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Tied Aid, Trade-Facilitating Aid or Trade-Diverting Aid?

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TIED AID, TRADE-FACILITATING AID OR
TRADE-DIVERTING AID?

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Tied Aid, Trade-Facilitating Aid or Trade-Diverting Aid?*

Lars M. Johansson[†] and Jan Pettersson[‡]

March 9, 2009

Abstract

Donor aid is often regarded as being informally tied (aid increases donor-recipient exports) and this effect is, in general, interpreted as being harmful to aid recipients. However, in this paper, using a gravity model, we show that aid is also positively associated with recipient-donor exports. That is, aid increases bilateral trade flows in both directions. Our interpretation is that an intensified aid relation reduces the effective cost of geographic distance.

We find a particularly strong relation between aid in the form of technical assistance and exports in both directions. When we disaggregate aid to specifically study the effects from trade-related assistance (Aid for Trade) the effect is small and fully accounted for by aid to investments in trade-related infrastructure. Our sample includes all 184 countries for which data is available during the period 1990 to 2005.

JEL Classification: F35; O19; O24

Keywords: Foreign Aid, International Trade, Exports, Gravity, Aid for Trade

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1 Introduction

The purpose of this article is to empirically study the relation between bilateral foreign development assistance (aid) and bilateral exports. While earlier studies find a positive correlation between donor aid and donor exports (leading to the interpretation that aid is informally tied and thus, harmful for recipient countries), we find a very similar correlation between received aid and recipient exports (or, in other words, between donor aid and donor imports). From this finding, we draw the conclusion that an intensified aid relation is associated with a reduction in the effective cost of geographic distance, which implies larger bilateral trade. This would explain why we observe a similar relation between aid and export for both the donor and the recipient. Alternatively, the mechanisms that determine the donor export effect are different from those that determine the recipient export effect. If so, tying could still explain the positive correlation between aid and donor exports. We use panel data to estimate gravity equations (explaining bilateral exports) augmented with various foreign development assistance variables. Our sample includes all 184 countries for which there is data available during the period 1990 to 2005.

When studying the aid-trade link, a number of potential explanations exists for the correlations observed.¹ Donor countries are rarely assumed to be pure altruists but rather as acting to pursue multiple objectives. As such, recipient country development is only one goal along with foreign policy considerations and commercial interests. A quite established result is the positive effect of aid on the volume of *donor country exports*. The size of this effect is often referred to as the effective amount of tied aid (Nilsson, 1997; Wagner, 2003). Hence, there is a reflux of aid. To the extent that the respective donor country is also providing the best quality of the goods actually imported from that donor at competitive prices, tying would not carry any efficiency costs. However, there is evidence that tying of aid results in im-

¹Morrissey (2006) provides a structured discussion on the relationship between trade and aid. This is part of the wider literature on aid allocation where Alesina and Dollar (2000) and Collier and Dollar (2001) are important contributions. Recent examples include Feeny and McGillivray (2008) and Wood (2008).

port cost increases (Jepma, 1991; Osei, 2004) and there could also be more dynamic effects by locking countries into less favourable production and trade structures.² Therefore, it is important to distinguish between the effects of formally tied aid and the effects resulting from an intensified bilateral relationship. The latter are likely to be less harmful and should presumably also have a positive effect on recipients' exports. Moreover, it is not evident that tied aid always results in increased donor exports. Tied aid funds may simply finance donor exports that would have been undertaken anyway. Donor exports may thus be considered to be "fungible", similarly to the normal use of the term relating to recipient government behaviour.³

Concerning the effects of aid on *recipient country exports*, aid has the possibility of speeding up the learning-by-doing process when practising trade, thus facilitating future exports in its creation of customer relations, reputation, distribution channels and in adapting to the formal and informal market environment.⁴ In short, aid creates links between the donor and the recipient that will enhance the recipient's exports to the donor. The same mechanism may also lead donors to choose to import from development partners instead of other countries. These relations may be sticky in nature (i.e. an importer keeps its current supplier) under positive switching costs. Thus, aid might have long-run positive effects on trade. A positive effect on recipient bilateral exports could also be observed if a donor provides aid as a means of guaranteeing imports of strategically important products/natural resources. In particular, for materials of strategic interest, aid may entail an implicit (or explicit) obligation to sell to the donor country. To the extent that the aid recipient controls the strategic resource, this could alternatively be seen as a means of securing future aid inflows. In contrast, one reason for instead expecting the effect of aid on recipient

²Tied aid may also be bad for the donor if it implies supporting domestic old inefficient firms by subsidising their exports.

³For a discussion on the effect of fungibility on growth and poverty reduction, see Pettersson (2007b,a).

⁴Using data on Moroccan manufactures, Fafchamps et al. (2008) test whether productivity learning (lower costs) or market learning (market familiarity) is the driving force for export selection. They find evidence of adaptability to changing consumer tastes (familiarity with export markets) to be important, while productivity learning turns out to be empirically unimportant.

bilateral exports to be small is that aid (even if targeted on trade facilitation) may primarily affect trade between the recipient and its neighbouring countries (not necessarily trade between the recipient and the donor). From this perspective, the effect on recipient bilateral exports says nothing about the extent to which aid is efficient.⁵

Each of the above arguments may also be used to make a case for the positive effects of trade on aid. Donors choose to support the development process for their trading partners rather than for other countries; exporters may identify the need for reform in countries where they are active; exports and aid to former colonies may be high; and concessions for certain strategic products may require a positive amount of aid. Hence, we strongly suspect aid to be endogenous to trade. Therefore, we would like to sort out the direction of causality, primarily by instrumenting for aid. Here, we face one major obstacle: We are unable to find any variable that we judge to be a credible instrument. We believe the absolute majority of aid-determinants to be unlikely to identify any exogenous variation in aid to assess its causal effect on trade, i.e. we expect the instruments to not only be correlated with aid but also directly correlated with trade, thus violating the exclusion restrictions for a valid instrument (that is, that the instrument has no partial effect on trade once aid is controlled for and that it is not correlated with unobservables affecting trade). In the robustness section, we do, however, instrument for aid before turning to Granger causality tests which confirm that two-way causality cannot be rejected. However, it is not evident that a Granger causality test captures causality. Aid is often disbursed following previous commitments, so that import decisions may be taken anticipating

⁵It is arguably the effect of aid on the total and not the bilateral level of exports that is of greatest importance for development. If aid is effective in enhancing the export potential of the recipient country (i.e. exports in total increase as a result of aid), this would be positive from a development perspective, regardless of the effects on bilateral trade. However, for a supply constrained developing nation, exports will not necessarily largely respond in total volumes but rather in their allocation. Hence, this article does not evaluate whether aid or trade is “good” for development. A recent article covering the literature on aid and growth is McGillivray et al. (2006). For a discussion on the effects of trade (openness) on development, see Rodrik et al. (2004).

aid inflows.⁶ Since we cannot establish the direction of causality, our hypothesis echoes that of Wagner (2003): Donors and recipients enter a reciprocity agreement. Aid and trade decisions are interlinked in that none of them would increase without the other. The main hypothesis to be tested is thus that (after controlling for other relevant variables) bilateral aid is not only correlated with donor exports but also with recipient exports.

This study mainly differs from earlier research in its focus on the impact of aid on recipient as well as donor exports. Other papers using the gravity model of trade in analysing the effect of aid include Nilsson (1997); Osei et al. (2004) and Wagner (2003). However, they all only consider the effect of aid on donor exports.⁷ When assessing the growth effects of aid, it has been shown to be important to disaggregate aid (e.g. Clemens et al., 2004). There is reason to believe that this also applies to recipient and donor exports. Therefore, we separate various subsets of aid from aggregate aid. First, we make a distinction between technical assistance (and general budget support) and other aid. Thereafter, we focus on aid aimed at increasing a developing country's export potential, that is, the amount of Aid for Trade (AfT). Moreover, the export effect is not likely to be symmetric over different product categories. Is the effect mainly on primary products, manufactures or maybe in sectors considered to be of strategic importance? We disaggregate total bilateral exports into a number of subsectors.

Apart from finding that aid is positively associated with recipient-donor exports as well as with donor-recipient exports, we find a particularly strong relation between aid in the form of technical assistance and exports in both directions, thus supporting our interpretation that market knowledge through interpersonal relations is an important driving force for exports. Moreover, when disaggregating aid to specifically study the effects of trade-related assistance (Aid for Trade), the pos-

⁶Lloyd et al. (2000) study the aid-trade relation between European donors and African recipients and find that Granger tests confirm all three links (i.e. aid - trade, trade - aid, and simultaneity) and conclude that the sample should be divided accordingly.

⁷Johansson et al. (2006) constitutes an attempt to look at the effect of aid on both recipient and donor exports, using the gravity model applied to Uganda and its donors.

itive correlation shows up with donor exports only, suggesting that some forms of Aid for Trade are easier to (informally) tie than other forms of aid. Moreover, the effect of Aid for Trade seems to come in full from aid to investments in trade-related infrastructure. The partial correlation between bilateral aid and bilateral trade is present in different export sectors, thus suggesting that no specific industry is driving the results. However, recipient country exports of strategic resources seem quite important. The relation between donor exports and aid differs between geographical regions. Donor exports to Sub-Saharan African countries are particularly strongly correlated with bilateral aid flows while the corresponding correlation is weaker for Asia and not present for Latin America. Still, the correlation between recipient exports and aid is similar across regions.

The article proceeds as follows. In Section 2, we set out our main empirical specification as well as some digressions from it. Section 3 presents the data we are using. Section 4 presents the results from the estimation of our base model while section 5 contains the results from some alternative specifications. Section 6 addresses a number of robustness issues. Finally, section 7 concludes the paper.

2 Empirical specification

Our empirical model is an augmented gravity model following the set up in Head (2003), for example.⁸ The gravity model explains bilateral trade intensity (in terms of total or unidirectional trade) as depending on economic size (proxied by GDP and population of the trading countries) and "distance". Distance is broadly defined as factors that in different ways act as resistance to trade, such as geographical distance, but also factors that may hinder or facilitate a trade relationship, such as the existence of a free trade agreement between trading partners, a common language etc. Anderson and van Wincoop (2003) have demonstrated that for trade

⁸A nice non-technical introduction is found in Piermartini and Teh (2005). Moreover, Egger (2005); Baldwin and Taglioni (2006) and Helpman et al. (2008) are good references for alternative techniques when estimating gravity models.

between country pairs, it is the relative resistance that is of importance, that is, the resistance to trade between the country pair in relation to the resistance to trade between these countries and other potential trading partners (so-called *multilateral resistance*). Preferably one would want to account for *multilateral resistance* in gravity model estimations. However, according to Anderson and van Wincoop, including country-specific dummies will also lead to consistent estimates of model parameters and this is the strategy we have chosen.⁹ Let us define $Gravity_{ijt}$ for an exporting-importing ($i-j$) country pair to include the “fundamental” gravity-model variables and their associated multipliers as:

$$\begin{aligned}
Gravity_{ijt} = & \alpha_i + \gamma_j + \lambda_t + \beta_1 LnGDP_{it} + \beta_2 LnGDP_{jt} + \beta_3 Pop_{it} + \beta_4 Pop_{jt} \\
& + \beta_5 LnDistance_{ij} + \beta_6 Contiguity_{ij} + \beta_7 ComColonizer_{ij} \\
& + \beta_8 Colony_{ij} + \beta_9 ComOffLang_{ij} + \beta_{10} RTA_{ijt}.
\end{aligned} \tag{2.1}$$

Subindex i represents the exporting country, j the importing country and t the period. GDP is the GDP of the respective country, Pop is population, $Distance$ is the distance between the two countries (in km between the economic centres in the respective country), $Contiguity$ is a dummy taking the value of one if the two countries are contiguous, $ComColonizer$, $Colony$ and $ComOffLang$ are dummies taking the value of one if the two countries have had a common colonizer after 1945, ever had a colonial link and share a common official language. RTA , finally, is a dummy variable equal to 1 if the two countries are members of the same regional trade agreement. To control for unobserved country and time characteristics (including *multilateral resistance* as discussed above), we follow e.g. Mátyás (1997), Feenstra (2002) and Helpman et al. (2008) by including import, export and time dummies (α_i , γ_j and λ_t). We then add aid to the typical gravity variables. Our

