Aid for Trade and International Investment

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Abstract

This paper investigates whether Aid for Trade (AfT) promotes greenfield and M&A investment in recipient countries. Using data for 25 donor and 140 recipient countries for 2004-2012, we measure the effects of both bilateral AfT and the aggregate AfT of other donors on bilateral greenfield and M&A investment. We find robust evidence that bilateral AfT increases bilateral greenfield investment but exerts insignificant effect on bilateral M&A. Our preferred specification includes bilateral and country-time fixed effects and employs Poisson Pseudo-Maximum Likelihood (PPML) estimation. We also find that the aggregate AfT of other donors is positively associated with both bilateral greenfield investment and M&A. Among the subcomponents of AfT, aid for infrastructure (particularly, transportation and energy) is found to have the strongest effect on greenfield investment followed by aid for building productive capacity. To the extent greenfield investment brings jobs and technology transfer, it appears AfT is accomplishing its development objectives.

Keywords: Aid, aid for trade, greenfield, investment, cross-border M&A

JEL Classifications: F21, F23, G15, G32, G34

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1. Introduction

Since the World Trade Organization (WTO) Doha Development Agenda negotiations started in 2001, the importance of Aid for Trade (AfT) is emphasized as valuable tool for facilitating trade, economic growth, and social development in developing countries. At the WTO Hong Kong Ministerial Conference in December 2005, the "AfT Initiative" was launched and many high-income member countries pledged to increase their AfT contributions, particularly for least developed countries (LDCs). While the focus of AfT has been on trade impacts, it is likely to influence foreign investment as well. In this paper, we contribute to the understanding of the economic impacts of AfT by considering its effects on new international investment in the form of greenfield projects and M&A.

We compile bilateral data for 25 donor and 140 recipient countries for 2004-2012 to investigate the relationship between aid and international investment. We measure the effects of both bilateral AfT and the aggregate AfT of other donors on bilateral greenfield and M&A investment. Our specifications include both bilateral and time-varying country effects. We estimate the relationship using Poisson Pseudo-Maximum Likelihood (PPML) estimation as well as Ordinary Least Squares (OLS). We find robust evidence that both aggregate and bilateral AfT increase greenfield investment. There is also evidence that aggregate aid promotes M&A.

The AfT Initiative culminated many years of efforts by multilateral agencies such as the United Nations, the World Trade Organization, and the Organization for Economic Cooperation and Development (OECD) to target aid to promote trade. A WTO task force identified AfT as comprising four categories: 1) technical assistance for trade policy and regulations; 2) trade-related infrastructure (e.g., transportation, communications, energy) 3) productive capacity building (assistance for agriculture, manufacturing, trade, banking), and 4) trade-related adjustment. Donor countries agreed to increase these types of aid. AfT is a subcomponent of Official Development Assistance and is reported in the OECD's Creditor Reporting System (CRS).

AfT is expected to increase trade, thereby giving developing and least developed countries better

access to foreign markets and goods. Another avenue through which AfT may promote economic development is through FDI. Aid targeted to improve infrastructure such as energy and information technologies would make a recipient country more attractive to investors. Aid to develop productive capacity may be complementary to MNE investment. Indeed, the World Bank (2011) states, "An important dimension of AFT support spans measures to make countries more attractive to foreign direct investment (FDI)" (page 13).

If AfT does promote investment in developing countries, there may be a number of benefits to developing countries. It has been well established that multinationals are more productive and pay higher wages than domestic firms (Doms and Jensen 1998; and Huttunen, 2007). Many studies indicate that FDI provides increases productivity of domestic firms (important papers includes Javorcik 2004 and Haskel et al 2007). Studies using Japanese data (Fukao et al 2007) and Swedish (Siegel and Simons, 2010) data indicate that domestic targets become more productive after being acquired. Finally, Faber et al (2014) find that multinational retail investment in Mexico has generated significant welfare increases, largely due to lower prices.

Most research on the effects of aid on international transactions has focused on trade. The earliest published gravity-based empirical work on aid and trade is Wagner (2003) who finds that aid increases donor exports to recipient countries during the 1970-1990 period.[3] More recent work considers the effects of AfT and its components on trade. Cali and te Velde (2011) study country-level exports for 99 countries over the 2002-2007 period and find that AfT for "economic infrastructure" is associated with more recipient-country exports (aid for "productive capacity" has no significant effect on exports). Vijii and Wagner (2012) use a cross-section of 88 countries to also compile evidence that infrastructure AfT promotes trade. Helble et al (2012) consider bilateral trade for the period 1990-2005 in a gravity framework and find that total AfT (the sum of aid across all donors) increases both recipient exports and imports. Ferro et al (2014) show that service sector aid promotes downstream manufacturing exports. Linking input-output information to trade and aid data for 132 countries over the 2002-2008 period, they find that the interaction between service aid and the service input intensity of a manufacturing sector enters

[3] Another group of researchers has assessed how the AfT has been allocated. For example, Lee et al (2014) assess whether and to what extent the WTO's developing member countries have received more AfT.

positively in regression specifications that control for country-year, country-sector and sector-year fixed effects.[4]

There exists much less research on aid and foreign direct investment. Harms and Lutz (2006) find that the overall effect of foreign aid on the sum of foreign direct and portfolio equity investment is close to zero during the 1990s and, surprisingly, the effect is significantly positive for countries in which foreign investors face a substantial regulatory burden. Selaya and Sunesan (2012) consider flows of FDI to 99 countries using data averaged over five-year intervals during 1970–2001 (their sample size never exceeds 325). Rather than the standard linear-in-logs gravity specification their dependent variable is FDI inflows per capita and aid variables are also normalized by population. Their preferred estimation methods are different forms of Generalized Method of Moments. They find that aid for social and economic infrastructure is "complementary" in that it is associated with more FDI, while aid for productive capacity deters investment.[5] Bhavan et al (2011) employ a similar framework to Selaya and Sunesan but limit the analysis to Bangladesh, Pakistan, India and Sri Lanka. They claim that infrastructure aid promotes FDI but the negative squared term appears to dominate the direct (unsquared) aid term indicating a negative relationship. Donabauer et al (2014) consider multilateral FDI flows scaled by GDP as the dependent variable to assess the influence of aid and an index of physical infrastructure. Their estimation employs 3SLS to accounting for dependencies between three structural equations on the allocation of sector-specific aid, the determinants of infrastructure, and the determinants of FDI, and find strong evidence that aid for infrastructure has a strong direct effect on FDI during 1990-2010 period.

Other papers use bilateral data to investigate the relationship of aid and foreign investment for specific donor countries. Kimura and Todo (2010) use system GMM to evaluate the relationship between FDI and aid by considering five donor countries and 98 recipient countries over the 1990-2002 period. Their dependent variable is the log of bilateral FDI and they evaluate

[4] Other empirical investigations of aid and trade include Brenton and Uexkull (2009), Skärvall, (2011), Nowak-Lehmann et al (2013), and Pettersson and Johansson (2013). Suwa_Eisenmann and Verdier (2007) survey the literature on this topic.

[5] Thus, their finding differs from Beladi and Oladi (2007), which show theoretically that foreign aid used to finance a public consumption could crowd out foreign investment.

aggregate and bilateral aid, sometimes split between "infrastructure" and "non-infrastructure".[6] The effects of aid on FDI are always insignificant aside from a marginally significant positive impact of Japanese infrastructure aid on Japanese investment in recipient countries, which they term a "vanguard effect". Kang et al (2011) extend Kimura and Todo to show that among seven donor countries, Korea joins Japan as the only countries where aid seems to promote bilateral FDI based on 1980-2003 data.

We contribute to the literature on aid and foreign investment in a number of dimensions. Rather than considering net FDI flows based on the international balance of payments (BoP), we investigate new M&A as well as greenfield investment utilizing data obtained from Thomson-Reuters SDC Platinum Database and fDi Intelligence (Financial Times Ltd), respectively. Net FDI flows are BoP transactions that reflect equity infusions financed abroad as well as changes in retained earnings and can be positive or negative. Increases in FDI associated with additional retained earnings do not necessarily translate to new employment opportunities or higher productivity in host countries in contrast to the documented benefits of greenfield and M&A. In specifications that use the log of FDI inflows such as Kimura and Todo (2010) the treatment of negative and zero or missing FDI flows pose a challenge for estimation. Counts and values of new greenfield and M&A investment do not contain negative values. In contrast to Selaya and Sunesan (2012) who use a semi-log specification (FDI flows scaled by population and logged right-hand-side variables), we handle zeros with the Poisson Pseudo-Maximum Likelihood (PPML) estimator proposed by Santos Silva and Tenreyro (2006). We also employ a larger sample of countries and investigate the subcategories of AfT in greater detail. Finally, our period of study, 2004-2012, corresponds to an increase in AfT due to commitments of the AfT Initiative.

