Does aid promote donor exports? Commercial interest versus instrumental philanthropy

Abstract

Aid is given for a mix of motivations and commercial interests are among them. This paper investigates by means of advanced panel data techniques to what extent bilateral aid has been successful in promoting bilateral exports to recipient countries during the period 1988-2007. To capture the material (in terms of donor exports) impact of aid we use a gravity model of trade which is augmented by several trade determinants: bilateral and multilateral foreign aid, bilateral exchange rates and trade agreements . There are three primary findings. First, in the long term, the average return, in terms of an increase in the donors' level of goods exports, is approximately $ 2.5 US for every aid dollar spent on bilateral aid when the whole sample is considered. Second, this effect seems to have vanished after 2000 for most countries. Third, comparisons among donors show that aid has a positive and significant effect on thirteen donors' export levels, while for eight donors we find no effect which appears to be related to the extent to which aid is tied as well as to the sectoral allocation of aid.

Key words: *exports, foreign aid, donors, panel data, sample selection, GLM*

JEL Classification: F10; F35; O10

1. Introduction

In recent decades, some research effort has been devoted to investigating the effects of developmental assistance on the economic performance of the recipient countries and on clarifying how aid can be used to promote exports from developing countries, the so-called "aid for trade" principle (Morrissey, 2006; Portugal-Perez and Wilson, 2009; Nowak-Lehmann D., Martinez-Zarzoso, Klasen and Cardoso, 2012; Calí and Te Velde, 2011). Much less attention has been devoted to the issue of quantifying the impact of aid on donors' export revenues (Suwa-Eisenmann and Verdier, 2008). A finding that aid flows promote exports from the donor countries would suggest that giving aid—if it also promotes development in the recipient country—can be a win-win situation for both parties and might also reduce taxpayers' reluctance to devote resources to aid.

The literature on aid allocation has found that aid flows depend strongly upon historical ties and strategic and economic interests, and are only weakly dependent upon poverty levels or the existence of democratic governance in recipient countries (Alesina and Dollar, 2000). Hence, an interesting question is to what extent commercial interests of the donor are indeed promoted by the aid relationship. There might also be a reverse causal relationship from commercial relations to aid flows. Younas (2008) finds that a larger amount of aid is provided to recipients who import capital goods and Martinez-Zarzoso, Nowak-Lehmann D. and Johannsen (2012) show that aid increases with donor's exports. If that causality were present, this would be an important finding, further questioning the motivation of donors when giving aid and partially supporting their trade benefits motive. Indeed, donors' aid policies could then be compared to other trade promotion policies such as regular trade missions and state visits (Rose, 2007; Head and Ries, 2010) or to the formation of regional trade agreements (RTAs).

Surprisingly, the related empirical evidence is still scarce. A number of studies focused on the effect of aid on export levels for a given donor (Zarin-Nejadan, Monteiro and Noormamode,

2008; Nowak-Lehmann D., Martínez-Zarzoso, Klasen and Herzer, 2009; Martínez-Zarzoso, Nowak-Lehmann D., Klasen and Larch, 2009). A few others have analyzed the effect of aid on donor countries' export levels from a multi-donor perspective (Nilsson, 1997; Lloyd, McGillivray, Morrissey, and Osei, 2000; Wagner, 2003; Nelson and Juhasz Silva, 2012; Johansson and Pettersson, 2012), all of which leaving open some methodological and/or substantive questions (see below). Our own analysis is similar to Nilsson (1997), Wagner (2003), Johanson and Pettersson (2012), and Nelson and Juhasz Silva, (2012) in using an augmented gravity model of international trade. This model allows controlling for the impact of other influences on trade, such as income (which affects production capacity and preferences for variety), population (absorption and economies-of-scale effects), and distance, in a world where common language, colonial ties, common borders, and aid can also influence trade. We augment the model with exchange rates, RTAs and two types of aid—bilateral and bilaterally-imputed multilateral aid.

The main contributions of this paper lie in two fronts. Firstly, we extend the existing empirical literature by paying special attention to donors heterogeneity, using more recent data, additional covariates (bilaterally-imputed multilateral aid, exchange rates and RTAs), and more advanced econometric techniques, in line with Martinez-Zarzoso, Nowak-Lehmann, Klasen and Larch (2009). In particular, we depart from Nilsson (1997), Wagner (2003), Nelson and Juhasz Silva (2012) and Johansson and Pettersson (2012) in the way we control for unobserved and observed heterogeneity. Secondly, from a policy point of view our contribution is to address the following four key questions. First, we ask to what extent donor countries benefit from bilateral and multilateral development aid in a multi-donor-multi-recipient set-up and over time, in terms of greater donor exports to the recipient countries. Second, we investigate to what extent a given bilateral commercial link, a donor-recipient link, displaces other donors' exports, generating a crowding-out effect. Third, we investigate whether there has been a change in the trade-aid relationship recently, as a consequence of the

international recommendations (e.g. by the Development Assistance Committee of the OECD, OECD-DAC) on untying official development assistance and to focus it more on least developed countries. Finally, we examine and quantify the effect of development aid on each donor's export levels and investigate whether the tying status of each country is able to explain the different aid effects.

To summarize our main results, we find that the increase in the amount of donors' exports flowing from donors' aid in the long run is more moderate than in earlier studies: around a $2.5 US increase in exports for every aid dollar spent. The overall effect is remarkably robust, but decreases over time for most donors. It is always positive, but disappears in the late 1990s. In particular, from 2000 onwards a lower (and even insignificant) effect of bilateral aid on the corresponding donors' exports is found. Since the late 1990s donors have increasingly been signing RTAs with developing countries as an alternative way to promote their commercial interest. We do not find evidence of a displacement effect for all donors, but only for European Union donors. Interestingly, the evidence indicates that aid from some donors is not export-enhancing, whereas for some others, the effect is strong and robust to several specifications. The effect is remarkably high for some donors (Austria, Australia, Italy, Japan, Sweden, US, Germany, Canada and Spain) and positive but smaller for France, UK, Norway, Denmark and Portugal. However for others, we find no such effect (Belgium, Finland, Greece, Ireland, Netherlands, New Zealand, and Switzerland). Donors for which aid promotes trade are characterized for having higher levels of tied aid (France, Austria, Australia, Canada, Spain) or for giving aid for specific purposes (e.g. The Norwegian Oil for Development (OfD) initiative[1]). On the other hand, countries in the second group are characterized for having lower levels of tied aid (Ireland, Netherland, Finland) or for giving aid mainly for social infrastructure and services (New Zealand, Greece and Belgium), where the export effects are apparently lower.

[1] http://www.norad.no/en/Thematic+areas/Energy/Oil+for+Development.

Section 2 summarizes the related literature and sets up the theoretical framework. Section 3 presents a description of the data. Section 4 presents the model specification, discusses the main results, and presents a number of robustness checks. Finally, Section 5 outlines some conclusions.

2. Theoretical Framework and Literature Review

In international trade theory, researchers have long studied the welfare implications of development aid for donors and recipient countries. While we do not study the welfare effect of aid, increase in (donors') exports could be regarded as an important intermediate step to increase welfare. The first public discussion of this topic was the Keynes-Ohlin debate in relation to the paradoxical effects of German reparations[2]. Keynes suggested that the income transfer has two effects on the transferring country. The first one is the direct effect of the transfer, which decreases the transferring country's income. The second one is that the transfer increases the transferring country's exports and hence the price of exporting goods should decrease, leading to a deterioration of the terms-of-trade. But Ohlin criticized the second effect and argued that the transfer may indeed improve the terms-of-trade of the transferring country and this effect may compensate the direct effect of the transfer. Leontieff (1936) also raised the possibility of transfer paradoxes by showing that the distribution of utility gains and losses from a transfer may be perverse (donor-enriching and recipient-immiserizing) due to the change in the terms-of-trade. Since those preliminary discussions, the theoretical literature on transfer paradoxes has been extended to more general settings (Gale, 1974; Brecher and Bhagwati, 1981 and 1982; Bhagwati, Brecher, and Hatta, 1983 and 1984). The findings indicate that the paradoxes are still possible but, under certain conditions both donors and recipients can benefit from transfers (weak paradox). More recently, Djajic, Lahiri, and Raimondos-Moller (2004) studied the welfare implications of temporary foreign

[2] Keynes (1929a, 1929b, and 1929c) and Ohlin (1929a, 1929b).

aid in the context of an intertemporal model of trade and considered the impact of aid on donor and recipient exports. The authors found that the net benefits of an aid transfer may change over time for both the donor and the recipient and that under certain conditions both, donor and recipient can benefit from aid.

