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Competition for Export Markets and the Allocation of Foreign Aid: The Role of Spatial Dependence among Donor Countries

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Summary. — We account for competition for export markets among donor countries of foreign aid by analyzing spatial dependence in aid allocation. Employing sector-specific aid data, we find that the five largest donors react to aid giving by other donors with whom they compete in terms of exporting goods and services to a specific recipient country at both stages of their allocation of aid for economic infrastructure and production sectors. By contrast, evidence for export competition driving aid allocation is lacking for more altruistic donors and for aid in social infrastructure.

Key words — aid allocation, sector-specific aid, export competition, spatial dependence

1. INTRODUCTION

It is widely believed that donor countries use aid as a means to promote their own export interests. Several contributions to the aid allocation literature offer empirical support. [1] With few exceptions, however, the aid allocation literature has assumed implicitly "that when a donor makes its ODA allocation it does not consider the ODA that recipients receive from other sources" (Trumball & Wall, 1994: 877). If at all, the possibility of competition among donors is accounted for by simply including the aid flows from all other sources among the determinants of the allocation of aid by a particular donor. [2] In other words, each dollar of aid from other sources is treated the same—as if it did not matter whether or not the specific source constituted a relevant competitive challenge for the donor deciding on aid for a particular recipient country.

The principal contribution of this paper is to overcome this limitation of previous aid allocation studies. Expecting that donors compete strategically, we consider it unlikely that each other donor counts the same in a donor's decisions on aid allocation. Specifically, we account for the competition for export markets among the donor countries of the OECD's Development Assistance Committee (DAC) by introducing spatial lags that link donor countries according to the extent to which a potential aid recipient country is of similar importance to them as a market for their exports. In other words, the more two donors export to a similar set of recipient countries, the more they compete in their exports with each other and, as a consequence, the more their aid allocation is supposed to spatially depend on each other. The principal hypothesis we test is that an increase in aid by other donors to a specific recipient with which the donor under observation competes in terms of exporting to this recipient increases the aid from the donor to the recipient.

Importantly, we assess aid allocation by employing sector-specific aid data, as the impact of export competition is expected to matter more for aid projects in economic infrastructure and production sectors than for aid projects in social infrastructure such as education and health. We also distinguish between the group of large donors (France, Germany, Japan, the United Kingdom, and the United States) that are traditionally regarded as pursuing predominantly their own self-interest and the group of so-called like-minded donors (Canada, Denmark, the Netherlands, Norway, and Sweden) that are traditionally regarded as being more altruistic and oriented toward recipients' needs rather than their own self-interest.

In our estimations, we distinguish between donors' decisions on (i) the selection of recipient countries, and (ii) conditional on being selected, on how much aid to allocate to each recipient. Disaggregating between groups of donors and types of aid, we only find export-driven spatial dependence for the allocation of aid for economic infrastructure and production sectors by the five largest DAC donors. This stands in contrast to aid for social infrastructure for which there is no compelling evidence. We also find that the group of like-minded and more altruistic donors does not compete in their aid allocation; rather, they seem to be specializing in the amount of aid allocated to social infrastructure, though this result is far from robust.

The rest of the paper is organized as follows. Section 2 surveys the literature on the complex and potentially bi-directional relationship between aid giving and donor exports. Section 3 presents reasons for competition among donors based on their interests in the exports market and the type of aid supplied and derives testable hypotheses within that framework. Section 4 describes the data and methods employed, and Section 5 reports our results. Section 6 concludes the paper.

2. AID AND DONOR EXPORTS: A BRIEF SURVEY OF THE LITERATURE

Our analysis relates to two major strands of the literature on aid and donor exports. On the one hand, various aid allocation studies consider the export-related self-interest of donors

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to be a relevant determinant of aid. On the other hand, the literature on aid effectiveness posits that aid may help promote donor exports in several ways. If true, then the relationship between aid giving and donor exports is potentially bi-directional, making it difficult to establish causality due to endogeneity concerns. Such concerns have been largely neglected until recently, notably in the earlier literature on aid allocation.

As noted by Claessens, Cassimon, and Van Campenhout (2009), earlier contributions to the aid allocation literature often reported a positive effect of donor exports on aid. Berthélemy (2006) supports the view that export-related self-interest drives the donors' aid allocation by ranking various donor countries according to the elasticity of aid with respect to bilateral exports of the donor to the recipient country. Most of the larger donors are rated "moderately egoistic" by this criterion. Similarly, Hoeffler and Outram (2011) find that all top five donor countries (France, Germany, Japan, the United Kingdom, and the United States) provide more aid to trading partners. [3] According to Younas (2008), export-related donor interests continued to be a major determinant of aid allocation in the post-Cold War era.

However, Feeny and McGillivray (2008) question the results obtained by influential cross-section studies on aid allocation, for basically two reasons. First of all, earlier studies ignoring the time invariant heterogeneity of recipient countries are not reliable since trading patterns are likely to be correlated with unobserved country heterogeneity. Recent evidence suggests that the variable on bilateral exports loses its significance once recipient-country fixed effects are accounted for and the results are based exclusively on the within variation of exports (Claessens *et al.*, 2009; Dreher, Nunnenkamp, & Schmaljohann, 2013; Hoeffler & Outram, 2011). Second, reverse causality from aid to donor exports has received limited attention. Typically, trade variables are lagged by one year to "overcome" the "potential of reverse causality" between trade and aid (Hoeffler & Outram, 2011: 241). [4] Berthélemy (2006: 184) considers the risk of simultaneity bias to be "limited" since he uses data on aid commitments, which usually precede aid disbursements. However, both temporally lagging and employing aid commitments rather than disbursements will be insufficient if aid is effective in promoting donor exports and if there is autocorrelation in the data.

As concerns the effectiveness of aid, Suwa-Eisenmann and Verdier (2007: 485) survey the recent literature and summarize that "aid flows may affect trade flows, either because of the general effects they induce in the recipient country, or because aid is directly tied to trade, or because it reinforces bilateral economic and political links (or a combination of all three)." Several empirical studies underscore Wagner's (2003) finding that it is not only Japan who uses aid to gain trade advantages. For instance, Nilsson (2004: 59) reports "large increases" in EU donors' exports for each dollar of additional aid. According to Nowak-Lehmann, Martínez-Zarzosa, Klasen, and Herzer (2009) as well as Martínez-Zarzosa, Nowak-Lehmann, Klasen, and Larch (2009), German aid is associated with an increase in German exports that is larger than the aid flow. [5]

However, as stressed by McGillivray and Morrissey (1998), the specific nature of the relationship between aid and donor exports can vary across donor–recipient pairs. Morrissey (2006a: 85) summarizes the earlier studies of Lloyd, McGillivray, Morrissey, and Osei (2000) and Osei, Morrissey, and Lloyd (2004), according to which the evidence that aid Granger-causes trade in a dynamic sense only applies to a minor share of all donor–recipient pairs, while "the more common link is that trade relations are a factor influencing donor allocation." The Granger causality tests of Arvin, Cater, and Choudhry (2000) reveal mixed evidence for subsamples of German aid recipient countries. [6] Findings remain inconclusive when employing more sophisticated panel cointegration and causality methods. Nowak-Lehmann *et al.* (2009: 1199) conclude that "in the long run, [German] exports are caused by aid and not vice versa." In contrast to this uni-directional causality, Nowak-Lehmann *et al.* (2013: 508) find that bilateral aid is endogenous in the donors' export equation and that "in the long run, aid [from members of the OECD's Development Assistance Committee] stands in a bi-directional relationship with donors' exports." [7]

All of the above exposes the fact that a single line of causation is difficult to establish in the aid-trade context. As argued by Wagner (2003: 159), "the intuition behind the aid-trade link contends that there is an *explicit or implicit contract* between the donor and recipient. Causation in a contract context differs from causation in other contexts, because neither event would occur without the other event." Likewise, Pettersson and Johansson (2013) argue that donors and recipients enter a reciprocity agreement. In the present context, caution is clearly required in drawing inferences from aid allocation models about causal effects of donor exports on bilateral aid.

We follow the previous literature by lagging our explanatory variables and using aid commitments (as in Berthélemy, 2006) in order to reduce endogeneity concerns, since commitments temporally precede disbursements and the endogeneity should be with respect to disbursements rather than commitments. As an important additional step in this direction, we perform additional estimations where we use the level of exports predicted by a simple gravity type estimation model, instead of actual levels of exports, in our empirical research design to eliminate any possibility that our findings are based on reverse causality. Specifically, we predict the level of exports (in natural log) in an estimation model based on dyad fixed effects, year fixed effects (to take out global ups and downs in trade), and the log of GDP of the exporter and the log of GDP of the importing country. We then use these predicted rather than actual exports both in the construction of our spatial lag variables and in the construction of the dyad-specific export control variable.

3. COMPETITION AMONG SELF-INTERESTED DONORS

The exporters of a donor country using aid strategically can benefit most evidently if aid is tied explicitly, obliging the recipient country to use aid for the import of goods and services from that particular donor country. At the same time, the recipient country may have to reduce overall imports if its terms of trade deteriorate due to tied aid (Tajoli, 1999). [8] Depending on the degree and direction of trade diversion, tied aid by one particular donor country is of concern to other donor countries whose exporters may suffer from trade diversion.

