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## Does German Development Aid Promote German Exports?

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# DOES GERMAN DEVELOPMENT AID PROMOTE GERMAN EXPORTS ?

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## **Abstract**

This paper uses a static and dynamic gravity model of trade to investigate the link between German development aid and exports from Germany to the recipient country. The findings indicate that German aid is associated with an increase in exports of goods that is larger than the aid flow, with a point estimate of 133% of the aid given. The paper also distinguishes among recipient countries and finds that the return to aid of German exports is higher for countries considered as “strategic aid recipients” by the German government. In addition, the evolution of the estimated coefficients over time shows an effect that is always positive but oscillates over time. Interestingly, in the 2001-2005 a steady increase on the effect of aid on trade can be observed after a decrease in the second half of the nineties.

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## 1. Introduction

The United Nations Millennium development goals are to promote growth and poverty reduction in developing countries. In support of this effort, MDG8 calls for a new partnership for development, including higher levels of aid for countries committed to poverty reduction. In the last decades, a great deal of research effort has been devoted to investigate the effects of development assistance on the economic performance of the recipient countries (e.g. Burnside and Dollar, 2000; Hanssen and Tarp, 2001) and to clarify the recent debate on how aid can help promote exports from developing countries or ‘aid for trade’ (Morrisey, 2006).

Although promoting economic development is one of the main objectives of national aid programmes, the motivations to give aid are diverse and also include historical ties, political and strategic goals as well as economic interests of aid-giving countries (Alesina and Dollar, 2000).

Given that economic interests of aid-giving countries plays a role in aid allocation, it is surprising that only a few authors have investigated the economic effects of aid from a donor’s perspective (Nilson, 1998; Wagner, 2003; Osei, Morrissey and Lloyd, 2004). In particular, the question arises whether the official development assistance is promoting exports to recipient countries. This question is of special interest for Germany, since the German government is committed, according to EU Plans, and in line with various international commitments, to increase its official development aid to 0.7 % by 2015. In the late 1990s and early 2000’s German ODA was below 0.3% of GDP, rising to 0.37% (or about \$9bn.) in 2005. To reach the goal of 0.7% and accounting for economic growth in the interim will imply that German ODA will have to more than double in real terms in the next eight years.

The only empirical study that quantifies the impact of aid on German exports is, to our knowledge Vogler-Ludwig et al. (1999). Using data for the period 1976-1995 and simple OLS panel regressions, the authors found that one deutschmark spent on ODA would increase

exports by 4.3 deutschmarks. The purpose of this paper is to address this question using a longer time horizon, a much larger country sample, a more comprehensive set of control variables, more advanced panel econometric techniques, and using a number of robustness checks as well as effects for country groups and different time periods. We estimate a dynamic gravity model of German exports to 138 recipients augmented with development aid for the period 1962 to 2005.

To summarize our main results, we find that the return to exports of German aid is somewhat more moderate: around 1-1.8\$ increase of exports for every dollar spent. In addition, the effect is higher for developing countries which are target countries for the German Ministry of Development (so called “BMZ countries”), i.e. countries where German aid is given based on agreements between the German government and the recipient country government.<sup>5</sup> The overall effect is remarkably robust but oscillates over time. It is always positive and has increased in recent years (after a decline in the 1990s). Interestingly, we find no effect of aid given by the European Union (partly paid for by German contributions to the EU)

Section 2 presents a review of the recent literature on trade and aid. Section 3 discusses the structure of German aid over time and across recipients. Section 4 presents the model specification and main results. Finally, Section 5 presents the conclusions.

## **2. Theoretical Background**

In international trade theory researchers have long studied the welfare implications of bilateral transfers for donors and recipient countries. The first public discussion of this topic was Keynes-Ohlin debate in relation to the paradoxical effects of German reparations<sup>6</sup>. Leontieff (1936) also raised the possibility of transfer paradoxes (foreign aid can be donor-

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<sup>5</sup> Other developing countries also receive aid, but this happens through different channels such as funding from private foundations that receive support from the German government, government scholarships to students from these countries to study in Germany, government support for German NGOs providing emergency assistance and other project support in that country. In these cases, the aid flow was not a result of German aid policy targeted to that particular country but an outcome of the policies and processes of these different programs.

<sup>6</sup> Keynes (1929a,1929b,1929c) and Ohlin (1929a,1929b).

enriching and recipient-immiserizing). Since then, the theoretical literature on transfer paradoxes has been extended to more general settings and the findings indicate that they are still possible but, under some conditions both donors and recipients can benefit from transfers (Gale, 1974; Brecher and Bhagwati, 1981 and 1982; Bhagwati, Brecher and Hatta, 1983, 1984). Bhagwati et al. (2004) present an early survey of this literature.

More recently, Djajic, Lahiri and Raimondos-Moller (2004) studied the welfare implications of temporary foreign aid in the context of an intertemporal model of trade. They find that the net benefits of an aid transfer may change over time for both the donor and the recipient. Assuming stability, a temporary transfer of income in the first period increases period-one welfare of the recipient and lowers that of the donor. But, in the presence of habit formation effects, aid in period one may serve to shift preferences of the recipient in favour of the donor's export good in period two. When the terms of trade effect associated with this shift is sufficiently large and the real rate of interest is sufficiently low, the second-period welfare gain of the donor (at the expense of the recipient) dominates its period-one loss. In addition, this transaction can also result in a net increase in welfare of the recipient country if the real rate of interest used to discount the period-two loss is sufficiently high, making its present value smaller than the period-one gain.