The next section briefly describes the AfT, greenfield, and M&A data used in the study. We identify the empirical specification in Section 3. The empirical results are presented in Section 4 along with their interpretations. The concluding section summarizes the results and discusses their implications.

[6] In their study, aid for infrastructure is defined as the sum of aid for social infrastructure, economic infrastructure, production activities, and multi-sector/cross-cutting classified in the CRS database, whereas aid for non-infrastructure is defined as the sum of commodity aid and general programme assistance, action relating to debt, and humanitarian aid.

2. Data

2.1. Aid for trade

The OECD identifies Aid for Trade as comprising the following categories and asks donors to specify the aid falling under each category:

1. Trade-related infrastructure: Transportation (eg, roads and ports), communication networks, and energy supply.
2. Building productive capacity: Finance, business support services, agriculture, forestry, fishing, mining, and industry (including textiles and chemicals).
3.Trade policy regulations and trade-related adjustment: Support for trade policy and regulations (and their implementation).

The OECD manages the CRS that contains flows of Official Development Assistance (ODA) and identifies the sectors that map into the above categories.[7] This allows us to compile disbursements of aid for trade by category for each donor-recipient pair.

For our sample of 25 donors and 140 recipients, total disbursements of ODA and AfT averaged US$88.5 billion and US$19.5, respectively, over 2004-2012. Figure 1 displays the shares of AfT and Non-AfT in overall ODA, and Figure 2 displays the shares of trade-related infrastructure (INF), building productive capacity (BPC), and trade policy regulations and trade-related adjustment (TPR). Most ODA is non-AfT but we observe an increase in the share of AfT over time as DAC countries fulfilled their promise of more AfT. Infrastructure is a slightly larger component than productive capacity. Trade policy aid is relatively small.

[Figures 1 and 2 here]

[7] See http://www.oecd.org/dac/aft/aid-for-tradestatisticalqueries.htm. Specifically, Trade-related infrastructure (inf) combine CRS codes 210, 220, and 230; Building productive capacity (bpc) 240, 250, 311, 312, 313, 321, 322 and 332; and Trade policy regulations and trade-related adjustment (tpr) 331.

Table 1 shows average annual ODA and AfT for the top 25 recipients of AfT. India is the largest recipient with average annual disbursements over the 2004-2012 period of AfT of $1.4 billion closely followed by Vietnam. Turkey, China, Egypt and Indonesia each received more than $600 million annually. African countries such as Democratic Republic of Congo, Ethiopia, and Nigeria receive a large amount of non-AfT relative to AfT. The disbursements are widely spread as the top 25 recipients only account for 66% of AfT and 56% of ODA.[8]

[Table 1 here]

The 25 OECD DAC donor countries are shown in Table 2 ordered by AfT. The annual AfT contributions of Japan and the US were $4.7 billion and $3.4 billion, respectively. The top five sources of AfT (Japan, US, Germany, UK, and France) account for 80% of the amount contributed by the top 25 donors (with Japan alone accounting for over one-third of the total). The US was the largest source of overall ODA (annual average of $17.2 billion) with Japan second ($12.4 billion). Overall, we observe that development assistance is highly concentrated across donors.

[Table 2 here]

2.2. New Greenfield and M&A data

We acquired data on the number and value of bilateral greenfield and M&A investments. The former was available in fDi Intelligence (Financial Times Ltd) and the latter in the Thomson-Reuters SDC Platinum Database. The data are characterized by a large share of zeros. The balanced data set (25 donors, 140 recipients, 9 years) totals 31,500 bilateral pair observations. Positive new greenfield investment occurs for 4,968 on the bilateral pairs (15.8%). There are 2,832 positive M&A observations (9.0% of total observations). Of cases where the number of M&A deals is positive, the value of the transactions was unavailable about one-third of the time for confidentiality reason.

[8] Afghanistan and Iraq are excluded due to their war circumstances.

Table 3 shows that China, India, Brazil, and Mexico receive the most of both types of investment. China was the top destination, received an annual average of 1,135 and 279 greenfield and M&A deals, respectively. Thailand and Vietnam, the 5th and 6th largest recipients of greenfield projects, only receive the 13^{th} and 14^{th} largest M&A investment. Table 4 reveals that the "Big 5" aid donors--the US, Japan, Germany, UK and France--are also the largest investors in the 140 recipient countries. While Japan was the largest donor of AfT, the US is the largest investor with average annual numbers of greenfield investment and M&A deals equal to 1,258 and 425, respectively. Japan accounts for the second most greenfield investment and Canada the second most M&A.

[Tables 3 and 4 here]

3. Empirical Specifications

The theoretical models derive a gravity equation for a variety of international transaction flows. The best known papers generating gravity equations for trade are Anderson and van Wincoop (2003), Eaton and Kortum (2002), and Chaney (2008) but antecedents go back to Anderson (1979). Head and Ries (2008) derive a gravity model for FDI based on the idea of an international market for corporate control.

Most theoretical formulations of the gravity equation specify Y_{ijt}, flows of transactions from origin *i* and destination *j* as the product of country and bilateral-specific terms.

$$Y_{ijt} = a_t M_{it} M_{jt} \phi_{ijt}$$

M_{it} and M_{jt} measure the attributes of origin *i* and destination *j* at a specific point in time, and a_t is a common time-specific factor. Variation in bilateral trade enters through ϕ_{ijt} and its log is typically expressed as a linear combination of time-varying and non-time varying factors that affect trade costs between *i* and *j* plus an error term: $\ln(\phi_{ijt}) = \delta D_{ijt} + u_{ijt}$.

We consider different types of international transactions, Y_{ijt}. Our primary focus is the count and value of new greenfield and M&A. We will also consider the imports or exports to see if our sample delivers similar results to those found in earlier studies.

The traditional approach to estimation is to take logs and estimate

$$\ln Y_{ijt} = \ln a_t + \ln M_{it} + \ln M_{jt} + \delta D_{ijt} + u_{ijt} \quad (1)$$

A problem with this approach is that many pairs of countries with zero-reported flows of cross-border M&A may indicate that fixed costs exceed expected variable profits (Razin et al., 2004, and Davis and Kristjánsdóttir, 2010). Santos Silva and Tenreyro (2006) argue that estimating a log-linearized gravity equation by OLS results in bias, based on the fact that the expected value of the logarithm of a random variable is different from the logarithm of its expected value (i.e., $E[\ln(y)] \neq \ln E[y]$). The expected value of the log-linear error would often depend on the explanatory variables, and OLS would be inconsistent in the presence of heteroskedasticity, which is highly likely in practice.

The alternative to estimating equation (1) is to re-express the relationship as

$$Y_{ijt} = \exp[\ln a_t + \ln M_{it} + \ln M_{jt} + \delta D_{ijt}] \eta_{ijt} \quad (2)$$

where $\eta_{ijt} = \exp[u_{ijt}]$. This formulation can be estimated using the Poisson Pseudo-Maximum Likelihood (PPML) estimator proposed by Santos Silva and Tenreyro (2006). Note that PPML estimator estimates the gravity equation without taking log of the dependent variable. One obvious advantage of utilizing PPML in our study is that the zero-valued observations are naturally included.