Even though the relative importance of formally tied aid has declined since the 1990s, [9] a particular donor may still benefit in terms of higher exports if untied aid generates goodwill for the donor in the recipient country (Silva & Nelson, 2012). Arvin and Baum (1997: 78) develop a theoretical model in which "a donor maintains a constant flow of untied aid in order to continually replenish its stock of goodwill." The donor benefits as the stock of goodwill tends to increase future exports. Djajic, Lahiri, and Raimondos-Møller (2004: 151–2) argue that "aid in one period may, as a result of habit-forma-

tion or 'goodwill' effects, cause a shift in preferences of the recipient country in the following period. Aid can then be seen as an instrument with the power to influence future consumption of the recipient in a direction that is beneficial to the donor." Similar to formally tied aid, goodwill and habit formation might imply trade diversion among donors.

Based on this reasoning, the aid allocation of a donor country is likely to spatially depend on the aid allocation of other donor countries, as a function of the extent to which they compete with each other in terms of exports to a specific recipient country. Put differently, if my main competitors in terms of exports to a specific recipient country increase their aid to this country, I have an incentive to similarly increase my aid to the same country in order to protect my export interests. This results in our first hypothesis:

H1. Export-oriented donors are likely to increase bilateral aid in response to increases in aid by other donors who compete in terms of exports to the same recipient country so as not to suffer from trade diversion induced by tied and untied aid.

Export-related self-interest does not necessarily need to play an equally strong role for all donors, however. As noted in Section 1, it is mainly the large donors which are widely considered selfish. By contrast, the group of so-called like-minded donor countries—including Canada, Denmark, the Netherlands, Norway, and Sweden—are regarded as more altruistic, focusing on recipient need rather than own export promotion and other strategic aid motives (Neumayer, 2003). While the view that not all donors behave the same (Berthélemy, 2006) commands considerable support among scholars, this also has important consequences for spatial dependence which have been neglected in the literature on aid allocation. Specifically, the distinction between more selfish and more altruistic donors leads to our second hypothesis:

H2. The aid allocation decisions of the largest donors with strong self-interest are more likely to spatially depend and will more strongly spatially depend on aid allocation by competing donors than the aid allocation decisions of the like-minded more altruistic donors.

The importance of selfish motives is also likely to vary across different aid categories. The OECD's DAC classifies aid into "sectors" ranging from social infrastructure (e.g., education, health) to economic infrastructure (e.g., transport, communication) and production sectors (e.g., agriculture, industry) as well as general budget support and food aid. The allocation of food aid, for example, is more needs based than aid in other sectors (Neumayer, 2005). The same could be true for aid meant to improve basic social services. [10] By contrast, aid projects in economic infrastructure and production sectors are explicitly part of the so-called Aid-for-Trade (AfT) Initiative launched at the WTO Ministerial Conference in Hong Kong in 2005. [11]

Several studies show that AfT helped promote the exports of recipient countries, dismissing the skeptical view that the initiative was only in the donors' self-interest. [12] Nevertheless, there is reason to suspect that spatial dependence is likely to shape the allocation of the major components of AfT. For instance, selfish donors may finance infrastructure projects that serve primarily their own export interests. This would resemble the "vanguard effect" found by Kimura and Todo (2010) for Japanese aid and its effect on foreign direct investment. Other donors can reasonably be expected to take this into account when deciding on their own aid allocation. In a similar vein, spatial dependence is likely to matter if donors direct aid to projects in production sectors where domestic exporters have important stakes as suppliers of capital goods or intermediaries.

Arguably, the fungibility of aid could weaken spatial dependence with regard to sector-specific aid. So-called categorical fungibility (Morrissey, 2006b) would imply that aid resources are diverted from the donor-intended use in a particular sector to another sector. This could render aid less effective in achieving its intended aims, e.g., upgrading infrastructure, by releasing domestic government funds that could now be spent elsewhere. [13] If donors anticipated this possibility, it would work against us finding empirical evidence for spatial dependence in the allocation of aid in trade-related categories. However, it is questionable whether donors fully anticipate different spending priorities of recipients and no longer use sector-specific aid to compete for export markets. Furthermore, the broad definition of our sector-specific aid categories (see below) limits the risk for donors that aid is actually spent outside the targeted sector. In other words, the broadly defined aid sectors render inter-sectoral fungibility less likely. [14] Against this backdrop, we state as our third and final hypothesis:

H3. Spatial dependence is more likely to shape the allocation of aid in trade-related categories such as economic infrastructure and production sectors, compared to aid for social infrastructure.

4. DATA AND APPROACH

(a) *Dependent aid variables*

For the present analysis, we use total aid as well as sector-specific aid from the OECD's Creditor Reporting System (CRS) as dependent variables. Total aid is the sum of all aid committed, independent of its purpose. [15] As concerns sector-specific aid, recall that we expect spatial dependence among donors to matter most for trade-related categories. Most obviously, aid meant to improve the economic infrastructure in recipient countries—including transport, communications, energy, and banking—may help promote the donors' exports to recipient countries. We consider aid in this sector (sector code 200 in the CRS) together with aid granted to production sectors such as industry, agriculture, and mining (sector code 300 in the CRS). This is for two reasons: First, sector code 300 includes aid granted in the category "Trade Policies and Regulations" (code 331) which may help promote donor exports by reducing transaction costs. Second, aid classified in sector codes 200 and 300 constitutes the AfT program (OECD & WTO, 2011). Aid in economic infrastructure and production sectors is compared with and contrasted to aid in social infrastructure (sector code 100). The latter ranges from education and health to governance issues, human rights, and civil society. The broad definition of both sector categories used in the subsequent analysis, each including a wide range of specific aid activities and projects, limits the risk that our empirical results will be affected by fungibility due to misaligned inter-sectoral spending priorities between donors and recipients.

The data on sector-specific aid suffer from considerable underreporting in the more distant past. Therefore, we restrict our empirical analysis to the 1995–2011 period. [16] We cover 23

DAC donor countries, excluding the Czech Republic and Iceland who became members only in 2013. The sample of aid recipients excludes countries with a population of less than 100,000 people. We also exclude high-income countries and some transition countries that were on the DAC's so-called part II list in several years of the period of observation and therefore lack sector-specific aid data.

As usual in the aid allocation literature, aid commitments rather than actual disbursements are taken as the dependent variable. Dudley and Montmarquette (1976) argue that commitments provide a more accurate measure of donor supply than disbursements, which partly depend on the administrative capacity and willingness to accept the funds in the recipient countries (see also Berthélemy, 2006). We use annual observations in our baseline estimations. It is well-known, however, that aid flows may fluctuate considerably from one year to the next. We therefore perform a robustness test below by averaging over three-year periods.

A donor usually has a fixed aid budget, which is divided among potential recipients. This decision is best approximated if aid to a particular recipient is expressed as a share of the total aid allocated by a donor in a given year (Neumayer, 2003). This definition has two other virtues: First, it eliminates any bias caused by comparing figures over different years, for instance caused by measurement errors due to fluctuations in domestic exchange rates to the USD. Second, it is insensitive to trends in the size of the aid budget over time, e.g., the widespread reduction of aid budgets in the 1990s.

Note that for sector-specific aid in the second stage of the allocation, our dependent variable is:

$$\frac{\text{(aid by donor } i \text{ to recipient } j \text{ in sector } k \text{ in year } t)}{\text{(aid by donor } i \text{ to all recipients } j \text{ in all sectors } k \text{ in year } t)}$$

Thus, rather than dividing the numerator by all sector-specific aid by donor i in a given year, we divide by the sum of total aid (i.e., across all sectors) by this donor in a given year. This implies that the aid shares across recipients for each donor do not necessarily add up to one. This definition allows us to better test for aid competition among donors. To understand why note that the dependent variable of other units enters the spatial lag variable. Dividing by all *sectoral* aid of a donor would result in a large value for the spatial lag variable for another donor who also exports much to a recipient even if the share of aid devoted by the donor to a particular sector is very small. In contrast, our definition would only produce a large value for the spatial lag variable if the donor gave a large share both to this sector and this recipient. This feature is particularly valuable in our setting, because if a donor barely gives any aid in a particular sector, then it cannot be a strong competitor for other donors in this specific sector.

Defining the dependent variable as described above implies that it is scale neutral in the sense of not being affected by proportional increases in aid to all recipient countries. In other words, it is the distribution of aid across recipient countries, independent of the absolute amounts involved, that affects competition between donors. It might be argued, however, that the overall size of the donors' aid budget also matters for the competition between donors. Specifically, a donor with a small overall aid budget may be a less relevant competitor of a large donor than a similarly large donor, even if the small donor spends a relatively high share of its aid budget in a particular recipient country. To take this scale effect into account we perform additional estimations in which the dependent aid variable (and correspondingly also the spatial lag variable) is defined in absolute terms as aid by donor i to recipient j in sector k in year t. In these estimations, we additionally include donor-specific and recipient-specific year fixed effects in the estimations to account for the time-varying overall propensity of donors to give aid and of recipients to receive aid. Note that these additional fixed effects are not necessary in our main estimations where our dependent variables are formulated as aid shares and are therefore scale neutral. Also note that with these additional fixed effects included, any donor- and recipient-specific (rather than dyad-specific) control variables are perfectly collinear to these fixed effects and therefore automatically dropped from the estimation in these models.