In this paper we focus exclusively on the effect of aid on the donor's exports. With this aim and taking into account the abovementioned theoretical considerations, we expect that, in the context of an intertemporal model of trade, development aid could lead to an increase in the donor's exports for several reasons. First, there might be an impact as a result of the fact that a considerable share of donor aid in the time period we analyze used to be tied to exports from the donor country. Up until the 1990s, approximately 50% of the donors' development aid was tied to exports. However, this number is much smaller today and for the German case amounts to only 7% of development aid (Development Assistance Committee, OECD (2007)). While tied aid is on the decline and now hardly practised anymore, it might

have an effect. That ‘tied aid’ effect would clearly be smaller than the amount of aid sent as a considerable share of aid is spent on paying local labour, funding technical assistance, purchasing local supplies and would thus not show up as exports from the donor country. Second, we hypothesize that there may be habit formation effects in the sense that donor-funded exports for aid-related projects might increase the proclivity of recipient countries to buy goods from the donor. Such an effect would go beyond tied aid and might be much larger than the direct effect of tied aid. Third, we assume that the aid relationship promotes a trade relationship in the sense that it creates ‘goodwill’ towards donor exporters and as donor countries might often combine aid missions and negotiations with trade missions the aid relationship might be ‘opening the door’ for donor exporters.

In order to evaluate this effect empirically, we have chosen the gravity model of trade as a basic framework. 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). The major contribution of Anderson and van Wincoop (AvW) was the appropriate modelling of trade costs in explaining bilateral exports. AvW model has been recently extended to applications explicitly involving developed and less developed countries by Nelson and Juhasz Silva (2007). They present an extension of AvW to the asymmetric North-South case and derive some implications related to the effect of aid on trade. Their results indicate that if a donor country is larger than the recipient at least by the amount of the foreign aid, there is an increase in exports from the larger one to the smaller. The intuition behind is that the more similar in size two countries are the more they trade.

### **3. Empirical Literature on Aid and Trade**

Based on this theoretical framework, we now turn to the existing empirical literature on aid and trade. In line with the focus of our study, we concentrate on the causal links from aid flows to trade flows.

In recent years, a number of researchers have investigated the relationship between aid and bilateral trade flows from donors to recipients. Some of them focus on quantifying the impact of donors' aid on trade. Since in many cases aid used to be contingent on purchasing goods from the donor, tied aid may automatically create such export effects.

The recent literature has been divided on the effect of aid on exports from donor countries. Most studies use the gravity model of trade as the empirical framework. Among those who found a positive effect of aid on trade, Nilson (1998) analysed the link between aid and exports for European Union donors to 108 recipients. He estimated a static specification of the gravity model for the period 1975 to 1992 (three year averages) and found an elasticity of exports with respect to aid of 0.23 that translates into 2.6 US\$ increase of exports for each dollar of aid. He also computed donors' specific elasticities and for Germany the return to foreign aid was 3.16\$ increase of exports for each dollar of aid. Wagner (2003) also used a gravity model of trade to investigate the effect of aid on trade for twenty donors to 109 recipient countries for the years 1970-1990. He obtained elasticities of trade with respect to aid in the range 0.062 (for FE specification) to 0.195 (for the pooled-OLS). The estimated average return to donor's aid according to the OLS result was 2.29\$ of exports per 1\$ of aid. They also decomposed the direct and indirect effects of aid on trade and found that the direct effect was only 0.35\$ and much lower than the indirect effect (0.98\$). In addition he obtained that the effect of past aid on trade was positive but very small (18 cents).

In the second strand of the literature we find some studies that deviate from the gravity model framework. A few authors studied the direction of the causality by using Granger causality tests. On the one hand, Arvin, Cater and Choudhry (2000) examined the direction of the causality between untied assistance and exports using German data for the period 1973-

1995. Their findings provide some support for the export promotion hypothesis whereby untied aid disbursements generate goodwill for the donor. On the other hand, Lloyd, McGillivray, Morrissey and Osei (2000) examined data on aid and trade flows for a sample of four European donors and 26 African recipients over 1969-95. Using Granger causality tests they found that there is little evidence showing that aid creates trade in a dynamic sense (only in 14% of the cases) and claim that the argument for tied aid is unproven in their analysis. Instead, they find that a more common link is that trade relations are a factor influencing donor allocation, rather than that aid generates these trade relations.

In the same line, Osei, Morrissey and Lloyd (2004) extended the analysis to more countries and also found no evidence that aid generates trade when testing for the relationship between aid and trade for different sub-samples. Although donors providing a higher share of aid tend to trade more with the recipients. They conclude that donors appear to be concerned with relative aid and trade shares rather than absolute volumes.

Our challenge and contribution in this paper is to consider dynamic effects of aid, as in the second strand of the literature, but relying on the gravity model of trade, as done in the first strand of the literature. In addition, we will examine a longer time period, more recipient countries, more covariates, a more advanced econometric framework, and use extensive robustness checks.