Recently, Nelson and Juhasz Silva (2012) present an extension of Anderson and van Wincoop (2003) to modelling trade flows to the asymmetric north-south case and derive some implications related to the effect of aid on trade. Their results indicate that if the economy of a donor country (GDP) is larger than that of the recipient country by at least the monetary value of the foreign aid, there is an increase in exports from the larger country to the smaller. The intuitive rationale behind this effect is that, as a result of the transfer, the two countries become more similar in size, and the more similar in size two countries are, the more they trade with one another.

Turning directly to the empirical literature that investigates the impact of aid on a donor country's exports, we classify the studies according to the underlying mechanism that generates the aid-trade relationship. Four mechanisms are identified in the related literature: First, aid could have a trade promoting effect and can act as a "door opener" for a given bilateral relationship (donor-recipient). Closely related to this aid can have an effect on overall bilateral trade, promoting also exports from recipients to donors.[3] Third, the bilateral link can generate a good-will or familiarity effect that also promotes donor's exports. Finally the bilateral link could also give rise to a displacement effect decreasing exports from other donors to a given recipient.

Concerning the trade promoting effect of development aid, some authors emphasized that it is critical to distinguish between the effects of tied and untied aid. Jepma ((1991), Arvin and Baum (1997) and Arvin and Choudry (1997) evaluated the relationship between bilateral aid and bilateral exports with and without tying of the aid and found that aid without tying

[3] This issue is examined in detail by Nowak-Lehmann, Martinez-Zarzoso, Herzer, Klasen and Cardoso (2012).

was roughly as export-promoting as tied aid. The authors pointed out that the reasons could be the existence of parallel trade agreements and trade concessions or the effects of the recipient countries' good will[4]. In recent years tying has been progressively reduced, partly due to pressure from the OECD-DAC.

The second mechanism has been scarcely investigated, to our knowledge only Johansson and Pettersson (2012) and Nowak-Lehman D. et al (2012) investigate the effect of bilateral aid on recipient exports. While the first study finds a positive and significant effect of aid on recipient exports, the second study finds that the long term impact of bilateral aid on recipient exports is not statistically significant after controlling for bilateral (dyadic) fixed effects, autocorrelation and endogeneity. The reason could be that Johansson and Pettersson (2012) failed to control for unobservable heterogeneity related to each bilateral relationship; to the extent that these fixed effects used in Nowak-Lehmann et al. (2012) capture time-invariant goodwill that affects both the trade and the aid relationship, aid might be a way to promote this goodwill and therefore should augment trade flows in both directions.

Related to this, a third group of studies analyzed the aid-trade link relying on the gravity model of international trade and pointed towards a good-will or familiarity effect as the main underlying mechanism explaining the relationship. Aid may facilitate trade by creating new customers relations, building reputation or opening distribution channels. Nilsson (1997) investigated the aid and trade relationship of EU countries and developing countries from 1975 to 1992 using three-year averages and showed that $1.00 US-worth of aid increased exports by an average of $2.60 US for EU countries. He also failed to control for unobservable heterogeneity since he used a common intercept for all countries and a time trend. In a similar framework, Wagner (2003) studied the aid and trade relationship between OECD donors (especially Japan) and recipient countries. Using pooled OLS for the years 1970, 1975, 1980, 1985, and 1990 he computed the donor-country export-level impact of

[4] Recent evidence shows that less tying does in fact lead to less exports (Johansson and Pettersson, 2012).

$1.00 US of aid to be approximately a $2.30 US return, however, when fixed country effects were added it was reduced to $0.73 US return. Nelson and Juhasz Silva (2012) also found an average positive effect of foreign aid on exports from the donor to the recipient, but fail to account for dynamics, multilateral resistance effects, and zero trade flows. Similarly, Nowak-Lehmann D. et al. (2009) and Martínez-Zarzoso et al. (2009) investigated whether aid from Germany promotes German exports and found that $1 of aid promotes exports of at least the same magnitude.

Finally, concerning the trade diversion effects, the evidence is scarce and inconclusive. Nowak-Lehmann et al. (2009) and Martinez-Zarzoso et al. (2009) find that aid from other European Union donors had a diverting effect on German exports. However, the effect was not robust to changes in the model specification and, in any case, only focused on one donor.

3. Description of the Data

3.1 Development Aid

The aid given by the Development Assistance Committee (DAC) members is reported as official development aid (ODA) and other official flows (OOF). OOF are other official sector transactions which do not meet ODA criteria[5] and are therefore disregarded in our analysis.

The aid data contains the bilateral transactions as well the multilateral contributions. The former are undertaken by a donor country directly with an aid recipient and the latter are contributions of international agencies and organizations that flow to recipient countries and

[5] For example, grants to aid recipients for representational or essentially commercial purposes, official bilateral transactions intended to promote development but having a grant element of less than 25 per cent or official bilateral transactions, whatever their grant element, that are primarily export-facilitating in purpose ("official direct export credits"). Net acquisitions by governments and central monetary institutions of securities issued by multilateral development banks at market terms, subsidies (grants) to the private sector to soften its credits to aid recipients, funds in support of private investment are also classified as OOF.

are then allocated *pro rata* to donor countries based on their contribution to that particular multilateral organization.

The total net ODA disbursements, the aid data we will work with, are the sum of grants, capital subscriptions, total net loans and other long-term capital.

Figure 1 shows the ratio of ODA over GDP for the most important donors from 1988 through 2007. The Nordic countries (Sweden, Norway, and Finland) and the Netherlands show the highest figures. Throughout this entire period, they consistently gave more than 0.6% of GDP as ODA and in some years the percentage surpassed 1 percent for the Netherlands. The USA presents the lowest figures showing percentages that are in many years below 0.2 percent of GDP.

Figure 1. Donor's ODA-to-GDP ratio (1988-2007)

3.2 Data Sources

The datasets used are the following: ODA data from 1988 to 2007 are from the OECD Development Database on Aid from DAC Members. We consider bilateral net ODA disbursements in current US$[6], instead of aid commitments, because we are interested in the funds actually released to the recipient countries in a given year. Disbursements record the actual international transfer of financial resources, or the transfer of goods or services valued at the cost to the donor. We also consider imputed multilateral aid as a proxy for donors' total contributions to multilateral aid.

The original DAC member countries are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Sweden, Switzerland, the United Kingdom, and the United States. Other countries are also included in the data, but they became donors many years later: the Czech Republic (1998), Greece (1996), Hungary (2003), Iceland (1988), Korea (1989),

[6] The net amount comprises total grants and loans extended (according to DAC).

Latvia (2002), Lithuania (2001), the Slovak Republic, Spain (1987), and Turkey (1990). In the empirical estimations we included all original DAC countries plus Greece and Spain. Bilateral exports are obtained from the UN COMTRADE database. Data on income and population variables are drawn from the World Bank (World Development Indicators Database, 2009). Bilateral exchange rates are from the IMF statistics. Distances between capitals have been computed as Great Circle distances using data on straight-line distances in kilometres, latitudes, and longitudes from the CIA World Fact Book. Other dummy variables included in the model are from CEPII The RTA variable has been constructed using the files provided by De Sousa (2012). Summary statistics of the described variables are presented in Table 1.

Table 1. Summary statistics

4. Model Specification and Results

4.1 Model Specification

The gravity model of trade is nowadays the most commonly accepted framework to model bilateral trade flows. Solid theoretical foundations that provide a consistent base for empirical analysis have been developed in the past three decades for this model (Anderson, 1979; Bergstrand, 1985; Anderson and van Wincoop, 2003; Helpman, Melitz, and Rubinstein, 2008). The major contribution of Anderson and van Wincoop (AvW) was the appropriate modelling of trade costs to explain bilateral exports.