⁹By including country dummies, we imperfectly control for *multilateral resistance*. Preferably, one would have to use time varying country dummies. However, this would imply estimating a model with more than 5 000 variables. We have chosen time invariant dummies simply to get a model that puts less demand on computing capacity.

extended gravity model becomes

$$\begin{aligned} LnExport_{ijt} = & Gravity_{ijt} + \beta_{aidr}LnAidr_{ijt-1} + \beta_{NADr}NADr_{ijt-1} \\ & + \beta_{aidg}LnAidg_{ijt-1} + \beta_{NADg}NADg_{ijt-1} + \epsilon_{ijt} \end{aligned} \quad (2.2)$$

where $Export_{ijt}$ are exports from country i to country j in period t . $LnAidr_{ij}$ ($LnAidg_{ij}$) is the log of aid that the exporting country receives from (gives to) country j . However, in many cases we will not have any aid flow. To control for these zeroes, we include $NADr$ and $NADg$, no-aid-dummies taking the value of one whenever $LnAidr_{ij} = 0$ or $LnAidg_{ij} = 0$.¹⁰ The coefficient β_{aidr} (β_{aidg}) hence measures the recipient's (donor's) aid elasticity of exports given that it is receiving (giving) aid. Exports to aid donors exceed exports to non-donors when $\beta_{aid}LnAidr_{ij} > \beta_{NADr}$ (equivalently for donors). In order to somewhat handle potential endogeneity of aid flows to exports, we use one period lagged aid flows.¹¹

2.1 Disaggregating aid: Technical assistance and Aid for Trade

When assessing the growth effects of aid, it has been shown to be important to disaggregate aid (e.g. Clemens et al., 2004). There is some reason to believe that this also applies to recipient exports. Therefore, we subtract the amount of technical assistance from total aid. We also make an attempt to control for the level of general

¹⁰To be precise, NAD is a dummy for all cases where aid is reported to be zero, negative or not reported at all. In all these cases we have set $aid = 1$.

¹¹If aid causes trade, it is reasonable to assume that this effect materialises with some lag, even if this is not necessarily the case. A discussion of the effects of lags and their plausible relation to causality is provided in the robustness section.

budget support (GBS).¹² The corresponding equation becomes

$$\begin{aligned}
LnExport_{ijt} = & Gravity_{ijt} + \beta_{aidr} LnAidr_{ijt-1}^{NTA} + \beta_{NADr} NADr_{ijt-1} \quad (2.3) \\
& + \beta_{TA_r} LnTA_r_{ijt-1} + \beta_{NTA_r} NTA_r_{ijt-1} + \beta_{aidg} LnAidg_{ijt-1}^{NTA} + \\
& \beta_{NADg} NADg_{ijt-1} + \beta_{TA_g} LnTA_g_{ijt-1} + \beta_{NTA_g} NTA_g_{ijt-1} + \epsilon_{ijt}
\end{aligned}$$

where $LnAidh_k^{NTA}$, $h \in r, g$, and $k \in i, j$ denote total aid net the amount of technical assistance (i.e. $Ln(Aidh_k - TA_h)$). A similar change in specification is made when controlling for general budget support.

An alternative attempt is made in order to see whether it is the sector supported rather than the type of aid that influences recipient country exports. One notable change in international development cooperation in the last decade is the increased emphasis on the potential of aid to help developing countries expand their trade capacity. Promises to increase trade-related assistance were an important part of the WTO Ministerial Declaration of 2001 (Doha) and this work on 'Aid for Trade' was further mandated in the 2005 Declaration (Hong Kong), for example through the set up of a specific Aid for Trade Task Force. Our ambition is therefore to separate from aggregate aid the amount aimed at increasing a developing country's export potential, that is the amount of Aid for trade (AfT). This involves some problems. Conceptually, it is far from evident how to define what should actually count as AfT since, in principle, any support that loosens the supply-side constraints of a country will also have a potentially positive effect on exports. At the practical level, data availability determines the possibilities for disaggregation. In order not to let AfT mean "anything", we limit AfT to aid aimed at improving (i) trade policy, (ii) trade related infrastructure and (iii) productive capacity.¹³ Including AfT, the

¹²A correct subtraction of GBS depends on a number of assumptions (see below), thus making the results uncertain.

¹³For a conceptual discussion, see e.g. Andersson et al. (forthcoming).

estimating equation becomes

$$\begin{aligned}
LnExport_{ijt} = & Gravity_{ijt} + \beta_{aidr}LnAidr_{ijt-1}^{NAFT} + \beta_{NADr}NADr_{ijt-1} + (2.4) \\
& \beta_{AfT}LnAfTr_{ijt-1} + \beta_{NAFT_r}NAFTDr_{ijt-1} + \beta_{aidg}LnAidg_{ijt-1}^{NAFT} + \\
& \beta_{NADg}NADg_{ijt-1} + \beta_{AfT}LnAfTg_{ijt-1} + \beta_{NAFT_g}NAFTDg_{ijt-1} + \epsilon_{ijt}
\end{aligned}$$

where $LnAidh^{NAFT}$ denotes total aid net of Aid for Trade (i.e. $Ln(Aidh - AfTh)$).

2.2 Disaggregating trade: Effect on different economic sectors

The impact of development assistance is not likely to be neutral across different export categories, with a resulting variation in export revenues to different sectors. Some sectors may be in particular need of development assistance for exports to increase. Other sectors may, due to the strategic nature of certain resources, respond strongly to aid, either as a way for a recipient country of guaranteeing aid inflows or as a way for donors of guaranteeing the supply of these goods. Therefore, we disaggregate our data on exports into several sub-sectors. Accordingly, the dependent variable in Equation (2.2) and the successive specifications are now instead $LnExport_{ijt}^d$, where d indicates the export sector of interest.

2.3 Non-traders

To control for the probability that countries start trading, we try to correct for potential Heckman selection bias by estimating a two-stage model. The first stage includes the estimation of a probit equation of the probability that country j exports to country i . In the second stage, the predicted selection from the first stage is controlled for. To identify the second equation, at least one variable is needed that can be excluded from the second stage, i.e. a variable that is a strong predictor of trade occurring but not a predictor of the intensity of trade. Helpman et al.

(2008) use regulation costs of firm entry from Djankov et al. (2002) as excluded variables. Since their sample is dramatically reduced due to data availability, they use common religion as an alternative excluded variable.¹⁴ We have chosen the Heckman selection model as our baseline estimation model, using common religion as the excluded variable in the intensity equation. However, Helpman et al. (2008) find the selection bias to be "economically negligible though statistically (strongly) significant" (p. 446) and we confirm this finding in the robustness section when comparing our results to ordinary least square estimations.

3 Data

Our sample covers the years 1990-2005 and includes all 184 countries for which there is data available. Our data on bilateral exports comes from the COMTRADE dataset. We use reported imports (so that, for example, Kenyan exports to France are the imports from Kenya to France as reported by France).¹⁵ The data on aid comes from the OECD's Development Assistance Committee's online database International Development Statistics. This, in turn, consists of two databases; the Development Assistance Committee online database (DAC) and the Creditor Reporting System online database (CRS). From DAC, we obtain the volumes of disbursed aid, while CRS reports commitments. Unfortunately, with one exception (technical assistance), we do not have any disbursement data on disaggregated aid so we are forced to use commitments from CRS. This is clearly a problematic mea-

¹⁴They also report that they could instead use common language as the excluded variable. However, both the religion and the language variable are often used as explanatory variables in the intensity equation. Therefore, it appears strange to use them in the choice equation only and, in particular, to alternate between them. However, we are unable to come up with any good alternatives. Iwanow and Kirkpatrick (2007), with reference to Helpman et al. (2008), also use common religion as the excluded variable. However, the focus of their study is on regulatory quality and in the volume equation, they use variables quite similar to the preferred *excluded* variable in Helpman et al. (2008). To say the least, there is no consensus on which variables to use for identification.

¹⁵When imports are not reported, we instead use the corresponding reported exports with some adjustments. See Appendix B for details.

sure, since it does not give any information about whether the amount committed has been disbursed or whether the disbursement has taken place in the same year as the commitment was made. We try to overcome this by using the shares of the respective commitments to total commitments. Assuming the share of commitments to be the same as the share actually disbursed in each sector, we use these shares to disaggregate total disbursements.

Data for distance, contiguity, colonial and common language dummies is taken from the "distance database" at CEPPIL. Data for GDP and population is taken from the World Development Indicators Online database. Following Helpman et al. (2008), all nominal variables are deflated into 2000 dollars using the US GDP chain price index.¹⁶ Appendix B describes the data in greater detail. Table B1 presents summary statistics and a correlation matrix is found in Table B2.

4 Aggregate results

The results from regressing aggregate bilateral export on aggregate aid as specified in equation (2.4) are presented in Table 1. The first column presents the results without the inclusion of the aid variables. Coefficient signs and levels are consistent with previous studies such as Iwanow and Kirkpatrick (2007), Francois and Manchin (2007) and Melitz (2007). The negative coefficient estimates for population mirror the result in e.g. Frankel and Romer (1999, Table 1), that "residents of larger countries tend to engage in more trade with their fellow citizens simply because there are more fellow citizens to trade with" (p. 380). Melitz (2007) posits that population should have a negative impact on bilateral trade in his model, but reports that it does not enter significantly when including country-fixed effects.

¹⁶Baldwin and Taglioni (2006) instead propose to use nominal trade and GDP data and include time dummies. However, when including time dummies, their results are identical to those obtained when using non-deflated data. An alternative is to deflate the data in nominal national currency by a national price index and then convert it to US dollars. However, all data we have is provided in current US dollars and previous studies on aid and trade also use constant dollar values. Therefore, we stick to this procedure.

Table 1 around here

The aid variables are introduced in columns (2) to (4). The parameter estimates from column (1) are essentially unaffected by these inclusions. In column (2), a one-year lag of aid given from the exporter to the importer is introduced. Our results mirror earlier findings of a positive correlation between donor aid and donor exports, thus corroborating the hypothesis that aid is tied to exports from the donor country. However, if the aid relationship facilitates the trade relationship more generally and is not only a means of persuading the recipient to buy goods and services from the donor, then we should be able to observe a similar effect on recipient exports. Moving to column (3), we see that this is indeed the case. Here, the aid variable is aid received and the parameter estimate indicates to what extent received aid is associated with an increase in the recipient's exports to the donor. The results suggest that an increase in aid of ten per cent is associated with roughly one per cent higher exports from the recipient to the donor.

Column (4) includes both aid given and aid received and is our preferred specification. Starting with aid given, recall that $NADg$ is a no-aid dummy. Hence, donor exports to aid recipient countries will be larger than exports to non-aid-recipients when $0.0908 * \logaidg > 0.618$, that is if aid given exceeds 902 dollars. Since this is lower than the smallest amount of aid in the sample, no bilateral relation would gain in terms of exports under a counterfactual of no aid being given. The estimated elasticity for aid received (\logaidr), 0.0904, is essentially identical to the estimate for donor aid (0.0908). What is the relative importance of this effect? Let us take figures for Sweden and Tanzania in the year 2005. The bilateral assistance from Sweden to Tanzania was 81 million dollar. The export from Sweden to Tanzania was 65 million dollars while Tanzania's export to Sweden was 4.1 million dollars. Taking these numbers as a departure and the elasticities of aid given and aid received above, a ten-per cent increase in aid (8.1 million dollars) would imply an increase in Swedish exports to Tanzania of around 590 000 dollars and an increase in Tanzanian

exports to Sweden of about 37 000 dollars.¹⁷ With the elasticity for distance from column (4), a reduction of the distance between Sweden and Tanzania of less than 45 kilometres would predict the same increase in export. So, even if aid given and aid received are statistically significant as predictors for export, as compared to the importance of distance, aid tends to only play a minor role for trade relationships.