#### **4. The Volume and Structure of German aid**

The standard used to measure development funding is the Official Development Assistance as a percentage of Gross National Income (ODA/GNI ratio). The repository of official information on aid is the Development Assistance Committee (DAC) of the OECD. DAC has two lists of countries. “Part I” countries are grouped into five categories: least developed countries (LLDCs), other low income countries (other LICs), low middle income countries (LMICs), upper middle income countries (UMICs) and high income countries



(LMICs). “Part II” countries refer to transition or upper middle-income level countries. Aid given to members on list I is called ODA, whereas aid given to members of list II is called official aid (OA). ODA is further classified into bilateral ODA (given directly by a donor country) and multilateral ODA (given by an international institution such as the World Bank or the United Nations). As most studies on aid, we focus on bilateral ODA given by Germany, but we also consider the effect of ODA given by the European Community (as part of the multilateral aid). We do this to find out whether a bilateral aid relationship has stronger effects than a multilateral one on the exports of individual donor countries.

Development aid has to satisfy three criteria to be classified as ODA. First, it has to be undertaken by official agencies. Second, the main objective of aid has to be the promotion of economic development and finally, it has to have a grant element of at least 25%. It is worth noting that private aid given by non governmental organizations is not counted and military aid is also not part of ODA.

How much does Germany spend on development? Table A.1 in the Appendix show German ODA to GNI ratio over the period 1964-2005. Aid flows increased in the late 1970s and decreased in the 1980s and 1990s. Only after 1999 a steady increase has been observed. In terms of relative importance, Germany has been in the past three decades among the 5 most important donors in terms of bilateral aid. According to OECD figures German bilateral aid accounts for around 10-15% of total bilateral aid.

Concerning the geographical distribution, Table A.2 in the Appendix shows the regional distribution of German ODA. German aid is more evenly distributed among recipients than is aid from the other larger donors. A higher percentage is directed to South Saharan Africa and Middle East and North Africa especially in the latest years, whereas aid shares to Latin America and Asia show a decreasing trend.

## **5. Specification and estimation of the gravity model**

## 5.1 Model specification

The gravity model of trade is nowadays the most commonly accepted framework to model bilateral trade flows (Anderson, 1979; Bergstrand, 1985; Anderson and Van Wincoop, 2003). According to the underlying theory, trade between two countries is explained by nominal incomes and the populations of the trading countries, the distance between the economic centres of the exporter and importer and by a number of other factors adding or preventing trade between them. Dummy variables are generally used to proxy for these factors, such as trade agreements, common language or common border. The traditional gravity model is specified as,

$$X_{ij} = \alpha_0 Y_i^{\alpha_1} Y_j^{\alpha_2} POP_i^{\alpha_3} POP_j^{\alpha_4} DIST_{ij}^{\alpha_5} F_{ij}^{\alpha_6} u_{ij} \quad (1)$$

where  $Y_i$  ( $Y_j$ ) indicates the GDPs of the exporter (importer),  $POP_i$  ( $POP_j$ ) are exporter (importer) populations,  $DIST_{ij}$  is geographical distances between countries  $i$  and  $j$  and  $F_{ij}$  denotes other factors aiding or preventing trade (e.g. trade agreements, common language or common border).

The gravity model has been broadly used to investigate the role played by specific policy or geographical variables in explaining bilateral trade flows. In this line, in order to investigate the effect of development aid on German exports, we augment the traditional model with bilateral and multilateral aid and also with exchange rates<sup>7</sup>. Usually the model is estimated in log-linear form. Taking logarithms in equation (1) and introducing time variation, the static specification of the gravity model is,

$$\ln X_{jt} = \alpha_0 + \phi_t + \delta_j + \beta_1 \ln(Y_{Gt} Y_{jt}) + \beta_2 \ln POP_{Gt} + \beta_3 \ln POP_{jt} + \beta_4 \ln DIST_j + \beta_5 \ln EXNR_{jt} + \beta_6 \ln BAID_{jt} + \beta_7 \ln EUAID_{jt} + \beta_8 \ln Col_{jt} + \beta_9 \ln AKP_j + \beta_{10} \ln WTO_{jt} + u_{jt} \quad (2)$$

where:

$\ln$  denotes variables in natural logs.

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<sup>7</sup> When the gravity model is estimated using panel data (with a time dimension) exchange rates are generally included as important determinants of bilateral trade flows over time.

$X_{jt}$  are the exports from Germany to country  $j$  in period  $t$  at current US\$.

$Y_{Gt}$ ,  $Y_{jt}$  indicates the German and the recipients GDP respectively, in period  $t$  at current PPP US\$.

$POP_{Gt}$ ,  $POP_{jt}$  denotes the population of Germany and country  $j$  respectively, in period  $t$  in thousand inhabitants.

$DIST_{ij}$  is the great circle distance between Germany and country  $j$ .

$EXRN_{jt}$  is the nominal bilateral exchange rate in monetary units of the recipient currency per Euro.

$BAid_{jt}$  is bilateral official gross development aid from Germany to country  $j$  at current US \$.

$EUAid_{jt}$  is EU official gross development aid to country  $j$  at current US \$.

The model includes a number of dummy variables for trading partners sharing specific trade agreements (AKP); for German colonies (Col) and for countries belonging to the GATT/WTO and for specific group of countries (LDC, ALA).  $\phi_t$  are specific time effects that control for omitted variables that are common for all trade flows but vary over time.  $\delta_j$  are importer effects that proxy for multilateral resistance factors. When these effects are included, the effect of the dummies that vary only with the “ $j$ ” dimension cannot be directly estimated.

## 5.2 Data sources and variables

Official Development Aid data are from the OECD Development Database on Aid from DAC Members<sup>8</sup>. We consider gross ODA disbursements at current US\$<sup>9</sup>, 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 of goods or services valued at the cost to the donor. Bilateral exports are obtained from the UN COMTRADE Database. Data on income and population variables are

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<sup>8</sup> [www.oecd.org/dac/stats/idsonline](http://www.oecd.org/dac/stats/idsonline).