According to the underlying theories, trade between two countries is explained by nominal incomes and the populations of the trading countries, by the distance between the economic centers of the exporter and importer, and by a number of trade impediment and facilitation variables. Dummy variables, such as trade agreements, common language, or a common border, are generally used to proxy for these factors. The gravity model has been widely used to investigate the role played by specific policy or geographical variables in

explaining bilateral trade flows. Consistent with this approach, and in order to investigate the effect of development aid on donors' exports, we augment the traditional model with bilateral and multilateral aid (ODA) variables. Among the variables facilitating trade, we add bilateral and imputed multilateral aid. Introducing time variation and bilateral exchange rates[7], the augmented gravity model is specified as

$$X_{ijt} = \alpha_0 \, Y_{it}^{\alpha_1} Y_{jt}^{\alpha_2} YH_{it}^{\alpha_3} YH_{jt}^{\alpha_4} DIST_{ij}^{\alpha_5} BAID_{ijt}^{\alpha_6} BAIDK_{jt}^{\alpha_7} MAID_{itj}^{\alpha_8} EXCHR_{ijt}^{\alpha_9} F_{ij}^{\alpha_{10}} \, u_{ijt} \quad (1)$$

where X_{ijt} are the exports from donor i to recipient j in period t in current US$; Y_{it} (Y_{jt}) indicates the GDPs of the exporter (importer) in period t, YH_{it} (YH_{jt}) are exporter (importer) GDPs per capita in period t and $DIST_{ij}$ is geographical distances between countries i and j. $BAID_{ijt}$ is bilateral official net development aid from donor i to country j in current US$; and $MAID_{ijt}$ is imputed multilateral development aid from donor i to country j in current US$; F_{ij} denotes other factors impeding or facilitating trade (e.g RTAS, common language, a colonial relationship, or a common border). $EXCHR_{ijt}$ denotes nominal bilateral exchange rates in units of local currency of country i (donor) per unit of currency in country j (recipient) in year t. Finally, u_{ijt} is an idiosyncratic error term that is assumed to be well behaved. Note that aid variables could be inserted with lags, in accordance with the theoretical predictions.

Usually the model is estimated in log-linear form[8]. Taking logarithms in Equation 1, the specification of the gravity model is

$$LX_{ijt} = \gamma_0 + \phi_t + \alpha_1 LY_{it} + \alpha_2 LY_{jt} + \alpha_3 LYH_{it} + \alpha_4 LYH_{jt} + \alpha_5 LDIST_{ij} + \alpha_6 LBAID_{ijt} + +\alpha_7 LBAIDK_{jt} + \alpha_8 LMAID_{ijt} + \alpha_9 LEXCHR_{ijt} + \alpha_{10} CONTIG_{ij} + \alpha_{11} COMLANG_{ij} + \alpha_{12} COLONY_{ij} + \alpha_{13} RTA_{ijt} + \eta_{ijt} \quad (2)$$

where L denotes variables in natural logs, RTA, CONTIG, COMLANG, COLONY are dummies that take the value of one when countries belong to the same trade agreement,

[7] When the gravity model is estimated using panel data, it is recommended to add bilateral exchange rates, as well, as a control variable (Carrere, 2006).
[8] We also estimate the model in its original multiplicative form.

share a border, have the same official language or have a colonial relationship, respectively and the other explanatory variables are described above. ϕ_t are specific time effects that control for omitted variables common to all trade flows but which vary over time. In the estimations, the constant (γ_o) is replaced by a trading-pair specific intercept, δ_{ij}, sometimes also referred to as dyadic fixed effects to control for unobservable bilateral effects that are time invariant. When these effects are specified as fixed effects, the influence of the variables that are time invariant and vary by trading pair cannot be directly estimated. This is the case for distance, common language, contiguity, and colonial history; therefore, its effect is subsumed into the country-pair dummies. Finally, η_{ijt} is an idiosyncratic error term that is assumed to be well behaved. The model will be estimated for all donors and also for each donor separately by restricting the income and income-per-capita coefficients to being equal ($\alpha_1 = \alpha_2$ and $\alpha_3 = \alpha_4$).

To investigate the existence of the abovementioned displacement effect, we use two additional control variables. First, aid from other donors (different from donor *i* to recipient *j* (LBAIDK=$\sum LBAID_{kjt}$). The rationale of adding this variable is to control for cross-correlation effects due to the fact that other donors' aid could promote their own exports to recipient *j*, which may have a negative effect on donor *i*'s exports[9]. In our two-way fixed effects framework, we do not think that endogeneity concerns will bias our results, as we are effectively investigating to what extent *changes* in aggregate aid flows of other donors affect exports from donor i; in any case, our robustness checks (GMM framework) would specifically address such concerns as well.[10] Alternatively, as a robustness we also use the *share* of total aid given to each recipient by other donors (LBAIDSHK$_{jt}$). This effect intends

[9] To our knowledge, this is the first paper to estimate this "crowding-out" effect in a multi-donor's setting. Martinez-Zarzoso et al. (2009) found some evidence indicating that aid from other EU countries displace German exports, although that result was not robust.

[10] In particular, the pair fixed effects are likely to capture all long-term bilateral trade relations, while the time fixed effects will capture effects common to all donors that vary over time. The only possible concern is that exports from donor i reduce aid flows from other bilateral donors. There is little evidence for such an effect in the literature or in our data; to the extent such an effect exists, it is captured in the lag structure we use as well as in the GMM framework.

to capture the importance of donor *i* for a given aid recipient; in particular, if the share of other donor-giving is high, we would expect that this is more likely to crowd-out exports from donor *i*. However, we find mainly insignificant results when using this variable and therefore we show results only with LBAIDK.

Considering that it may take some time before aid fully affects trade, we include a number of lags of the two types of aid (bilateral and imputed multilateral) in the model specification. To determine the number of lags added to the right-hand side, we start by adding more lags than one could reasonably expect to need and then disregard those that are statistically non-significant. The chosen number of lags is two for bilateral aid and one for imputed multilateral aid.

With respect to the specification of the country-pair effects, we not only consider the usual fixed-versus-random-effects approach, but also an attractive alternative approach, which is especially suitable when there are missing values and the time span is short, and consists of estimating the model, as proposed by Mundlak (1978), including within and between effects (Egger and Url, 2006). Basically, this approach involves modelling the correlation of unobserved heterogeneity under the assumption that the unobserved factors are correlated with the group mean of the explanatory variables. Each time-variant variable is included twice, once in its original form and once averaged over time. FGLS on this model obtains both within effects and the between-within effects in a single model. According to Egger and Pfaffermayer (2004), the former approximate short-run effects, and the latter additional long-run effects. This model could be named correlated random effects model. The extended model is given by

$$LX_{ijt} = \gamma_0 + \phi_t + \alpha_1 LY_{it} + \alpha_2 LY_{jt} + \alpha_3 LYH_{it} + \alpha_4 LYH_{jt} + \alpha_5 LDIST_{ij} + \alpha_6 LBAID_{ijt} + \alpha_7 LBAIDK_{jt} + \alpha_8 LMAID_{ijt} +$$
$$+ \alpha_9 LEXCHR_{ijt} + \alpha_{10} CONTIG_{ij} + \alpha_{11} COMLANG_{ij} + \alpha_{12} COLONY_{ij} + \alpha_{13} RTA_{ijt} + \alpha_{14} AVLYD_{ij} + \alpha_{15} AVLYR_{ij} +$$
$$\alpha_{16} AVLYHD_{ij} + \alpha_{17} AVLYHR_{ij} + \alpha_{18} AVLBAID_{ij} + \alpha_{19} AVLBAID_{j} + \alpha_{20} AVLMAID_{ij} + \alpha_{21} AVLEXCHR_{ij} +$$
$$+ \alpha_{22} AVRTA_{ij} + \eta_{ijt}$$
$$where \ \eta_{ijt} = \mu_{ij} + \nu_{ijt}$$

(3)

where variables starting with AV refer to averages over time of the time-variant regressors that were described above. According to Mundlak (1978), the heterogeneity bias will be minimal, due to the fact that the correlation between the country-pair effects and the explanatory variables is captured in the model. FGLS estimation of model (3) will provide similar estimates to the within transformation and, therefore, unbiased estimates. Equation (3) is also estimated for groups of donors and for each donor country to account for country heterogeneity. Indeed, the literature has argued that different donors may use aid in different ways (e.g. seeking new markets or reinforcing existing relationships) which predict opposite effects.

In the next section, estimation results obtained with the outlined approaches are presented and discussed.

4.2. Main Results

Model 3 is estimated for data on 21 donors' exports and development aid (ODA) to 132 recipient countries during the period of 1988 to 2007. Table 2 reports the main estimation results for all donors.