In our application, we define country *i* as donor *d* and country *j* as recipient *r* and specify the bilateral term as

$$D_{drt} = \beta_1 \ln AID_{drt} + \beta_2 \ln AID_{\sim drt} + \beta_3 \ln FTA_{drt} + \beta_4 \ln BIT_{drt} + \boldsymbol{\theta}\, PAIR_{dr} + u_{drt}$$

where ln AID_{drt} represents the natural logarithm of official aid from donor *d* to recipient *r*. ln $AID_{\sim drt}$ represents the natural logarithm of aid to *r* from all donors *other than* from country *d*. It includes not only aid from other country donors but also from multilateral donors. Thus, the specification captures not only the effects of bilateral aid on bilateral FDI but also the effects of aid provided by all other donors on bilateral FDI. The other bilateral variables are dummy variables: FTA_{drt} and BIT_{drt} indicate whether both countries are members of a regional free trade arrangement or a bilateral investment treaty and $PAIR_{dr}$ captures bilateral fixed effects between countries *d* and *r*. The latter captures non-time varying influences on international transactions such as distance and contiguity. More importantly, they control unobserved factors influencing both aid and international transactions. For example, a donor country is more likely to give a more development aid to the countries with which it has a good relationship and close economic linkages, which may also increase investment by the multinationals from the donor country. Therefore, we include bilateral fixed effects to mitigate omitted variable bias and endogeneity.

We specific the country-specific terms, M_{dt} and M_{rt}, two ways. Our first specification is

$$M_t = \gamma_h \ln POP_{ht} + \gamma_h \ln PCGDP_{ht} \qquad \text{for } h = \{d,r\}$$

where POP_{ht} and $PCGDP_{ht}$ are, respectively, the population and per capita GDPs (PCGDP) of trading partner *h* (*h* = *d*,*r*). Since the bilateral fixed effects specified in D_{drt} implicitly define country-fixed effects, the effects of POP and PCGDP are identified off time series variation in these country characteristics.

Our second specification incorporates time-varying country fixed effects that displace the population and per-capita GDP variables. This specification is consistent with "structural" gravity models in that it incorporates multilateral resistance effects (as well as other time-varying country characteristics that influence international transactions).[9] The inclusion of time varying country effects also precludes identification of β_2, the coefficient on the aid of other countries (ln

[9] Baier and Bergstrand (2007) estimate the gravity equation with 'time-varying multilateral price terms' to account for such an endogeneity problem when they asses the effects of preferential regional arrangements on bilateral trade.

$AID_{\sim drt}$). This variable is calculated as the difference between total aid to a recipient and the bilateral aid of the donor in question: $AID_{\sim drt} = AID_{total,rt} - AID_{drt}$. Since total aid in a given year to a recipient is captured by the recipient-time fixed effect, the variation in $AID_{\sim drt}$ is solely attributable to variation in AID_{drt}, the bilateral variable already included in the specification. Thus, in specifications with country-time fixed effects, we omit $AID_{\sim drt}$.

We will consider different types of aid when specifying AID. Our primary focus is AfT. We will also define AID according to its primary subcomponents of AfT--- infrastructure (inf), building productive capacity (bpc), and trade policy regulations and trade-related adjustment (tpr). Aid for infrastructure is further divided into transportation, communication networks, and energy supply as classified in the DAC database, while aid for building productive capacity will be split into financial/ business services sector and other sectors. Finally, we will consider non-AfT which we do not expect to influence international transactions.

There are many observations with zero values for bilateral AID. One common practice is to add one to the AfT value before being transformed to natural logarithm. However, this practice is ill-advised as results become sensitive to the units used to measure aid (e.g., millions of dollars or total dollars). It implies all missing data are treated equally, an assumption that ignores heterogeneity in the decision to provide aid across donors. Therefore, following Wagner (2003) and Cali and te Velde (2010), we split the aid variable into two variables as follows:

$$\beta_1 \ln AID_{drt} = \beta_{11} \ln \max(1, AID_{drt}) + \beta_{12} NAID_{drt}$$

where NAID is a no-aid dummy, which takes the value of 1 when AID = 0 and zero otherwise.[10] In this formulation, the difference in the FDI of a recipient receiving positive aid and a recipient receiving zero aid (ceteris paribus) is given by $FDI|_{AID>0} - FDI|_{AID=0} = \beta_{11} \ln AID_{drt} - \beta_{12}$.

Our sample comprises country-level and bilateral flows for 25 donors and 140 recipients for the period 2004-2012. We reduce the time dimension to three periods by taking the mean of the

[10] We apply implement this approach for AID of other countries as well (AID~drt) but there are very few zero observations for this variable.

variables for years 2004-2006, 2007-2009, 2010-2012. The benefits of the procedure is that random volatility is reduced, there are fewer cases of zero values, the large number of fixed effects are easier to estimate, and we allow for a larger window for the effects of aid on international transaction to manifest.

Our primary specification will be equation (2) which we will estimate using PPML. For the sake of comparison, we will also estimate the traditional linear in logs specification (equation 1). All specifications estimate the standard errors by allowing for clustering by donor-recipient pair. We will investigate differential effects across categories of aid as well individual donors and groups of donors. We will also estimate effects with lags of the aid variables.

4. Results

4.1. Benchmark Result

As explained in the previous section, we report the results for two different types of FDI: greenfield FDI and cross-border M&A. Both variables are either expressed as the number of projects/deals or in terms of US$ at market prices. For the sake of comparison, we also report the results for bilateral exports and imports.[11] Key explanatory variables are bilateral AfT (AfT_{dr}) and the aggregate AfT of other countries ($AfT_{\sim drt}$). Table 5 reports results that employ bilateral fixed effects. Table 6 shows estimates when we also include country-time fixed effects, a specification that prevents estimation of aid of other countries. Both tables use PPML estimation and include time dummy variables.

Examining on Columns (1) and (2) in Table 5, we find that bilateral AfT does not have a significant effect on trade between donor and recipient countries. We also observe that AfT from other donors does not affect bilateral exports or imports of goods. Among the control variables, income per capita of both donor and recipient countries obtains positive and significant

[11] Data on trade (exports and imports of all commodities) is taken from OECD's online database.

coefficients for both exports and imports while population carries a marginally significant positive coefficient for donor country in the equation for donor exports.[12]

Columns (3-6) reporting results for greenfield investment and M&A in terms of numbers and value. We find that AfT from other donors has significant positive impacts on both types of FDI in terms of both the number and value of investment. The estimates of the effects of bilateral AfT on bilateral greenfield investment and bilateral M&A are positive but generally insignificant. The exception is a significant effect of bilateral AfT on the number of greenfield investments (coefficient of 0.043 that is significant at the 5% confidence level).

As discussed in the previous section, a full structural gravity specification requires accounting for multilateral resistance. We accomplish this by adding time-varying donor and recipient country fixed effects in the specifications reported in Table 6. While we can no longer estimate the effects of AfT of other countries, the specification removes potential bias in estimating the impact of bilateral AfT. The table reveals that the bilateral AfT continues to have a positive impact on the number of greenfield investments from donor to recipient countries that is now significant at the 1% level (the magnitude falls slightly from 0.043 to 0.041).

Another important finding is that after controlling bilateral fixed as well as country-and-time fixed effects, the bilateral AfT is found to promote both donor exports to recipient countries and donor imports from recipient countries. This finding is in line with Cali and te Velde (2011) and Helble et al (2012) who find that AfT increases both recipient exports and imports. However, it should be noted that, our finding is obtained using different specifications. Helble et al. (2012) use only positive trade flows and consider AfT commitments, while we include zero trade flows and consider AfT disbursements. Cali and te Velde (2011) use AfT disbursements from all aggregated donors for the period 2002-2007, while we use bilateral AfT disbursements for the period 2004-2012.

[12] Data on population and per capita GDP is taken from the World Bank's World Development Indicators online database.

Free trade agreements are also shown to have a statistically significant positive impact on donor exports. It is also interesting to note that FTA increases the number of M&A by multinationals of donor countries in recipient countries. But this finding should be interpreted with caution because FTA is found to decrease the value of M&A.[13]

[Tables 5 and 6 here]

Table 7 compares PPML results to OLS results for our focus variables--bilateral AfT and aggregate AfT from other donors. In the OLS specifications, we add one to all zero observations before taking logs. Overall, the PPML and OLS results for the AfT variables are similar. Of the 16 estimated coefficients for bilateral AfT and Other's AfT, 13 have the same sign across the two methods. In the three cases with different signs, one or both of the estimates are statistically insignificant. The only notable case where one method delivers statistically significant effects and the other does not is the PPML estimate with country-period fixed effects (lower panel) where bilateral AfT has a significant effect on donor imports but not in the case of OLS (Columns 3 and 4, Panel II). We also note that the magnitudes of estimated coefficients are larger with PPML than with OLS in most specifications, especially for estimates of the effects of other donor AfT.

