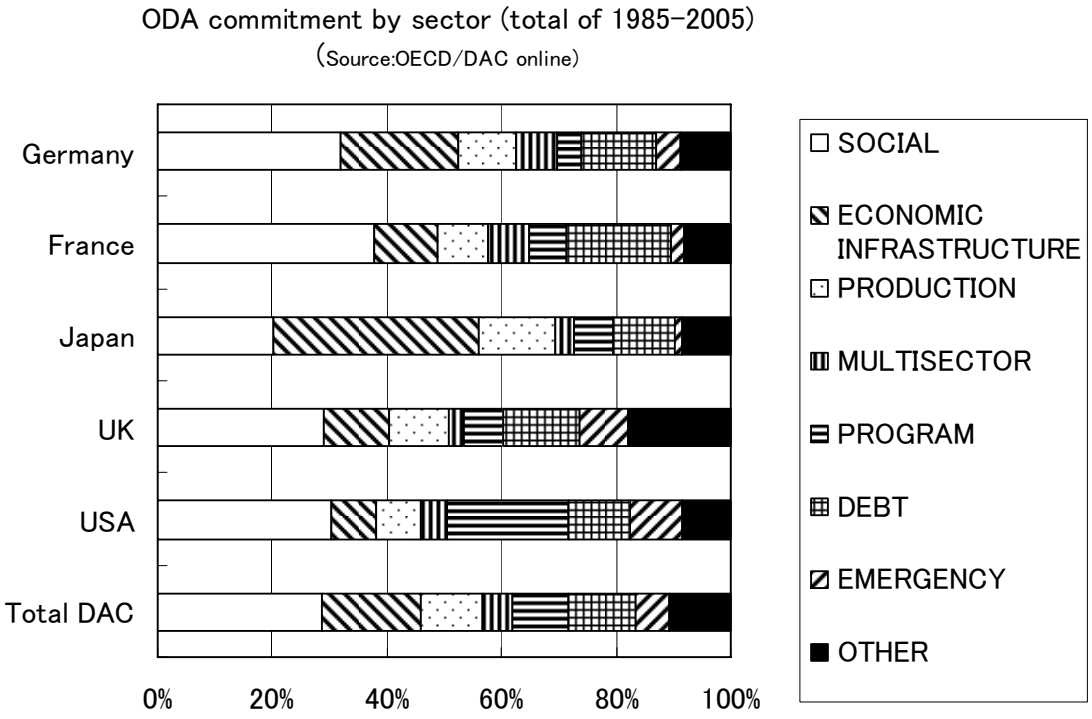

Table 1

Hypotheses to be tested:

Three Types of Effect of Foreign Aid on FDI

	Effect on FDI from country *i* to *j*		
	Infrastructure effect	Rent-seeking effect	Vanguard effect
Aid from any country			
For infrastructure	+	-	0
For non-infrastructure	0	-	0
Aid from country *i*			
For infrastructure	+	-	+
For non-infrastructure	0	-	+

Table 2

Share of Top 5 Donors in Total Foreign Aid from DAC Countries

	1985	1990	1995	2000	2005
France	13%	14%	16%	9%	9%
Germany	11%	11%	11%	9%	9%
Japan	13%	18%	20%	21%	13%
United Kingdom	5%	5%	6%	8%	10%
United States	29%	22%	16%	18%	31%
Total of 5 donors	72%	70%	68%	65%	72%

Source: OECD / DAC online. Shares are computed based on the amount of foreign aid in constant 2004 US dollars.