Table 2: Development Aid and Donors' Exports—Results for different periods

The correlated random effects model (model 3) is estimated with a flexible structure in the error term that allows for panel-specific variances and for first order autocorrelation

within panels; the results for the whole period are shown in Column 1 (Table 2). This is our preferred specification[11]. A RESET-type test indicates that the model is correctly specified (last row in Table 2). The within-coefficients on bilateral and multilateral aid are practically unchanged with respect to those in the FE specification (Table A.1).

With respect to the variable of interest, bilateral aid, the estimated within-coefficient is always positive and significant, indicating that a one-percent increase in bilateral aid raises donors' exports by 0.039 percent (0.020+0.007+0.012). The effect is small compared to that shown in previous studies which did not control for country-pair unobserved heterogeneity, autocorrelation, and heteroskedasticity, but it is still positive and significant. Using the results in Column 1 (Table 2), we find that, in the short run, the average return on aid for donors' exports is approximately a $0.50 US increase[12] in exports for every aid dollar spent. [13]

It is worth noting that the between-effect (the coefficient obtained for bilateral aid averaged over time) is much larger in magnitude (0.209) than the within effect, and considering that it could be taken as an approximation of the long-run effect, using this result, the average return on aid for donors' exports in the long term is approximately a $2.5 US increase in exports for every aid dollar spent.

[11] Results of the most popular specifications are reported in the Appendix. The first and second columns of Table A.1 show the pooled OLS without and with lagged aid terms, respectively. Time-fixed effects are also included in both columns. Individual (country-pair) effects (modelled as random) are included in Column 3 to control for unobservable heterogeneous effects across trading partners. A Hausman test indicates that the dyadic unobservable effects are correlated with the error term, hence the random effects approach, ignoring this correlation, leads to inconsistent estimators. The fourth column presents the two-way FE estimates that are consistent. Restricting the analysis to the within variation eliminates the bias due to unobserved heterogeneity that is common to each trading-pair but means that the between-variation is lost.

[12] This average is calculated as: $\frac{\partial X}{\partial BAIDG} = \beta_{BAIDG} * \frac{AV(X)}{AV(BAIDG)} = 0.039 * \frac{276906}{22071} = 0.49$

[13] The fixed effects results obtained by Wagner (2003) implied that exports derived from a dollar of aid amount to $0.73 US for a sample of 20 donors, 108 recipients, and five years (1970, 1975, 1980, 1985, and 1990). This result, in the context of a static gravity model, is higher than our preferred result ($0.55 US using the coefficients of Model 1 in Table 2), but closer to the result obtained for the period 1988-1993 ($ 1.1 US). It seems that the average return to aid in terms of donors' exports has been decreasing over time. However our results are not strictly comparable to Wagner (2003). Indeed, he did not control for autocorrelation and heteroskedasticity in the error term and he included only data for five years during the 1970s and 1980s, whereas we examine the 1990s and the 2000s and use a wider sample of countries and years.

The estimated coefficient for the official net development aid of other donors is also positive and statistically significant, but the magnitude is quite low (0.012). This suggests that donors' exports could be positively influenced by aid given by other DAC members. In particular, when other donors give higher amounts of aid to a particular recipient and aid is untied, it could promote recipient imports also from other donors, generating a positive effect on a specific donor's exports. By adding these effects to the effect of bilateral aid from other donors, the average return on aid for donors' exports amounts to $0.63 US increase in exports for every aid dollar spent. However, the between-coefficient of our displacement-variable is negative and significant indicating that higher average aid in the whole period from other donors to a given recipient decreases bilateral exports of a given donor. Discounting this negative effect, the average return on aid for donors' exports in the long term amounts to $1.9 US increase in exports for every aid dollar spent.

With respect to imputed multilateral aid, the within-effect on donors' exports is positive and significant. According to column 1 (Table 2), an increase of 10 percent in multilateral aid increases exports by 0.022 (0.012+0.010) percent.

Most of the other variables present the expected sign and are statistically significant and of similar magnitude as found in the literature. Columns 2-4 (Table 2) present the results for three different periods of time. For the first period (1988-1993) the total effect of bilateral aid on exports is higher than average, being the estimated elasticity 0.15, which corresponds to a $1.1 US increase in exports for every aid dollar spent. However the effect is reduced to a $0.5 US increase in exports for every aid dollar spent in the period 1994 to 2000 and fades away after 2000 (Column 4, Table 2). Interestingly, these decreasing aid-elasticities are accompanied by increase coefficients of the RTA variable, which is positive and statistically significant for the last two periods. In particular when a North-South trade agreement is in place, donors export around 8 (12) percent more in the period 1994 to 1999 (2000-2007), whereas RTA is not statistically significant in 1988-1993.

The decreasing effect of aid on donor's exports could also be related to the 2001 DAC recommendation of untying official development assistance to least developed countries, which entered into force on 1 January 2002, and the Paris Declaration agreed in 2005, are having an effect on donors aid policies. Specifically, if the effect of aid on donors exports is related to tied aid, an increase the amount of untied aid could reduce or even eliminate the effect. We investigate this hypothesis in the next section.

Next, to account for possible heterogeneity of the estimated coefficients across donors, Table 3 presents separated results for groups of donors and Table 4 for each donor using the correlated random effects estimator.

Table 3: Development Aid and Donors' Exports— Results for Groups of Donors

We have classified donors according to geographical location and to the economic blocs to which they belong. We are aware of the fact that it is an ad-hoc classification and other criteria could also be valid, for this reason we also present individual donor regressions. The main reason for grouping the donors is that we are able to efficiently estimate time-variant aid coefficients. Looking at the aid coefficients, a clear decreasing pattern is observed for most groups of donors over time, with the only exception of EU- South (periphery) countries. Most of these countries, apart from Italy, started to give development aid in the late 1980s and early 1990s. The most pronounced decline in the aid elasticity is shown for the group of Nordic countries, which includes Denmark, Finland, Norway and Sweden, with aid coefficients that are not statistically significant in the 2000s. But also for EU-North (Austria, Belgium, France, Netherland, Germany, UK) and Non-EU (Australia, Canada, Japan, New Zealand, Switzerland, US) groups the effect of bilateral aid on trade vanishes in the 2000s. Only for EU Southern countries the pattern is different showing increasing and significant aid elasticities in

the 2000s. A clear picture of the evolution of the coefficients over time is shown in Figure 2. It is also worth noting that for EU countries (EU-North and EU-South groups) aid given by other donors (BAIDK) shows as negative effect on exports of a given donor, showing a displacement effect that may reduce the return of aid on bilateral exports.

Finally, Table 4 shows the effects of bilateral aid on exports for each donor. Aid elasticities vary among donors[14], with Australia, Germany, Italy, Spain and Sweden showing above-average effects. It is also found that for six countries—Belgium, Finland, Greece, Ireland, the Netherlands, New Zealand, Portugal and Switzerland —such effects are not statistically significant. It is worth mentioning that Greece, Portugal and Ireland began giving aid in the 1990s and so the number of observations for them is lower than that for other donors, which could render the results insignificant.

Table 4: Development Aid and Donors' Exports—Results for Each Donor

Table 4 also presents the short-run monetary return on aid from single donors' exports. One US dollar spent on aid generates more than fifty cents (US$) of exports for Australia, Austria, Germany, Italy, Spain, and Sweden. The highest return is found for Australia.

We also run single-donor regressions using alternative estimators. According to the results of the two-way FE within estimator[15], the average effect, calculated as the average of the estimated coefficients in single donor regressions, is similar to the one found in Table 4 and is close to the average effect obtained in column 1 (Table 2).

4.3 Robustness Checks

[14] The slightly lower effect found for Germany in comparison to Martinez-Zarzoso et al. (2009) and Nowak Lehmann D. et al. (2009) is probably due to the longer and different time period considered in those studies (1960-2004). And it is consistent with our findings pointing to a decrease in the effect of aid on donor's exports over time.

[15] Results are available upon request from the authors.