<sup>9</sup> The gross amount comprises total grants and loans extended (positions 201 and 2004 according to DAC).

drawn from the World Bank (World Development Indicators Database 2007). Bilateral effective exchange rates are from the IMF Statistics. Distances between capitals have been computed as Great circle distances using data on strait line distances in kilometres, latitudes and longitudes from the CIA World Fact Book.

### 5.3 Results

The model is estimated for data on German exports and development aid (ODA) to 138 recipient countries, during the period 1962 to 2005. Table 1 reports the main estimation results. The first column shows the results obtained for all countries. Individual (country) effects (modelled as fixed) are included to control for unobservable heterogeneous effects across recipients and time fixed effects are also included to model specific unobservable time effects. Those effects are also a proxy for the so-called “multilateral resistance” factors modelled by Anderson and Van Wincoop (2003). We rely on the two-ways FE estimates, since a Wald test indicates that the individual effects are jointly significant and a Hausman test indicate that these effects are correlated with the error term.

With respect to the variable of interest, bilateral aid, the estimated coefficient is positive and significant indicating that a 1 per cent increase in German aid raises German exports by 0.11%. The effect is small compared to previous studies that did not control for country and time effects, but still positive and significant. However, the estimated coefficient for the EU official gross development aid is negative but not statistically significant. This suggests that individual donor countries do not benefit from EU aid. This implies that the ‘habit formation’, ‘goodwill’ and ‘door-opening’ factors are not present in EU aid, at least not for German exporters.<sup>10</sup>

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<sup>10</sup> It would be interesting to investigate whether other EU members profit more from EU aid. It may also be related to the fact that EU aid is of a different type, including more humanitarian and food aid where such export effects are likely to be smaller.

Most of the other variables present the expected sign and are statistically significant. The explanatory power of the model is good, since the included variables explain around 76 percent of the variation of German exports. The coefficient of total income is positive and significant and slightly lower than the theoretical value of unity. The same holds for the coefficient of population of the recipient countries which is negative and significant in the FE specification. The bilateral exchange rate has a negative coefficient that is always statistically significant at the one percent level. Therefore, a depreciation of the Euro (a decrease in the exchange rate) with respect to the recipient currencies would have a positive effect on German exports. Most of the dummies included as factors promoting or deterring trade are insignificant after controlling for unobserved heterogeneous effects, apart from the “independent state” dummy which presents a positive sign. For comparison purposes, Table A.3.1 shows the OLS, random effects (RE) and fixed effects (FE) estimates using a specification including more covariates. In the OLS and RE results we can see how distance from Germany to the recipient countries also seems to be a strong impediment to German exports, with a coefficient which is negative and always significant at one percent level. However, the effect of distance could not be directly estimated in the 2 ways FE equation. Since distance is constant over time its effect is subsumed in the country dummies. Equation (2) is also estimated on data of five year averages, to reduce the effects of temporary shocks and to avoid cyclical effects (Table A.3.2). There are two main differences encountered with respect to the estimation on yearly data. First, the effect of German aid on German exports is slightly higher in magnitude and second the coefficients of populations, EU aid and “independent state” dummy are now not significant according to the RE and FE estimates. Summarizing, we find that, in static terms, the average return to aid of German exports is around a one and a half dollar increase of exports for every aid dollar spent. This average is calculated as,

$$\beta_{LBAIDG} = \frac{\partial X}{\partial BAIDG} * \frac{BAIDG}{X} \Rightarrow \frac{\partial X}{\partial BAIDG} = \beta_{BAIDG} * \frac{X}{BAIDG} = 0.116 * \frac{229000}{18234} = 1.456$$

Finally, columns 2-4 in Table 1 report the results of estimating equation (2) for different groups of recipient countries, in order to ascertain whether the effect of bilateral aid could vary among recipients. It is worth noting that the return of exports to German aid is markedly higher for BMZ countries (3.2\$ of exports for each \$ of aid), in fact it is almost twice the average effect for all countries. This is quite plausible as only in these countries we would expect the export-increasing effects. Also the return to exports is relatively high for ACP countries (1.75), whereas for least developed countries a 1\$ of aid generates only 0.21\$ of exports.

Considering that trade relations once established might last for a long time, it makes sense to consider that current export volumes also depend on past exports. Therefore, we estimated a dynamic version of equation (2). In order to model dynamics we considered the introduction of the Koyck geometric lag structure that includes the lagged dependent variable as an additional regressor. The main problems of this specification are related to the statistical difficulties caused by the combination of an endogenous regressor (lagged exports) and autocorrelated errors. As a result, the OLS estimates are biased and inconsistent (the coefficient of the lagged dependent variable is biased towards unity, whereas the remaining coefficients are biased towards zero).

Nevertheless, these difficulties can be easily overcome using more sophisticated estimation techniques that control for endogeneity of the explanatory variables and for autocorrelated errors. The dynamic specification is given by,

$$\ln X_{jt} = \alpha_0 + \phi_t + \delta_j + \gamma \ln X_{jt-1} + \beta_1 \ln(Y_{Gt} Y_{jt}) + \beta_2 \ln POP_{Gt} + \beta_3 \ln POP_{jt} + \beta_4 \ln DIST_j + \beta_5 \ln EXRN_{jt} + \beta_6 \ln BAid_{jt} + \beta_7 \ln EUAid_{jt} + \beta_8 Col_{jt} + \beta_9 AKP_j + \beta_{10} WTO_{jt} + u_{jt} \quad (3)$$

where most of the variables are described above and  $X_{j,t-1}$  are exports from Germany to country  $j$  in period  $t-1$  at current US\$. Since most of the dummies were not statistically significant in the static model, they are not included in the dynamic model.