Table 3 Summary Statistics

	Description	Mean	Standard deviation	Min.	Max.
$\ln FDI_{ij}$	Log of FDI stock from country *i* to *j*	13.821	1.654	9.281	17.888
$\ln \sum_i AID_{ij}$	Log of total aid stock from all countries to *j*	15.215	1.240	12.008	17.243
$\ln \sum_i AID\_INF_{ij}$	Log of total aid stock for infrastructure from all countries to *j*	15.039	1.240	11.936	17.115
$\ln \sum_i AID\_NonINF_{ij}$	Log of total aid stock for non-infrastructure from all countries to *j*	12.827	1.684	8.144	16.263
$\ln AID_{ij}$	Log of aid stock from country *i* to *j*	12.081	2.910	0	16.677
$\ln AID\_INF_{ij}$	Log of aid stock for infrastructure from country *i* to *j*	11.125	3.517	0	16.395
$\ln AID\_NonINF_{ij}$	Log of aid stock for non-infrastructure from country *i* to *j*	11.014	2.994	-0.001	16.032
$\ln GDP_i$	Log of GDP of country *i*	21.589	0.702	20.863	23.026
$\ln GDP_j$	Log of GDP of country *j*	18.690	1.322	14.871	21.074
$\ln DIST_{ij}$	Log of distance between *i* and *j*	8.929	0.560	7.056	9.821
$SKDIF_{ij}$	Difference in the log of GDP per capita between *i* and *j*	2.395	0.911	0.657	4.563
$Kaufmann1_j$	Index of the regulatory quality	16.873	3.073	8.490	24.245
$Kaufmann2_j$	Sum of 6 indices of governance	16.873	3.073	8.490	24.245
$OPEN_j$	Ratio of the sum of exports and imports to GDP of country *j*	69.858	45.820	16.300	228.875
$COMMON_{ij}$	Dummy variable for sharing a common language	0.025	0.156	0	1

Note: Figures are based on 640 country-pair observations during the period 1995-2002, although estimation is based on 480 observations during the period 1997-2002 since lagged variables are used as instruments.

Table 4 Impact of Total Foreign Aid from All Donor Countries on Bilateral FDI

Dependent variable: log of the amount of FDI stock from country *i* to country *j*

	(1) OLS	(2) GMM	(3) OLS	(4) GMM	(5) OLS	(6) GMM
$\ln \sum_i AID_{ij}$	-0.054	0.104	-0.514	0.756	0.093	0.349
	(0.051)	(0.162)	(0.283)+	(0.520)	(0.175)	(0.443)
$\ln \sum_i AID_{ij} * Kaufmann1_j$			0.102	-0.178		
			(0.066)	(0.119)		
$Kaufmann1_j$			-1.250	2.521		
			(0.954)	(1.704)		
$\ln \sum_i AID_{ij} * Kaufmann2_j$					-0.010	-0.013
					(0.011)	(0.027)
$Kaufmann2_j$					0.156	0.145
					(0.158)	(0.393)
$\ln GDP_i$	4.765	6.930	4.624	7.312	4.774	6.903
	(2.348)*	(1.740)**	(2.337)*	(1.671)**	(2.350)*	(1.710)**
$\ln GDP_j$	0.872	0.728	0.911	0.663	0.885	0.666
	(0.041)**	(0.189)**	(0.044)**	(0.185)**	(0.044)**	(0.161)**
$SKDIF_{ij}$	0.755	1.937	0.792	1.404	0.810	1.084
	(0.247)**	(0.957)*	(0.249)**	(0.856)	(0.263)**	(0.768)
$SKDIF_j^2$	-0.185	-0.461	-0.167	-0.351	-0.192	-0.307
	(0.046)**	(0.190)*	(0.047)**	(0.161)*	(0.047)**	(0.144)*
$\ln DIST_{ij}$	-0.437	-0.439	-0.448	-0.469	-0.456	-0.424
	(0.068)**	(0.174)*	(0.069)**	(0.181)**	(0.070)**	(0.174)*
No. of observations	480	480	480	480	480	480
R-squared	0.761		0.764		0.762	
Hansen *J* statistic		0.292		0.701		0.824
Arellano-Bond statistic		0.528		0.581		0.467

Note: Standard errors are in parentheses. **, *, and + signify statistical significance at the 1%, 5%, and 10% levels, respectively. Year dummies and donor-country dummies are included in all specifications. GMM estimation is based on the system GMM estimation developed by Blundell and Bond (1998). *P* values are reported for the Hansen *J* and Arellano-Bond statistics. Description of regressors are as follows: AID_{ij} = stock of foreign aid from country *i* to country *j*; $Kaufmann1_j$ = index of regulatory quality of country *j* taken from Kaufmann et al. (2006); $Kaufmann2_{ij}$ = sum of 6 indices of governance of country *j* taken from Kaufmann et al. (2006); $GDP_{i(j)}$ = GDP of country *i* (*j*); $SKDIF_{ij}$ = measure of skill differences; $DIST_{ij}$ = distance between country *i* and *j*.