5 Disaggregated results

Given the correlations in the previous section, an interpretation that aid is tainted with some murky mercantilistic policy to induce the recipient to buy the donor's goods and services will not give the full picture. Furthermore, some export sectors may respond more to given and received aid than others. It could be the case that some recipient export sectors are more responsive to aid or that some industries are generally targeted more aid than other industries. Regarding donor exports, some industries may be easier to match with given aid than others, implying that the implicit or explicit tying (and hence the elasticity) should be higher for those exports. It may also be the donor's need for certain strategic products, like oil and minerals, that drives the result with regards to the recipient's export to the donor (or, as mentioned before, a way for aid recipients of ensuring future aid inflows). To test for this, we perform the same estimations as in our baseline model but using the exports of specific product categories as alternative dependent variables. More specifically, we focus on six subsectors: *Ores and metals*; *Fuels*; *Food*; *Agricultural raw materials*; *Manufacturing* and what we denote as *Strategic sectors* (including different strategic minerals).¹⁸ Compared to our results for total exports, we would expect the elasticities to differ between given aid and received aid as well as between product categories. In particular, we would expect *aidg* to be most responsive in manufactures, while we have no specific reason to believe that *aidg* in the other

¹⁷Note, once more, that this estimate of aid on bilateral exports is not informative of whether aid is efficient (i.e. associated with an increase in total exports).

¹⁸For details, see Appendix B.

sectors differs from the elasticity for total exports. If anything, we would expect a low correlation between donor aid and donor exports of natural resources and agricultural products since such exports are at least as likely to find a market in countries not receiving aid. Regarding *logaidr*, we expect exports of strategic nature to be relatively important.

Table 2 around here

The results are presented in Table 2. For the sectors in focus, the general impression is that recipient exports tend to be more strongly correlated with aid than donor exports. Looking at donor exports, the elasticity is particularly low in food and manufactures, which is at odds with our expectations. The elasticity for agricultural products is surprisingly high. The results for recipient exports are more consistent with our priors. The elasticity is highest in the agriculture and strategic materials sectors. The coefficient estimate for strategic materials is more than fifty per cent higher than the corresponding estimate for total exports and much higher than in other sectors.¹⁹ However, the effect for certain strategic products alone does not explain the strong general link between aid and the recipients' export to the donors since this link seems to exist for all types of exports (or at least for the different types of exports we checked). This supports our explanation that an aid-relationship in more general terms may induce trade.

As discussed in the introduction, aid may facilitate trade between two countries by the creation of customer relations, reputation, distribution channels etc. and hence reduce the effective "distance" between trading partners. Here, one might speculate whether certain forms of aid are more conducive to this than others. For example, it would be expected that development cooperation that involves broad

¹⁹Unfortunately, the OECD/DAC database does not include China as a donor. Some people claim that China's need to secure the supply of energy and minerals for its industry is an important driving force for China's involvement in development cooperation with Africa. If this is correct, adding data on China would supposedly reinforce the effect for recipient exports of strategic materials. However, Africa is also becoming more important as a market for Chinese manufactured products. For an overview of Chinese-African aid, trade and investment linkages, see Zafar (2007).

contacts between business people on both sides would have a strong positive effect on bilateral trade. However, it is beyond the scope of this work to identify such cooperation in the data in any detail. Instead, we make a simple disaggregation among technical assistance (TA), general budget support (GBS) and other forms of aid as specified in equation (2.3). Our hypothesis would be that TA, involving more of personal contacts, would have a stronger impact on the bilateral trade relationship than aid in general while the opposite would be true for GBS. Such a disaggregation is made in Table 3. As expected, the partial correlation is stronger between TA and exports than between other forms of aid and exports. The coefficients on $\log aidg$ and $\log aidr$, which are now aid net of TA in column (2) and net of TA and GBS in column (3), fall by around two thirds. We find no correlation between GBS and bilateral trade. However, as noted in Section 3, the disaggregation involving GBS is based on commitment shares and, therefore, possibly subject to measurement error.

Table 3 around here

Another way of cutting the pie would be to separate from aggregate aid the amount of aid that is specifically aimed at strengthening the trading capacity of the development partner, the so-called Aid for Trade (AfT, see equation (2.3)). We follow the same disaggregation as in DAC (2006), although somewhat less detailed, distinguishing between aid to *Trade Policy and Regulations*; *Investments in Trade-Related Infrastructure*; and *Building Productive Capacity*. The broadest definition of AfT is the sum of all these parts.²⁰ Table 4, column (1), presents the original results in order to facilitate the comparison. Singeling out AfT, in column (2), the quantitative effect from other aid decreases. AfT is very weakly correlated with recipient exports, although it shows a small but statistically significant positive correlation with donor exports. One speculation could be that it is easier to informally tie AfT than other forms of aid. When disaggregating the amount of total AfT, in column (3), the results suggest that aid to investments in trade-related infrastructure fully

²⁰See Appendix B for details.

drives the results for both recipients ($\ln AFTInfr$) and donors ($\ln AFTInfg$).

Table 4 around here

As a final disaggregation exercise, we split the sample geographically. More specifically, based on recipient status, we separate three different regions: Sub-Saharan Africa, Asia, and Latin America. The results are presented in Table 5. We find no large differences in the effect of aid received between the regions. The coefficient varies between 0.05 (Sub-Saharan Africa) and 0.07 (Asia). More interestingly, $\ln aidg$ is estimated to have a zero effect for Asia, a small effect for Latin America and a large (0.14) and highly significant effect for Sub-Saharan Africa. One interpretation of this is that tied aid (along with its potential negative effects) is a special feature in the donor-recipient relation with African countries only.

Table 5 around here

6 Robustness

In this section, we test the extent to which our results are robust to a number of changes in the specification as well as in sample size (in terms of country and time coverage).

6.1 Non-Traders

We control for selection bias using the Heckman selection model with common religion as the excluded variable. Many other studies control for selection, but are not explicit on which variable is excluded (e.g. Wagner, 2003). Some studies use OLS, controlling or not controlling for unobserved heterogeneity by including one or more of exporter, importer, and trade-pair dummies after dropping the zero-observations of trade. While controlling for selection seems to have become the new standard in estimations of gravity models, what is of importance from a practical perspective

is whether controlling for selection bias is actually of importance. Helpman et al. (2008) find the bias to be economically negligible, so that studies using OLS may not be that far off the target. In Table A1, we can see that it is of no importance for our main results whether we use the Heckman Selection model (using the two-step or maximum-likelihood estimation – see columns 1 and 2) or OLS, based on positive observations of exports (column 4). Even when we include the zeros (by adding a dollar to all zero-export observations) in column (3), the estimates for *logaidg* and *logaidr* do not change the conclusion of a positive correlation between aid and exports.²¹

6.2 Endogenous aid, causality

To address the likely endogeneity of aid to recipient exports, we would like to instrument for aid. It is beyond the scope of this paper to attempt to nest a Heckman selection estimation procedure with an Instrumental Variable (IV) estimation. Therefore, and justified by the observation in the previous section of the minor quantitative importance of selection bias, selection bias is not controlled for in this section. There are at least three potential groups of instruments used in the previous literature: (i) donor country characteristics; (ii) recipient political importance; and (iii) lagged aid.

A set of instruments belonging to the first group was first adopted by Tavares (2003), where the dependent variable is the level of corruption. The idea behind the use of these instruments is that recipient circumstances are not the only factor determining the level of aid received but also that, to a large extent, these flows are determined by donor country characteristics. When a donor changes its total aid budget, this is mainly driven by domestic budgetary considerations. However, this will tend to (exogenously) favour culturally and geographically closer recipient

²¹It is of potential interest that the no-aid dummies now change sign, which is probably explained by a non-proportional increase in small and poor bilateral pairs. However, we refrain from further speculations since most other parameter estimates change significantly.

countries. Hence, the change in aid receipts is exogenous to recipient behaviour.²² The question is whether the set of instruments plausibly identifies any exogenous variation in aid when analysing its effect on aid-recipient exports. The instruments consist of a dummy for common language between donor and recipient, a common religion dummy, total net disbursements of ODA by the (five largest) donor(s) and (the inverse of the) physical distance. Hence, our problem is not only that many of the proposed instruments are likely to be correlated with donor exports. In particular, they all belong to the set of “traditional” determinants of trade in a gravity equation.

A set of instruments capturing recipient countries’ political importance as a determinant for aid allocation comes from Kuziemko and Werker (2006). Using aid recipients’ seat-holding in the U.N. Security Council as a determinant of U.S. and U.N. aid disbursements, they find a larger effect during key diplomatic years (proxied by the total yearly number of *New York Times* articles with the words “United Nations” and “Security Council” in the article). These two variables are used to instrument for recipient country aid in a study of foreign aid fungibility by Tamura (2005).²³

Finally, aid has often been instrumented using its own lags (see e.g. Hansen and Tarp, 2001, for the effect of aid on growth). To the extent that aid disbursements lag commitments, disbursements will not necessarily identify any causal effect. Furthermore, aid tends to change quite slowly, thus making lagged aid a good proxy rather than a good instrument for current aid.

We believe that only the second set of instruments has some plausibility of being exogenous to country exports, at the same time as they act as determinants of aid. Naturally, it could also be the case that votes in the Security Council (SC) are bought

²²This set of instruments has recently been used, in particular by Paul Collier, in analysing a wide range of effects of aid such as the probability of exit state failure (Chauvet and Collier, 2007), economic growth (Collier and Goderis, 2007) and the size of military expenditures (Collier and Hoeffler, 2007).

²³Alesina and Dollar (2000) use donor friendship to capture donor strategic interests, where friendship is defined as the bilateral correlation of votes in the UN General Assembly.

by granting special trade favours, thus making the SC-seat a direct determinant of bilateral trade. We hold this to be less likely, however, since trade policy is less discretionary and has longer time lags. The “visibility of the bribe” would tend to be better when changing trade rules for a single trade partner as compared to adjusting aid-disbursements. It is also shown by Kuziemko and Werker (2006) that there is a significant decrease in aid when the recipient country exits the council and reversing trade policy to have the same effects appears to be less likely. Hence, we posit that a seat does not directly influence the aid-recipient export volume to a particular nation.

The results are presented in Table A2. In Column (1), the instrument set consists of two variables, a dummy for membership in the SC and the NYT-variable.²⁴ First-stage estimates are presented in the lower panels. The security council dummy does not enter significantly in the first-stage regression for received aid while for aid given, it is significant at the ten-per cent level only (but with a *negative* point estimate). The NYT-instrument is significant at the five-per cent level in both regressions. Hence, the very low significance levels, in particular for *SCseat*, suggest that our instruments are weak in this setting and make the system underidentified in practice. Indeed, the partial R-squared between the instruments and the endogenous variables is zero as reported below in the first-stage estimates. Unsurprisingly, the IV-estimates in column (1) differ in magnitude from our earlier results. In column (2), we add lagged aid to the instrument set.²⁵ While our second-stage results are now more in line with our original estimates, these results depend heavily on the use of lagged aid as instruments (in particular in the first-stage regression for aid received) and, as stated earlier, we fear that lagged aid values may be correlated with the error term. Indeed, a test for overidentifying restrictions rejects the null of instrument exogeneity.

²⁴As an alternative to the NYT-variable, we tried to use the yearly number of resolutions from the Security Council. However, this variable never entered as significant.

²⁵Note that this is the second lag of aid since the first lag of aid is still used as the endogenous variable.