A battery of robustness check supports our result and competing specifications indicate that our estimates are conservative. As a first robustness check, we consider an alternative specification that includes country-and-time effects to account for time-variant, multilateral price terms, as proposed by Baldwin and Taglioni (2006) and Baier and Bergstrand (2007). As stated by Baldwin and Taglioni, including time-varying country dummies should completely eliminate the bias stemming from the "gold-medal error" (the incorrect specification or omission of the terms that Anderson and van Wincoop (2003) called *multilateral trade resistance*). Income and income-per-capita variables cannot be estimated because they are collinear with the exporter and time variables and importer and time multilateral resistance terms. Bilateral fixed effects are also included to isolate the aid impacts on bilateral trade flows from any time-invariant country-pair-specific elements, some of which (colonial links, common language) could be related to the decision on giving aid. In this way we are also able to partially account for the aid endogeneity issue. Table A.2 provides results including time-varying country dummies for three periods. The two-way fixed effect within-estimator with robust and clustered standard errors has been used and only the level of the ODA variables enter the model, since the lags of ODA were not statistically significant. The estimated coefficients for impact of bilateral ODA on exports are decreasing over time (from column 1 to 3) and lie within the interval (0.023-0.053) until 2000. Compared with the average results obtained in Table 2 (column 1), the results are very similar on average (0.038). ODA also turns out to be insignificant from 2000 onwards[16]. Simultaneously, we find a clear displacement effect since 2001 onwards, indicating that an increase of 10 percent in other donors' aid leads to a decrease of 1.28 percent in bilateral exports of a particular donor to the given recipient. Hence, there is a displacement effect that may indirectly induce increases in other donors' exports in detriment of a given donor'

[16] We also performed sequential estimations adding a year at a time and aid started to be insignificantly related to exports from 2000 onwards. It thus appears that the export-enhancing effect does get smaller over time, which could be related to changes in aid allocation (focusing on poorer countries) and less tying of aid post-2000, following recommendations of OECD-DAC on aid effectiveness.

exports. The results were very similar when the share of aid was added instead of the magnitude.

The coefficient on imputed multilateral donors' aid is now insignificant in all three periods, whereas it was positive and significant in Table 2. Assuming that adding time-varying nation dummies is an alternative way of capturing history, the results are also consistent with the fact that the between-coefficient (cross-section average effect) of imputed multilateral aid is negative in column 1 (Table 2).

Second, two issues related to the estimation of gravity models of trade that may give raise to biased estimates are the presence of zeros in the dependent variable (bilateral trade) and the omission of the extensive margin of trade (number of exporters). To approach these issues we consider an alternative specification that is based on Helpman et *al*. (2008). Table A.3 presents the results from estimating Equation 3 (Mundlak approach), first considering only selection effects, showing the results of the second step estimation in the first column of Table A.3, and second, considering selection effects and heterogeneity in productivity, with the results of the second step estimation given in column 2 (Table A.3). In the first-step estimation, we estimate a correlated random-effects probit model with time effects. The selection variable used is the variable corruption. Hence this variable is excluded in the second step estimations[17]. From these estimates we obtained the inverse Mills ratio (INVMILLS) and the linear predictions down-weighted by their standard error (ZHAT) and these two elements were incorporated as regressors in the second-step estimation. Column 2 in Table A.3 incorporates into the second-step estimation heterogeneity in productivity and self-selection effects, along with random effects, average effects of the time-variant variables and time dummies. Both, the ZHAT coefficient and the INVMILLS coefficient are not statistically significant, showing no evidence of selection effects or heterogeneity in

[17] Other studies used religion or legal origin as exclusion variables, but in general the results are unchanged.

productivity. Hence, disregarding selection effects and heterogeneity in productivity does not change the estimates.[18]

Next, we estimate a dynamic gravity model following the standard technique of adding lagged dependent variables as regressors. The results for three different sub-periods are presented in Table A.4. The first three columns in this table present the results obtained by following a difference GMM approach for the same three periods as in Table A.2 (1988-1993, 1994-2000, 2001-2007), while Columns 4 to 6 present the results when estimating by the system GMM approach[19]. This second method is commonly accepted as one of the ways to estimate the determinants of bilateral export flows in a dynamic context. The results concerning the variable of interest obtained in Columns 4 to 6 are consistent with those obtained above. Indeed, the average return on aid for donors' exports in the long term, calculated using the average of the long term aid coefficients in those periods, is approximately a $1.88 US increase in exports for every aid dollar spent, which is slightly lower than the estimate found in the correlated random effects model ($ 2.5 US). In this framework we also tested for endogeneity of bilateral aid and for non-linearities Aid is found to be exogenous and the squared coefficient of bilateral aid reinforces the effect of aid[20].

Finally, the gravity model is also estimated in its original multiplicative form within the framework of generalized linear models (GLM).[21] These models allow for a more flexible specification of the variance and the mean and deal with the problems of heteroskedasticity and zero values in the dependent variable simultaneously. The main models considered are a correlated RE-Gamma model, a correlated RE-Poisson model and a correlated RE-NLS

[18] Note that Helpman et al. (2008) and Johansson and Pettersson (2012) find the selection bias to be economically negligible.

[19] The models estimated using Difference-GMM and system-GMM estimators pass the specification tests: autocorrelation of second order is rejected and the Hansen over-identification test indicates that the validity of the instruments cannot be rejected. However, in two cases we have to add a second lag of the dependent variable to the baseline specification.

[21] Results are available upon request from the authors.

model. The main difference in the estimated elasticities of exports with respect to bilateral aid[22] is that the results indicate slightly higher returns in terms of exports. According to the Gamma family (which is the best model in terms of AIC and BIC) the elasticity of exports with respect to bilateral aid is 0.07, indicating that a 10-percent increase in aid increases exports by 0.7 percent. The decreasing effect of the aid coefficients over time is confirmed using these techniques.

5. Discussion of the Results and Policy Implications

To better understand the reasons why the effect of bilateral aid on bilateral exports has decreased over time and affects differently each donor's exports, we look at the tying status of aid over time and for different countries. Figure 3a shows the time-evolution of tying status and Figure 3b shows the tying status of aid for each single donor.

Figure 3a. Tying status of development aid over time

Figure 3b. Tying status of development aid across donors

With respect to the tying status, despite the DAC recommendations of untying ODA given in 1987, 2001and 2005, Austria and Canada still tie more than 20 percent of its ODA, US and Spain more than 30 percent and Australia more than 20 percent. Figures reported in Table 4 show that all these donors show a higher than average return to aid. Although previous research (Jepma, 1991) stated that tied aid was not more export-promoting for donors than non-tied aid, the figures shown in Figure 3b together with our estimations results do not support this evidence. On the contrary, donors with a higher share of tied aid appear to have a higher return to aid in terms of exports. The importance of tied aid would also explain the falling export-promoting effect of aid post-2000 after which tying of aid has been much reduced. This evidence is more clearly shown in Figure 4, which points towards a positive

[22] Results are available upon request from the authors.

relation between the aid effect and the tying status over time. Fitting a simple OLS regression, the tying status explains 75 percent of the variation of the aid coefficient.

Figure 4. Tying status and aid effect on exports

A similar OLS regression across donors indicates that the tying status explains around 25 percent of the across-country variation of the aid coefficients. Indeed, other factors may play a role, as for example the sectoral allocation of development aid, which has changed over time and significantly differs across donors. More specifically, Figure 5a shows that the percentage of sectoral allocable aid has increased over time for all donors, but more sharply for EU Northern countries. Since this information is only available from 2002 onwards we cannot report statistics for our sample period.

Figure 5a. Sectoral allocation of development aid over time

Figure 5b shows how individual donors allocated their aid to different sectors in 2004. We will relate this evidence to our results concerning the aid effects.

Figure 5a. Sectoral allocation of development aid across donors

All donors with a non-significant aid-trade effect (Belgium, Finland, Greece, the Netherland, New Zealand, Switzerland Ireland and Portugal) dedicate more than 40 percent of its aid to social infrastructure and services (Greece and Ireland more than 60 percent, Switzerland almost 40 percent). On the other hand, more than 30 percent of Japanese ODA and around 20 percent of German and US aid is spent on economic infrastructure and services. These are all donors showing a significant aid-trade link, as well as donors that dedicate an important share of their ODA to production sectors like Canada and Denmark or

donors for which a high aid share is classified as “non allocable aid”, like Austria, Belgium, Canada, France, Italy, Sweden, Switzerland or UK with more than 40 percent.

In summary, our results indicate that in the short run the average return on aid for donors’ exports in the period 1988-2007 is approximately a $0.50 US dollar increase in exports for every aid dollar spent, whereas in the long run, this number is even larger (around $ 2.5 US-dollar). However, this result shows an average effect that has been decreasing over time and disappeared in the 2000s for most donors and it is also different across donors, with later members of the DAC showing a different picture.

These results could be good news for both developing and developed countries. The first could benefit from receiving more productive aid. The second could contribute to the economic development of poor countries by focusing on the best aim of development aid, which is improving the living conditions of developing countries and use other means to promote trade, namely RTAs, trade missions and other trade promotion policies that do not have detrimental effects on developing countries’ economic performance.