Table 5 Differences between Aid for Infrastructure and Non-Infrastructure

Dependent variable: log of the amount of FDI stock from country *i* to country *j*

	(1) OLS	(2) GMM	(3) OLS	(4) GMM	(5) OLS	(6) GMM
ln $\sum_i AID\_INF_{ij}$	0.120	0.129	-0.013	0.106		
	(0.062)+	(0.189)	(0.054)	(0.171)		
ln $\sum_i AID\_NonINF_{ij}$	-0.130	-0.058			-0.098	-0.014
	(0.032)**	(0.119)			(0.027)**	(0.108)
lnGDP_i	4.788	7.312	4.770	7.193	4.771	6.649
	(2.312)*	(1.686)**	(2.350)*	(1.734)**	(2.319)*	(1.667)**
lnGDP_j	0.827	0.748	0.853	0.758	0.875	0.752
	(0.042)**	(0.204)**	(0.042)**	(0.194)**	(0.034)**	(0.179)**
$SKDIF_{ij}$	0.294	1.843	0.695	2.137	0.550	2.083
	(0.268)	(1.028)+	(0.253)**	(0.972)*	(0.233)*	(1.015)*
$SKDIF_j^2$	-0.106	-0.444	-0.181	-0.502	-0.139	-0.464
	(0.049)*	(0.192)*	(0.046)**	(0.192)**	(0.046)**	(0.206)*
ln$DIST_{ij}$	-0.501	-0.482	-0.435	-0.445	-0.484	-0.448
	(0.069)**	(0.190)*	(0.068)**	(0.177)*	(0.068)**	(0.173)**
No. of observations	480	480	480	480	480	480
R-squared	0.769		0.760		0.767	
Hansen *J* statistic		0.515		0.287		0.319
Arellano-Bond statistic		0.556		0.517		0.593

Note: Standard errors are in parentheses. **, *, and + signify statistical significance at the 1%, 5%, and 10% levels, respectively. Year dummies and donor-country dummies are included in all specifications. GMM estimation is based on the system GMM estimation developed by Blundell and Bond (1998). *P* values are reported for the Hansen *J* and Arellano-Bond statistics. Description of regressors are as follows: AID_INF_{ij} = stock of aid for infrastructure from country *i* to *j*; AID_NonINF_{ij} = stock of aid for non-infrastructure from country *i* to *j*; $GDP_{i(j)}$ = GDP of country *i* (*j*); $SKDIF_{ij}$ = measure of skill differences; $DIST_{ij}$ = distance between country *i* and *j*.

Table 6 Impact of Foreign Aid on Bilateral FDI from the Donor Country

Dependent variable: log of the amount of FDI stock from country *i* to country *j*

	(1) OLS	(2) GMM	(3) OLS	(4) GMM	(5) OLS	(6) GMM	(7) OLS	(8) GMM
lnAID_{ij}	0.027	-0.015						
	(0.020)	(0.026)						
lnAID_INF_{ij}			0.060	0.044	0.042	-0.003		
			(0.021)**	(0.038)	(0.016)**	(0.040)		
lnAID_NonINF_{ij}			-0.031	-0.050			0.015	-0.040
			(0.025)	(0.032)			(0.019)	(0.042)
lnGDP_i	4.490	4.719	4.489	4.215	4.420	4.199	4.664	6.105
	(2.355)+	(1.777)**	(2.336)+	(1.516)**	(2.337)+	(1.723)*	(2.352)*	(1.756)**
lnGDP_j	0.833	0.686	0.828	0.734	0.824	0.693	0.840	0.819
	(0.035)**	(0.138)**	(0.035)**	(0.123)**	(0.035)**	(0.144)**	(0.035)**	(0.152)**
$SKDIF_{ij}$	0.568	1.360	0.425	1.667	0.425	1.429	0.620	2.721
	(0.245)*	(0.859)	(0.250)+	(0.870)+	(0.250)+	(0.960)	(0.242)*	(1.113)*
$SKDIF_j^2$	-0.165	-0.301	-0.141	-0.379	-0.143	-0.328	-0.172	-0.582
	(0.047)**	(0.178)+	(0.047)**	(0.170)*	(0.047)**	(0.190)+	(0.046)**	(0.220)**
ln$DIST_{ij}$	-0.414	-0.434	-0.424	-0.452	-0.406	-0.436	-0.420	-0.473
	(0.069)**	(0.162)**	(0.070)**	(0.163)**	(0.068)**	(0.164)**	(0.070)**	(0.167)**
No. of observations	480	480	480	480	480	480	480	480
R-squared	0.761		0.765		0.764		0.761	
Hansen *J* statistic		0.140		0.513		0.217		0.242
Arellano-Bond statistic		0.606		0.614		0.583		0.612