A reasonable explanation for the bad performance of the security council instruments is the vast amount of zero-aid observations in our sample. Therefore, we narrow down our sample in three different ways: (i) by only including country pairs for which one of the aid variables is positive, thus keeping the original specification²⁶; (ii) by only focusing on donor exports to partners being given aid; and (iii) by only focusing on recipient exports to countries providing aid to them. These results are presented in columns (3) to (5).²⁷ When looking at both recipient and donor exports, this sample reduction does not improve the first-stage estimates (cf. columns 3 and 1) and the system is still underidentified. In column (4), when limiting the sample to donor exports only, we get a weak and probably inflated estimate of *logaidg*, but which is now in line with the original results. The excluded instruments are "less weak" in this setting (although the SC-dummy still has an unexpected negative sign). The results for recipient country exports only, in column (5), go in the same direction, although the instrument set is much weaker than when it is applied to donor exports.

We conclude from this that while it is important to address the likely endogeneity of aid, the available instruments are not sufficiently strong to identify the exogenous variation in aid and hence, we cannot provide any evidence of a causal relation between aid and trade. Given our disbelief in the IV-results, we turn to Granger causality tests. In Table A3, exports and aid received and given are, in turn, regressed on five-year lags of export and aid received (using OLS estimation). In the first two columns, export is the dependent variable. In the first column, we only include export and aid while in the second column, we also include the gravity controls. Only the first lag of aid enters significantly, albeit only at the five-per cent level. When including the gravity controls, the significance level decreases to ten

²⁶With one exception: The no-aid-dummy is now common to recipients and donors since receiving aid precludes giving and vice versa.

²⁷The relevant comparisons to the second-stage results are now the original regressions on the respective sample. For column (3), the coefficients for comparison are 0.086 for *lnaidr* and 0.161 for *lnaidg*; for column (4), 0.163 for *lnaidg*; and for column (5) 0.085 for *lnaidr*. Detailed results are available from the authors upon request.

per cent. With aid received as the dependent variable (columns 3 and 4) the first, second and fifth lag of export are significant when excluding the gravity controls (column 3), while only the fifth lag is significant when including the controls. When using aid given and donor exports (right-hand side of the table, columns 5 to 8) the correlations, if anything, provide stronger support for reverse causality. However, while Granger causality may be an indicator of causality, it is no proof thereof and we cannot say whether aid causes exports or exports cause aid or if both are influenced by some other (unobserved) variable that makes them covary.

6.3 Some additional tests

One way of controlling for unobservables (in more detail than through our previous use of import, export and time dummies) is to control for unobserved exporter-importer *group-specific* effects by using trade-pair dummies instead of our exporter and importer dummies. When doing this, the within group effects of aid are much weaker but still significant (the results are not reported but are available from the authors upon request). However, we are not surprised by this. Given that our main hypothesis is that the positive correlation between aid and trade stems from a unique relation between specific country pairs, this is the same variation being controlled for when including pair dummies. Furthermore, we divided our sample for 1990-2005 into three five-year periods: 90-95, 96-00 and 01-05. The coefficient of *aidg* falls from 0.11 in 90-95 to 0.05 in 01-05. This would favour the interpretation that donor aid has become less tied over time. The estimates for aid received show a marginal increase over the periods (0.086 in 90-95 to 0.095 in 01-05, the results are not reported but are available from the authors upon request).

Finally, we added aid received by other partners than the bilateral trading partner. The parameter estimate for aid received from other bilateral partners has an elasticity that is about one third of the elasticity for aid received from the trading partner but with a reversed sign (significant at $p < 0.001$). That is, a donor will

import less from its partner if that partner receives more aid from other partners.²⁸ This result supports the argument that bilateral aid is trade diverting rather than, more generally, trade facilitating. These results are available from the authors upon request.

7 Conclusions

In this article, we find that the correlation between donor aid and donor exports is remarkably similar to the correlation between recipient aid and recipient exports. From this finding, we draw the conclusion that aid cannot be interpreted as only being conditioned on donor exports. Even if donor aid is explicitly or implicitly tied, another explanation is needed to interpret the link between aid received and recipient exports. Our favoured explanation is that an intensified aid relation is associated with a reduction in the effective cost of physical distance, which implies larger bilateral trade. Our guess is that this is a good candidate explanation for donor exports as well as for recipient exports, even though we cannot rule out the "tacit binding"-explanation for donor exports.

Besides finding that aid is positively associated with recipient-donor exports as well as donor-recipient exports, we find a particularly strong relation between aid in the form of technical assistance and exports in both directions, thus supporting our interpretation that market knowledge through interpersonal relations is an important driver for exports. Moreover, when disaggregating aid to specifically study the effects of trade-related assistance (Aid for Trade), the positive correlation shows up with donor exports only. This suggests that Aid for Trade is a form of aid that is easier to link to donor exports than other forms of aid. Moreover, this effect seems to be driven in full by aid to trade-related infrastructure. Studying the effects across different export sectors, we find a positive partial correlation between bilateral aid

²⁸Including aid received by other partners does not have any significant impact on the parameter estimate for aid received from the trading partner.

and bilateral trade in all sectors. However, the link is particularly pronounced in aid recipient exports of strategic materials. Finally, we divided the sample into different regions and found aid to be positively correlated to donor exports in Sub-Saharan Africa only. Why implicitly tied aid shows up in this region only is an interesting avenue for further research.

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Tables

Table 1: Bilateral aid and trade relations

| | (1) No-Aid | (2) Aid-g | (3) Aid-r | (4) Aid-gr |
|-----------------|------------------------|------------------------|------------------------|------------------------|
| lnGDP_i | 0.637*** (0.0199) | 0.637*** (0.0199) | 0.626*** (0.0199) | 0.627*** (0.0198) |
| lnGDP_e | 0.352*** (0.0200) | 0.340*** (0.0199) | 0.347*** (0.0199) | 0.338*** (0.0199) |
| lnpop_i | -0.373*** (0.0753) | -0.268*** (0.0752) | -0.407*** (0.0751) | -0.303*** (0.0750) |
| lnpop_e | -0.594*** (0.0759) | -0.603*** (0.0758) | -0.471*** (0.0758) | -0.486*** (0.0757) |
| RTA | 0.405*** (0.0186) | 0.450*** (0.0186) | 0.456*** (0.0186) | 0.492*** (0.0185) |
| lndist | -1.506*** (0.00708) | -1.519*** (0.00709) | -1.526*** (0.00710) | -1.533*** (0.00710) |
| contig | 0.0484 (0.0297) | 0.0747* (0.0297) | 0.0611* (0.0297) | 0.0959** (0.0296) |
| comlang_off | 0.665*** (0.0138) | 0.635*** (0.0138) | 0.634*** (0.0138) | 0.607*** (0.0138) |
| colony | 1.349*** (0.0323) | 1.213*** (0.0325) | 1.201*** (0.0326) | 1.082*** (0.0328) |
| comcol | 0.867*** (0.0165) | 0.880*** (0.0165) | 0.884*** (0.0165) | 0.895*** (0.0165) |
| logaidg | | 0.0922*** (0.00539) | | 0.0908*** (0.00539) |
| NADg | | 0.536*** (0.0793) | | 0.618*** (0.0792) |
| logaidr | | | 0.0906*** (0.00547) | 0.0904*** (0.00546) |
| NADr | | | 0.333*** (0.0808) | 0.418*** (0.0806) |
| _cons | 21.87*** (1.984) | 19.94*** (1.980) | 20.39*** (1.980) | 18.34*** (1.977) |
| mills lambda | 0.802*** (0.0192) | 0.848*** (0.0191) | 0.882*** (0.0192) | 0.895*** (0.0191) |
| <i>N</i> | 282212 | 282212 | 282212 | 282212 |

The dependent variable is log exports. Regressions include exporter and importer fixed effects and time dummies (not shown). Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Number of uncensored observations reported. Total $N = 503\,398$.

Table 2: Aid and trade for various export sectors

| | (1) | (2) | (3) | (4) | (5) | (6) |
|-----------------|------------------------|-----------------------|------------------------|-----------------------|------------------------|------------------------|
| | lnornmet | lnfuels | lnfood | lnagrraw | lnstrat | lnman |
| logaidr | 0.108*** (0.00876) | 0.0999*** (0.0154) | 0.110*** (0.00605) | 0.125*** (0.00697) | 0.151*** (0.00996) | 0.105*** (0.00572) |
| NADr | 1.516*** (0.132) | 1.080*** (0.234) | 0.795*** (0.0903) | 1.415*** (0.104) | 2.015*** (0.151) | 0.822*** (0.0844) |
| logaidg | 0.0803*** (0.00838) | 0.0817*** (0.0117) | 0.0545*** (0.00673) | 0.150*** (0.00758) | 0.0887*** (0.00904) | 0.0597*** (0.00638) |
| NADg | 0.847*** (0.126) | 1.123*** (0.177) | 0.267** (0.0995) | 1.683*** (0.114) | 1.000*** (0.136) | 0.325*** (0.0942) |
| lnGDP_i | 0.760*** (0.0445) | 0.524*** (0.0670) | 0.534*** (0.0320) | 0.594*** (0.0369) | 0.870*** (0.0502) | 0.730*** (0.0268) |
| lnGDP_e | 0.154*** (0.0391) | 0.134* (0.0618) | 0.0401 (0.0268) | 0.126*** (0.0307) | 0.232*** (0.0449) | 0.238*** (0.0225) |
| lnpop_i | -0.685*** (0.152) | 0.710** (0.233) | 0.172 (0.107) | 0.697*** (0.127) | -0.282 (0.173) | -0.619*** (0.0928) |
| lnpop_e | -0.234 (0.144) | -2.390*** (0.215) | -0.415*** (0.104) | -1.479*** (0.120) | 0.182 (0.164) | -0.396*** (0.0856) |
| RTA | 0.602*** (0.0284) | 0.435*** (0.0411) | 0.852*** (0.0220) | 0.283*** (0.0252) | 0.656*** (0.0312) | 0.457*** (0.0205) |
| lnDIST | -1.798*** (0.0175) | -2.564*** (0.0342) | -1.294*** (0.0102) | -1.502*** (0.0133) | -1.806*** (0.0193) | -1.648*** (0.00840) |
| contig | -0.243*** (0.0427) | -0.210*** (0.0615) | 0.281*** (0.0344) | -0.120** (0.0382) | -0.435*** (0.0467) | -0.171*** (0.0324) |
| comlang_off | 0.512*** (0.0265) | -0.183*** (0.0398) | 0.644*** (0.0185) | 0.549*** (0.0222) | 0.866*** (0.0301) | 0.805*** (0.0160) |
| colony | 1.353*** (0.0456) | 1.739*** (0.0670) | 1.248*** (0.0370) | 1.165*** (0.0405) | 1.220*** (0.0495) | 0.870*** (0.0361) |
| comcol | 0.851*** (0.0348) | 0.760*** (0.0538) | 0.920*** (0.0229) | 0.725*** (0.0279) | 0.705*** (0.0407) | 0.838*** (0.0191) |
| _cons | 4.033 (3.115) | 4.630 (4.987) | 4.402 (2.311) | 4.165 (2.990) | -18.89*** (3.652) | 1.741 (1.514) |
| mills lambda | 1.658*** (0.0428) | 2.276*** (0.0754) | 1.011*** (0.0295) | 1.662*** (0.0342) | 1.778*** (0.0483) | 1.629*** (0.0252) |
| <i>N</i> | 96971 | 69580 | 163066 | 121529 | 80543 | 208832 |

The dependent variable is log exports. Regressions include exporter and importer fixed effects and time dummies (not shown). Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Number of uncensored observations reported. Total $N = 503\,398$.