(b) *Spatial lag variables*

We estimate spatial lag models to analyze the potential influence of aid allocated by other donors to the same recipient. In such a model, for each observation the dependent variable of other observations is included as a right-hand side variable. This variable is weighted using a connectivity variable in a weighting matrix that links dyads with each other. Aid flows from a donor to a recipient are an example of a directed dyad, in which there is a clear source and target and the action originates from the former and is directed toward the latter. In the present context, spatial dependence is assumed to take the form of "specific source contagion" (Neumayer & Plümper, 2010), in which aid by a donor i to a recipient j depends on aid by other donors k to the very same recipient j.[17] Abstracting from all other explanatory variables, specific source contagion is modeled as follows:

$$Y_{ijt} = \rho \sum_{k \neq i} w_{ikt} Y_{kjt} + \varepsilon_{ijt} \tag{1}$$

where Y_{ijt} is, as defined above, aid of donor i to recipient j in year t, Y_{ktj} is aid of other donors k except donor i to the same recipient j, and w_{ikt} is the weighting matrix which measures the connectivity between donor i and donor k.

As argued in Section 3, we expect that donors account for the aid decisions of other donors with which they compete for export markets when allocating their own aid. To test this, the connectivity between donor i and donor k is the product between the share of recipient country j in the exports of donor country i and the share of recipient country j in the exports of donor country k. This reflects the assumption that aid from donor i to recipient j is the stronger influenced by aid from donor k to the same recipient j the more economically important recipient j is for exports from *both* donor i *and* donor k. For instance, China is a relatively important country for exports from both Japan and Germany. Therefore, it is assumed that the aid allocation decision of Japan with regard to China is relatively strongly influenced by aid from Germany to China. Formally:

$$w_{ikt} = \frac{exports_{ijt}}{exports_{it}} \times \frac{exports_{kjt}}{exports_{kt}} \tag{2}$$

By taking export shares rather than absolute exports as connectivity, we assume that the relative importance of a recipient country j for the two donors i and k is not simply driven by the fact that, for example, larger recipient countries generally trade more than smaller countries. By taking the product of the two donor countries' export shares, we model spatial dependence as being strongest when recipient country j is important for both donor countries i and k. In other words, it is not enough for a recipient country to be important for only one donor, which would be assumed if we modeled the connectivity as being additive between the two donor coun-

tries' export shares. Also note that as a consequence of connectivity consisting of the product of the two donor countries' export shares, the coefficient of the spatial lag variable, the parameter ρ in (1), no longer directly indicates the degree of spatial dependence among donors. In order to interpret the substantive degree of spatial dependence we have to resort to a more conventional analysis of computing substantive effects. We will do so by calculating by how many standard deviations the dependent variable changes for a one-standard deviation change in the spatial lag variable.

(c) *Control variables*

The remaining explanatory variables are fairly standard in the aid allocation literature. We account for recipient need by including *GDP per capita* in constant 2,000 USD taken from the World Development Indicators (World Bank, 2013). It is expected that less aid is allocated to richer countries. To control for the size of a recipient country, its *Population* is taken from the same source. We also include a measure of good governance, namely the *polity2* score from the Polity IV project (http://www.systemicpeace.org/polity/polity4.htm). This score combines information on the extent to which various democratic and autocratic features are present in the recipient country. Donors often claim to favor more democratic recipients when allocating aid.

To account for the economic self-interest of donors that is additional to and independent of spatial dependence, the variable *Export share* measures the exports of a donor country to a recipient country as a share of the donor's total exports. Finally, we consider temporary membership of recipient countries in the United Nations Security Council (UNSC) as a proxy of political interest of donors. There is evidence that governments elected to the UNSC receive more aid than other developing countries (e.g., Dreher *et al.*, 2013). Compared to previously used proxies of geo-political donor motives such as voting patterns in the UN General Assembly, UNSC membership has the advantage that it is likely to be exogenous to variables that are directly related to foreign aid (Dreher, Gould, Rablen, & Vreeland, 2012).

With the exception of UNSC membership, all time variant variables are lagged by one year to mirror the situation donors face at the time of decision-making and to reduce the potential risk of endogeneity.[18] Summary statistics are presented in Table 1. Note that in order to keep this table manageable, it presents summary statistics for all dependent and spatial lag variables of all samples,[19] but for the control variables such statistics are presented only for the sample of total aid by all donors in the second stage estimations.

(d) *Model specification and estimation strategy*

As noted by Plümper and Neumayer (2010), model specification in the analysis of spatial dependence needs to tackle several challenges in order to avoid biased results and to draw causal inferences rather than simply catching spurious effects. First, the one-period time lag of the dependent variable is included on the right-hand side to control for temporal dynamics. The temporally lagged dependent variable can also account for bureaucratic inertia (Allison, 1971). This introduces some Nickell (1981) bias given we employ dyad fixed effects. However, the bias converges to zero as the number of time periods increases and our T is quite large. The effect of a common trend in the size of the aid budget, e.g., all donors give more or less aid over time, is removed by normalizing aid commitments per donor-year, i.e., by expressing aid in shares. A $t-1$ set of year dummies additionally controls for a change in the number of recipients for a given aid budget which would lead to higher or lower average shares for all recipient countries.

Furthermore, the existence of spatial clustering and unobserved spatial heterogeneity, i.e., factors which influence aid allocation decisions of several donors in the same direction but cannot be controlled for, can lead to biased spatial effects. To mitigate the impact of the former, we control for a range of observable factors that might influence donor decisions. To address the problem of unobserved spatial heterogeneity and clustering, all models are estimated with dyad fixed effects. This removes all variation between dyads and the estimation is solely based on the within variation of each dyad. While this automatically controls for any time-invariant dyad-specific effect, such as cultural and geographic proximity or bilateral relations (for example the United States' large aid to Israel and Egypt), it also removes unobserved spatial heterogeneity and spatial clustering in aid levels.

Spatially lagged dependent variables introduce a certain degree of endogeneity into the estimation model. However, based on Monte Carlo analyses, Franzese and Hays (2007) have demonstrated that ignoring this endogeneity (i.e., estimating what they call a spatial-OLS model) does not produce strongly biased results as long as the degree of inter-dependence is small. This is the case here as will become clear when we report results in the next section.

The process of aid allocation can be modeled as a two-step decision: In the first step, a donor country decides to which of all potential recipients it will allocate any positive amount of aid (eligibility stage). In case of being selected, the actual amount of aid is determined in a second step (level stage).[20] Thus, the dependent variable is only partly continuous and has a positive probability mass at the value of zero, which violates the OLS assumption that the expected value of the dependent variable is linear in the explanatory variables.

Following the pioneering work by Cragg (1971), we employ a so-called two-part model, which has been widely applied in the context of aid allocation.[21] It resembles a Heckman sample selection model in also estimating two separate equations for both stages, but it is based on the assumption that the two stages are independent of each other, i.e., that there is no correlation in the error terms of both regressions.[22] The model of the eligibility stage is estimated with a conditional fixed-effects Logit estimator. The second stage is estimated with a linear fixed-effects estimator with standard errors clustered on dyads.

5. RESULTS

(a) *Baseline results: all donors*

Recalling the second hypothesis from Section 3, we are mainly interested in comparing the selection of recipient countries and, subsequently, the allocation of aid among selected recipients between the largest DAC donor countries and the so-called like-minded DAC donor countries and between aid given to different sectors of the economy. In particular the largest donors are assumed to be self-interested so that their decisions are most likely to depend on the decisions of other donors competing for the export markets of aid recipient countries. The group of the largest donors comprises five countries of the overall set of 23 DAC countries: France, Germany, Japan, the United Kingdom, and the United States. In contrast, the like-minded donors are regarded as more altruistic.