Note: Standard errors are in parentheses. **, *, and + signify statistical significance at the 1%, 5%, and 10% levels, respectively. Year dummies and donor-country dummies are included in all specifications. GMM estimation is based on the system GMM estimation developed by Blundell and Bond (1998). *P* values are reported for the Hansen *J* and Arellano-Bond statistics. Description of regressors are as follows: AID_{ij} = stock of foreign aid from country *i* to country *j*; AID_INF_{ij} = stock of aid for infrastructure from country *i* to *j*; AID_NonINF_{ij} = stock of aid for non-infrastructure from country *i* to *j*; $GDP_{i(j)}$ = GDP of country *i* (*j*); $SKDIF_{ij}$ = measure of skill differences; $DIST_{ij}$ = distance between country *i* and *j*.

Table 7: Impact of Foreign Aid on FDI: Results by Donor Country

Dependent variable: log of the amount of FDI stock from country *i* to country *j*

	(1) OLS	(2) GMM	(3) OLS	(4) GMM	(5) OLS	(6) GMM	(7) OLS	(8) GMM
$\ln AID_{JPN,j}$	0.026	0.013						
	(0.030)	(0.069)						
$\ln AID_{USA,j}$	-0.002	0.003						
	(0.015)	(0.023)						
$\ln AID_{GRB,j}$	0.007	-0.002						
	(0.020)	(0.033)						
$\ln AID_{FRA,j}$	0.004	-0.031						
	(0.048)	(0.112)						
$\ln AID_{DEU,j}$	-0.163	-0.151						
	(0.038)**	(0.091)+						
$\ln AID\_INF_{JPN,j}$			-0.047	-0.023	0.020	-0.010		
			(0.040)	(0.077)	(0.024)	(0.057)		
$\ln AID\_INF_{USA,j}$			0.069	0.042	0.010	0.007		
			(0.023)**	(0.023)+	(0.012)	(0.019)		
$\ln AID\_INF_{GRB,j}$			0.038	0.008	0.007	-0.024		
			(0.017)*	(0.023)	(0.017)	(0.028)		
$\ln AID\_INF_{FRA,j}$			0.095	0.023	0.024	0.019		
			(0.031)**	(0.032)	(0.026)	(0.042)		
$\ln AID\_INF_{DEU,j}$			-0.089	-0.100	-0.164	-0.150		
			(0.049)+	(0.086)	(0.034)**	(0.098)		
$\ln AID\_NonINF_{JPN,j}$			0.069	0.025			0.021	0.047
			(0.054)	(0.091)			(0.032)	(0.068)
$\ln AID\_NonINF_{USA,j}$			-0.095	-0.051			-0.003	-0.003
			(0.031)**	(0.023)*			(0.016)	(0.022)
$\ln AID\_NonINF_{GRB,j}$			-0.005	0.016			0.015	0.007
			(0.019)	(0.035)			(0.015)	(0.045)
$\ln AID\_NonINF_{FRA,j}$			-0.239	-0.153			-0.122	-0.079
			(0.051)**	(0.089)+			(0.043)**	(0.099)
$\ln AID\_NonINF_{DEU,j}$			-0.016	-0.044			-0.116	-0.088
			(0.051)	(0.036)			(0.035)**	(0.042)*
No. of observations	480	480	480	480	480	480	480	480
R-squared	0.773		0.790		0.774		0.777	
Hansen *J* statistic		0.996		1.000		0.979		0.998
Arellano-Bond statistic		0.788		0.902		0.852		0.635

Note: Standard errors are in parentheses. **, *, and + signify statistical significance at the 1%, 5%, and 10% levels, respectively. All control variables used in the benchmark estimation, year dummies, and donor-country dummies are included in all specifications. GMM estimation is based on the system GMM estimation developed by Blundell and Bond (1998). *P* values are reported for the Hansen *J* and Arellano-Bond statistics. Description of regressors are as follows: AID_{ij} = stock of foreign aid from country *i* to country *j*; AID_INF_{ij} = stock of aid for infrastructure from country *i* to *j*; AID_NonINF_{ij} = stock of aid for non-infrastructure from country *i* to *j*; *JPN*, *USA*, *GBR*, *FRA*, and *DEU* denote Japan, the United States, the United Kingdom, France, and Germany, respectively.