Our purpose here is to contrast the results from the most common ways of estimating these effects. With this aim several procedures are considered to estimate equation (3). First, pooled OLS is used with comparison purposes, which ignores country-specific and time-specific effects. Second, one way and two ways Fixed Effects (within FE), which assumes that the country effects are modelled by country dummies and by country and time dummies respectively. Third the generalised least squares (GLS) estimator, which treats the country-effects as random and the time effects as fixed. Then, the Two Stages Least Squares estimator (2SLS) with FE that controls for endogeneity of the lagged dependent variable is applied to the model in levels and also in first differences (as an alternative to eliminate the unobserved heterogeneity). Finally, the Generalised Method of Moments (GMM) (Arellano and Bond, 1991) and System GMM (Blundell and Bond, 1998) are used.

Results are shown in Tables 2-5. Initially, lagged aid was also added to the list of explanatory variables. However, we found that lagged aid did not affect exports, since the correspondent estimated parameters were always non significant. The reason could be that we are using aid disbursements and it is the announcement of the policy decision (aid commitment) the factor that influences future donor's exports, whereas the actual international transfer (disbursements) has an effect exclusively on present exports.

In general, the estimated parameter for lagged exports is always statistically significant and with the expected positive sign pointing towards the importance of persistency in export flows. The short-run coefficients of the variables are lower than the long run coefficients and the latter are similar to those obtained before (static model) with the signs remaining unchanged.

Table 2 presents the parameter estimates of the dynamic model with the variables in levels. The first column shows the OLS results with a common constant ( $\delta_j = \delta$ ), the second and third columns present the within regression estimates with two ways (country and time-specific) fixed effects and with an added AR(1) term to correct for autocorrelation in the residuals<sup>11</sup>. The fourth column reports the results using 2SLS (Anderson and Hsiao estimator) to control for the endogeneity of the lagged dependent variable. Since the country-specific effects are jointly significant ( $\delta_j \neq \delta$ ), we cannot rely on the OLS estimates to make inference. Likewise, the time-specific effects are also statistically significant ( $\phi_t \neq \phi$ ) and therefore, the two ways FE model is preferred to the one way FE model. The Hausman test indicates that only the within estimator<sup>12</sup> is consistent since the null hypothesis (orthogonality between the individual effects and the regressors) is rejected.

In addition, the 2SLS within estimates are less precisely (higher standard errors) but consistently estimated. Relying on these last column estimates (Table 2), the average return to German aid is calculated as,

$$\beta_{LBAIDG} = \frac{\partial X}{\partial BAIDG} * \frac{BAIDG}{X} \Rightarrow \frac{\partial X}{\partial BAIDG} = \beta_{BAIDG} * \frac{X}{BAIDG} = 0.127 * \frac{229000}{18234} = 1.589$$

According to the above figure, the long-run average return to aid of German exports is a one and a half dollars increase of exports for every aid dollar spent. Therefore, aid appears to be export creating also when dynamics are modelled and the results are remarkably similar to the static model.

With respect to the other variables included in the model, the expected positive coefficient for income is obtained; Germany exports more to countries with a higher income. Population in the recipient countries shows a negative coefficient which is not significant in

<sup>11</sup> The Bhargava et al. modified Durbin-Watson and the Baltagi-Wu test indicate autocorrelated residuals (second column) that disappear when an AR(1) term is added to the model (column 4).

<sup>12</sup> Although the Hausman tests point towards the inconsistency of the random effects estimates (not reported), the coefficient estimates for bilateral aid are practically equal in magnitude and sign.



the 2SLS results. EU aid is, as in the static model, showing a negative effect in the OLS and 2 ways FE model; however this effect is positive and non-significant when controlling for autocorrelation and for endogeneity of the lagged dependent variable (columns 3 and 4 in Table 2). But clearly also the dynamic model confirms that EU aid does not have a significant export-promoting effect for Germany.

A different way to control for autocorrelation and unobserved heterogeneous effects is to estimate the model in first differences. However, in this way a considerable amount of information is lost and the interpretation of the estimates changes slightly. Table 3 shows the results obtained for the equation in first differences. The first and second columns show the OLS and the Anderson and Hsiao estimates. The third and four columns show the generalised method of moments (GMM) for two different sub-periods, since this estimator (Arellano and Bond) is suitable for short time spans. Although the parameter of interest, the coefficient of bilateral aid, is always positive and significant, the coefficients are much lower than when the model was estimated in levels. The reason could be that first differencing the data eliminates the economic structure implied by the levels of the variables within any given time series. In addition, a time span of twenty two years is still too long to use GMM techniques, since the number of instruments exceeds the number of groups.