As discussed in Section 3, our preferred approach is the PPML because it is consistent in the presence of heteroschasticity and naturally includes the zero-valued observations. Therefore, our interpretation of the results is confined to the PPML estimates. First we consider bilateral AfT effects on exports and imports as reported in the lower panel specifications that account for both bilateral fixed effects and country-period fixed effects. PPML finds that 10 percent increase in bilateral AfT increases donor exports by 0.17 percent and donor imports by 0.20 percent (Columns 1 and 3, respectively, Panel II). In our sample, the average value of the bilateral AfT to recipient countries is $5.0 billion and the average value of donor exports is $459.6 billion (see Appendix Table 1). Thus, 10 percent increase in bilateral AfT ($500 million) increases average donor exports to recipients by $800 million ($459.6 billion x 0.17 x 0.01). A similar calculation

[13] Note that for the confidentiality reason, the value of M&A has a smaller number of observations than the number of M&A deals.

reveals that $500 million (10 percent) additional AfT results in an increase in donor imports of $1.5 billion. Hence, while the estimated trade elasticities appear small, they imply a more than proportional increase in trade relative to a given increase in the amount of AfT.

Regarding the effect of bilateral AfT on cross-border investment, our PPML results (Column 5, Panel II) suggest that 10 percent increase in bilateral AfT ($500 million) increases greenfield investment from the donor to the recipient by 0.41 percent. This implies that with 10 percent increase in bilateral AfT, each DAC donor would have made 6 more greenfield projects in the 140 recipient countries during 2004-2012 (1,471 x 0.41 x 0.01).[14] The PPML results also indicate that 10 percent increase in AfT from all other donors[15] would increase greenfield investment by 1.16 percent and cross-border M&A by 3.11 percent (Columns 5 and 7, respectively, upper panel). Considering the fact that the average value of AfT from all other donors was $224.4 billion during the period, our result implies that 10 percent increase in AfT from all other donors ($22.4 billion) would have increased greenfield investment from each donor country in all 140 recipient countries by 17 projects (1,471 x 1.16 x 0.01) and cross-border M&A from each donor country by 17 deals (542 x 3.11 x 0.01).

[Table 7 here]

4.2. Different Categories of AfT

Cali and te Velde (2010) find that aid for economic infrastructure is associated with more recipient-country exports, while aid for productive capacity has no significant effect on exports. We assess how differently three categories of AfT – infrastructure, building productive capacity, and trade policy and regulation -- contribute to cross-border investment activities between donor and recipient countries. Ferro et al (2014) show that aid to the transportation, energy, and banking services sectors promotes downstream manufacturing exports. Therefore, aid for infrastructure is further split into transportation, communication networks, and energy supply, while aid for building productive capacity is split into financial/business services sector and

[14] See Appendix Table 1.
[15] Note that AfT from other donors includes not only AfT from other DAC donors but also AfT from multilateral donors.

other sectors. Table 8 summarizes the results for three different categories and its sub-categories of AfT estimated by the PPML. For the sake of comparison, the table also reports the results for the total AfT and overall aid other than AfT (non-AfT).

[Table 8 here]

We report results for the number of greenfield projects in columns (1) and (2) and those for M&A deals in columns (3) and (4). The estimates we report for bilateral aid are based on the specification that includes both bilateral and country-period fixed effects (columns 1 and 3). We begin by discussing results for greenfield investment. Among the three types of AfT– infrastructure, building productive capacity, and trade policy and regulation, aid for trade-related infrastructure appears to contribute to foreign investments most significantly. Specifically, greenfield investment from a donor to a recipient country increases when the recipient receives a greater amount of AfT for infrastructure not only from the donor country but also from all other donors. Among the three sub-categories infrastructure aid, transportation and energy have positive effects on greenfield. Aid for communication by other donors appears to encourage greenfield investment but bilateral aid for communication is associated with significantly less greenfield investment. In the case of AfT for building productive capacity, bilateral greenfield investment increases only when bilateral aid increases, while in the case of AfT for trade policy and regulations, bilateral greenfield investment increases only when aid from other donors increases. When we divide aid for building productive capacity into two sub-categories, aid in service industry such as banking, financial, and business appears to result in a positive impact in bilateral greenfield investment, while for building productivity in other industries, aid from other donors has a positive impact.

Turning to the effects of AfT on cross-border M&A (columns 3-4 of Table 8), aid from other donors for infrastructure and building productive capacity is associated with a greater bilateral M&A. Most estimates for bilateral aid are insignificant. The exceptions are non-AfT aid and aid for building productive capacity which has a perverse negative sign. This negative effect is small (-0.029) relative to the positive effects of building productive capacity aid from other donors (0.196). Overall, as the case with greenfield investment, aid for infrastructure has the greatest

positive impact on cross-border M&A. Among the sub-categories of aid for infrastructure and aid for building productive capacity, aid in communication sector reveals and insignificant coefficient.

To summarize, the positive effect of AfT on both greenfield FDI and cross-border M&A is largely driven by aid for trade-related infrastructure. This finding is consistent with Cali and te Velde (2010) and Vijii and Wagner (2012) who find that the positive effect of AfT on exports is entirely driven by aid for infrastructure.

The top of Table 8 reports results for aid other than AfT. This comprises aid for non-economic purposes such as education and health. Therefore, we would not expect it to influence greenfield investment or M&A. This is mostly the case in the equations for greenfield investment. In the equations for M&A, however, we find positive and significant (5 percent level) estimates for both bilateral and aggregate non-AFT variables.

4.3. Lagged Effects of AfT

While our three-year periods allow time for international investment to respond to changes in AfT within the period, we might expect that adjustment may take longer. To investigate this possibility, we amend the specification to include the one-period lagged value of AfT.[16] The lagged AfT variable is also less likely to reflect unobserved time-varying bilateral influences that may lead to bias. We use aid for the period 2002-2003 as the lagged aid for the period 2004-2006, while aid for the period 2004-2006 and 2007-2009 is used as the lagged aid for the period of 2007-2009, and 2010-2012, respectively. In the equations for the number of greenfield projects (columns 1 and 3), introducing time lags does not appear to reduce the size or significance level of the estimated coefficients for the concurrent AfT (both bilateral and aggregate). Moreover, the lagged AfT (both bilateral and aggregate) is similar to the concurrent AfT in terms of size of the coefficients. Thus, when we consider the lagging effects of AfT, the

[16] In Table 9, other control variables are entered as concurrent variables. Free trade agreement and bilateral investment agreements may also influence FDI with lags (eg., Baier and Bergstrand, 2007) so we also allowed one-period lag for these two control variables and found almost identical results for focus variables – bilateral and aggregate AfT. The results are available upon request.

cumulative effect of AfT on greenfield FDI seems even greater than when we consider only the concurrent effect of AfT. As for the number of cross-border M&A deals, as was the case in the specification without lags, AfT from other donors is associated with more M&A. Moreover, lagged AfT from others is also positive and significant.

[Table 9 here]

4.4. Different groups of donors

One advantage of working with bilateral data is that we can investigate not only the effect of overall aid on FDI but also the "vanguard guard" effect of bilateral aid on FDI. Another benefit of using bilateral data is that we can assess whether aid-FDI nexus is contingent on different donor-recipient pair groups.

As discussed in Section 2, the five major donors account for 69.1% of DAC 25 members' total greenfield FDI (also 56.1% of total M&A), while their AfT accounts for 79.7% of DAC 25 members' total AfT (also 73.5% of total aids). Therefore, we assess whether the five major donors are different from other DAC donors in terms of the nexus between AfT and cross-border investment.[17]

Table 10 repots the results estimated separately for three different groups of donors: all 25 donors, the major 5 donors, and the remaining 20 donors. Examining columns (1) – (3), which reports results that include country-pair fixed effects, we find that both bilateral AfT and aggregate AfT have positive impacts on greenfield FDI in the recipient countries. The exception is the effect of bilateral AfT for the group of 20 DAC members, for whom the estimate is insignificant. These countries are rather small in terms of the size of their AfT contributions. Therefore, the finding seems reasonable because a small amount of each bilateral AfT may have

[17] While some studies (eg., Berthelemy, 2006 and Humhne, Meyer, and Nunnekenkam) differentiate donor countries in terms of altruistic donors, moderate donors, and egoistic donors, we do not attempt to assess the differences among these three groups of donors because in the case of altruistic groups, the donors are rather small in terms of the size of cross-border investment and hence there are a substantial number of zero observations for both greenfield investment and M&A.

only a limited impact on improving domestic conditions for FDI. All the bilateral results are robust to the inclusion of country-period fixed effects (columns 4-6).