Table 8: Impact of Foreign Aid on Bilateral FDI from the Donor Country: Results by Donor Country

Dependent variable: log of the amount of FDI stock from country *i* to country *j*

	(1) OLS	(2) GMM	(3) OLS	(4) GMM	(5) OLS	(6) GMM	(7) OLS	(8) GMM
$\ln AID_{JPN,j} \cdot JPN_i$	0.859	0.742						
	(0.074)**	(0.211)**						
$\ln AID_{USA,j} \cdot USA_i$	-0.031	-0.112						
	(0.023)	(0.068)+						
$\ln AID_{GRB,j} \cdot GRB_i$	0.073	0.112						
	(0.028)**	(0.050)*						
$\ln AID_{FRA,j} \cdot FRA_i$	0.094	-0.396						
	(0.073)	(0.286)						
$\ln AID_{DEU,j} \cdot DEU_i$	0.097	0.071						
	(0.043)*	(0.115)						
$\ln AID\_INF_{JPN,j} \cdot JPN_i$			0.745	0.747	0.774	0.741		
			(0.094)**	(0.208)**	(0.065)**	(0.171)**		
$\ln AID\_INF_{USA,j} \cdot USA_i$			0.080	0.038	-0.010	-0.014		
			(0.047)+	(0.053)	(0.022)	(0.044)		
$\ln AID\_INF_{GRB,j} \cdot GRB_i$			0.082	0.125	0.069	-0.007		
			(0.024)**	(0.025)**	(0.019)**	(0.101)		
$\ln AID\_INF_{FRA,j} \cdot FRA_i$			-0.121	-0.149	-0.034	-0.249		
			(0.047)*	(0.089)+	(0.040)	(0.097)*		
$\ln AID\_INF_{DEU,j} \cdot DEU_i$			-0.040	0.108	0.044	0.181		
			(0.056)	(0.116)	(0.037)	(0.187)		
$\ln AID\_NonINF_{JPN,j} \cdot JPN_i$			0.117	0.251			0.661	0.697
			(0.096)	(0.258)			(0.073)**	(0.227)**
$\ln AID\_NonINF_{USA,j} \cdot USA_i$			-0.102	-0.082			-0.035	-0.074
			(0.047)*	(0.062)			(0.024)	(0.048)
$\ln AID\_NonINF_{GRB,j} \cdot GRB_i$			-0.017	-0.014			0.044	0.064
			(0.031)	(0.039)			(0.026)+	(0.082)
$\ln AID\_NonINF_{FRA,j} \cdot FRA_i$			0.293	0.213			0.093	-0.305
			(0.083)**	(0.158)			(0.075)	(0.245)
$\ln AID\_NonINF_{DEU,j} \cdot DEU_i$			0.127	0.014			0.055	-0.051
			(0.058)*	(0.053)			(0.040)	(0.100)
No. of observations	480	480	480	480	480	480	480	480
R-squared	0.817		0.830		0.822		0.798	
Hansen *J* statistic		0.982		1.000		0.995		0.984
Arellano-Bond statistic		0.824		0.834		0.577		0.769

Note: Standard errors are in parentheses. **, *, and + signify statistical significance at the 1%, 5%, and 10% levels, respectively. All control variables used in the benchmark estimation, year dummies, and donor-country dummies are included in all specifications. GMM estimation is based on the system GMM estimation developed by Blundell and Bond (1998). *P* values are reported for the Hansen *J* and Arellano-Bond statistics. Description of regressors are as follows: AID_{ij} = stock of foreign aid from country *i* to country *j*; AID_INF_{ij} = stock of aid for infrastructure from country *i* to *j*; AID_NonINF_{ij} = stock of aid for non-infrastructure from country *i* to *j*; *JPN*, *USA*, *GBR*, *FRA*, and *DEU* = Japan, the United States, the United Kingdom, France, and Germany, respectively; CTY_i = a dummy variable that is one if source country *i* is *CTY*.