Table 3: Types of aid

| | (1) Base | (2) DisaggrI | (3) DisaggrII |
|----------|------------------------|------------------------|------------------------|
| logaidr | 0.0904*** (0.00546) | 0.0307*** (0.00694) | 0.0311*** (0.00701) |
| logaidg | 0.0908*** (0.00539) | 0.0313*** (0.00685) | 0.0266*** (0.00692) |
| NADr | 0.418*** (0.0806) | 0.128 (0.0973) | 0.136 (0.0982) |
| NADg | 0.618*** (0.0792) | 0.195* (0.0957) | 0.138 (0.0966) |
| TAr | | 0.0546*** (0.00725) | 0.0557*** (0.00725) |
| TANADr | | 0.0192 (0.0954) | 0.0311 (0.0955) |
| TAg | | 0.0632*** (0.00717) | 0.0625*** (0.00718) |
| TANADg | | 0.307** (0.0941) | 0.296** (0.0942) |
| GBSr | | | -0.0268 (0.0263) |
| GBSNADr | | | -0.436 (0.416) |
| GBSg | | | 0.0202 (0.0263) |
| GBSNADg | | | 0.0710 (0.415) |
| <i>N</i> | 282212 | 282212 | 282212 |

The dependent variable is log exports. Regressions include exporter and importer fixed effects and time dummies as well as the controls used in Table 1(not shown).

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Number of uncensored obs. reported. Total N = 503 398.

Table 4: Aid for Trade

| | (1) Base | (2) AFTtot | (3) AFTdisagr |
|------------|------------------------|------------------------|------------------------|
| logaidr | 0.0904*** (0.00546) | 0.0657*** (0.00619) | 0.0689*** (0.00623) |
| logaidg | 0.0908*** (0.00539) | 0.0657*** (0.00612) | 0.0680*** (0.00615) |
| NADr | 0.418*** (0.0806) | 0.151 (0.0872) | 0.183* (0.0875) |
| NADg | 0.618*** (0.0792) | 0.330*** (0.0858) | 0.354*** (0.0861) |
| AFTtotr | | 0.0182* (0.00910) | |
| AFTNADr | | 0.0425 (0.130) | |
| AFTtotg | | 0.0340*** (0.00905) | |
| AFTNADg | | 0.304* (0.129) | |
| AFTPoRegr | | | -0.0342 (0.0270) |
| PolRegNADr | | | -0.302 (0.330) |
| AFTPrCapr | | | 0.00366 (0.0102) |
| PrCapNADr | | | -0.0945 (0.143) |
| AFTInfr | | | 0.0227* (0.0115) |
| InfNADr | | | 0.189 (0.161) |
| AFTPoRegg | | | -0.0174 (0.0270) |
| PolRegNADg | | | -0.132 (0.330) |
| AFTPrCapg | | | 0.0141 (0.0102) |
| PrCapNADg | | | 0.0972 (0.142) |
| AFTInfg | | | 0.0341** (0.0115) |
| InfNADg | | | 0.315* (0.160) |
| <i>N</i> | 282212 | 282212 | 282212 |

Continued on next page...

... table 4 continued

The dependent variable is log exports. Regressions include exporter and importer fixed effects and time dummies as well as the controls used in Table 1(not shown). Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Number of uncensored observations reported. Total N = 503 398.

Table 5: Different Regions

| | (1) SSA | (2) Asia | (3) LA |
|-----------------|-----------------------|-----------------------|-----------------------|
| logaidr | 0.0504*** (0.0114) | 0.0683*** (0.0105) | 0.0547*** (0.0129) |
| NADr | 0.243 (0.167) | 0.105 (0.161) | 0.399* (0.181) |
| logaidg | 0.138*** (0.0112) | 0.0207* (0.0104) | 0.0184 (0.0128) |
| NADg | 1.309*** (0.162) | -0.0698 (0.160) | -0.00104 (0.179) |
| lnGDP_i | 0.520*** (0.0326) | 0.811*** (0.0351) | 0.941*** (0.0390) |
| lnGDP_e | 0.362*** (0.0331) | 0.349*** (0.0356) | 0.0772* (0.0381) |
| lnpop_i | 1.434*** (0.151) | -2.205*** (0.149) | 0.387* (0.163) |
| lnpop_e | 0.474** (0.151) | -0.329* (0.151) | 0.528** (0.166) |
| RTA | 0.659*** (0.0437) | 0.324*** (0.0398) | 1.622*** (0.0453) |
| lnDIST | -1.391*** (0.0242) | -1.956*** (0.0290) | -1.892*** (0.0257) |
| contig | 1.239*** (0.0615) | 0.146* (0.0700) | -1.451*** (0.0775) |
| comlang_off | 0.401*** (0.0259) | 0.00650 (0.0329) | 0.846*** (0.0279) |
| colony | 1.196*** (0.0795) | 1.413*** (0.0832) | 0.750*** (0.0942) |
| comcol | 0.744*** (0.0287) | 1.138*** (0.0267) | 0.357*** (0.0399) |
| _cons | -28.67*** (3.489) | 21.20*** (2.314) | -18.60*** (4.006) |
| mills lambda | 1.542*** (0.0429) | 0.741*** (0.0296) | 1.965*** (0.0332) |
| <i>Nuncens</i> | 98190 | 79916 | 87509 |
| <i>Ntotal</i> | 224040 | 131900 | 166986 |

The dependent variable is log exports. Regressions include exporter and importer fixed effects and time dummies (not shown). Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Appendix A. Tables to robustness section

Table A1: Different estimation models

| | (1) Heck-ML | (2) Heck-TS | (3) OLS-zeros | (4) OLS-positive |
|-------------|------------------------|------------------------|-----------------------|-----------------------|
| logaidr | 0.0985*** (0.0110) | 0.0904*** (0.00546) | 0.0802*** (0.0208) | 0.102*** (0.0109) |
| logaidg | 0.0988*** (0.00818) | 0.0908*** (0.00539) | 0.0701*** (0.0177) | 0.102*** (0.00814) |
| NADr | 0.677*** (0.158) | 0.418*** (0.0806) | -0.936** (0.292) | 0.776*** (0.157) |
| NADg | 0.849*** (0.115) | 0.618*** (0.0792) | -0.803** (0.247) | 0.938*** (0.115) |
| lnGDP_i | 0.640*** (0.0240) | 0.627*** (0.0198) | -0.00426 (0.0437) | 0.646*** (0.0240) |
| lnGDP_e | 0.360*** (0.0255) | 0.338*** (0.0199) | -0.183*** (0.0428) | 0.368*** (0.0255) |
| lnpop_i | -0.0614 (0.100) | -0.303*** (0.0750) | -4.573*** (0.206) | 0.0311 (0.100) |
| lnpop_e | -0.367** (0.112) | -0.486*** (0.0757) | -4.121*** (0.218) | -0.319** (0.112) |
| RTA | 0.575*** (0.0447) | 0.492*** (0.0185) | -0.216* (0.0998) | 0.606*** (0.0439) |
| Indist | -1.458*** (0.0173) | -1.533*** (0.00710) | -1.803*** (0.0422) | -1.429*** (0.0171) |
| contig | 0.422*** (0.0895) | 0.0959** (0.0296) | -3.220*** (0.297) | 0.548*** (0.0872) |
| comlang_off | 0.549*** (0.0366) | 0.607*** (0.0138) | 1.048*** (0.0636) | 0.527*** (0.0363) |
| colony | 1.033*** (0.0865) | 1.082*** (0.0328) | 1.430*** (0.177) | 1.013*** (0.0851) |
| comcol | 0.899*** (0.0472) | 0.895*** (0.0165) | 0.409*** (0.0840) | 0.901*** (0.0466) |
| _cons | -1.846 (1.639) | 18.34*** (1.977) | 218.7*** (6.536) | 5.711* (2.308) |
| athrho | | | | |
| _cons | 0.127*** (0.00583) | | | |
| Insigma | | | | |
| _cons | 0.691*** (0.00370) | | | |
| mills | | | | |
| lambda | | 0.895*** (0.0191) | | |
| <i>N</i> | 282212 | 282212 | 503398 | 282212 |

Continued on next page...

... table A1 continued

| | | |
|------------|-------|-------|
| adj. R^2 | 0.642 | 0.726 |
|------------|-------|-------|

The dependent variable is log exports. Regressions include exporter and importer fixed effects and time dummies (not shown). Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Number of uncensored obs. in columns 1 and 2. Total N = 503 398.

Table A2: Instrumenting for aid (IVreg)

| | (1) | (2) | (3) | (4) | (5) |
|--|-----------------------|---------------------------|---------------------|----------------------|----------------------|
| | IVnyt | IVlaid | IVred | IVred-d | IVred-r |
| logaidr | -5.128 (6.658) | 0.184*** (0.00957) | -0.0422 (1.500) | | 0.176 (0.257) |
| logaidg | 2.008 (3.724) | 0.166*** (0.00694) | 0.729 (0.410) | 0.435* (0.175) | |
| lnGDP_i | 0.786*** (0.167) | 0.642*** (0.0205) | 0.691* (0.271) | 0.748*** (0.0435) | 0.0795 (0.268) |
| lnGDP_e | 0.390*** (0.0667) | 0.365*** (0.0218) | 0.518*** (0.124) | -0.535** (0.171) | 0.711*** (0.0629) |
| lnpop_i | 2.043 (2.814) | 0.0209 (0.0753) | -0.645 (1.539) | -1.110*** (0.204) | 2.710** (0.946) |
| lnpop_e | -2.070 (2.569) | -0.320*** (0.0819) | -1.895 (1.357) | 2.826*** (0.738) | -1.528*** (0.284) |
| RTA | 0.818*** (0.234) | 0.598*** (0.0168) | 0.514 (0.782) | 0.420 (0.239) | 0.724* (0.344) |
| lnDIST | -1.440*** (0.0167) | -1.428*** (0.00663) | -1.076 (0.674) | -1.048*** (0.203) | -1.220*** (0.294) |
| contig | -0.00109 (0.586) | 0.572*** (0.0297) | 0.593 (0.399) | 0.307 (0.158) | 0.938*** (0.263) |
| comlang_off | 0.781** (0.272) | 0.516*** (0.0138) | -0.00205 (0.738) | -0.109 (0.220) | 0.220 (0.324) |
| colony | 3.195 (2.319) | 0.917*** (0.0266) | 0.564 (1.009) | 0.487 (0.290) | 0.748 (0.426) |
| comcol | 0.904*** (0.0282) | 0.900*** (0.0181) | | | |
| NADr | -73.73 (94.81) | 1.950*** (0.139) | -9.820 (23.51) | | |
| NADg | 27.87 (52.74) | 1.852*** (0.1000) | | | |
| <i>N</i> | 282212 | 282212 | 54535 | 27635 | 26900 |
| adj. <i>R</i> ² | -0.346 | 0.726 | 0.748 | 0.812 | 0.777 |
| Hansen J Chi2 | | 6.295** | | 0.48 | 0.07 |
| First-stage <i>logaidr</i> -regressions: | | | | | |
| exp_scd | -0.00500 (0.00574) | 0.00405 (0.00484) | 0.00154 (0.0188) | | -0.0553 (0.0576) |
| scnyt_scd | 0.0107** (0.00412) | 0.00175 (0.00342) | 0.0146 (0.0114) | | 0.134** (0.0434) |
| L2lnaid_r | | 0.217*** (0.00253) | | | |
| L2lnaid_g | | -0.00339*** (0.000161) | | | |
| F-value | 3.61** | 1,991.03*** | 1.24 | | 5.7*** |
| Partial <i>R</i> ² | 0.000 | 0.276 | 0.000 | | 0.000 |
| First-stage <i>logaidg</i> -regressions: | | | | | |

Continued on next page...