[Table 10 here]

Kimura and Todd (2010) assess the effects of aid on FDI (balance of payments basis) for the five major DAC donors in aggregate and individually. They find that aggregate foreign aid from these five donors does not significantly promote FDI from these countries to the recipient countries. However, when they allow for difference across donors, they establish that only the Japanese aid to a recipient country promotes Japanese FDI to the same recipient country. Thus, they conclude that only Japanese aid has a vanguard effect.

Similarly to Kimura and Todo (2010), we allow for separate AfT effects for each of the five donor countries. Since we are concerned with the bilateral effects of aid on FDI, we only report the results of specifications with bilateral and country-period fixed effects. The results for greenfield FDI are summarized in Table 11,[18] where subscripts, JP, US, GM, FR, and UK denote Japan, United States, Germany, France, and United Kingdom. We assess the impact of all types of aid (Column 1), AfT (Column 2), and non-AfT (Column 3).[19]

With regard to overall aid, we do not find a vanguard effect for Japan. Instead, we find a vanguard effect for U.S. aid. In contrast, AfT from Japan, Germany and the U.K. reveals a vanguard effect. Interestingly, we also find a vanguard effect for non-AfT from the U.S. and the U.K. Our results may differ from Kimura and Todo because they use the log of FDI flows (dropping zeros, missing values, and negative values) instead of new greenfield and M&A as the dependent variable, measure aid as commitments instead of disbursements, and use GMM rather than PPML.

[Table 11 here]

[18] We do not report the results for cross-border M&A because bilateral AfT was not found to have a contemporaneous effect on bilateral M&A.

[19] Kimura and Todd (2010) consider overall aid and then aid for infrastructure vs non-infrastructure. They find a vanguard effect of foreign aid on FDI only in the case of Japanese of overall aid and Japanese aid for infrastructure.

5. Summary and Concluding Remarks

We investigate whether AfT from donor *d* to recipient *r* increases bilateral investment from donor *d* to recipient *r*. We also assess whether *d*'s investment in *r* is increasing in the AfT of other countries. We uncover robust evidence that AfT promotes international investment in the form of greenfield investment through both changes and increases M&A through the second channel.

In specifications employing bilateral and country-period fixed effects, we find that bilateral AfT increases the number of bilateral greenfield investments. Our estimates imply that $500 million in AfT corresponds to about 6 additional greenfield projects from each donor country during the 9-year period 2004-2012. Results for bilateral AfT and bilateral M&A are generally insignificant. Among the subcomponents of AfT, aid for infrastructure (particularly, transportation and energy) has the strongest effect on greenfield investment followed by aid for building productive capacity. Aid for trade policy and regulation and non-AfT aid do not exert significant effects on greenfield investment. Across donors, we find that bilateral AfT has significant effects on bilateral greenfield investment for Japan, Germany, and the U.K.

Bilateral investment from a donor to a recipient is also promoted by the AfT of other countries. We find significant effects of the AfT of other donors on both the number of bilateral greenfield investments and the number of bilateral M&A deals. Our estimates imply that a 10 percent increase in AfT from other donors leads to 17 more bilateral greenfield projects and 17 more M&A deals.

Our results indicate that aid for trade is exerting positive effects on development. Greenfield investment is associated with increases in wages and productivity in the host economy as well as lower prices. Productivity and wage benefits have also been found for M&A. AfT is also associated with additional trade in our sample. Overall, these results suggest that AfT has helped developing countries integrate into global value chains.

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Source of Key variables

Bilateral Aid for Trade (disbursements in dollar value): OECD, Creditor Reporting System (CRS)

Bilateral Greenfield FDI (dollar value and the number of projects): fDi Intelligence (Financial Times Ltd)

M&A data (dollar value and the number of deals): Thomson-Reuters SDC Platinum Database

Figure 1: Trend of Aid for Trade, 2004-2012

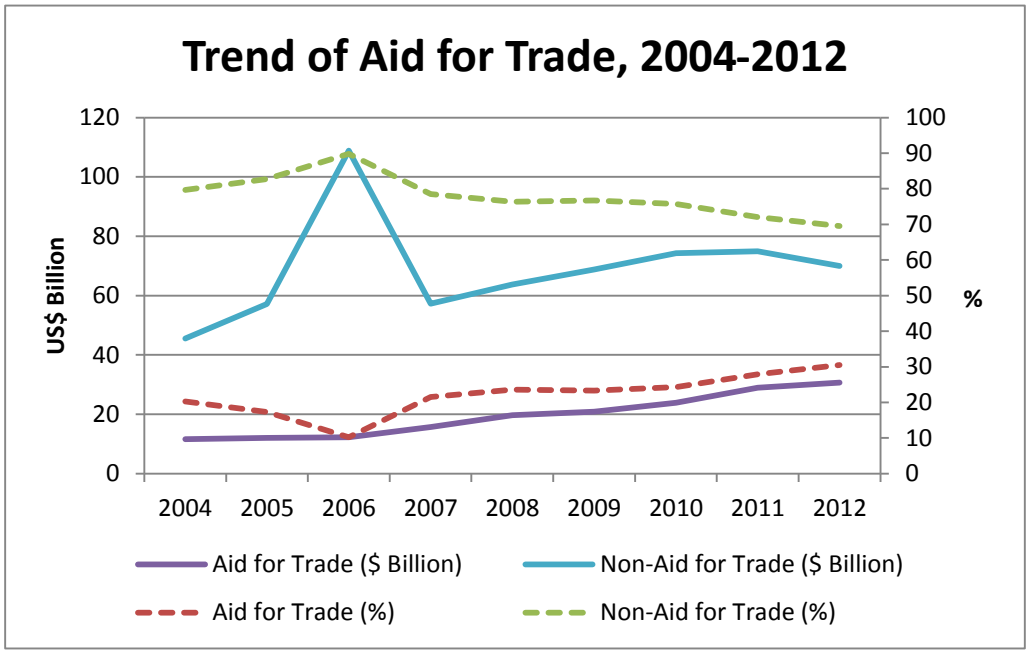

Figure 2: Share of Different Categories of Aid for Trade, 2004-2012

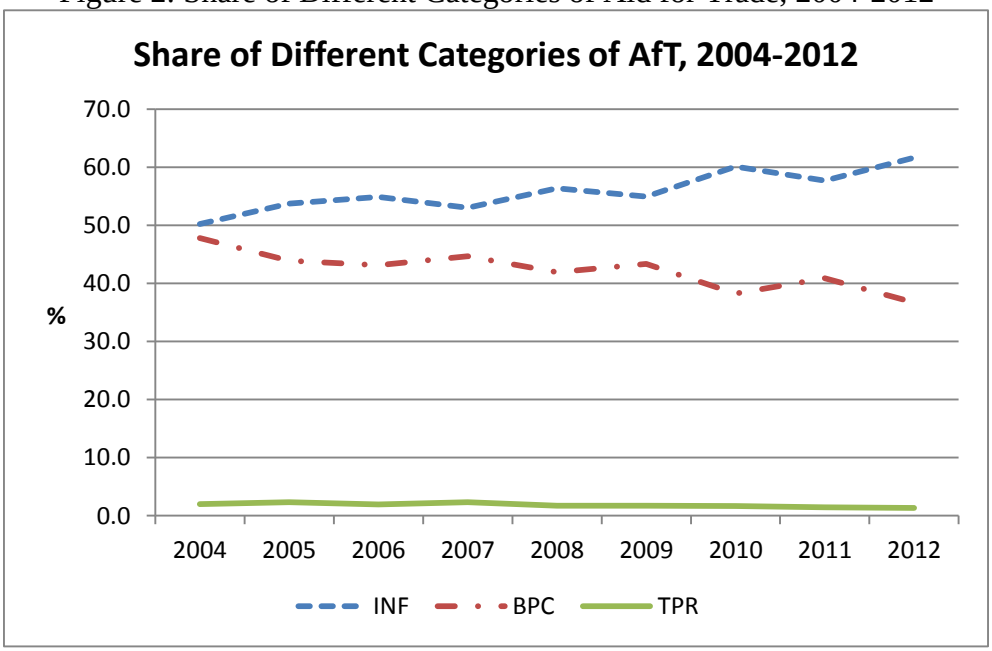

Table 1: Top 25 Recipients of Bilateral AfT and Bilateral Gross Aid, Annual Average during 2004-2012