Appendix Table 1 List of Country Pairs

Recipient/host country	Donor/home country				
	Germany	France	United Kingdom	Japan	United States
Argentina	Y	Y	Y	Y	Y
Brazil	Y	Y	Y	Y	Y
Chile	Y	Y	Y	Y	Y
China	Y	Y	Y	Y	Y
Columbia	Y	Y	Y		Y
Costa Rica	Y				
Dominican Republic	Y				
Ecuador	Y				
Egypt		Y			
Indonesia	Y	Y	Y	Y	
India	Y	Y	Y	Y	
Korea, Republic of	Y	Y	Y	Y	Y
Sri Lanka	Y				
Morocco	Y	Y			
Mexico	Y	Y	Y	Y	Y
Mauritius	Y				
Malaysia	Y	Y	Y	Y	Y
Namibia	Y				
Nigeria	Y				
Pakistan	Y				
Panama	Y				
Philippines	Y	Y	Y	Y	Y
Paraguay	Y				
Thailand	Y	Y	Y	Y	Y
Tunisia	Y				
Turkey	Y	Y		Y	Y
Uruguay	Y				
Venezuela	Y		Y		Y
Vietnam	Y				

Note: Y indicates that the country pair is included in the sample.

Appendix Table 2 Robustness Check (1): Results Using Dynamic Specification

Dependent variable: log of the amount of FDI stock from country *i* to country *j*

	(1) GMM	(2) GMM	(3) GMM	(4) GMM	(5) GMM
Comparable benchmark model	Table 4 (2)	Table 5 (2)	Table 6 (2)	Table 7 (2)	Table 8 (2)
Lagged lnFDI_{ij}	0.560	0.567	0.594	0.599	0.585
	(0.139)**	(0.140)**	(0.131)**	(0.092)**	(0.127)**
ln $\sum_i AID_{ij}$	-0.033				
	(0.076)				
ln $\sum_i AID\_INF_{ij}$		-0.028			
		(0.083)			
ln $\sum_i AID\_NonINF_{ij}$		-0.021			
		(0.053)			
lnAID_{ij}			0.003		
			(0.019)		
ln$AID_{JPN,j}$				-0.003	
				(0.032)	
ln$AID_{USA,j}$				0.012	
				(0.015)	
ln$AID_{GRB,j}$				-0.016	
				(0.019)	
ln$AID_{FRA,j}$				-0.028	
				(0.052)	
ln$AID_{DEU,j}$				-0.059	
				(0.042)	
ln$AID_{ij} \cdot JPN_i$					0.233
					(0.114)*
ln$AID_{ij} \cdot USA_i$					-0.041
					(0.037)
ln$AID_{ij} \cdot GRB_i$					0.070
					(0.037)+
ln$AID_{ij} \cdot FRA_i$					-0.180
					(0.165)
ln$AID_{ij} \cdot DEU_i$					-0.063
					(0.066)
No. of observations	480	480	480	480	480
Hansen *J* statistic	0.283	0.887	0.227	1.000	1.000
Arellano-Bond statistic	0.032	0.032	0.037	0.053	0.038

Note: Standard errors are in parentheses. **, *, and + signify statistical significance at the 1%, 5%, and 10% levels, respectively. All control variables used in the benchmark estimation, year dummies, and donor-country dummies are included in all specifications. GMM estimation is based on the system GMM estimation developed by Blundell and Bond (1998). *P* values are reported for the Hansen *J* and Arellano-Bond statistics. Description of regressors are as follows: AID_{ij} = stock of aid from country *i* to *j*; JPN_i, USA_i, GRB_i, FRA_i, and DEU_i, = dummy variables that is one if country *i* is Japan, the United States, the United Kingdom, France, and Germany, respectively.