Table 1. *Summary statistics*

Variable	*N*	mean	s.d.	min	max
Aid dummy (total aid, all donors)	21,764	0.552	0.497	0	1
Aid dummy spatial lag (total aid, all donors)	21,764	0.008	0.080	0	2.919
Aid dummy (total aid, large donors)	2,875	0.768	0.422	0	1
Aid dummy spatial lag (total aid, large donors)	2,875	0.005	0.0478	0	1.065
Aid dummy (total aid, like-minded donors)	4,042	0.578	0.494	0	1
Aid dummy spatial lag (total aid, like-minded donors)	4,042	0.007	0.063	0	1.675
Aid dummy (social infrastr., large donors)	4,796	0.721	0.449	0	1
Aid dummy spatial lag (social infrastr., large donors)	4,796	0.007	0.073	0	1.960
Aid dummy (social infrastr., like-minded donors)	5,180	0.539	0.499	0	1
Aid dummy spatial lag (social infrastr., like-minded donors)	5,180	0.006	0.056	0	1.675
Aid dummy (econ. infrastr./prod., large donors)	6,241	0.617	0.486	0	1
Aid dummy spatial lag (econ. infrastr./prod., large donors)	6,241	0.004	0.034	0	0.919
Aid dummy (econ. infrastr./prod., like-minded donors)	5,798	0.476	0.499	0	1
Aid dummy spatial lag (econ. infrastr./prod., like-minded donors)	5,798	0.008	0.065	0	1.384
Aid share (total aid, all donors)	23,452	0.011	0.028	9.54E−09	0.967
Aid share spatial lag (total aid, all donors)	23,452	0.0004	0.003	0	0.073
Aid share (total aid, large donors)	7,174	0.009	0.022	9.54E−09	0.350
Aid share spatial lag (total aid, large donors)	7,174	0.0003	0.003	0	0.073
Aid share (total aid, like-minded donors)	5,496	0.011	0.021	1.45E−07	0.293
Aid share spatial lag (total aid, like-minded donors)	5,496	0.0004	0.003	0	0.058
Aid share (social infrastr., large donors)	6,255	0.004	0.009	4.05E−08	0.218
Aid share spatial lag (social infrastr., large donors)	6,255	0.0002	0.002	0	0.037
Aid share (social infrastr., like-minded donors)	4,323	0.006	0.012	8.53E−08	0.183
Aid share spatial lag (social infrastr., like-minded donors)	4,323	0.0002	0.002	0	0.028
Aid share (econ. infrastr./prod., large donors)	4,680	0.004	0.012	3.20E−08	0.226
Aid share spatial lag (econ. infrastr./prod., large donors)	4,680	0.0001	0.002	0	0.029
Aid share (econ. infrastr./prod., like-minded donors)	2,970	0.004	0.011	1.29E−08	0.199
Aid share spatial lag (econ. infrastr./prod., like-minded donors)	2,970	0.0002	0.002	0	0.029
Aid (total aid, all donors)	23,452	28.784	119.877	0.00003	4,481.146
Aid spatial lag (total aid, all donors)	23,452	1.904	16.023	0	412.554
Aid (total aid, large donors)	7,174	70.611	205.777	0.00003	4,481.146
Aid spatial lag (total aid, large donors)	7,174	1.571	15.027	0	379.2273
Aid (total aid, like-minded donors)	5,496	14.334	30.359	0.00011	454.9246
Aid spatial lag (total aid, like-minded donors)	5,496	2.084	16.401	0	260.2211
Aid (social infrastr., large donors)	6,255	28.216	73.364	0.00035	1,143.177
Aid spatial lag (social infrastr., large donors)	6,255	0.902	9.276	0	230.9844
Aid (social infrastr., like-minded donors)	4,323	8.451	18.202	0.00014	230.5486
Aid spatial lag (social infrastr., like-minded donors)	4,323	1.274	10.277	0	169.6154
Aid (econ. infrastr./prod., large donors)	4,680	32.112	127.230	0.00068	2,461.859
Aid spatial lag (econ. infrastr./prod., large donors)	4,680	0.743	5.873	0	149.3543
Aid (econ. infrastr./prod., like-minded donors)	2,970	4.863	12.383	0.00003	218.9667
Aid spatial lag (econ. infrastr./prod., like-minded donors)	2,970	1.120	7.594	0	147.2693
ln GDP per capita ($t-1$)	23,452	7.900	0.941	4.614	10.358
ln Population ($t-1$)	23,452	16.390	1.579	12.784	21.014
Share of recipient in donor's exports ($t-1$)	23,452	0.012	0.033	0	0.633
Democracy ($t-1$)	23,452	2.582	5.825	−10	10
UN Security Council membership	23,452	0.076	0.265	0	1

Spatial lags capturing the export-related competition for recipient markets should thus play a minor role for this group, which also comprises five DAC countries: Canada, Denmark, the Netherlands, Norway, and Sweden. At the same time, in line with our third hypothesis we distinguish between major sectors of aid. In particular, we expect spatial lags to matter most for aid by large donors in trade-related categories, namely in economic infrastructure and production sectors, rather than aid in social infrastructure.

Before we start breaking aid down into the sectors in which it flows, we first of all start with reporting baseline estimations in which we consider total aid for all 23 DAC donors taken together, for the group of large donors and for the group of like-minded donors. We expect the effect of spatial lags to be ambiguous in these aggregate estimations as the effects for specific sectors of aid might work differently and may cancel each other out.

In Table 2, we present the conditional fixed-effects Logit estimation for the first stage of the allocation of total aid by all donor countries in column (1). Column (2) shows the fixed-effects estimation for the second stage of aid allocation with the share of recipient *j* in total aid of donor *i* as the dependent variable, whereas column (3) does the same but this time for the second stage of aid allocation with total aid by donor *i* to recipient *j* as the dependent variable. Columns (4) to (6) show the same set of results, but for the group of large donors

Table 2. *First- and second-stage estimates: Total aid.*

Type of donors / Stage of aid allocation	All First stage (1)	All Second stage (aid share) (2)	All Second stage (aid) (3)	Large First stage (4)	Large Second stage (aid share) (5)	Large Second stage (aid) (6)	Like-minded First stage (7)	Like-minded Second stage (aid share) (8)	Like-minded Second stage (aid) (9)
Lagged dependent variable	1.429**	0.113	0.199*	1.084**	0.242**	0.174*	0.963**	0.0523	0.0543
	(0.0411)	(0.0660)	(0.084)	(0.128)	(0.0856)	(0.0882)	(0.0858)	(0.0372)	(0.0520)
Export competition-weighted spatial lag ($t-1$)	5.155*	−0.248	−0.844	1.871	−0.529	−3.025*	6.614	−0.164	0.128
	(2.046)	(0.260)	(0.735)	(7.105)	(0.312)	(1.209)	(5.220)	(0.145)	(0.115)
ln GDP per capita ($t-1$)	−0.0697	−0.00148		0.623	0.000764		−0.294	−0.00466	
	(0.146)	(0.00142)		(0.418)	(0.00124)		(0.288)	(0.00243)	
ln Population ($t-1$)	1.530**	0.000402		2.644	0.00508		2.704**	0.00767	
	(0.468)	(0.00340)		(1.435)	(0.00301)		(0.873)	(0.00589)	
Share of recipient in donor's exports ($t-1$)	−8.177*	−0.0288		6.017	−0.0165		−11.53	−0.00733	
	(3.773)	(0.0423)		(24.40)	(0.101)		(9.537)	(0.0283)	
Democracy ($t-1$)	−0.00264	0.000251**		−0.0144	1.21e−05		0.000918	0.000417**	
	(0.00891)	(5.76e−05)		(0.0270)	(9.28e−05)		(0.0174)	(0.000101)	
UN Security Council membership	0.105	0.00121		0.337	0.00173		−0.0231	0.000809	
	(0.0920)	(0.000813)		(0.288)	(0.00122)		(0.193)	(0.00118)	
Observations	21,764	23,452	23,452	2,875	7,174	7,174	4,042	5,496	5,496
Number of dyads	1,385	2,142	2,142	184	526	526	258	472	472

Note: standard errors in parentheses (clustered on dyads for second-stage estimations). All estimations include year and dyad fixed effects. Columns 3, 6, and 9 additionally include donor-specific and recipient-specific year fixed effects. Control variables are perfectly collinear to the donor- and recipient-specific year fixed effects and thus dropped from the estimation model in these columns.
* Statistically significant at $p < .05$.
** Statistically significant at $p < .01$.

only, whereas columns (7) to (9) report the same set of results for the group of like-minded donors.

Looking at the estimation results, readers should bear in mind that dyad fixed effects take out all the between-variation in the data and estimates are exclusively based on the within-variation in each dyad. It is therefore not surprising that many of the control variables are not statistically significant.[23] Moreover, it should be recalled from Section 4 that the donor- and recipient-specific control variables are automatically dropped in the estimations with aid amounts as the dependent variable; the control variables are absorbed by the donor-specific and recipient-specific year fixed effects included in these estimations. The lagged dependent variable is significant in the first stage, but becomes statistically insignificant in the second stage for all donors and for the group of like-minded countries. Note that the reported results for the first-stage estimations represent Logit coefficients, not marginal effects. A coefficient above one therefore does not imply that over time all recipients would be predicted to receive aid.

The bounded nature of the dependent aid variable together with the fact that between-variation dominates within-variation in aid shares may explain the result that the coefficients of the control variables are often statistically insignificant in Table 2. As a country's population increases it becomes more likely to receive aid from all donors and the group of like-minded countries, but it will not receive more aid conditional on being an aid recipient. A rise in a recipient's per capita income does not have a significant impact. There is, however, some evidence for a merit-based aid allocation since a country that becomes more democratic receives more aid from all donors and the group of like-minded donors, albeit only modestly so in substantive terms as a ten point improvement on the 21-point democracy scale results in, respectively, a .09 and .20 standard deviation increase in the dependent variable, the aid share received by all donors.[24]

Countries that increase their share of a donor's exports become less likely to receive aid from all donors, while there is no statistically significant effect for the groups of donors or on the amount of aid committed. This finding may be surprising, recalling that a positive relation with aid was often found for the 1970s and 1980s (Claessens *et al.*, 2009). As discussed in Section 2, however, the recent aid allocation literature strongly suggests that earlier estimations without fixed effects are not reliable (Hoeffler & Outram, 2011). Various studies reporting estimations with and without fixed effects find that the variable on bilateral trade loses its significance once time invariant heterogeneity of recipient countries is accounted for and the results are based exclusively on the within variation of the trade variable.[25]

Of greatest interest to us, if a country becomes a recipient in the aid allocation by a donor's major export competitors this raises the likelihood that the same country will also become a recipient for aid from the donor under observation, if we look at all donors taken together. In other words, we find evidence for export-competition-driven spatial dependence in the first stage of total aid allocation by all donors, though only at the 10% level of significance. There is no such evidence for donor groups in the first stage or for any of the estimations in the second stage. In fact, if anything column (6) might even suggest the opposite in that an increase in aid by major export competitors to a specific recipient lowers the predicted amount of total aid allocated to this recipient by the group of large donors.

(b) *First-stage results: donor groups and aid sectors*

We now distinguish between major sectors of aid. Recalling our third hypothesis, we expect spatial lags to matter most for aid by large donors in trade-related categories, namely in economic infrastructure and production sectors, rather than aid in social infrastructure.