... table A2 continued

| | | | | |
|---------------|-----------|-------------|-----------|-----------|
| exp_scd | -0.0180* | -0.0330*** | -0.0654* | -0.118** |
| | (0.00883) | (0.00772) | (0.0272) | (0.0382) |
| scnyt_scd | 0.0197** | 0.0242*** | 0.0669*** | 0.0877*** |
| | (0.00760) | (0.00649) | (0.0187) | (0.0240) |
| L2lnaid_r | | -0.00338*** | | |
| | | (0.000167) | | |
| L2lnaid_g | | 0.215*** | | |
| | | (0.00245) | | |
| F-value | 3.51** | 2,065.52*** | 6.49*** | 7.61*** |
| Partial R^2 | 0.000 | 0.274 | 0.000 | 0.001 |

The dependent variable is log exports. Regressions include exporter and importer fixed effects and time dummies (not shown). Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A3: Granger Causality: lags of exports and aid, year 1990-2005

| COEFFICIENT Controls? | Aid received | | | | Aid given | | | |
|-----------------------|------------------------|-----------------------|-----------------------|-----------------------|-------------------------|------------------------|-----------------------|-----------------------|
| | (1) Exp No | (2) Exp2 Yes | (3) Aidr No | (4) Aidr2 Yes | (1) Exp No | (2) Exp2 Yes | (3) Aidg No | (4) Aidg2 Yes |
| Llnaid | 0.00462** (0.0023) | 0.00379* (0.0022) | 0.178*** (0.0051) | 0.120*** (0.0043) | 0.00544*** (0.0016) | 0.00711*** (0.0016) | 0.169*** (0.0047) | 0.114*** (0.0040) |
| L2lnaid | -0.000323 (0.0022) | 0.000150 (0.0022) | 0.0855*** (0.0049) | 0.0541*** (0.0041) | 0.000271 (0.0017) | 0.00159 (0.0017) | 0.0818*** (0.0045) | 0.0512*** (0.0038) |
| L3lnaid | -0.0000599 (0.0022) | 0.000520 (0.0022) | 0.0472*** (0.0047) | 0.0318*** (0.0040) | -0.00543*** (0.0017) | -0.00409** (0.0016) | 0.0453*** (0.0044) | 0.0290*** (0.0037) |
| L4lnaid | -0.00158 (0.0023) | -0.000609 (0.0022) | 0.0452*** (0.0044) | 0.0355*** (0.0038) | -0.0000692 (0.0016) | 0.00201 (0.0016) | 0.0428*** (0.0041) | 0.0330*** (0.0036) |
| L5lnaid | -0.00149 (0.0020) | 0.00189 (0.0020) | 0.0454*** (0.0037) | 0.0361*** (0.0033) | -0.00348** (0.0014) | 0.00115 (0.0014) | 0.0437*** (0.0035) | 0.0320*** (0.0031) |
| LlnexpValueI | 0.596*** (0.015) | 0.519*** (0.015) | 0.0446*** (0.012) | 0.0100 (0.011) | 0.551*** (0.013) | 0.460*** (0.013) | 0.0702*** (0.013) | 0.0778*** (0.012) |
| L2lnexpValueI | 0.180*** (0.017) | 0.156*** (0.016) | 0.0308** (0.014) | 0.0132 (0.012) | 0.189*** (0.014) | 0.157*** (0.013) | 0.0379*** (0.015) | 0.0426*** (0.013) |
| L3lnexpValueI | 0.0990*** (0.017) | 0.0914*** (0.016) | 0.00779 (0.014) | -0.00551 (0.012) | 0.109*** (0.014) | 0.0940*** (0.013) | 0.0273* (0.015) | 0.0342** (0.013) |
| L4lnexpValueI | 0.0475*** (0.016) | 0.0430*** (0.015) | 0.0133 (0.013) | 0.00486 (0.011) | 0.0448*** (0.013) | 0.0390*** (0.012) | 0.0178 (0.015) | 0.0205 (0.013) |
| L5lnexpValueI | 0.0593*** (0.012) | 0.0573*** (0.011) | 0.0444*** (0.011) | 0.0303*** (0.0097) | 0.0876*** (0.011) | 0.0781*** (0.011) | 0.0425*** (0.013) | 0.0505*** (0.011) |
| Observations | 23524 | 23524 | 23524 | 23524 | 25047 | 25047 | 25047 | 25047 |
| R ² | 0.91 | 0.91 | 0.58 | 0.72 | 0.92 | 0.93 | 0.59 | 0.72 |

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1
Notes: Only observations for which both export and aid received/given in t=0 are > 0 are included.

Appendix B. More on data

Here follows a short description of the variables used. All nominal values have been translated into constant year 2000 USD using the US GDP chain price index from the World Development Indicators database. In the estimations, variables for export, GDP, population etc. are all in their logarithmic values.

- **expValueI**. The dependent variable is the value of total annual bilateral export per exporter-importer pair downloaded from the UN Comtrade data base on 27 September 2007. In the Comtrade data base, all commodity values are converted from national currency into US dollars using exchange rates supplied by the reporter countries, or derived from monthly market rates and volume of trade. We used the Standard International Trade Classification (SITC) revision 2 (for more information visit <http://comtrade.un.org>). The figures we have used are, in general, those reported by importer. Where data is lacking and the corresponding data is reported by exporter, this data is instead used. On average, the import data reported by importer is higher than the corresponding export data reported by exporter. Therefore, in those cases where we use data reported by exporter we increased the reported data by a factor equal to the factor by which importer reported data on average exceeds exporter reported data.²⁹ The sub-sector data also comes from the Comtrade data base. The sub-sector export variables used in this paper are defined by the following SITC Revision 2 codes:
 - **ornmet** = SITC2_27 + SITC2_28 + SITC2_68 (ores and metals)
 - **fuels** = SITC2_3 (mineral fuels, lubricants and related materials)
 - **food** = SITC2_0 + SITC2_1 + SITC2_4 + SITC2_22
 - **agrraw** = SITC2_2 - SITC2_22 - SITC2_27 - SITC2_28 (agricultural raw materials)
 - **strat** = SITC2_667 + SITC2_68 + SITC2_97 (pearls, precious and semi-precious stones; non-ferrous metals; gold)
 - **man** = SITC2_5 + SITC2_6 + SITC2_7 + SITC2_8 - SITC2_68 - SITC2_667 (manufacturing)
- **GDP** is the World Development Indicators' (WDI) series for GDP in current USD, downloaded on 23 October 2007.
- **pop** is total national population downloaded from WDI on 23 October 2007.
- **dist** is distance in kilometres between trading partner downloaded from Centre D'Etudes. Prospectives Et D'Informations Internationales (<http://www.cepii.fr>).
- **comlang_off** is a dummy variable taking the value of one if the exporting and importing countries share a common language (also from the CEPII database).

²⁹This procedure seems quite innocuous. The results from using exporter reported data (211 278 observations) do not differ to any considerable extent from our presented results (using 282 212 observations). The results are available from the authors upon request.

- **colony** is a dummy variable taking the value of one if the trading pair has had a historical colonial relation (also from the CEPII database).
- **comcol** is a dummy variable taking the value of one if the trading pair has had the same coloniser after 1945 (also from the CEPII database).
- **rel** is a dummy variable taking the value of one if the trading pair shares the same dominant religion. The religions considered are Christianity, Buddhism, Hinduism, Jewish, Islam and traditional beliefs (source: Parker, 1997).
- **aid** is bilateral disbursement, given (*aidg*) and received (*aidr*), of Official Development Assistance (the ODA type chosen is "ODA (OA) Total Net") downloaded on 15 October 2007 from DAC online table 2a. All aid variables are adjusted so that a zero value or a missing value is replaced with one (i.e. the log value in these cases then becomes zero).
 - **TA** is disbursements of the ODA type "Technical Cooperation" downloaded on 15 October 2007 from DAC online table 2a.
 - **GBS** is General Budget Support. There does not exist any good disbursement data for GBS over the period in which we are interested. Therefore, GBS is constructed by calculating the share in total ODA commitments that is GBS commitments (sector-name "VI.1 General Budget Support") from DAC's Creditor Reporting System (CRS, downloaded on 19 October 2007). The *GBS*-variable is then obtained by multiplying the disbursement of *aid* with this share.
 - **AfT** The Aid for Trade variables are created in a similar way to *GBS* using CRS data (downloaded on 19 October 2007). Total AfT is the sum of *AfTPolReg* *AfTPrCap* *AfTInf* defined as follows:
 - * **AfTPolReg** is based on the commitment for Trade Policy and Regulations (sector code 331).
 - * **AfTPrCap** is based on the sum of commitment for the following sectors: Banking & Financial Services (240), Business & Other Services (250), Agriculture (311), Forestry (312), Fishing (313), Industry (321), Mining (322), Construction (323) and Tourism (332);
 - * **AfTInf** is based on the sum of commitment for the following sectors: Transport & Storage (210), Communications (220) and Energy (230).
 - **NAD** is a dummy variable that is one if the aid variable that *NAD* refers to is zero or missing.
- **RTA** is a dummy variable that takes the value of one if the exporter and importer both belong to the same Regional Trade Agreement. The following RTAs have been considered: NAFTA, EEA, AFTA, SPARTECA, MERCOSUR, CARICOM, USAIsr, PATCRA, ANZERTA, CACM, APEC, SAPTA, EFTA, GCC, CEFTA, ANDEAN, BA, ECOWAS, COMESA, CEMAC and SACU.

Summary statistics are presented in Table B1 and a correlation matrix is found in Table B2. Our baseline model is estimated using a sample of 184 countries over the period

1990-2005. Table B3 lists these countries together with information on how many times each country emerges as an exporter and importer, respectively, in the data set. The table also includes data on total aid given and received by the respective country as well as information on the number of observations over which this aid given and received is spread.³⁰

Table B1: Summary Statistics

| Variable | Mean ^a | Median ^a | SD | Min | Max | N-pos ^b |
|-------------|-------------------|---------------------|----------|----------|---------|--------------------|
| expValueI | 3.0e+08 | 1737718 | 3.1e+09 | 1 | 2.6e+11 | 282,194 |
| aidg | 19249554 | 2404768 | 83172560 | 9,138 | 4.7e+09 | 30,026 |
| aidr | 19249554 | 2404768 | 83172560 | 9,138 | 4.7e+09 | 30,026 |
| GDP_i | 1.8e+11 | 8.3e+09 | 7.9e+11 | 34814932 | 1.1e+13 | 503,398 |
| GDP_e | 1.8e+11 | 8.3e+09 | 7.9e+11 | 34814932 | 1.1e+13 | 503,398 |
| pop_i | 32070793 | 6096955 | 1.2e+08 | 19,700 | 1.3e+09 | 503,398 |
| pop_e | 32070793 | 6096955 | 1.2e+08 | 19,700 | 1.3e+09 | 503,398 |
| dist | 7,933 | 7,495 | 4,550 | 3 | 19,904 | 503,398 |
| RTA | | | | 0 | 1 | 28,272 |
| contig | | | | 0 | 1 | 11,284 |
| comlang_off | | | | 0 | 1 | 85,082 |
| colony | | | | 0 | 1 | 5,690 |
| comcol | | | | 0 | 1 | 58,837 |

a) The mean and median of the aid variables are conditional on aid being positive.

b) The number of positive values for each variable (i.e. for dummy variables we count values = 1, for aid values > 1 and for other variables we count values > 0).

³⁰Aid is lagged one year in our baseline model; hence the table includes the sum of aid over the period 1989-2004.