Although the first differences-GMM estimator suggested by Arellano and Bond (1991) has commonly been used in the literature of dynamic panel data estimations, when data are highly persistent, as in the case of bilateral exports flows, Blundell and Bond (1998) argued that this procedure can be improved by using the system GMM estimation, which supplements the equations in first differences with equations in levels, for the former the instruments used are the lagged levels and for the latter the instruments are the lagged differences. Table 4 shows the results using system-GMM for eight different sub-periods. We keep the number of years in each period below eight because the number of instruments tends to explode with time. Too many instruments can over-fit endogenous variables and weaken

the power of the Hansen test to detect over-identification. In the present case, the Hansen test does not reject the null hypothesis of validity of the instruments and the autocorrelation tests indicate that first (in four sub-samples) and second order (in all sub-samples) autocorrelation are not present in the data. The results concerning bilateral aid indicate that the return to German Aid was much lower in the late 1960s and in the 1970s (around 0.60\$ of exports for 1\$ of aid) than in the early eighties (2\$ for 1\$ of aid) and it has been quite stable since 1986 onwards (around 1.5\$ for 1\$ of aid). This result is reassuring and very similar to the average effect found for the whole sample using 2SLS (1.589\$ per 1\$ of aid). We conclude that 2SLS with fixed effects provides the preferred estimates when we are interested in the within-country variation. These results also suggest that tied aid is not the most important driver of these export effects. While the export effects seem to have increased over time, tied aid was on the decline.

As a robustness check, we divided the sample of countries into BMZ and non BMZ countries and estimated the model using 2SLS fixed effects. The results that are shown in Table 5 below indicate a very high return to aid for BMZ countries (3.621\$ of exports for 1\$ of German aid versus 1.349\$ for non-BMZ countries). This again confirms the large effects in BMZ countries where we would presume the effects to be larger.

Finally, Figure 1 shows the estimates of the 2SLS fixed effect model allowing the bilateral aid coefficient to be time-variant. The evolution of the estimates coefficients over time shows a positive long-run trend. Interestingly, in the 2001-2005 a steady increase on the effect of aid on trade can be observed after a decrease in the nineties. Concerning the significance of the coefficients, only in three short periods (1965-1972 and 1980-84 and 1996-2000) they were not significant. In order to control for the high variation of the bilateral aid coefficients over time, we also re-estimated the model averaging the data over 5-years periods. Figure 2 shows the results. The figure shows a decreasing trend until 1985 and from them onwards an increasing effect of bilateral German aid on German exports.

Previous studies found a larger effect of development aid on German exports. For example, we obtained a lower return to aid of German exports than Nilsson (1997)<sup>13</sup>. He reported an average return to aid of exports is around 2.6\$ increase of exports for every dollar spent, whereas in this study the average return is around 1.5\$ (although larger for the BMZ countries). There are two explanations for the different results obtained by Nilsson (1997). First, in Nilsson (1997) the period under study is 1975-1992, whereas we considered the period 1960-2005. The larger time span give rise to a lower average return to aid. In fact, the results from the regressions for different sub-periods indicate that the return to aid was higher in the 1980s and early 1990s than for the early seventies and for the late 1990s. Second, in Nilsson (1997) the data were converted to three-year averages of constant 1987\$ and fixed effect were not included, only specific aid coefficients for donors and a trend were specified.

Finally, we also considered the existence of reverse causation. Causation may also run from exports to aid, since a strong export performance may encourage the donor country to increase its level of aid to the recipient. A way to overcome this problem is to model German aid as an endogenous variable. Therefore, we also instrumented for development aid in the 2SLS regression and in the GMM regressions using the lagged values of aid and the results were generally the same.

## **6. Conclusions**

There are three basic messages in this paper. First, German aid has a positive effect on German exports. Although the effect is not as large as predicted by previous studies it is still relevant. Our findings indicate that the return to exports of German aid is around 1\$-1.8\$ increase of exports for every dollar spent. Second, this effect differs among groups of recipients. The return to German aid of exports is much higher for developing countries which

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<sup>13</sup> Also higher than ours was the return to German aid found by Vogler-Ludwig et al. (1999). They found, for the period 1976-1995, that one German mark spent on ODA increased exports by 4.3 marks.

have a real aid relationship with Germany (BMZ countries). Third, this effect is only present for German bilateral aid, but not for multilateral aid provided by the EU.

This investigation and the related literature suggest that the impact of aid on trade depends on the specific pair of countries and on the type of aid given and can change over time. The relationship between trade and aid could be more closely analysed using either more donor countries, focusing on country-case studies and using disaggregated aid data and sectoral trade data to have a more precise characterization of the direction of causality and the quantification of the effects. Further research would also be desirable on the interactions between development aid and the recipient's trade policy to investigate the existence of complementarities.