6. Conclusions

The purpose of this paper is to analyze the effects of development aid on donors’ exports. The study period runs from 1988 to 2007. The main results can be summarized as follows. First, donors’ bilateral aid has positively affected their exports to developing countries. The results point to large beneficial effects of bilateral aid upon donor’s exports and to non-negligible effects of imputed multilateral aid in the short term. Second, the effects of bilateral aid on exports vary over time and across donors. Indeed, the effects of aid on donors’ exports do appear to have decreased substantially over the period studied. Among donors, Australia, Italy, Germany, Spain and Sweden showing the greatest positive effects; this appears to be related to differences in the tying status and in the sectoral allocation of aid. Third, a particular donor’s export levels were negatively affected if other donors increased their aid

only for EU countries. It is worth noticing that the effect of bilateral aid on trade is even not statistically significant in the 2000s, showing perhaps an effect of the recommendations given by the OECD-DAC concerning the tying of aid and aid allocation. While we do not assess the various transmission channels directly, the findings are consistent with the notion that in the last decades bilateral aid has promoted exports from donor to recipient countries, has promoted export-enhancing goodwill and exposure, and displaced exports from other donors, at least in some cases.

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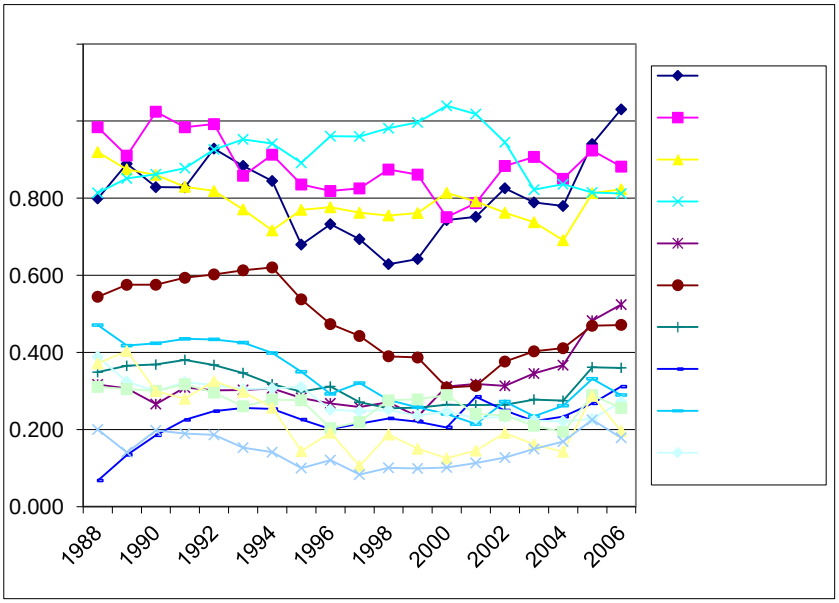
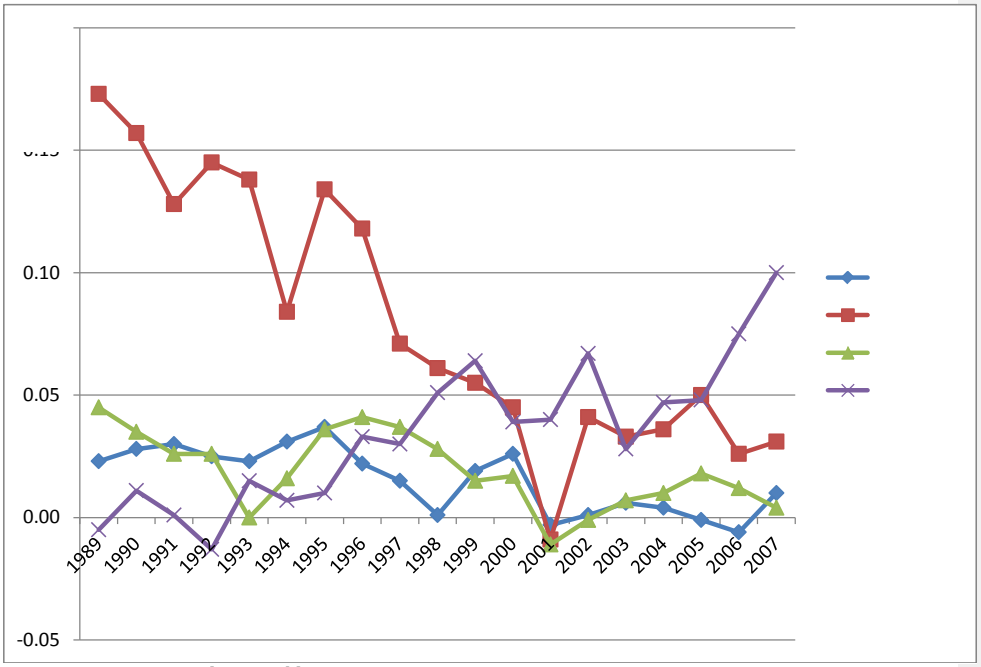
Figure 1. Donors ODA-to-GDP ratio (1988-2007)



Source: OECD International Development Statistics (IDS) online databases on aid.

Figure 2. Time-varying development aid coefficients



Source: Regression results in Table 3. Non EU: Australia, Canada, Japan, New Zealand, Switzerland, US. Nordic: Denmark, Finland, Sweden, Norway. EU North: Austria, Belgium, France, Netherland, Germany, UK. EU South: Greece, Ireland, Italy, Portugal, Spain.

Figure 3a. Tying status of development aid over time

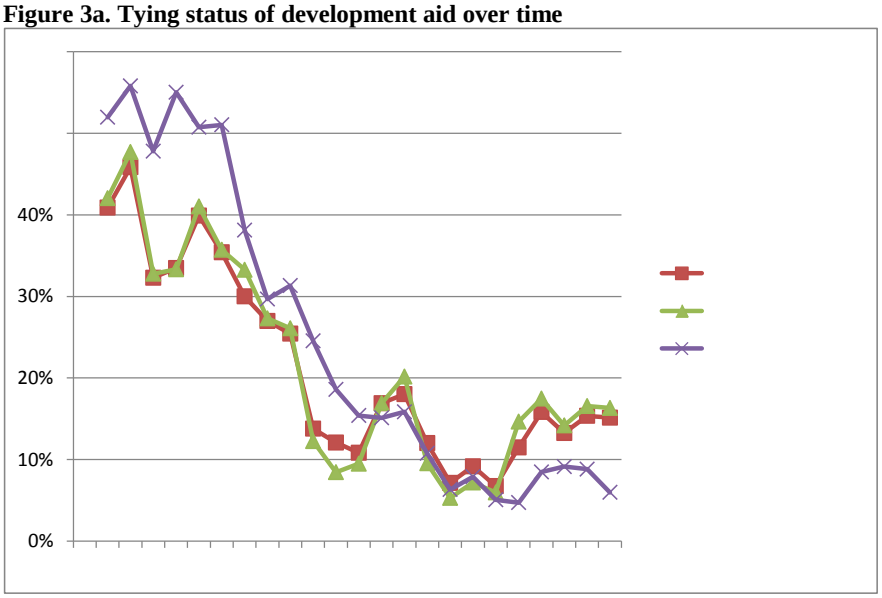
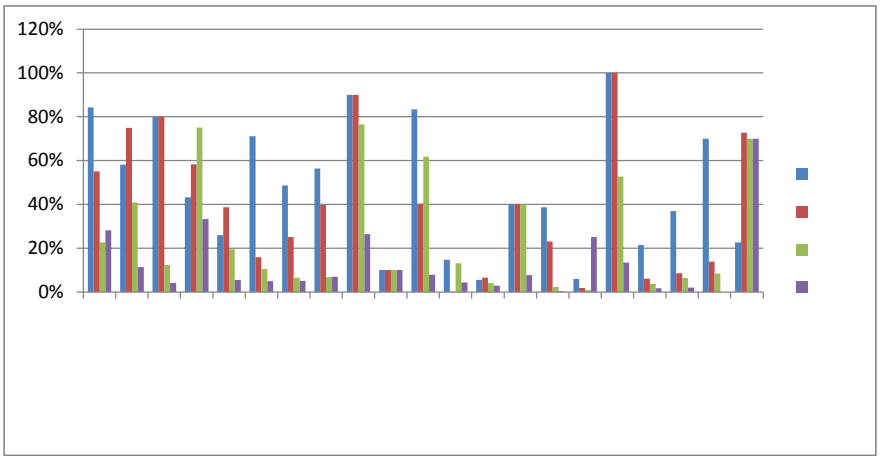
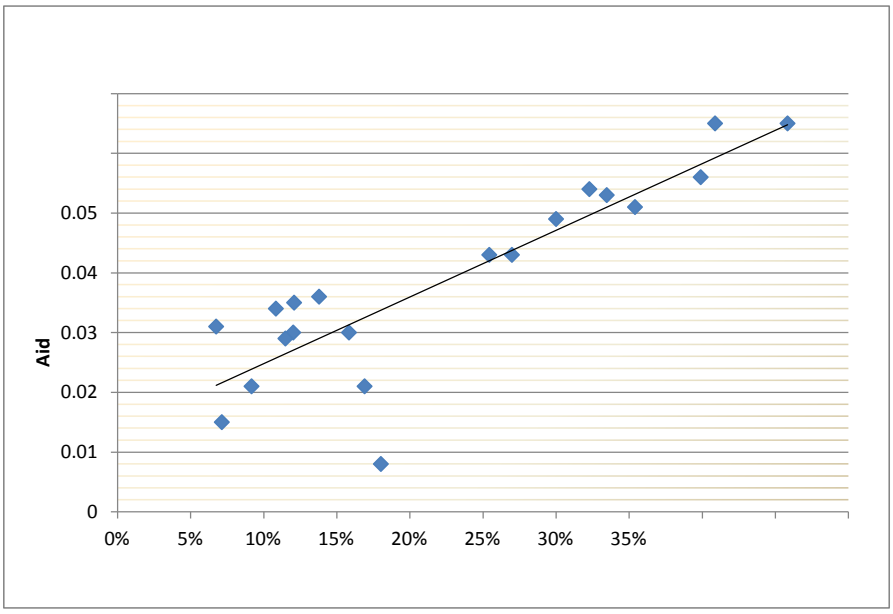