Table B2: Pairwise Correlations

| Variables | expValueI | aid_g | aid_r | year | GDP_i | GDP_e | pop_i | pop_e | RTA | dist | contig | comlang_off | colony |
|-------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------------------|------------------|-------------------|
| aid_g | 0.049 (0.000) | 1.000 | | | | | | | | | | | |
| aid_r | 0.060 (0.000) | -0.005 (0.004) | 1.000 | | | | | | | | | | |
| year | 0.009 (0.000) | -0.024 (0.000) | -0.024 (0.000) | 1.000 | | | | | | | | | |
| GDP_i | 0.214 (0.000) | -0.013 (0.000) | 0.212 (0.000) | -0.004 (0.023) | 1.000 | | | | | | | | |
| GDP_e | 0.177 (0.000) | 0.211 (0.000) | -0.013 (0.000) | -0.007 (0.001) | -0.031 (0.000) | 1.000 | | | | | | | |
| pop_i | 0.063 (0.000) | 0.043 (0.000) | 0.029 (0.000) | 0.001 (0.773) | 0.263 (0.000) | -0.022 (0.000) | 1.000 | | | | | | |
| pop_e | 0.078 (0.000) | 0.026 (0.000) | 0.040 (0.000) | -0.010 (0.000) | -0.025 (0.000) | 0.255 (0.000) | -0.023 (0.000) | 1.000 | | | | | |
| RTA | 0.190 (0.000) | 0.025 (0.000) | 0.025 (0.000) | 0.042 (0.000) | 0.028 (0.000) | 0.026 (0.000) | 0.017 (0.000) | 0.012 (0.000) | 1.000 | | | | |
| dist | -0.054 (0.000) | -0.000 (0.903) | -0.000 (0.914) | -0.016 (0.000) | 0.054 (0.000) | 0.057 (0.000) | 0.054 (0.000) | 0.064 (0.000) | -0.245 (0.000) | 1.000 | | | |
| contig | 0.147 (0.000) | -0.011 (0.000) | -0.011 (0.000) | 0.003 (0.077) | -0.008 (0.000) | -0.009 (0.000) | 0.030 (0.000) | 0.027 (0.000) | 0.237 (0.000) | -0.217 (0.000) | 1.000 | | |
| comlang_off | 0.016 (0.000) | 0.021 (0.000) | 0.021 (0.000) | -0.018 (0.000) | -0.001 (0.776) | -0.001 (0.488) | -0.023 (0.000) | -0.020 (0.000) | 0.169 (0.000) | -0.098 (0.000) | 0.125 (0.000) | 1.000 | |
| colony | 0.042 (0.000) | 0.097 (0.000) | 0.097 (0.000) | -0.015 (0.000) | 0.059 (0.000) | 0.058 (0.000) | 0.001 (0.621) | -0.002 (0.385) | -0.005 (0.006) | -0.033 (0.000) | 0.078 (0.000) | 0.172 (0.000) | 1.000 |
| comcol | -0.026 (0.000) | -0.025 (0.000) | -0.024 (0.000) | -0.003 (0.123) | -0.082 (0.000) | -0.082 (0.000) | -0.014 (0.000) | -0.009 (0.000) | 0.128 (0.000) | -0.088 (0.000) | 0.076 (0.000) | 0.379 (0.000) | -0.046 (0.000) |

Table B3: Sample countries

| Country | Exp-o ^a | Imp-o ^b | Aidg ^c | Aidg-o ^d | Aidr ^e | Aidr-o ^g |
|---------------|--------------------|--------------------|-------------------|---------------------|-------------------|---------------------|
| Albania | 1 242/2 838 | 1 290/2 838 | 0 | 0 | 2 713 | 263 |
| Algeria | 1 581/2 838 | 1 941/2 838 | 0 | 0 | 4 361 | 228 |
| Angola | 926/2 838 | 1 259/2 838 | 0 | 0 | 5 395 | 306 |
| Antigua & B. | 972/2 838 | 1 153/2 838 | 0 | 0 | 81 | 80 |
| Argentina | 2 346/2 838 | 1 992/2 838 | 0 | 0 | 2 733 | 268 |
| Armenia | 884/2 838 | 956/2 838 | 0 | 0 | 1 507 | 193 |
| Australia | 2 648/2 838 | 2 448/2 838 | 15 044 | 1 101 | 0 | 0 |
| Austria | 2 628/2 838 | 2 622/2 838 | 4 925 | 1 525 | 0 | 0 |
| Azerbaijan | 1 014/2 838 | 1 106/2 838 | 0 | 0 | 1 193 | 173 |
| Bahamas | 1 261/2 486 | 1 150/2 486 | 0 | 0 | 4 | 28 |
| Bahrain | 1 485/2 838 | 1 519/2 838 | 0 | 0 | 30 | 57 |
| Bangladesh | 2 100/2 838 | 1 893/2 838 | 0 | 0 | 15 523 | 316 |
| Barbados | 1 470/2 838 | 1 790/2 838 | 0 | 0 | 39 | 144 |
| Belarus | 1 325/2 838 | 1 248/2 838 | 0 | 0 | 0 | 0 |
| Belgium | 1 220/2 838 | 1 185/2 838 | 8 651 | 1 484 | 0 | 0 |
| Belize | 1 196/2 838 | 1 284/2 838 | 0 | 0 | 298 | 141 |
| Benin | 1 251/2 838 | 1 633/2 838 | 0 | 0 | 3 355 | 254 |
| Bermuda | 444/1 418 | 542/1 418 | 0 | 0 | 65 | 10 |
| Bhutan | 572/2 838 | 602/2 838 | 0 | 0 | 840 | 229 |
| Bolivia | 1 422/2 838 | 1 631/2 838 | 0 | 0 | 9 255 | 294 |
| Bosnia & H. | 892/2 135 | 941/2 135 | 0 | 0 | 6 499 | 213 |
| Botswana | 500/2 838 | 534/2 838 | 0 | 0 | 1 470 | 253 |
| Brazil | 2 578/2 838 | 2 234/2 838 | 0 | 0 | 4 145 | 303 |
| Brunei | 923/2 838 | 1 145/2 838 | 0 | 0 | 38 | 42 |
| Bulgaria | 2 095/2 838 | 1 858/2 838 | 0 | 0 | 0 | 0 |
| Burkina Faso | 1 055/2 838 | 1 327/2 838 | 0 | 0 | 5 349 | 292 |
| Burundi | 933/2 838 | 1 169/2 838 | 0 | 0 | 2 097 | 277 |
| Cambodia | 1 243/2 838 | 1 006/2 838 | 0 | 0 | 3 793 | 306 |
| Cameroon | 1 595/2 838 | 1 674/2 838 | 0 | 0 | 8 528 | 272 |
| Canada | 2 626/2 838 | 2 577/2 838 | 16 656 | 1 819 | 0 | 0 |
| Cape Verde | 649/2 838 | 1 083/2 838 | 0 | 0 | 1 648 | 267 |
| C. Afr Rep | 1 034/2 838 | 1 116/2 838 | 0 | 0 | 1 680 | 223 |
| Chad | 812/2 838 | 917/2 838 | 0 | 0 | 2 453 | 232 |
| Chile | 2 266/2 838 | 1 881/2 838 | 0 | 0 | 2 288 | 280 |
| China | 2 704/2 838 | 2 494/2 838 | 0 | 0 | 31 164 | 310 |
| Colombia | 2 173/2 838 | 2 186/2 838 | 0 | 0 | 4 644 | 297 |
| Comoros | 699/2 822 | 808/2 822 | 0 | 0 | 82 | 108 |
| Congo | 1 180/2 838 | 1 307/2 838 | 0 | 0 | 2 747 | 223 |
| Costa Rica | 1 871/2 838 | 1 748/2 838 | 0 | 0 | 1 970 | 229 |
| Cote D'Ivoire | 1 844/2 838 | 1 742/2 838 | 0 | 0 | 9 888 | 258 |
| Croatia | 1 934/2 838 | 2 004/2 838 | 0 | 0 | 824 | 175 |
| Cyprus | 2 079/2 663 | 1 945/2 663 | 0 | 0 | 217 | 68 |

Continued on next page...

... table B3 continued

| Country | Exp-o ^a | Imp-o ^b | Aidg ^c | Aidg-o ^d | Aidr ^e | Aidr-o ^g |
|----------------|--------------------|--------------------|-------------------|---------------------|-------------------|---------------------|
| Czechoslovakia | 2 117/2 838 | 2 054/2 838 | 0 | 0 | 0 | 0 |
| Denmark | 2 688/2 838 | 2 520/2 838 | 14 141 | 1 110 | 0 | 0 |
| Djibouti | 758/2 838 | 1 080/2 838 | 0 | 0 | 1 398 | 152 |
| Dominica | 1 180/2 838 | 1 342/2 838 | 0 | 0 | 210 | 118 |
| Dominican R. | 1 426/2 838 | 1 261/2 838 | 0 | 0 | 1 673 | 239 |
| Ecuador | 1 872/2 838 | 1 712/2 838 | 0 | 0 | 3 419 | 285 |
| Egypt | 2 314/2 838 | 2 078/2 838 | 0 | 0 | 39 890 | 302 |
| El Salvador | 1 454/2 838 | 1 397/2 838 | 0 | 0 | 5 137 | 304 |
| Eq. Guinea | 561/2 838 | 756/2 838 | 0 | 0 | 561 | 161 |
| Eritrea | 511/2 486 | 690/2 486 | 0 | 0 | 1 723 | 220 |
| Estonia | 1 548/2 838 | 1 626/2 838 | 0 | 0 | 0 | 0 |
| Ethiopia | 1 254/2 838 | 1 380/2 838 | 0 | 0 | 10 505 | 327 |
| Fiji | 1 101/2 838 | 1 313/2 838 | 0 | 0 | 819 | 160 |
| Finland | 2 617/2 838 | 2 353/2 838 | 4 033 | 1 219 | 0 | 0 |
| France | 2 678/2 822 | 2 650/2 822 | 85 446 | 1 893 | 0 | 0 |
| Fr. Polynesia | 505/1 954 | 797/1 954 | 0 | 0 | 5 370 | 38 |
| Gabon | 1 423/2 838 | 1 543/2 838 | 0 | 0 | 1 668 | 147 |
| Gambia | 1 040/2 838 | 1 284/2 838 | 0 | 0 | 691 | 264 |
| Georgia | 1 147/2 838 | 1 146/2 838 | 0 | 0 | 1 714 | 215 |
| Germany | 2 556/2 838 | 2 553/2 838 | 63 937 | 1 879 | 0 | 0 |
| Ghana | 1 697/2 838 | 1 855/2 838 | 0 | 0 | 8 016 | 303 |
| Greece | 2 564/2 838 | 2 389/2 838 | 0 | 0 | 0 | 0 |
| Greenland | 41/180 | 87/180 | 0 | 0 | 0 | 0 |
| Grenada | 945/2 838 | 1 346/2 838 | 0 | 0 | 113 | 106 |
| Guatemala | 1 763/2 838 | 1 589/2 838 | 0 | 0 | 3 944 | 289 |
| Guinea | 1 279/2 838 | 1 469/2 838 | 0 | 0 | 3 311 | 264 |
| Guinea Bissau | 523/2 838 | 735/2 838 | 0 | 0 | 1 439 | 256 |
| Guyana | 1 279/2 838 | 1 388/2 838 | 0 | 0 | 1 075 | 170 |
| Haiti | 1 027/2 838 | 1 127/2 838 | 0 | 0 | 4 208 | 264 |
| Honduras | 1 622/2 838 | 1 703/2 838 | 0 | 0 | 5 314 | 278 |
| Hong Kong | 2 602/2 838 | 2 424/2 838 | 0 | 0 | 144 | 86 |
| Hungary | 2 475/2 838 | 2 324/2 838 | 24 | 43 | 0 | 0 |
| Iceland | 1 761/2 838 | 1 749/2 838 | 49 | 44 | 0 | 0 |
| India | 2 646/2 838 | 2 368/2 838 | 0 | 0 | 20 186 | 275 |
| Indonesia | 2 471/2 838 | 2 258/2 838 | 0 | 0 | 27 821 | 280 |
| Iran | 1 838/2 488 | 1 361/2 488 | 0 | 0 | 1 982 | 226 |
| Iraq | 177/538 | 188/538 | 0 | 0 | 675 | 49 |
| Ireland | 2 635/2 838 | 2 491/2 838 | 2 234 | 1 078 | 0 | 0 |
| Israel | 2 236/2 838 | 1 868/2 838 | 0 | 0 | 17 214 | 109 |
| Italy | 2 696/2 838 | 2 648/2 838 | 24 477 | 1 358 | 0 | 0 |
| Jamaica | 1 733/2 838 | 1 730/2 838 | 0 | 0 | 1 810 | 192 |
| Japan | 2 700/2 838 | 2 689/2 838 | 119 801 | 1 985 | 0 | 0 |
| Jordan | 1 875/2 838 | 1 674/2 838 | 0 | 0 | 7 389 | 272 |

Continued on next page...