		Bilateral Gross Aid		Bilateral Aid for Trade	
	Donor	Amount (US$ Mil)	Share (%)	Amount (US$ Mil)	Share (%)
1	India	3,615.9	4.3	1,419.4	7.7
2	Vietnam	2,793.6	3.3	1,336.1	7.2
3	Turkey	1,578.0	1.9	848.5	4.6
4	China	2,624.0	3.1	705.0	3.8
5	Egypt	1,498.4	1.8	682.7	3.7
6	Indonesia	2,654.9	3.1	662.8	3.6
7	Morocco	1,267.0	1.5	521.6	2.8
8	Ethiopia	3,094.5	3.6	521.4	2.8
9	Tanzania	2,733.1	3.2	491.2	2.7
10	Bangladesh	1,930.7	2.3	479.6	2.6
11	Ghana	2,041.0	2.4	401.6	2.2
12	Pakistan	2,498.2	2.9	378.3	2.0
13	Philippines	1,113.9	1.3	357.3	1.9
14	Serbia	992.7	1.2	342.7	1.9
15	Mozambique	1,871.6	2.2	342.0	1.9
16	Uganda	1,858.9	2.2	336.5	1.8
17	Kenya	1,587.6	1.9	330.8	1.8
18	Sri Lanka	927.8	1.1	314.5	1.7
19	Congo, Dem. Rep	3,376.0	4.0	271.0	1.5
20	Tunisia	733.7	0.9	265.2	1.4
21	Thailand	550.9	0.6	256.2	1.4
22	Mali	1,121.8	1.3	254.6	1.4
23	Nigeria	3,075.1	3.6	233.7	1.3
24	Senegal	1,181.4	1.4	212.5	1.2
25	Brazil	631.9	0.7	205.3	1.1
	Total	47,352.6	55.8	12,170.5	66.0

Source: Authors' calculation using OECD's DAC database.

Table 2: 25 DAC Donors of Bilateral Gross Aid and Bilateral AfT Disbursements, Annual Average during 2004-2012

		Bilateral Gross Aid		Bilateral Aid for Trade	
	Donor	Amount (US$ Mil)	Share (%)	Amount (US$ Mil)	Share (%)
1	Japan	12,439.2	18.9	4,735.9	34.3
2	United States	17,168.3	26.0	3,365.2	24.3
3	Germany	6,893.0	10.5	1,370.5	9.9
4	France	6,596.1	10.0	884.1	6.4
5	United Kingdom	5,377.2	8.2	663.3	4.8
6	Spain	2,039.2	3.1	444.1	3.2
7	Norway	1,434.3	2.2	318.0	2.3
8	Canada	1,694.0	2.6	278.8	2.0
9	Denmark	993.6	1.5	272.2	2.0
10	Australia	1,909.2	2.9	241.8	1.7
11	Korea	508.8	0.8	212.8	1.5
12	Sweden	1,403.1	2.1	172.8	1.3
13	Italy	1,294.7	2.0	172.8	1.3
14	Belgium	1,016.9	1.5	172.3	1.2
15	Netherlands	1,984.0	3.0	160.5	1.2
16	Switzerland	824.3	1.3	135.2	1.0
17	Ireland	464.7	0.7	45.7	0.3
18	Finland	308.7	0.5	43.0	0.3
19	Portugal	379.7	0.6	43.0	0.3
20	New Zealand	176.3	0.3	30.0	0.2
21	Austria	679.3	1.0	21.3	0.2
22	Luxembourg	184.9	0.3	20.1	0.1
23	Greece	134.5	0.2	15.7	0.1
24	Czech Republic	12.1	0.0	2.2	0.0
25	Iceland	2.5	0.0	0.8	0.0
	Total	65,918.6	100.0	13,822.1	100.0

Source: Authors' calculation using OECD's DAC database.

Table 3: Top 25 Recipients of Foreign Direct Investment, Annual Average during 2004-2012

		Greenfield FDI		Cross-border M&A	
	Donor	Number of projects	Share (%)	Number of deals	Share (%)
1	China	1,134.8	29.1	279.1	19.0
2	India	668.7	17.1	195.8	13.3
3	Brazil	254.7	6.5	148.4	10.1
4	Mexico	223.6	5.7	119.5	8.1
5	Thailand	148.5	3.8	30.2	2.1
6	Vietnam	141.7	3.6	27.3	1.9
7	Malaysia	127.4	3.3	36.3	2.5
8	Turkey	103.4	2.6	65.0	4.4
9	South Africa	80.4	2.1	68.8	4.7
10	Philippines	74.6	1.9	27.4	1.9
11	Indonesia	74.1	1.9	48.9	3.3
12	Argentina	72.6	1.9	58.4	4.0
13	Colombia	57.6	1.5	37.1	2.5
14	Chile	53.9	1.4	51.9	3.5
15	Serbia	53.1	1.4	11.0	0.7
16	Morocco	51.0	1.3	8.6	0.6
17	Egypt	33.7	0.9	10.7	0.7
18	Tunisia	29.9	0.8	4.2	0.3
19	Peru	29.6	0.8	43.5	3.0
20	Costa Rica	24.4	0.6	4.9	0.3
21	Algeria	22.5	0.6	3.0	0.2
22	Kazakhstan	22.5	0.6	11.6	0.8
23	Nigeria	22.0	0.6	5.3	0.4
24	Panama	17.6	0.5	8.9	0.6
25	Angola	16.9	0.4	3.1	0.2
	Total	3539.2	90.9	1308.9	89.1

Source: Authors' calculation using greenfield FDI data commercially provided by fDi Intelligence of Financial Times, Ltd and cross-border M&A data drawn from Thomson-Reuters SDC Platinum Database.

Table 4: 25 DAC Donors for Foreign Direct Investment, Annual Average during 2004-2012

		Greenfield FDI		Cross-border M&A	
	Donor	Number of projects	Share (%)	Number of deals	Share (%)
1	United States	1,257.6	30.8	424.6	28.2
2	Japan	520.7	12.7	117.8	7.8
3	Germany	388.0	9.5	56.9	3.8
4	United Kingdom	372.4	9.1	160.6	10.7
5	France	285.6	7.0	84.7	5.6
6	Spain	199.1	4.9	55.7	3.7
7	Italy	132.2	3.2	24.7	1.6
8	Switzerland	130.9	3.2	33.7	2.2
9	Korea	129.3	3.2	36.7	2.4
10	Canada	125.7	3.1	226.7	15.1
11	Netherlands	107.3	2.6	60.4	4.0
12	Sweden	73.1	1.8	22.0	1.5
13	Australia	64.2	1.6	106.8	7.1
14	Austria	47.6	1.2	15.9	1.1
15	Finland	46.9	1.1	7.7	0.5
16	Denmark	44.3	1.1	12.7	0.8
17	Belgium	37.1	0.9	10.7	0.7
18	Norway	28.1	0.7	7.6	0.5
19	Luxembourg	27.7	0.7	11.1	0.7
20	Ireland	27.0	0.7	7.2	0.5
21	Portugal	12.9	0.3	7.3	0.5
22	Czech Republic	10.2	0.3	3.1	0.2
23	Greece	8.6	0.2	5.9	0.4
24	New Zealand	7.9	0.2	3.6	0.2
25	Iceland	3.0	0.1	1.7	0.1
	Total	4,087.3	100.0	1,505.3	100.0

Source: Authors' calculation using greenfield FDI data commercially provided by fDi Intelligence of Financial Times, Ltd and cross-border M&A data drawn from Thomson-Reuters SDC Platinum Database.