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## Tables

**Table 1. Static model results. Effect of bilateral aid on exports to various recipient-groups. 5 years intervals.**

<b>2 ways FE</b>	<b>All</b>		<b>ACP</b>		<b>BMZ</b>		<b>LDC</b>	
<b>Variable</b>	<b>Coefficient</b>	<b>t-Stat.</b>	<b>Coefficient</b>	<b>t-Stat.</b>	<b>Coefficient</b>	<b>t-Stat.</b>	<b>Coefficient</b>	<b>t-Stat.</b>
<b>LYY</b>	0.875	16.790	0.641	9.160	0.928	9.420	0.686	8.140
<b>LPOPJ</b>	-0.361	-2.040	-0.334	-1.450	-1.267	-3.210	0.326	0.760
<b>LEXRN</b>	-0.018	-1.240	-0.002	-1.098	-0.013	0.032	-0.091	-1.093
<b>LBAIDG</b>	0.116	4.490	0.041	1.320	0.282	4.940	0.143	3.980
<b>LEUAIDG</b>	-0.032	-1.220	0.047	1.470	-0.207	-3.270	0.089	2.310
<b>LDC</b>	-0.510	-1.520	-0.500	-1.520	-0.340	-1.300	-0.254	-0.510
<b>ALA</b>	-0.065	-0.360	-		-0.152	-0.710	0.613	1.680
<b>AKP</b>	0.133	1.660	0.477	3.540	0.142	1.250	-0.089	-0.580
<b>INDEP</b>	0.461	2.270	0.457	2.270	0.114	0.160	-0.481	-0.780
<b>Nobs</b>	895		462		524		313	
<b>Countries</b>	135		71		76		47	
<b>Adj R Sq</b>	0.760		0.730		0.820		0.760	
<b>Return to aid</b>	<b>1.460</b>		<b>1.750</b>		<b>3.240</b>		<b>0.210</b>	

Note: Countries in each group are listed in the Appendix. All the variables are in natural logarithms. The dependent variable is bilateral exports at current prices, LYy is the product of GDPs of Germany and recipient country j, LPOPj is recipient population, LBAIDG is gross bilateral German aid to country j and LEUAIDG is European Union aid to country j. All the equations were estimated in levels.



**Table 2. Dynamic gravity model estimation results (Equation in levels, yearly data)**

1963-2005	Pooled OLS		Fixed Effects		2-ways Fixed Effects With AR(1)		2SLS Fixed Effects	
Variable	Coefficient	t-Stat.	Coefficient	t-Stat.	Coefficient	t-Stat.	Coefficient	t-Stat.
LYY	0.086	11.501	0.211	17.470	0.450	15.430	0.283	9.520
LPOPG	0.025	2.419	-	-			-	-
LPOPJ	0.049	6.890	-0.134	-4.740	-0.148	-1.590	-0.111	-1.330
LDIST	-0.131	-8.058	-	-			-	-
LEXRN	-0.009	-3.314	-0.007	-1.080	-0.015	-1.890	-0.015	-0.770
LBAIDG	0.019	2.815	0.045	6.060	0.051	4.630	0.043	4.240
LEUAIDG	-0.041	-5.435	-0.004	-2.890	0.002	0.170	0.000	-0.020
LX(-1)	0.865	108.546	0.596	91.690	0.429	29.030	0.658	24.510
Aid Long run coeff.	0.143		0.111		0.089		0.127	
Time effects	NO		YES		YES		YES	
Adj R Sq	0.960		0.953		0.937		0.958	
log lik	-2326				Bhargava et al DW	2.06		
Akaike	1.240				Baltagi-Wu	2.168		
Schwarz	1.250							
Hausman			570***		586***			
F test $\alpha_j$	F(130,3597)=4.28***							
Return to Aid		<b>1.795</b>		<b>1.399</b>		<b>1.119</b>		<b>1.589</b>

Note: All the variables are in natural logarithms. The dependent variable is bilateral exports at current prices, Lyy is the product of GDPs of Germany and recipient country j, lpopg and lpopj are German and recipient populations respectively, ldist is distance between Germany and recipient country j, lexchrn is the bilateral exchange rate at current prices, lbaidg is gross bilateral German aid to country j and leuaidg is European Union aid to country j. All the equations were estimated in levels.

**Table 3. Dynamic gravity model estimation results (variables in differences)**

<b>Methods:</b>	<b>Diff. Pooled OLS</b>		<b>2SLS (Anderson-Hsiao)</b>		<b>Diff-GMM (1962-1985)</b>		<b>Diff-GMM (1986-2005)</b>	
<b>Variable</b>	<b>Coefficient</b>	<b>t-Stat.</b>	<b>Coefficient</b>	<b>z-Stat.</b>	<b>Coefficient</b>	<b>z-Stat.</b>	<b>Coefficient</b>	<b>t-Stat.</b>
<b>LYY</b>	0.290	7.130	0.273	7.610	0.489	6.000	0.502	9.320
<b>LPOPJ</b>	-0.328	-0.580	0.805	1.460	0.925	2.400	-0.394	-1.630
<b>LEXRN</b>	0.014	0.680	0.017	0.900	-0.128	-2.050	0.036	1.810
<b>LBAIDG</b>	0.023	2.220	0.019	2.550	0.061	3.650	0.036	2.120
<b>LEUAIDG</b>	0.016	1.320	0.028	2.640	0.059	3.000	-0.029	-1.200
<b>LX(-1)</b>	0.500	27.070	0.501	79.900	0.209	5.37	0.332	13.710
<b>Aid Long run coeff.</b>	0.046		0.037		0.077		0.054	
<b>Time effects</b>	NO		YES		YES		YES	
<b>Return to German Aid</b>	<b>0.578</b>		<b>0.468</b>		<b>0.832</b>		<b>0.702</b>	
<b>F test ui</b>	F(128,3287)=0.95		F(128,3287)=0.94					
<b>Ar(1)</b>						-2.49		-4.55**
<b>Ar(2)</b>						1.41		1.39
<b>Sargan</b>						585***		466.23***
<b>Hansen</b>						64.05		107.26

Note: All the variables are in natural logarithms. The dependent variable is bilateral exports at current prices, Lyy is the product of GDPs of Germany and recipient country j, lpopg and lpopj are German and recipient populations respectively, ldist is distance between Germany and recipient country j, lexchrn is the bilateral exchange rate at current prices, lbaidg is gross bilateral German aid to country j and leuaidg is European Union aid to country j. All the equations were estimated in first differences.