Table 3 presents the results for the selection of recipients by the largest donors (columns 1 and 3) and the like-minded donors (columns 2 and 4) with respect to aid in social infrastructure and aid in economic infrastructure/production sectors, respectively. Results on the lagged dependent variable and control variables largely resemble those from the first-stage estimations in Table 2, though becoming more democratic now has a positive effect on aid eligibility in all but one of the estimations (large donors, social infrastructure).[26] Of greatest importance to our analysis, we find evidence for export-related competition for recipient markets in this first stage of aid allocation only among the large donors and only for aid eligibility in economic infrastructure/production sectors. In other words, large donors are more likely to give aid for economic infrastructure/production sectors to a recipient in case other export competing donors do so. The previous finding of significantly positive spatial lags when assessing the selection of recipients by all donors and on the basis of total aid thus appears to be attributable largely to the selection decisions of the largest donors with regard to aid in economic infrastructure/production sectors. By contrast, there is no evidence for spatial dependence neither for the like-minded donors, nor for eligibility for aid in social infrastructure from the large donors.

The results so far tend to support our second and third hypotheses. It should be stressed, however, that the insights to be gained from our first-stage results are generally limited. The binary nature of the dependent aid variable has the effect that variation over time is drastically reduced in the selection equation. We lose a large share of dyads completely in the conditional fixed-effects Logit estimations as there is no change in the binary aid variable over time. For example, for the group of large donors and aid in economic infrastructure/production sectors, we lose 1,944 out of 8,185 dyads. Moreover, one cannot compute meaningful marginal effects in conditional Logit estimations.[27] Against this backdrop, we proceed to the estimations for the second stage of allocating aid among selected recipients.

(c) *Second-stage results: donor groups and aid sectors*

Moving to the second stage of aid allocation, the dependent aid variable is now defined as the amount of sector-specific aid of donor i going to recipient j in period t, divided by total aid of donor i in period t, in columns 1, 3, 5, and 7 of Table 4 and as the amount of sector-specific aid of donor i going to recipient j in period t in columns 2, 4, 6, and 8 of Table 4. Recall that the control variables are dropped in the latter set of estimations which include donor-specific and recipient-specific year fixed effects. In the former set of estimations, the results on most of the control variables are similar to the corresponding estimations for all donors and total aid from Table 2. Interestingly, however, even in this stringent and conservative research design there is still some, though inconclusive evidence in Table 4 that like-minded donors pursue a needs-based aid allocation strategy. More aid for economic infrastructure/production sectors goes to poorer countries, while the (negative) coefficient on GDP per capita proves to be insignificant at conventional levels with regard to aid for social infrastructure. The latter result might be attributed to a refined needs-based targeting of specific elements of aid for social infrastructure such as aid for education or health. Most of the Millennium Development Goals address specific needs, e.g., with respect to universal primary education, maternal health, child mortality, and HIV infections; and GDP per capita is probably too crude an indicator to capture needs-based allocation along these lines. There is also some evidence for a merit-based strategy by like-minded donors: countries that become more democratic receive more aid in both types of sectors. No such evidence is apparent for the large donors.

Table 4 provides evidence for export-competition-driven spatial dependence in the aid allocation by large donors in economic infrastructure/production sectors, but not in social infrastructure. More aid of the former category goes to important export-market recipients that receive more aid from other

Table 3. *First-stage estimates: Donor groups and sectors of aid*

Type of aid Group of donor	Social Large donors (1)	Social Like-minded donors (2)	Econ/prod Large donors (3)	Econ/prod Like-minded donors (4)
Lagged dependent variable	1.169**	0.909**	1.279**	0.711**
	(0.0983)	(0.0752)	(0.0727)	(0.0723)
Export competition-weighted spatial lag ($t-1$)	7.973	5.971	12.79*	−0.748
	(7.523)	(4.968)	(5.574)	(1.538)
ln GDP per capita ($t-1$)	0.471	0.136	0.185	−0.284
	(0.390)	(0.269)	(0.273)	(0.248)
ln Population ($t-1$)	1.720	1.128	0.772	−0.704
	(1.200)	(0.776)	(0.752)	(0.690)
Share of recipient in donor's exports ($t-1$)	−23.18	−2.624	−36.07**	8.576
	(19.60)	(8.106)	(11.83)	(6.070)
Democracy ($t-1$)	−0.00886	0.0348*	0.0485**	0.0483**
	(0.0203)	(0.0156)	(0.0154)	(0.0143)
UN Security Council membership	−0.0505	−0.0508	0.276	0.0812
	(0.226)	(0.171)	(0.172)	(0.156)
Observations	4,796	5,180	6,241	5,798
Number of dyads	306	332	399	369

Note: standard errors in parentheses. All estimations include year and dyad fixed effects.
* Statistically significant at $p < .05$.
** Statistically significant at $p < .01$.

Table 4. *Second-stage estimates: Donor groups and sectors of aid (based on actual exports)*

Type of aid	Social	Social	Social	Social	Econ/prod	Econ/prod	Econ/prod	Econ/prod
Definition of dependent variable	Aid share	Aid	Aid share	Aid	Aid share	Aid	Aid share	Aid
Group of donor	Large donors	Large donors	Like-minded donors	Like-minded donors	Large donors	Large donors	Like-minded donors	Like-minded donors
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Lagged dependent variable	0.0761	0.336**	−0.0134	0.0430	0.127	0.131*	−0.103	0.048
	(0.0649)	(0.0762)	(0.0426)	(0.0665)	(0.0854)	(0.067)	(0.0606)	(0.122)
Export competition-weighted spatial lag ($t-1$)	0.322	0.849	−0.409**	0.0370	0.942*	2.484	0.816	0.305
	(0.228)	(0.546)	(0.117)	(0.0530)	(0.375)	(2.218)	(0.674)	(0.198)
ln GDP per capita ($t-1$)	0.000306		−0.00200		0.000280		−0.00729**	
	(0.000635)		(0.00205)		(0.00173)		(0.00269)	
ln Population ($t-1$)	0.00370*		0.00912*		0.00510		0.00373	
	(0.00172)		(0.00427)		(0.00375)		(0.00650)	
Share of recipient in donor's exports ($t-1$)	0.0423		0.0157*		−0.130		−0.0189	
	(0.0361)		(0.00776)		(0.0850)		(0.0202)	
Democracy ($t-1$)	6.41e−05		0.000220**		9.39e−05		0.000215*	
	(4.30e−05)		(7.14e−05)		(6.21e−05)		(9.23e−05)	
UN Security Council membership	0.000498		−0.000871		0.000946		0.00175	
	(0.000485)		(0.000598)		(0.000713)		(0.00134)	
Observations	6,255	6,255	4,323	4,323	4,680	4,680	2,970	2,970
Number of dyads	517	517	440	440	466	466	365	365

Note: standard errors clustered on dyads in parentheses. All estimations include year and dyad fixed effects. Estimations for aid as dependent variable additionally include donor-specific and recipient-specific year fixed effects. Control variables are perfectly collinear to the donor- and recipient-specific year fixed effects in these estimations and thus dropped from the estimation model.
* Statistically significant at $p < .05$.
** Statistically significant at $p < .01$.

Table 5. *Second-stage estimates: Donor groups and sectors of aid (based on predicted exports)*

Type of aid	Social	Social	Social	Social	Econ/prod	Econ/prod	Econ/prod	Econ/prod
Definition of dependent variable	Aid share	Aid	Aid share	Aid	Aid share	Aid	Aid share	Aid
Group of donor	Large donors	Large donors	Like-minded donors	Like-minded donors	Large donors	Large donors	Like-minded donors	Like-minded donors
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Lagged dependent variable	0.0735	0.341**	−0.0134	0.0431	0.0992	0.0574	−0.106	0.0486
	(0.0672)	(0.0781)	(0.0426)	(0.0665)	(0.0844)	(0.0451)	(0.0597)	(0.122)
Export competition-weighted spatial lag ($t-1$)	1.282**	0.717	−0.363	0.0567	2.059**	6.941**	0.424	0.287
	(0.307)	(1.022)	(0.195)	(0.100)	(0.556)	(1.014)	(0.488)	(0.241)
ln GDP per capita ($t-1$)	0.000975		−0.00159		0.000642		−0.00426	
	(0.000643)		(0.00212)		(0.00153)		(0.00249)	
ln Population ($t-1$)	0.00401*		0.00938*		0.00468		0.00391	
	(0.00179)		(0.00431)		(0.00337)		(0.00621)	
Share of recipient in donor's exports ($t-1$)	−0.0210		−0.0183		−0.140		−0.119*	
	(0.0519)		(0.0386)		(0.148)		(0.0596)	
Democracy ($t-1$)	5.93e−05		0.000223**		0.000109		0.000222*	
	(4.32e−05)		(7.14e−05)		(5.84e−05)		(9.23e−05)	
UN Security Council membership	0.000502		−0.000847		0.000941		0.00172	
	(0.000489)		(0.000597)		(0.000701)		(0.00135)	
Observations	6,255	6,255	4,323	4,323	4,680	4,680	2,970	2,970
Number of dyads	517	517	440	440	466	466	365	365

Note: standard errors clustered on dyads in parentheses. All estimations include year and dyad fixed effects. Estimations for aid as dependent variable additionally include donor-specific and recipient-specific year fixed effects. Control variables are perfectly collinear to the donor- and recipient-specific year fixed effects in these estimations and thus dropped from the estimation model.
* Statistically significant at $p < .05$.
** Statistically significant at $p < .01$.

donors with which donor *i* competes. In substantive terms, a one-standard deviation increase in the spatial lag variable is estimated to increase the predicted aid share by .16 standard deviations.[28] This represents a modest, but not negligible degree of spatial dependence. However, this finding does not carry over to like-minded donors. Perhaps surprisingly, we even find a negative and significant coefficient for the spatial lag in social infrastructure among the like-minded donors if

the dependent variable is the aid share (column 3).[29] In substantive terms, a one-standard deviation increase in the spatial lag variable is estimated to decrease the predicted aid share by .07 standard deviations.[30] Note, however, that this somewhat surprising result is not robust if instead of estimating in aid shares we estimate in levels of aid (column 4). It is also not robust to replacing actual exports with predicted exports (Table 5) and if, as a robustness test, we estimate in aid shares, but with three-year averaged rather than annual data (Table 7).