Figure 3b. Tying status of development aid across donors



Source: OECD International Development Statistics (IDS) online databases on aid. Based on aid commitments.

Figure 4. Tying status and average aid effect on donors exports over time



Source: OECD International Development Statistics (IDS) online databases on aid and regression results.

Figure 5a. Sectoral allocation of development aid over time and across donors

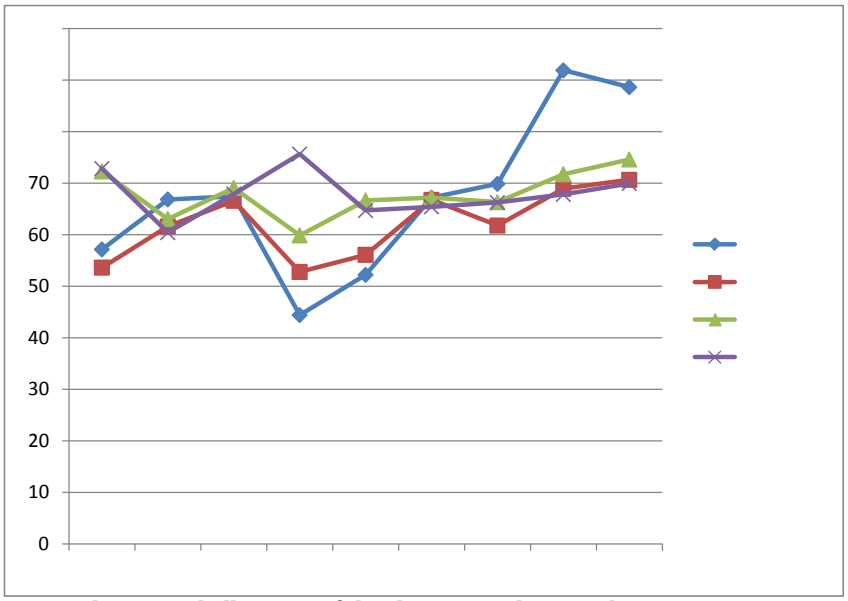
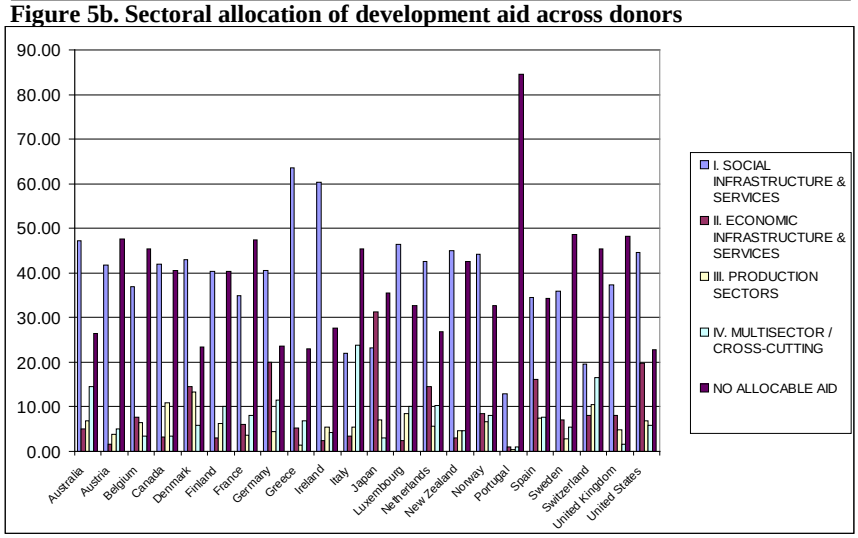


Figure 5b. Sectoral allocation of development aid across donors



Note: Figure 5a shows the percentage of bilateral sector allocable aid (I-IV). The percentages shown in Figure 5b are for 2004. Source: OECD International Development Statistics (IDS) online databases on aid.

Table 1. Summary statistics

VARIABLE	Obs.	Mean	Std. Dev.	Min.	Max.
LXDON	48132	16.238	2.893	2.303	25.640
LYD	51660	26.793	1.315	24.325	30.252
LYR	49791	22.651	1.974	17.162	28.850
LYHD	51660	10.058	0.303	9.136	10.886
LYHR	47628	7.813	1.126	4.714	11.075
LD	51660	8.811	0.590	5.601	9.850
LBAID	34921	14.497	2.492	9.210	23.142
LMAID	44943	-0.017	2.019	-4.605	6.705
LEXCHR	49476	4.683	1.123	-4.345	14.988
VARIABLE	**Obs.**	**Mean**	**Std. Dev.**	**Min.**	**Max.**
XDON1000	48132	276,906	2,226,510	0	137,000,000
YD1000	51660	1,130,000,000	2,050,000,000	36,700,000	13,800,000,000
YR1000	49791	48,200,000	166,000,000	28,414	3,380,000,000
YHD1000	51660	24.405	7.331	9.279	53.433
YHR1000	47628	4.738	7.054	0.112	64.512
D	51660	7,738.555	3,787.725	270.680	18,953.230
BAID1000	35003	22,071.590	121,510.00	-17,740	11,200,000
MAID1000	46508	4,941.066	14,306.160	-55,340	816,630
EXCHR	47250	118.909	117.825	0.013	2,939.103

Note: The period considered is 1988-2007. L indicates natural logarithms and 1000 indicates thousand US$; XDON denotes bilateral donors' exports at current prices, YD and YR are donors' and recipients' GDPs, respectively; YHD and YHR and are donors' and recipients' GDPs per capita, respectively; D is distance; BAID is net bilateral aid from donor *i* to country *j*; and MAID is imputed multilateral aid to country *j*. EXCHR denotes nominal bilateral exchange rates in units of local currency of the donor per unit of currency of the recipient.