Table 5: Effects of Aid for Trade (AfT) on Trade of Goods, Greenfield FDI and Cross-border M&A - PPML Results with Bilateral Fixed Effects

	Trade of Goods		Greenfield FDI		Cross-border M&A	
	(1)	(2)	(3)	(4)	(5)	(6)
	Donor exports to recipient	Donor imports from recipient	Number of projects	Value	Number of deals	Value
Bilateral AfT	0.017	-0.001	0.043b	0.033	0.012	0.003
ln{max(1, AfT_{drt})}	(0.011)	(0.011)	(0.019)	(0.026)	(0.015)	(0.069)
No Bilateral AfT	0.106	-0.101	0.457b	0.242	0.176	0.426
($NAID_{drt}$)	(0.131)	(0.116)	(0.218)	(0.336)	(0.181)	(0.806)
Other's AfT	0.026	0.007	0.116a	0.149a	0.311a	0.136
ln{max(1, $AfT_{\sim drt}$)}	(0.020)	(0.023)	(0.042)	(0.057)	(0.042)	(0.150)
ln$Population_{rt}$	-0.881b	0.539	1.325	-1.193	0.300	2.726
	(0.436)	(0.809)	(0.849)	(1.590)	(1.110)	(4.187)
ln$PCGDP_{rt}$	0.521a	0.430a	-0.277c	-0.358	0.411b	0.100
	(0.078)	(0.120)	(0.158)	(0.236)	(0.183)	(0.679)
ln$Population_{dt}$	2.726c	-1.233	0.016	-3.012	-4.880c	-1.234
	(1.452)	(0.863)	(1.798)	(2.045)	(2.491)	(5.195)
ln$PCGDP_{dt}$	0.520b	0.792a	0.220	-0.032	0.966b	1.632c
	(0.246)	(0.122)	(0.257)	(0.417)	(0.377)	(0.934)
Free Trade Agreement	0.053	0.024	0.082	0.250	0.783a	0.218
(FTA_{drt} =1 if yes)	(0.056)	(0.065)	(0.098)	(0.227)	(0.155)	(0.465)
Bilateral Investment	0.072	0.402c	0.087	1.448	0.356	-0.974
Treaty (BIT_{drt}=1 if yes)	(0.128)	(0.232)	(0.379)	(1.270)	(0.405)	(1.290)
Fixed Effects						
Period(t)	Yes	Yes	Yes	Yes	Yes	Yes
Pair(dr)	Yes	Yes	Yes	Yes	Yes	Yes
N	8975	8966	3878	3878	2351	1788
R-sq	0.994	0.998	0.959	0.900	0.965	0.638

Notes: 1. Estimates are obtained with Poisson Psuedo-Maximum Likelihood (PPML) estimator. 2. Standard errrs are in parenthesis are based on clustering by country-pair. 3. a, b, and c indicate the significance levels of 1, 5, and 10 percent, respectively.

Table 6: Effects of Aid for Trade (AfT) on Trade of Goods, Greenfield FDI and Cross-border M&A - PPML Results with Bilateral Fixed and Country-and-Time Fixed Effects

	Trade of Goods		Greenfield FDI		Cross-border M&A	
	(1)	(2)	(3)	(4)	(5)	(6)
	Donor exports to recipient	Donor imports from recipient	Number of projects	Value	Number of deals	Value
Bilateral AfT	0.017a	0.020b	0.041a	0.019	-0.006	-0.039
ln{max(1, AfT_{drt})}	(0.006)	(0.009)	(0.014)	(0.024)	(0.016)	(0.070)
No Bilateral AfT	-0.087c	-0.130a	-0.082	-0.107	0.108	1.120a
($NAID_{drt}$)	(0.046)	(0.045)	(0.077)	(0.144)	(0.118)	(0.408)
Free Trade Agreement	0.171a	0.067	0.157	0.346	0.302b	-1.321b
(FTA_{drt} =1 if yes)	(0.055)	(0.074)	(0.123)	(0.231)	(0.154)	(0.530)
Bilateral Investment	-0.002	0.060	0.025	1.956	0.810b	1.101
Treaty (BIT_{drt}=1 if yes)	(0.111)	(0.246)	(0.302)	(1.817)	(0.386)	(1.081)
Fixed Effects						
Country-Period	Yes	Yes	Yes	Yes	Yes	Yes
Pair(dr)	Yes	Yes	Yes	Yes	Yes	Yes
N	9848	9846	3874	3874	2299	1706
R-sq	0.998	0.999	0.989	0.95	0.983	0.866

Notes: 1. Estimates are obtained with Poisson Psuedo-Maximum Likelihood (PPML) estimator. 2. Standard errors are in parenthesis are based on clustering by country-pair. 3. a, b, and c indicate the significance levels of 1, 5, and 10 percent, respectively.

Table 7: Comparison of PPML and OLS Results

I. Specification with bilateral fixed effects and period effects								
	Donor exports		Donor imports		Number of Greenfield FDI projects		Number of cross-border M&A deals	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	PPML	OLS	PPML	OLS	PPML	OLS	PPML	OLS
Bilateral AfT	0.017	0.019a	-0.001	-0.001	0.043b	0.010a	0.012	0.003
$\ln\{\max(1, AfT_{drt})\}$	(0.011)	(0.006)	(0.011)	(0.011)	(0.019)	(0.004)	(0.015)	(0.002)
No Bilateral AfT	0.106	-0.092b	-0.101	-0.161a	0.457b	-0.028	0.176	-0.006
$(NAID_{drt})$	(0.131)	(0.036)	(0.116)	(0.062)	(0.218)	(0.019)	(0.181)	(0.011)
Other's AfT	0.026	0.010	0.007	-0.040	0.116a	0.015b	0.311a	0.021a
$\ln\{\max(1, AfT_{\sim drt})\}$	(0.020)	(0.020)	(0.023)	(0.035)	(0.042)	(0.006)	(0.042)	(0.004)
Fixed Effects								
Period(t)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pair(dr)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	8975	8800	8966	8735	3878	9475	2351	9475
R-sq	0.994	0.146	0.998	0.068	0.959	0.042	0.965	0.026

II. Specification with bilateral fixed effects and country-period effects								
	Donor exports		Donor imports		Number of Greenfield FDI projects		Number of cross-border M&A deals	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	PPML	OLS	PPML	OLS	PPML	OLS	PPML	OLS
Bilateral AfT	0.017a	0.012c	0.020b	-0.008	0.041a	0.007b	-0.006	0.001
$(\ln AfT_{drt})$	(0.006)	(0.006)	(0.009)	(0.011)	(0.014)	(0.003)	(0.016)	(0.002)
No Bilateral AfT	-0.087c	-0.045	-0.130a	-0.131b	-0.082	-0.014	0.108	0.003
$(NAID_{drt})$	(0.046)	(0.040)	(0.045)	(0.066)	(0.077)	(0.018)	(0.118)	(0.010)
Fixed Effects								
Country-Period	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pair(dr)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	9848	9645	9846	9582	3874	10474	2299	10474
R-sq	0.998	0.219	0.999	0.149	0.989	0.157	0.983	0.152

Notes: 1. Estimates are obtained with Poisson Psuedo-Maximum Likelihood (PPML) estimator or OLS. 2. Standard errrsare in parenthesis are based on clustering by country-pair. 3. a, b, and c indicate the significance levels of 1, 5, and 10 percent, respectively. 4. All other variables are included in regressions but not reported for the sake of brevity.

Table 8: Effects of Different Categories of Aid for Trade (AfT) on the Number of Greenfield FDI and Cross-border M&A - PPML Results

	Greenfield		M&A	
	(1)	(2)	(3)	(4)
	Other's AID ($lnAID_{\sim drt}$)	Bilateral AID ($lnAID_{drt}$)	Other's AID ($lnAID_{\sim dr}t$)	Bilateral AID ($lnAID_{drt}$)
Non-Aid for Trade	0.022	0.033	0.183b	0.052b
	(0.071)	(0.021)	(0.085)	(0.024)
Aid for Trade, all	0.116a	0.041a	0.311a	-0.006
	(0.042)	(0.014)	(0.042)	(0.016)
Infrastructure	0.096a	0.027b	0.209a	0.015
	(0.029)	(0.011)	(0.021)	(0.014)
Transportation	0.074a	0.022b	0.106a	0.001
	(0.021)	(0.010)	(0.020)	(0.015)
Communication	0.048b	-0.033a	0.026	0.003
	(0.021)	(0.010)	(0.027)	(0.012)
Energy	0.065a	0.036a	0.136a	-0.007
	(0.023)	(0.012)	(0.022)	(0.013)
Building productive capacity	0.045	0.030b	0.196a	-0.029b
	(0.039)	(0.012)	(0.054)	(0.015)
Banking, financial, business, and other services (240 and 250)	0.035	0.037a	0.124a	0.007
	(0.024)	(0.010)	(0.030)	(0.011)
BPC, other sectors	0.090c	0.010	0.175a	-0.002
	(0.054)	(0.009)	(0.050)	(0.015)
Trad policy and regulations	0.049a	-0.010	0.025	0.030
	(0.018)	(0.012)	(0.024)	(0.023)
Fixed Effects				
Period(t)	Yes		Yes	
Pair(dr)	Yes	Yes	Yes	Yes
Country-Period		Yes		Yes

Notes: 1. All estimates are obtained using Poisson Pseudo-Maximum Likelihood (PPML) Estimator. 2. Reported in columns (1) and (3) are regression results for AID variables with bilateral fixed effects, while in columns (2) are (4) are with country-period fixed effects. 3. All other variables including the non-Aid dummies (NAD) are included in regressions but not reported for the sake of brevity. 4. Standard errors are in parenthesis are based on clustering by country-pair. 5. a, b, and c indicate the significance levels of 1, 5, and 10 percent, respectively.