In Table 5, we replaced actual exports with predicted exports from the gravity-type prediction model described in Section 3 in both the construction of the spatial lag variables and as control variable. We continue to find evidence for export-competition-driven spatial dependence in the allocation of aid to economic infrastructure and production sectors by large donors. Different from the estimation results so far, we also find evidence for such spatial dependence in the allocation of aid to social infrastructure by the group of large donors, but only if the dependent variable is defined as aid shares not as the level of aid giving. Even for aid shares, in substantive terms, the spatial effect is significantly smaller in social infrastructure compared to economic infrastructure and production sectors. By contrast, no evidence for spatial dependence in the allocation of aid into either sector is found for the group of like-minded donors.

Table 6. *Robustness test: trade-weighted spatial lag variables (dependent variable: aid share)*

Type of aid Group of donor	Social Large donors (1)	Social Like-minded donors (2)	Econ/prod Large donors (3)	Econ/prod Like-minded donors (4)
Lagged dependent variable	0.0790	−0.0136	0.135	−0.101
	(0.0643)	(0.0426)	(0.0855)	(0.0615)
Trade competition-weighted spatial lag ($t-1$)	0.293	−0.278**	0.795*	0.343
	(0.153)	(0.0886)	(0.328)	(0.371)
ln GDP per capita ($t-1$)	0.000442	−0.00182	−0.000438	−0.00711**
	(0.000651)	(0.00210)	(0.00152)	(0.00272)
ln Population ($t-1$)	0.00376*	0.00905*	0.00444	0.00369
	(0.00173)	(0.00426)	(0.00356)	(0.00646)
Share of recipient in donor's trade ($t-1$)	0.0247	0.0125	−0.0909	−0.0211
	(0.0336)	(0.0119)	(0.0753)	(0.0266)
Democracy ($t-1$)	6.33e−05	0.000220**	9.88e−05	0.000213*
	(4.30e−05)	(7.14e−05)	(5.94e−05)	(9.26e−05)
UN Security Council membership	0.000500	−0.000855	0.000956	0.00176
	(0.000487)	(0.000597)	(0.000697)	(0.00135)
Observations	6,255	4,323	4,680	2,970
Number of dyads	517	440	466	365

Note: standard errors clustered on dyads in parentheses. All estimations include year and dyad fixed effects.
* Statistically significant at $p < .05$.
** Statistically significant at $p < .01$.

Table 7. *Robustness test: Three-year period averaged rather than annual data (dependent variable: aid share)*

Type of aid Group of donor	Social Large donors (1)	Social Like-minded donors (2)	Econ/prod Large donors (3)	Econ/prod Like-minded donors (4)
Lagged dependent variable	0.0185	−0.109	0.250**	−0.186*
	(0.0926)	(0.0741)	(0.0403)	(0.0728)
Trade competition-weighted spatial lag ($t-1$)	0.164	−0.455	3.404**	0.849
	(1.187)	(0.243)	(0.830)	(0.537)
ln GDP per capita ($t-1$)	0.000809	−0.000632	0.00130	−0.00329
	(0.000839)	(0.00222)	(0.00175)	(0.00187)
ln Population ($t-1$)	0.00478*	0.00732	0.00155	0.00193
	(0.00200)	(0.00547)	(0.00220)	(0.00601)
Share of recipient in donor's trade ($t-1$)	0.0456	0.00171	0.00656	−0.00937
	(0.0489)	(0.00967)	(0.0670)	(0.0156)
Democracy ($t-1$)	4.62e−05	0.000326**	5.58e−05	0.000251
	(5.96e−05)	(0.000103)	(5.96e−05)	(0.000128)
UN Security Council membership	−0.000129	0.000469	0.00104	0.00233
	(0.000695)	(0.000840)	(0.000958)	(0.00162)
Observations	2,212	1,730	1,842	1,332
Number of dyads	515	436	468	370

Note: standard errors clustered on dyads in parentheses. All estimations include year and dyad fixed effects.
* Statistically significant at $p < .05$.
** Statistically significant at $p < .01$.

Table 8. *Robustness test: Group of large donors jackknives (dependent variable: aid share)*

Excluded donor	US	US	UK	UK	FRA	FRA	GER	GER	JPN	JPN
Type of aid	Social	Econ/prod	Social	Econ/prod	Social	Econ/prod	Social	Econ/prod	Social	Econ/prod
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Lagged dependent variable	−0.0207	0.0840	0.179**	0.0991	0.0743	0.122	0.0818	0.212**	0.0746	0.120
	(0.0523)	(0.0861)	(0.0414)	(0.0895)	(0.0682)	(0.0923)	(0.0695)	(0.0816)	(0.0743)	(0.133)
Export competition-weighted spatial lag ($t-1$)	0.281	1.220**	0.414*	0.989**	0.321	1.034**	0.316	0.750	0.322	0.269
	(0.207)	(0.377)	(0.191)	(0.371)	(0.262)	(0.386)	(0.273)	(0.575)	(0.525)	(0.612)
ln GDP per capita ($t-1$)	0.000655	0.000989	0.000232	0.000426	0.000460	0.000753	0.000273	0.000455	−3.85e−05	−0.00182*
	(0.000735)	(0.00215)	(0.000482)	(0.00182)	(0.000985)	(0.00200)	(0.000754)	(0.00193)	(0.000678)	(0.000765)
ln Population ($t-1$)	0.000973	0.00639	0.00218	0.00711*	0.00734**	0.00664	0.00437*	0.00483	0.00401*	−0.000523
	(0.00191)	(0.00485)	(0.00147)	(0.00430)	(0.00233)	(0.00443)	(0.00202)	(0.00421)	(0.00188)	(0.00242)
Share of recipient in donor's exports ($t-1$)	0.0605	−0.161	0.0266	−0.138	0.0398	−0.138	0.0193	−0.109	0.0757	−0.0773
	(0.0451)	(0.0912)	(0.0301)	(0.0943)	(0.0413)	(0.0896)	(0.0296)	(0.0961)	(0.0565)	(0.0542)
Democracy ($t-1$)	2.57e−05	0.000115	6.18e−05*	9.32e−05	7.50e−05	0.000121	6.43e−05	8.36e−05	9.31e−05	5.52e−05
	(4.73e−05)	(7.71e−05)	(3.14e−05)	(7.43e−05)	(5.78e−05)	(7.46e−05)	(5.25e−05)	(6.88e−05)	(5.05e−05)	(4.05e−05)
UN Security Council membership	0.000275	0.000655	0.000837	0.00110	0.000564	0.00112	0.000701	0.000939	−5.99e−05	0.000902
	(0.000526)	(0.000767)	(0.000465)	(0.000797)	(0.000639)	(0.000893)	(0.000609)	(0.000841)	(0.000480)	(0.000658)
Observations	4,958	3,683	5,379	4,149	4,670	3,707	4,897	3,671	5,116	3,510
Number of dyads	412	368	423	390	411	372	411	374	411	360

Note: standard errors clustered on dyads in parentheses. All estimations include year and dyad fixed effects.
* Statistically significant at $p < .05$.
** Statistically significant at $p < .01$.

Table 9. *Robustness test: Group of like-minded donors jackknives (dependent variable: aid share)*

Excluded donor	CAN	CAN	DNK	DNK	NTH	NTH	NOR	NOR	SWE	SWE
Type of aid	Social	Econ/prod	Social	Econ/prod	Social	Econ/prod	Social	Econ/prod	Social	Econ/prod
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Lagged dependent variable	−0.0374	−0.132*	0.100*	0.0893	−0.0326	−0.115	−0.0371	−0.164**	−0.0255	−0.0990
	(0.0444)	(0.0645)	(0.0449)	(0.0999)	(0.0460)	(0.0614)	(0.0447)	(0.0351)	(0.0458)	(0.0698)
Export competition-weighted spatial lag ($t-1$)	−0.372**	0.0616	−0.344**	0.733	−0.407**	0.871	−0.471	1.459*	−0.469**	0.918
	(0.141)	(0.272)	(0.104)	(0.643)	(0.117)	(0.701)	(0.240)	(0.681)	(0.133)	(0.751)
ln GDP per capita ($t-1$)	−0.000945	−0.00713*	−0.00104	−0.00612**	−0.00239	−0.00843**	−0.00288	−0.00676*	−0.00290	−0.00638*
	(0.00164)	(0.00319)	(0.00187)	(0.00222)	(0.00252)	(0.00312)	(0.00303)	(0.00332)	(0.00251)	(0.00300)
ln Population ($t-1$)	0.00640	−0.00211	0.00880*	0.00492	0.00763	0.00158	0.0134*	0.00863	0.00904	0.00435
	(0.00382)	(0.00983)	(0.00403)	(0.00516)	(0.00520)	(0.00755)	(0.00563)	(0.00626)	(0.00515)	(0.00755)
Share of recipient in donor's exports ($t-1$)	0.0163*	0.00261	0.0105	−0.0197	0.0178*	−0.0174	0.0206	−0.0590	0.0175*	−0.0230
	(0.00791)	(0.00643)	(0.00628)	(0.0200)	(0.00772)	(0.0199)	(0.0369)	(0.0482)	(0.00815)	(0.0224)
Democracy ($t-1$)	0.000301**	0.000302*	0.000146*	0.000103*	0.000225**	0.000247*	0.000281**	0.000265*	0.000168*	0.000189
	(7.86e−05)	(0.000135)	(6.03e−05)	(5.31e−05)	(8.44e−05)	(0.000112)	(9.52e−05)	(0.000117)	(8.06e−05)	(0.000102)
UN Security Council membership	−0.000562	0.00328	−0.00136**	0.000302	−0.00112	0.00208	−0.000826	0.00150	−0.000403	0.00215
	(0.000763)	(0.00205)	(0.000475)	(0.000707)	(0.000700)	(0.00167)	(0.000768)	(0.00163)	(0.000640)	(0.00152)
Observations	3,307	2,021	3,887	2,715	3,420	2,366	3,233	2,262	3,445	2,516
Number of dyads	341	271	371	328	350	285	346	285	352	291

Note: standard errors clustered on dyads in parentheses. All estimations include year and dyad fixed effects.
* Statistically significant at $p < .05$.
** Statistically significant at $p < .01$.