Appendix Table 3 Robustness Check (2): Results Using Lagged Regressors

Dependent variable: log of the amount of FDI stock from country *i* to country *j*

	(1) GMM	(2) GMM	(3) GMM	(4) GMM	(5) GMM
Comparable benchmark model	Table 4 (2)	Table 5 (2)	Table 6 (2)	Table 7 (2)	Table 8 (2)
$\ln \sum_i AID_{ij}$	0.081				
	(0.160)				
$\ln \sum_i AID\_INF_{ij}$		0.138			
		(0.192)			
$\ln \sum_i AID\_NonINF_{ij}$		-0.085			
		(0.116)			
$\ln AID_{ij}$			-0.009		
			(0.031)		
$\ln AID_{JPN,j}$				0.007	
				(0.070)	
$\ln AID_{USA,j}$				0.019	
				(0.023)	
$\ln AID_{GRB,j}$				-0.025	
				(0.030)	
$\ln AID_{FRA,j}$				-0.015	
				(0.112)	
$\ln AID_{DEU,j}$				-0.175	
				(0.087)*	
$\ln AID_{ij} \cdot JPN_i$					0.749
					(0.205)**
$\ln AID_{ij} \cdot USA_i$					-0.103
					(0.061)+
$\ln AID_{ij} \cdot GRB_i$					0.079
					(0.050)
$\ln AID_{ij} \cdot FRA_i$					-0.402
					(0.256)
$\ln AID_{ij} \cdot DEU_i$					0.052
					(0.101)
No. of observations	480	480	480	480	480
Hansen *J* statistic	0.197	0.405	0.186	0.994	0.993
Arellano-Bond statistic	0.850	0.912	0.887	0.729	0.860

Note: Standard errors are in parentheses. **, *, and + signify statistical significance at the 1%, 5%, and 10% levels, respectively. All control variables used in the benchmark estimation, year dummies, and donor-country dummies are included in all specifications. GMM estimation is based on the system GMM estimation developed by Blundell and Bond (1998). *P* values are reported for the Hansen *J* and Arellano-Bond statistics. Description of regressors are as follows: AID_{ij} = stock of aid from country *i* to *j*; JPN_i, USA_i, GRB_i, FRA_i, and DEU_i = dummy variables that is one if country *i* is Japan, the United States, the United Kingdom, France, and Germany, respectively. All regressors are first lagged.

Appendix Table 4 Robustness Check (3): Results Using an Alternative Depreciation Rate

Dependent variable: log of the amount of FDI stock from country *i* to country *j*

	(1) GMM	(2) GMM	(3) GMM	(4) GMM	(5) GMM
Comparable benchmark model	Table 4 (2)	Table 5 (2)	Table 6 (2)	Table 7 (2)	Table 8 (2)
$\ln \sum_i AID_{ij}$	0.099				
	(0.165)				
$\ln \sum_i AID\_INF_{ij}$		0.077			
		(0.179)			
$\ln \sum_i AID\_NonINF_{ij}$		-0.026			
		(0.112)			
$\ln AID_{ij}$			-0.023		
			(0.021)		
$\ln AID_{JPN,j}$				0.010	
				(0.066)	
$\ln AID_{USA,j}$				-0.004	
				(0.022)	
$\ln AID_{GRB,j}$				0.005	
				(0.034)	
$\ln AID_{FRA,j}$				-0.058	
				(0.107)	
$\ln AID_{DEU,j}$				-0.141	
				(0.076)+	
$\ln AID_{ij} \cdot JPN_i$					0.606
					(0.183)**
$\ln AID_{ij} \cdot USA_i$					-0.097
					(0.061)
$\ln AID_{ij} \cdot GRB_i$					0.123
					(0.048)*
$\ln AID_{ij} \cdot FRA_i$					-0.423
					(0.306)
$\ln AID_{ij} \cdot DEU_i$					0.026
					(0.110)
No. of observations	480	480	480	480	480
Hansen J statistic	0.245	0.485	0.165	0.997	0.984
Arellano-Bond statistic	0.509	0.550	0.610	0.874	0.677

Note: Standard errors are in parentheses. **, *, and + signify statistical significance at the 1%, 5%, and 10% levels, respectively. All control variables used in the benchmark estimation, year dummies, and donor-country dummies are included in all specifications. GMM estimation is based on the system GMM estimation developed by Blundell and Bond (1998). *P* values are reported for the Hansen *J* and Arellano-Bond statistics. Description of regressors are as follows: AID_{ij} = stock of aid from country *i* to *j*; JPN_i, USA_i, GRB_i, FRA_i, and DEU_i = dummy variables that is one if country *i* is Japan, the United States, the United Kingdom, France, and Germany, respectively. FDI and aid stock are constructed, assuming the depreciation rate of 10%.