Table 9: Lagged Effects of Aid for Trade (AfT) on the Number of Greenfield FDI and Cross-border M&A - PPML Results

	Greenfield	M&A	Greenfield	M&A
	(1)	(2)	(3)	(4)
Bilateral AfT ln{max(1, AfT_{drt})}	0.038b	0.010	0.042a	-0.004
	(0.017)	(0.015)	(0.014)	(0.016)
Bilateral AfT ln{max(1, AfT_{drt-1})}	0.037b	0.025	0.038a	0.020
	(0.016)	(0.018)	(0.010)	(0.018)
Other's AfT ln{max(1, $AfT_{\sim drt}$)}	0.100a	0.272a		
	(0.039)	(0.039)		
Other's AfT ln{max(1, $AfT_{\sim drt-1}$)}	0.144a	0.165a		
	(0.042)	(0.046)		
ln$Population_{rt}$	0.484	-0.523		
	(0.931)	(1.115)		
ln$PCGDP_{rt}$	-0.179	0.487a		
	(0.155)	(0.184)		
ln$Population_{dt}$	-0.142	-4.868c		
	(1.751)	(2.601)		
ln$PCGDP_{dt}$	0.331	1.040a		
	(0.264)	(0.377)		
Free Trade Agreement (FTA_{drt} =1 if yes)	0.025	0.711a	0.114	0.276c
	(0.102)	(0.160)	(0.117)	(0.157)
Bilateral Investment Treaty (BIT_{drt}=1 if yes)	0.122	0.427	0.021	0.809b
	(0.378)	(0.415)	(0.303)	(0.387)
Fixed Effects				
Period(t)	Yes	Yes		
Pair(dr)	Yes	Yes	Yes	Yes
Country-Period			Yes	Yes
N	3866	2345	3862	2293
R-sq	0.965	0.966	0.990	0.983

Notes: 1. Estimates are obtained with Poisson Psuedo-Maximum Likelihood (PPML) estimator. 2. Standard errors are in parenthesis are based on clustering by country-pair. 3. a, b, and c indicate the significance levels of 1, 5, and 10 percent, respectively. 4. The non-Aid dummies (NAD) are included but not reported for the sake of brevity.

Table 10: Effects of Aid for Trade (AfT) by Different Groups of Donors on the Number of Greenfield FDI Projects – PPML Results

	All	Major 5	Others	All	Major 5	Others
	(1)	(2)	(3)	(4)	(5)	(6)
Bilateral AfT	0.043b	0.095a	0.018	0.041a	0.066b	0.020
ln{max(1, AfT_{drt})}	(0.019)	(0.036)	(0.015)	(0.014)	(0.026)	(0.016)
Other's AfT	0.116a	0.105c	0.119a			
ln{max(1, $AfT_{\sim drt}$)}	(0.042)	(0.063)	(0.045)			
ln$Population_{rt}$	1.325	1.132	1.035			
	(0.849)	(1.046)	(1.073)			
ln$PCGDP_{rt}$	-0.277c	-0.369c	-0.011			
	(0.158)	(0.194)	(0.186)			
ln$Population_{dt}$	0.016	-2.934	5.759a			
	(1.798)	(3.260)	(1.750)			
ln$PCGDP_{dt}$	0.220	0.110	-0.838a			
	(0.257)	(0.580)	(0.261)			
Free Trade Agreement	0.082	0.194	-0.108	0.157	0.387a	-0.159
(FTA_{drt} =1 if yes)	(0.098)	(0.143)	(0.103)	(0.123)	(0.135)	(0.126)
Bilateral Investment	0.087	3.215b	-0.195	0.025	0.343	0.075
Treaty (BIT_{drt}=1 if yes)	(0.379)	(1.420)	(0.370)	(0.302)	(1.559)	(0.305)
Fixed Effects						
Period(t)	Yes	Yes	Yes			
Pair(dr)	Yes	Yes	Yes	Yes	Yes	Yes
Country-Period				Yes	Yes	Yes
N	3878	1248	2630	3874	1184	2596
R-sq	0.959	0.971	0.921	0.989	0.994	0.953

Notes: 1. Estimates are obtained with Poisson Psuedo-Maximum Likelihood (PPML) estimator. 2. Standard errors are in parenthesis are based on clustering by country-pair. 3. a, b, and c indicate the significance levels of 1, 5, and 10 percent, respectively. 4. The non-Aid dummies (NAD) are included but not reported for the sake of brevity.

Table 11: Differences among five Major Donors in Vanguard Effects of Aid on the Number of Greenfield FDI Projects - PPML Results

	All Aid	AfT	Non-AfT
	(1)	(3)	(5)
$\ln\{\max(1, AID_{JP,\,drt} \bullet JP_{dr})\}$	0.130	0.186b	-0.028
	(0.140)	(0.075)	(0.123)
$\ln\{\max(1, AID_{US,\,drt} \bullet US_{dr})\}$	0.138b	0.063	0.139b
	(0.060)	(0.052)	(0.065)
$\ln\{\max(1, AID_{DE,\,drt} \bullet DE_{dr})\}$	-0.014	0.067c	-0.117
	(0.096)	(0.040)	(0.128)
$\ln\{\max(1, AID_{FR,\,drt} \bullet FR_{dr})\}$	0.019	-0.008	0.046
	(0.049)	(0.025)	(0.051)
$\ln\{\max(1, AID_{UK,\,drt} \bullet UK_{dr})\}$	0.044	0.063b	0.085c
	(0.040)	(0.029)	(0.047)
Free Trade Agreement (=1 if yes)	0.345b	0.277b	0.428a
	(0.143)	(0.118)	(0.152)
Bilateral Investment Treaty (=1 if yes)	0.219	0.349	0.328
	(1.603)	(1.572)	(1.620)
Fixed Effects			
Pair(dr)	Yes	Yes	Yes
Country-Period	Yes	Yes	Yes
N	1183	1184	1181
R-sq	0.994	0.995	0.993

Notes: 1. Estimates are obtained with Poisson Psuedo-Maximum Likelihood (PPML) estimator. 2. Standard errrsare in parenthesis are based on clustering by country-pair. 3. a, b, and c indicate the significance levels of 1, 5, and 10 percent, respectively. 4. The non-Aid dummies (NAD) are included but not reported for the sake of brevity.

Appendix Table 1: Mean Values of Key Variables for 25 Donor Countries during 2004-2012

Variable	Obs	Mean	Std. Dev.	Min	Max
Bilateral AfT (US$ Million)	25	4,976.0	10,046.6	7.2	42,623.0
AfT from other donors (US$ Million)	25	224,445.2	10,046.6	186,798.2	229,414.0
Greenfield FDI (Number of projects)	25	1,471.4	2,390.6	27.0	11,318.0
Greenfield FDI (US$ Million)	25	106,531.5	150,778.9	2,175.0	695,661.4
Cross-border M&A (Number of deals)	25	541.9	849.2	15.0	3,821.0
Cross-border M&A (US$ Million)	25	29,816.1	38,795.9	41.4	150,605.2
Donor exports	25	459,553.5	661,463.9	1,607.9	2,329,986.0
Donnor imports	25	726,174.1	1,281,520.0	5,531.7	6,229,834.0
Source: Authors' calculation.					