(d) *Robustness tests*

For the sake of brevity and recalling the qualifications we mentioned above with regard to the first-stage results, we restrict the robustness tests to the second stage of aid allocation. We also restrict the robustness tests to estimating in aid shares and with actual rather than predicted exports in order to keep the number of additional estimation tables manageable.

In Table 6, we employ total trade (exports + imports) rather than exports as weights in the construction of the spatial lag variables. The results are very similar to those reported in Table 4. In Table 7, we estimate in periods of three-year averages rather than in annual data. As already mentioned, the spatial lag variable is not statistically significant with the unexpected negative coefficient for the spatial lag in social sector aid by like-minded donors. Otherwise results are very similar to those reported in Table 4.

In Table 8, we employ a so-called jackknife to the estimations for the large donors: we drop each one of the large donors at a time from the estimations to check whether the results for the large-donor group are dependent on the inclusion of any specific large donor. We find that results are not much affected if the US, the UK, or France is dropped from the sample. There is some evidence for spatial dependence in aid for social infrastructure as well if the UK is dropped from the sample, albeit at roughly half the substantive effect of spatial dependence in aid for economic infrastructure/production sectors. This suggests that the allocation of UK aid for social infrastructure resembles the allocation behavior of the like-minded donors in this field more closely than that of the other large donors. [31] More importantly, however, if we drop either Germany or Japan from the sample, then the coefficients on the spatial lag for aid for economic infrastructure/production sectors become statistically insignificant. This is an interesting result: of the large donors Germany and Japan are the most export-oriented ones and the results from Table 8 suggest that export-competition-driven aid allocation is mainly due to these two donors.

In Table 9, we similarly employ a jackknife, but this time to the estimations for the like-minded donors, dropping each one of them from the estimations at a time. Results are very similar to those reported in Table 4 with the exception of the case when Norway is dropped from the sample. In the estimations without Norway, the coefficient for the spatial lag in the allocation of aid for social infrastructure continues to be negative, but is no longer statistically significant, whereas the coefficient for the spatial lag in the allocation of aid for economic infrastructure/production sectors, which was positive but insignificant before, now becomes statistically significant. From this one can infer that Norway is a major driving force behind the specialization of like-minded donors in social infrastructure, and it seems that other like-minded donors are subject to export competition in the allocation of aid for economic infrastructure/production sectors.

In Table 10, we check the robustness of our results toward excluding the top decile of recipient countries for which donors compete, i.e., the recipient countries in the top decile of values of the spatial lag variables over the entire estimation period. The purpose of this test is to see whether the countries that are the most important export markets for most donors are the only ones driving the results on spatial dependence in aid allocation. This list of countries includes Brazil, China, India, Indonesia, Thailand, and Turkey for aid in economic infrastructure/production sectors and Angola, China, India, Indonesia, Mexico, South Africa, and Turkey for aid in social infrastructure. As can be seen from Table 10, results are qualitatively the same. In contrast to expectations, however, the coefficients for the spatial lag variables are much larger than in Table 4. One has to keep in mind that the largest values for the spatial lag variables have been truncated, and that some increase in its coefficient size is therefore to be expected. In substantive terms, the effect in column (3) of Table 10 represents an increase from .09 (baseline model) to .28 standard deviation increases in the predicted aid share following a one-standard deviation increase in this truncated spatial lag variable. The estimated degree of spatial dependence is thus significantly larger in this sample, but still relatively modest. Nevertheless, it is a surprising finding that the degree of spatial dependence is larger if we exclude the top decile of recipient countries for which donors compete.

Table 10. *Robustness test: Dropping recipients in top decile of spatial lag (dependent variable: aid share)*

Type of aid Group of donor	Social Large donors (1)	Social Like-minded donors (2)	Econ/prod Large donors (3)	Econ/prod Like-minded donors (4)
Lagged dependent variable	0.151**	−0.0476	0.0950	−0.177**
	(0.0459)	(0.0424)	(0.101)	(0.0308)
Export competition-weighted spatial lag ($t-1$)	3.130	1.988	47.17**	−4.877
	(2.664)	(1.715)	(10.91)	(10.49)
ln GDP per capita ($t-1$)	0.000566	−9.75e−05	−0.00118	−0.00357
	(0.000569)	(0.00224)	(0.000675)	(0.00237)
ln Population ($t-1$)	0.00366*	0.00901	−0.000752	0.00732
	(0.00165)	(0.00459)	(0.00184)	(0.00489)
Share of recipient in donor's exports ($t-1$)	0.0271	−0.00943	0.0305	0.00901
	(0.0252)	(0.0200)	(0.0434)	(0.0115)
Democracy ($t-1$)	5.83e−05	0.000187*	6.93e−05	0.000260*
	(4.36e−05)	(7.72e−05)	(5.11e−05)	(0.000110)
UN Security Council membership	0.000489	−0.000414	0.000398	0.00134
	(0.000503)	(0.000690)	(0.000719)	(0.00144)
Observations	5,753	3,888	4,278	2,691
Number of dyads	482	406	436	340

Note: standard errors clustered on dyads in parentheses. All estimations include year and dyad fixed effects.
* Statistically significant at $p < .05$.
** Statistically significant at $p < .01$.

This may point to a weakness of our spatial lag variable when using actual exports as weights. It is conceivable that *actual* exports sometimes fail to differentiate appropriately between more and less important markets. Competition among donors may be particularly fierce where donors spot a promising export *potential*, e.g., when recipient countries open up to trade such as after the regime change in Central and Eastern Europe in the 1990s or, more recently, in Myanmar. Indicative of this explanation is that we no longer find the effect to be larger after excluding the top decile of recipient countries for which donors compete if we base both sets of results on predicted rather than actual exports. [32]

6. CONCLUSION

It is widely believed that donor countries use aid as a means to promote their own export interests. With few exceptions, however, the large aid allocation literature has ignored spatial dependence among export-oriented donor countries. If at all, the possibility of competition among donors is accounted for by including the aid flows from all other sources among the determinants of the allocation of aid by a particular donor. By contrast, our analysis realistically assumed that it matters whether or not the specific source constitutes a relevant competitive challenge for the donor deciding on aid for a particular recipient country.

Specifically, we accounted for the competition for export markets among the donor countries of the OECD's Development Assistance Committee during the 1995–2011 period by introducing spatial lag variables that link donor countries according to the extent to which a potential aid recipient country is of similar importance to them as a market for their exports. We differentiated between large donors who were supposed to compete strategically and more altruistic (like-minded) donors. At the same time, we employed sector-specific aid data, as the impact of export competition is expected to matter more for aid in economic infrastructure and production sectors than for aid in social infrastructure such as education and health. Finally, we distinguished between donors' first- and second-stage decisions on (i) the selection of recipient countries, and (ii) conditional on being selected, on the amount of aid allocated to each recipient.

As expected, the evidence for spatial dependence proved to be weak and inconclusive in our baseline estimations when using aggregate total aid data for all donor countries. The estimations supported the view that the effects of spatial lags for specific sectors of aid and specific groups of donors might work differently and tend to cancel each other out when aggregated. The evidence for export-competition-driven spatial dependence for total aid was limited to the first stage of selecting recipient countries by all donors; we found no such evidence for the second stage of the allocation of total aid by all donors or the group of large or the group of like-minded donors. The significant effect in the first stage appeared to be attributable largely to the selection decisions of the largest donors with regard to aid in economic infrastructure and production sectors. This supports the hypothesis that large and strategically oriented donors are more likely to give aid in trade-related sectors to recipients where other export competing donors have done so before. By contrast, spatial dependence did not matter for the like-minded donors; nor did it matter for eligibility for aid in social infrastructure from the large donors.

The disaggregated estimations for the second stage of deciding on aid amounts among selected recipients pointed to different patterns mainly between the allocation of aid in economic infrastructure and production sectors by the large donors and the allocation of aid in social infrastructure by the like-minded donors. In the former case, spatial dependence proved to be significantly positive and quantitatively non-negligible. In other words, the large donors tend to grant more aid in trade-related sectors to important export-market recipients that receive more aid from competing donors. This finding proved to be remarkably robust, upholding no matter whether we estimated in aid shares or in aid levels (unless we employ actual instead of predicted exports in the construction of spatial lag variables), and is also robust in our robustness tests. In contrast, we found some indications, though not robust, for negative spatial dependence for aid in social infrastructure from like-minded donors, suggesting that these donors possibly engaged in specialization and coordinating aid efforts in this sector. This would have implications for on-going efforts to render aid more effective by reducing the duplication of aid efforts, increasing the specialization of donors and strengthening donor coordination. It appears that progress in implementing the Paris Declaration and the subsequent Accra Agenda for Action of 2008 cannot reasonably be expected from strategically oriented donors with respect to trade-related aid categories.