Table 2: Development aid and donors' exports–results for different periods

	Whole Period	1988-1993	1994-2000	2001-2007
LYD	0.303***	0.068	0.394***	0.066*
	(0.025)	(0.060)	(0.042)	(0.040)
LYR	0.479***	0.045	0.592***	0.631***
	(0.019)	(0.033)	(0.029)	(0.030)
LYHD	-0.462***	0.158	-0.426***	0.365***
	(0.046)	(0.145)	(0.064)	(0.097)
LYHR	0.663***	1.165***	0.372***	0.332***
	(0.039)	(0.067)	(0.062)	(0.055)
LBAID	0.020***	0.063***	0.025***	0.003
	(0.003)	(0.006)	(0.004)	(0.003)
LBAID(-1)	0.011***	0.047***	0.008*	-0.004
	(0.003)	(0.005)	(0.004)	(0.003)
LBAID(-2)	0.007***	0.041***	0.003	-0.002
	(0.002)	(0.006)	(0.004)	(0.003)
LMAID	0.012***	0.034***	0.020***	-0.003
	(0.003)	(0.007)	(0.004)	(0.004)
LMAID (-1)	0.010***	-0.002	0.025***	-0.006
	(0.003)	(0.007)	(0.004)	(0.004)
LBAIDK	0.012**	0.024**	-0.008	-0.001
	(0.005)	(0.011)	(0.011)	(0.007)
LEXCHR	0.012*	0.123***	0.025***	-0.095***
	(0.006)	(0.013)	(0.009)	(0.018)
LD	-0.821***	-1.009***	-0.862***	-0.864***
	(0.012)	(0.019)	(0.015)	(0.013)
CONTIG	0.988***	1.365***	1.183***	0.967***
	(0.196)	(0.152)	(0.296)	(0.293)
COMLANG	0.216***	-0.293***	0.153***	0.361***
	(0.024)	(0.032)	(0.027)	(0.028)
COLONY	0.658***	0.903***	0.826***	0.604***
	(0.030)	(0.035)	(0.035)	(0.034)
RTA	0.089***	-0.059	0.076***	0.113***
	(0.017)	(0.071)	(0.025)	(0.022)
AVLYD	0.479***	0.740***	0.442***	0.739***
	(0.027)	(0.060)	(0.044)	(0.042)
AVLYR	0.386***	0.854***	0.306***	0.282***
	(0.020)	(0.035)	(0.030)	(0.031)
AVLYHD	-0.274***	-1.764***	-0.616***	-1.028***
	(0.077)	(0.173)	(0.095)	(0.115)
AVLYHR	-0.569***	-1.267***	-0.331***	-0.254***
	(0.043)	(0.072)	(0.065)	(0.059)
AVLBAID	0.209***	0.145***	0.201***	0.229***
	(0.007)	(0.010)	(0.010)	(0.009)
AVLMAID	-0.166***	-0.311***	-0.243***	-0.122***
	(0.011)	(0.015)	(0.014)	(0.014)

AVLBAIDK	-0.058***	-0.085***	-0.011	-0.051***
	(0.011)	(0.016)	(0.016)	(0.014)
AVLEXCHR	-0.070***	-0.313***	-0.062***	-0.023*
	(0.013)	(0.027)	(0.015)	(0.013)
AVRTA	0.079*	-0.329***	0.017	0.054
	(0.047)	(0.077)	(0.056)	(0.059)
NOBS	25878	4300	11676	11209
RESET	0.144			

Note: * p<0.10, ** p<0.05, *** p<0.01. The dependent variable is bilateral exports at current prices; LYD and LYR are donors' and recipients' GDPs, respectively; LYHD and LYHR are donors' and recipients' GDPs per capita, respectively; LD is distance; LBAIDK is net bilateral aid from other donors (different from *i*) to country j; LBAID is net bilateral aid from donor i to country j; and LMAID is imputed multilateral aid to country j. LEXCHR is the bilateral exchange rate at current prices; RTA,CONTIG, COMLANG, COLONY are dummies that take the value 1 when countries belong to the same RTA, share a border, have the same official language or have a colonial relationship, respectively. AV denotes average values of the respective variables. t-statistics are reported. Reset reports the p-value of a Ramsey Reset specification test, which H_0 is that the model is correctly specified. H_0 cannot be rejected.

Table 3. Development aid and donors' exports–results for different country groups

	Non EU	Nordic	EU North	EU South
LBAIDK	0.024***	0.046***	-0.029***	-0.104***
	(0.008)	(0.012)	(0.005)	(0.009)
LBAID_89	0.023*	0.133***	0.045***	-0.005
	(0.013)	(0.028)	(0.015)	(0.033)
LBAID_90	0.028**	0.117***	0.035**	0.011
	(0.013)	(0.030)	(0.014)	(0.034)
LBAID_91	0.030**	0.088***	0.026*	0.001
	(0.012)	(0.033)	(0.014)	(0.033)
LBAID_92	0.025**	0.105***	0.026*	-0.013
	(0.012)	(0.030)	(0.014)	(0.032)
LBAID_93	0.023*	0.098***	0.000	0.015
	(0.012)	(0.031)	(0.014)	(0.032)
LBAID_94	0.031**	0.044*	0.016	0.007
	(0.012)	(0.025)	(0.013)	(0.032)
LBAID_95	0.037***	0.094***	0.036***	0.010
	(0.012)	(0.023)	(0.013)	(0.032)
LBAID_96	0.022*	0.078***	0.041***	0.033
	(0.013)	(0.029)	(0.012)	(0.032)
LBAID_97	0.015	0.031	0.037***	0.030
	(0.013)	(0.027)	(0.013)	(0.032)
LBAID_98	0.001	0.021	0.028**	0.051
	(0.013)	(0.028)	(0.012)	(0.032)
LBAID_99	0.019	0.015	0.015	0.064**
	(0.012)	(0.026)	(0.012)	(0.032)
LBAID_2000	0.026**	0.005	0.017	0.039
	(0.012)	(0.027)	(0.013)	(0.032)
LBAID_2001	-0.003	-0.049*	-0.011	0.040
	(0.012)	(0.027)	(0.013)	(0.032)
LBAID_2002	0.001	0.001	-0.001	0.067**
	(0.012)	(0.027)	(0.012)	(0.031)
LBAID_2003	0.006	-0.007	0.007	0.028
	(0.011)	(0.029)	(0.012)	(0.032)
LBAID_2004	0.004	-0.004	0.010	0.047
	(0.011)	(0.028)	(0.012)	(0.031)
LBAID_2005	-0.001	0.010	0.018	0.048
	(0.010)	(0.028)	(0.012)	(0.031)
LBAID_2006	-0.006	-0.014	0.012	0.075**
	(0.007)	(0.026)	(0.012)	(0.031)
LBAID_2007	0.010	-0.009	0.004	0.100***
	(0.011)	(0.022)	(0.010)	(0.031)
LBAID (-1)	0.004	0.040***	0.007	0.011
	(0.005)	(0.010)	(0.007)	(0.029)
LMAID	0.004	0.011	-0.027***	0.024**
	(0.004)	(0.020)	(0.008)	(0.011)
NOBS	8573	5393	9688	5387

Note: * p<0.10, ** p<0.05, *** p<0.01. The dependent variable is bilateral exports at current prices; the same control variables as in Table 2 are added to the regressions. Non EU: Australia, Canada, Japan, New Zealand, Switzerland, US. Nordic: Denmark, Finland, Sweden, Norway. EU North: Austria, Belgium, France, Netherland, Germany, UK. EU South: Greece, Ireland, Italy, Portugal, Spain.

Table 4. Development aid and donors' exports–results for each donor

correlated RE	LBAID	LBAID (-1)	Return $1 US Aid in $X	NOBS
Australia	0.045**	0.023	1.008	854
Austria	0.036**	0.011	0.480	1095
Belgium	0.009	-0.007	-	1263
Canada	0.058***	-0.006	0.643	1711
Denmark	0.044***	0.013	0.134	1158
Finland	-0.003	0.017	-	1188
France	0.032**	0.009	0.293	1917
Germany	0.043***	0.020*	0.971	1889
Greece	0.00	0.006	-	492
Ireland	-0.012	0.012	-	1002
Italy	0.021***	0.018***	0.917	1505
Japan	0.034***	0.012	0.432	1934
Netherland	0.012	0.001	-	1743
New Zealand	0.00	-0.023	-	738
Norway	0.085***	0.022	0.248	1495
Portugal	0.024	0.019	-	255
Spain	0.030***	0.020**	0.590	1268
Sweden	0.044***	0.028**	0.590	1488
Switzerland	0.006	0.00	-	1532
UK	0.006	0.020***	0.247	1632
US	0.016**	0.004	0.353	1661
Average	0.025	0.010	0.516	

Note: * p<0.10, ** p<0.05, *** p<0.01 The dependent variable is bilateral exports at current prices, LBAID is net bilateral aid from donor i to country j. The return on aid is calculated using the results from columns 1 and 2, taking into account only the estimates that are significant at the 1, 5 or 10% level.