... table B3 continued

| Country | Exp-o ^a | Imp-o ^b | Aidg ^c | Aidg-o ^d | Aidr ^e | Aidr-o ^g |
|---------------|--------------------|--------------------|-------------------|---------------------|-------------------|---------------------|
| Kazakhstan | 1 316/2 838 | 1 413/2 838 | 0 | 0 | 1 804 | 211 |
| Kenya | 2 003/2 838 | 1 812/2 838 | 0 | 0 | 8 910 | 312 |
| Kiribati | 521/2 838 | 592/2 838 | 0 | 0 | 315 | 89 |
| Korea RP.(S) | 2 661/2 838 | 2 521/2 838 | 0 | 0 | 789 | 118 |
| Kuwait | 1 345/2 310 | 1 409/2 310 | 0 | 0 | 12 | 17 |
| Kyrgyzstan | 858/2 838 | 959/2 838 | 0 | 0 | 0 | 0 |
| Laos | 1 002/2 838 | 736/2 838 | 0 | 0 | 2 550 | 276 |
| Latvia | 1 480/2 838 | 1 355/2 838 | 0 | 0 | 0 | 0 |
| Lebanon | 1 818/2 838 | 1 888/2 838 | 0 | 0 | 1 755 | 287 |
| Lesotho | 282/2 838 | 318/2 838 | 0 | 0 | 1 146 | 242 |
| Liberia | 1 057/2 838 | 1 170/2 838 | 0 | 0 | 1 008 | 235 |
| Libya | 1 089/2 838 | 1 301/2 838 | 0 | 0 | 55 | 78 |
| Lithuania | 1 596/2 838 | 1 464/2 838 | 0 | 0 | 0 | 0 |
| Luxembourg | 1 139/2 838 | 860/2 838 | 1 132 | 919 | 0 | 0 |
| Macedonia | 1 129/2 838 | 1 436/2 838 | 0 | 0 | 1 200 | 179 |
| Madagascar | 1 843/2 838 | 1 658/2 838 | 0 | 0 | 5 334 | 261 |
| Malawi | 1 608/2 838 | 1 321/2 838 | 0 | 0 | 4 805 | 308 |
| Malaysia | 2 644/2 838 | 2 461/2 838 | 0 | 0 | 3 057 | 236 |
| Maldive Isl. | 796/2 838 | 874/2 838 | 0 | 0 | 330 | 180 |
| Mali | 1 309/2 838 | 1 454/2 838 | 0 | 0 | 5 776 | 277 |
| Malta | 1 973/2 838 | 1 830/2 838 | 0 | 0 | 375 | 105 |
| Marshall Isl. | 358/2 838 | 521/2 838 | 0 | 0 | 695 | 54 |
| Mauritania | 1 188/2 838 | 1 219/2 838 | 0 | 0 | 2 415 | 251 |
| Mauritius | 1 923/2 838 | 1 889/2 838 | 0 | 0 | 618 | 197 |
| Mexico | 2 356/2 838 | 2 360/2 838 | 0 | 0 | 3 652 | 281 |
| Micronesia | 250/2 838 | 343/2 838 | 0 | 0 | 1 323 | 70 |
| Moldova | 1 095/2 838 | 1 181/2 838 | 0 | 0 | 529 | 138 |
| Mongolia | 715/1 780 | 687/1 780 | 0 | 0 | 1 489 | 194 |
| Morocco | 2 165/2 838 | 2 098/2 838 | 0 | 0 | 8 723 | 251 |
| Mozambique | 1 290/2 838 | 1 322/2 838 | 0 | 0 | 16 975 | 342 |
| Namibia | 775/2 838 | 671/2 838 | 0 | 0 | 2 165 | 322 |
| Nepal | 1 245/2 838 | 1 173/2 838 | 0 | 0 | 5 260 | 307 |
| Netherlands | 2 697/2 838 | 2 645/2 838 | 30 626 | 1 741 | 0 | 0 |
| N. Caledonia | 460/1 954 | 602/1 954 | 0 | 0 | 5 464 | 48 |
| N. Zealand | 2 444/2 838 | 2 156/2 838 | 1 181 | 1 036 | 0 | 0 |
| Nicaragua | 1 361/2 838 | 1 468/2 838 | 0 | 0 | 9 344 | 304 |
| Niger | 1 134/2 838 | 1 373/2 838 | 0 | 0 | 4 267 | 261 |
| Nigeria | 1 651/2 838 | 1 899/2 838 | 0 | 0 | 2 873 | 304 |
| Norway | 2 628/2 838 | 2 335/2 838 | 15 500 | 1 498 | 0 | 0 |
| Oman | 1 626/2 663 | 1 505/2 663 | 0 | 0 | 369 | 94 |
| Pakistan | 2 468/2 838 | 2 222/2 838 | 0 | 0 | 10 866 | 277 |
| Palau | 60/530 | 79/530 | 0 | 0 | 75 | 14 |
| Panama | 1 722/2 838 | 1 562/2 838 | 0 | 0 | 1 174 | 189 |

Continued on next page...

... table B3 continued

| Country | Exp-o ^a | Imp-o ^b | Aidg ^c | Aidg-o ^d | Aidr ^e | Aidr-o ^g |
|----------------|--------------------|--------------------|-------------------|---------------------|-------------------|---------------------|
| Papua Guinea | 1 095/2 838 | 1 069/2 838 | 0 | 0 | 6 415 | 233 |
| Paraguay | 1 451/2 838 | 1 255/2 838 | 0 | 0 | 1 358 | 234 |
| Peru | 2 070/2 838 | 1 880/2 838 | 0 | 0 | 7 990 | 309 |
| Phillipines | 2 362/2 838 | 2 061/2 838 | 0 | 0 | 15 343 | 306 |
| Poland | 2 438/2 838 | 2 253/2 838 | 0 | 0 | 0 | 0 |
| Portugal | 2 598/2 838 | 2 440/2 838 | 3 697 | 334 | 0 | 0 |
| Qatar | 1 481/2 838 | 1 593/2 838 | 0 | 0 | 16 | 21 |
| Romania | 2 392/2 838 | 2 096/2 838 | 0 | 0 | 0 | 0 |
| Russia | 1 994/2 838 | 1 886/2 838 | 0 | 0 | 0 | 0 |
| Rwanda | 798/2 838 | 1 197/2 838 | 0 | 0 | 4 785 | 307 |
| S. Tome & P. | 270/884 | 298/884 | 0 | 0 | 133 | 49 |
| Saudi Arabia | 2 045/2 838 | 2 223/2 838 | 0 | 0 | 295 | 92 |
| Senegal | 1 659/2 838 | 1 832/2 838 | 0 | 0 | 8 659 | 297 |
| Seychelles | 1 013/2 838 | 1 183/2 838 | 0 | 0 | 243 | 183 |
| Sierra Leone | 1 048/2 838 | 1 115/2 838 | 0 | 0 | 2 055 | 299 |
| Singapore | 2 381/2 838 | 2 210/2 838 | 0 | 0 | 323 | 55 |
| Slovakia | 1 836/2 838 | 1 832/2 838 | 10 | 92 | 0 | 0 |
| Slovenia | 1 973/2 838 | 2 040/2 838 | 0 | 0 | 122 | 87 |
| Sol. Isl. | 589/2 838 | 600/2 838 | 0 | 0 | 820 | 112 |
| Somalia | 39/177 | 41/177 | 0 | 0 | 523 | 17 |
| South Africa | 1 038/2 838 | 1 018/2 838 | 0 | 0 | 5 283 | 247 |
| Spain | 2 649/2 838 | 2 633/2 838 | 16 142 | 1 272 | 0 | 0 |
| Sri Lanka | 2 194/2 838 | 1 668/2 838 | 0 | 0 | 6 104 | 280 |
| S. Lucia | 817/2 838 | 1 389/2 838 | 0 | 0 | 230 | 106 |
| S. Vinc. Gren | 748/2 838 | 1 250/2 838 | 0 | 0 | 104 | 101 |
| S. Kitts Nevis | 654/2 838 | 1 083/2 838 | 0 | 0 | 66 | 79 |
| Sudan | 1 453/2 838 | 1 653/2 838 | 0 | 0 | 5 429 | 321 |
| Suriname | 1 131/2 838 | 1 229/2 838 | 0 | 0 | 1 077 | 118 |
| Swaziland | 686/2 838 | 479/2 838 | 0 | 0 | 494 | 200 |
| Sweden | 2 684/2 838 | 2 526/2 838 | 15 920 | 1 486 | 0 | 0 |
| Switzerland | 2 680/2 838 | 2 610/2 838 | 8 786 | 1 534 | 0 | 0 |
| Syria | 1 765/2 838 | 1 542/2 838 | 0 | 0 | 2 183 | 210 |
| Tajikistan | 803/2 838 | 725/2 838 | 0 | 0 | 776 | 193 |
| Tanzania | 1 610/2 838 | 1 788/2 838 | 0 | 0 | 16 232 | 313 |
| Thailand | 2 623/2 838 | 2 508/2 838 | 0 | 0 | 10 613 | 297 |
| Togo | 1 377/2 838 | 1 703/2 838 | 0 | 0 | 1 768 | 234 |
| Tonga | 407/2 838 | 585/2 838 | 0 | 0 | 432 | 103 |
| Trin. & Tob. | 1 678/2 838 | 1 758/2 838 | 0 | 0 | 87 | 138 |
| Tunisia | 2 013/2 838 | 2 102/2 838 | 0 | 0 | 3 864 | 214 |
| Turkey | 2 518/2 838 | 2 315/2 838 | 895 | 293 | 5 086 | 194 |
| Turkmenistan | 837/2 838 | 811/2 838 | 0 | 0 | 288 | 119 |
| USA | 2 695/2 838 | 2 677/2 838 | 109 565 | 1 543 | 0 | 0 |
| Uganda | 1 505/2 838 | 1 673/2 838 | 0 | 0 | 8 354 | 312 |

Continued on next page...

... table B3 continued

| Country | Exp-o ^a | Imp-o ^b | Aidg ^c | Aidg-o ^d | Aidr ^e | Aidr-o ^f |
|--------------|--------------------|--------------------|-------------------|---------------------|-------------------|---------------------|
| Ukraine | 1 772/2 838 | 1 678/2 838 | 0 | 0 | 0 | 0 |
| U.A. Em. | 2 057/2 838 | 1 991/2 838 | 0 | 0 | 35 | 25 |
| UK | 2 691/2 838 | 2 676/2 838 | 35 401 | 1 740 | 0 | 0 |
| Uruguay | 1 845/2 838 | 1 607/2 838 | 0 | 0 | 791 | 246 |
| Uzbekistan | 919/2 838 | 840/2 838 | 0 | 0 | 1 517 | 183 |
| Vanuatu | 585/2 838 | 687/2 838 | 0 | 0 | 698 | 99 |
| Venezuela | 1 821/2 838 | 1 793/2 838 | 0 | 0 | 842 | 241 |
| Vietnam | 2 042/2 838 | 1 682/2 838 | 0 | 0 | 11 290 | 309 |
| W. Samoa | 521/2 838 | 685/2 838 | 0 | 0 | 580 | 129 |
| Yemen | 1 225/2 838 | 1 416/2 838 | 0 | 0 | 3 254 | 233 |
| Zaire | 1 168/2 838 | 1 080/2 838 | 0 | 0 | 10 626 | 292 |
| Zambia | 1 404/2 838 | 1 490/2 838 | 0 | 0 | 9 546 | 302 |
| Zimbabwe | 1 960/2 838 | 1 663/2 838 | 0 | 0 | 5 710 | 315 |
| Total | 282194/503398 | 282194/503398 | 598274 | 30026 | 598274 | 30026 |

Notes: The total number of countries in the sample is 184 and the number of export-import pairs is 33 818.

a) Number of observations in which the country is an exporter (postiv observations/all observations)

b) Number of observations in which the country is an importer. (postiv observations/all observations)

c) Aid given in million USD.

d) Number of observations with aid given per exporting country.

e) Aid received in million USD.

f) Number of observations with aid received per exporting country.

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