Our estimation results proved to be fairly robust, for example to alternative spatial weights (specifically, to replacing donor exports by bilateral trade in both directions), to estimating in three-year averages rather than annual data, and to excluding the most important export markets among the recipient countries for which donors compete in their aid allocation. However, the evidence on positive spatial dependence in aid allocation among the large donors seems to depend on the inclusion of the strongly export-oriented donors Germany and Japan in the group of the largest donors. This suggests an important extension in future research once sufficient aid data become available for non-traditional donor countries. Various "new" donors, notably China and other Asian countries such as South Korea, are strongly export oriented, too. This raises the question of whether these donors are also subject to export-competition-driven spatial dependence in their aid allocation such that the allocation behavior of these "new" donors is more similar to that of the large traditional donors than to that of the like-minded DAC donors.

NOTES

1. Recent examples include Berthélemy (2006), Younas (2008), and Hoeffler and Outram (2011). However, Claessens *et al.* (2009) argue that donors have recently become more altruistic; see also Dollar and Levin (2006). For a more detailed discussion of the relevant literature, see Section 2.

2. Examples include Berthélemy (2006), Powell and Bobba (2006), and Davies and Klasen (2011). In an earlier study, Katada (1997) assesses the links between Japanese and US aid to Latin American countries. Fuchs, Nunnenkamp, and Öhler (2013) analyze commercial and political competition within pairs among the five major donors.

3. In contrast to Berthélemy (2006), Hoeffler and Outram (2011) consider the flow of exports and imports between a donor and recipient country.

4. This approach is also followed by other prominent studies, including Younas (2008) and Claessens *et al.* (2009).

5. Helble, Mann, and Wilson (2012) and Pettersson and Johansson (2013) analyze the effects of aid on the donors' as well as the recipients' exports. Helble *et al.* (2012) focus on aid granted in the context of the WTO's Aid-for-Trade Initiative of 2005, finding that this type of aid is more strongly associated with the exports of the recipients than those of the donors. Likewise, Pettersson and Johansson (2013) show that bilateral aid is not only positively associated with donor exports to recipients, but also with recipient exports to donors. See also Hühne, Meyer, and Nunnenkamp (in press). By contrast, Nowak-Lehmann, Martínez-Zarzosa, Herzer, Klasen, and Cardozo (2013) do not find significantly positive effects of aid on recipient exports, though on donor exports.

6. Causality appears to be running from German aid to German exports for the subsample of relatively advanced recipient countries. By contrast, there is some evidence for reverse causality from German exports to aid, e.g., for the subsample of lower income countries. Arvin *et al.* (2000) report a lack of any causal impact for the subsample of typically poor recipients being part of the so-called Lomé agreement.

7. Pettersson and Johansson (2013) made an attempt to instrument aid with membership of recipient countries in the UN Security Council at diplomatically important times. However, the authors conclude that the instruments are not sufficiently strong to identify the exogenous variation in aid. Hühne *et al.* (in press) find that the effect of aid granted by altruistic donors (as classified by Berthélemy, 2006) on donor exports is similarly strong as the effect of aid granted by egoistic donors. They take this as an indication that reverse causality is rather unlikely.

8. In other words, tied aid may be immiserizing (Kemp & Kojima, 1985).

9. For details, see: http://www.oecd.org/development/untyingaidtherighttochoose.htm#progress; accessed: July 2013.

10. However, Thiele, Nunnenkamp, and Dreher (2007) find that aid allocation patterns differ even between sectors that are closely related to the Millennium Development Goals.

11. For details see OECD (2011).

12. Recent examples include Calì and Te Velde (2011), Helble *et al.* (2012) and Hühne *et al.* (in press).

13. For a detailed discussion, see e.g., McGillivray and Morrissey (2000).

14. See Wagstaff (2011) for the distinction between inter-sectoral and intra-sectoral fungibility.

15. Results are very similar if instead of total aid we only look at country programmable aid (CPA), defined as total gross aid net of aid that is (i) unpredictable by nature, (ii) entails no cross-border flows, and (iii) is not part of co-operation agreements between governments (OECD, 2009). As a consequence, CPA excludes humanitarian aid, debt relief, food aid, and administrative costs in the donor country. The excluded categories of aid are often the result of coordinated aid allocation by several donors to recipients hit by natural disasters or burdened by excessive debt. This co-ordination behavior does not need to reflect spatial dependence, but it could be purely driven by a phenomenon called spatial clustering (Plümper & Neumayer, 2010).

16. The OECD discourages the use of earlier sectoral aid data by restricting the automatic download option on its CRS website to data since 1995. So-called related files with earlier data are clearly separated and less visible. For details on underreporting of CRS data, see e.g., Aldasoro, Nunnenkamp, and Thiele (2010). Underreporting has become less severe over time. Coverage of sectoral commitments was often below 50% before 1995, compared to more than 90% in 2002–06. Note also that the degree of underreporting differed across donor countries, notably in earlier years.

17. See Neumayer and Plümper (2010) for other forms of spatial contagion—such as aggregate source or aggregate target contagion, and specific target contagion.

18. The explanatory variables are not lagged, however, when performing the robustness test with three-year period averages.

19. For the spatial lag variables and the export variables, these are based on actual rather than predicted exports.

20. In particular, smaller donors provide aid to a limited number of recipients so that the dependent variable is zero in many cases.

21. Earlier aid allocation studies have often used Tobit models. This option is no longer attractive when accounting for fixed effects, as we do in all our estimations, because of the poor statistical properties of Tobit fixed-effects models' estimators—in particular the serious attenuation in variances of the estimated coefficients (see Greene (2002) for an extended discussion).

22. A Heckman sample selection model would in principle be superior since it allows the error terms to be correlated and corrects for this correlation. However, in the context of aid allocation, Alesina and Dollar (2000) and Berthélemy (2006) do not find much correlation between the residuals of the selection equation in the first step and of the allocation equation in the second step. Moreover, the Heckman model depends on the existence of a variable that fulfills the exclusion restriction, i.e., that affects the first stage of aid allocation only, but not the second (level) stage. None of the variables affecting aid allocation is likely to fulfill this restriction.

23. Random effects estimation is not appropriate for the analysis of spatial dependence, but if we estimated the models reported in Table 1 with random effects estimation, then the results on the control variables (in terms of sign and statistical significance) are in line with previous literature and theoretical expectations. Dreher *et al.* (2013) on German aid achieve similarly "weak" results on indicators of recipient need and donor interests as we do here when they account for recipient country fixed effects.

24. $0.00251/0.028 = 0.09$ and $0.00417/0.021 = 0.20$.

25. Recent examples include Claessens *et al.* (2009), Hoeffler and Outram (2011), and Dreher *et al.* (2013). Likewise, the seminal study of Alesina and Dollar (2000) finds that the coefficient on the recipients' openness to trade is significantly positive in OLS regressions, whereas the coefficient switches to significantly negative in fixed effects panel regressions. Furthermore, the relation between donor exports and aid appears to

have changed over time. For instance, Claessens *et al.* (2009) observe that the coefficients on the export variable "are not significant and trend toward negative" for the more recent past. Even for the largest donors who are widely perceived to be selfish, the evidence on the relation between exports and aid has increasingly become ambiguous (McGillivray, 2003; Nunnenkamp & Öhler, 2011).

26. Consistent with the results for total aid from all donors, we find that as a large donor increases its export share in a country this country becomes less likely to receive aid.

27. The reason is that the marginal effects are dependent on the fixed effects which are conditioned out of the estimations. See http://www.stata.com/statalist/archive/2012-12/msg00889.html.

28. $(0.942 * 0.002)/0.012 = 0.16$.

29. We can only speculate about possible explanations of this finding. Specifically, we suspect that the export-related spatial weights could be correlated with the donors' interest and expertise in a recipient country. Donors with higher export shares could have gained more experience and better knowledge of local conditions in the recipient country. This would allow for better informed decisions on where and how to grant aid. Further assuming that like-minded donors are willing to specialize in their aid allocation and cooperate with other donors according to their particular comparative advantage, they could have reduced their social infrastructure aid to a specific recipient when another donor with a particular interest and/or expertise in a recipient country increased its aid. If so, like-minded donors would have observed repeated calls to avoid duplication of aid efforts and improve the division of labor between donors, e.g., by mutually agreeing on peers assuming the role of the "lead donor" in particular recipient-sector combinations. For instance, donors promised in the so-called Paris Declaration of 2005 to render aid more effective by "eliminating duplication of efforts and rationalizing donor activities" and committed themselves "to make full use of their respective comparative advantage at sector or country level" (OECD, 2005: paragraphs 3 and 35). However, previous assessments of the actual implementation of the Paris Declaration pointed to large gaps between donor rhetoric and actual behavior until recently (e.g., Nunnenkamp, Öhler, & Thiele, 2013).

30. $(-0.409 * 0.002)/0.012 = -0.07$.

31. This result is in line with earlier findings according to which the UK behaves more altruistically than other major donors such as France, Japan, and the US; see, e.g., the export-related results of Berthélemy and Tichit (2004) and Dollar and Levin (2006); see also the ranking of donors according to the quality adjusted aid-to-GDP ratio by Roodman (2006).

32. Detailed results not reported, but part of the replication dataset and do-file.

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