**Table 4. Dynamic gravity model System-GMM estimation results**

Periods	1962-1969	1970-75	1976-80	1981-85	1986-90	1991-95	1996-2000	2001-05
<b>LX (-1)</b>	0.581*** 18.690	0.876*** 12.790	0.593*** 4.400	0.280*** 3.640	0.524*** 4.520	-0.0117 -0.070	0.587*** 4.010	0.645*** 7.090
<b>LYY</b>	0.535*** 11.440	0.191* 2.370	0.470** 2.790	0.822*** 7.880	0.488*** 3.590	0.938*** 5.570	0.446* 2.500	0.405*** 3.840
<b>LPOPJ</b>	-0.215*** -5.38	-0.082* -2.21	-0.172 -1.93	-0.244*** -3.52	-0.0995 -1.35	0.0754 0.66	-0.0863 -1.33	-0.080 -1.41
<b>LEXRN</b>	0.002 0.270	0.011 1.540	-0.023 -1.230	-0.021 -0.980	-0.012 -0.690	-0.037 -1.190	-0.008 -0.670	-0.011 -0.680
<b>LBAIDG</b>	0.0819*** 5.380	0.0566* 2.610	0.103* 2.260	0.182*** 4.650	0.169*** 3.790	0.165* 2.470	0.0935* 2.010	0.0780** 2.780
<b>LEUAIDG</b>	-0.011 -1.110	-0.016 -0.880	0.010 0.240	0.026 0.520	-0.052 -1.030	-0.123 -1.680	-0.056 -1.740	-0.033 -0.900
<b>_CONS</b>	-3.987*** -8.360	-1.914* -2.540	-3.817* -2.270	-7.678*** -5.480	-4.457** -2.780	-10.79*** -4.850	-4.611* -2.190	-4.557*** -3.390
<b>Time Effects</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Return to German aid</b>	<b>0.584</b>	<b>0.604</b>	<b>1.184</b>	<b>2.026</b>	<b>1.254</b>	<b>1.631</b>	<b>1.364</b>	<b>1.520</b>
<b>Nobs</b>	379	332	300	349	391	438	472	474
<b>Instruments</b>	39							
<b>Ar1</b>	-4.169**	-2.623**	-1.568	-1.971	-2.78	-2.618**	-2.615**	-1.977
<b>Ar2</b>	1.136	0.893	-0.348	1.252	1.818	-0.447	-0.500	0.757
<b>Sargan</b>	47.13 ***	48.95***	19.84*	8.422	33.43***	9.986	22.590*	41.79***
<b>Hansen</b>	25.59	12.94	4.831	5.416	7.057	4.956	10.240	9.610
<b>Hansen_df</b>	26	13	8	8	8	8	8	8
<b>t statistics reported</b>								
<b>*</b>	p<0.05,	**	p<0.01,	***	p<0.001			

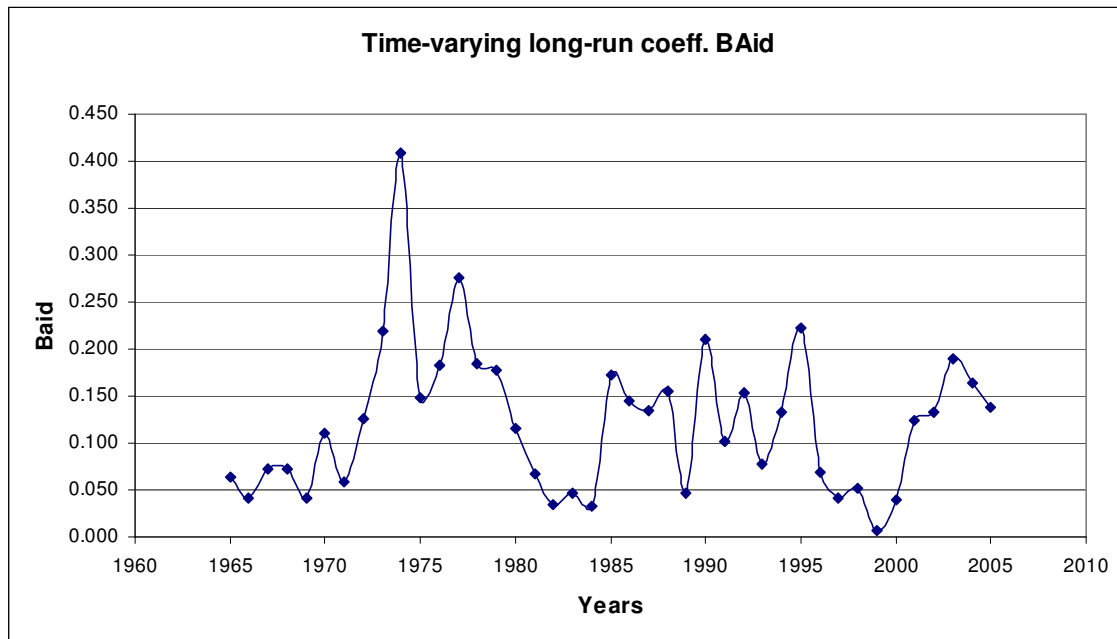
Note: All the variables are in natural logarithms. The dependent variable is bilateral exports at current prices, Lyy is the product of GDPs of Germany and recipient country j, lpopg and lpopj are German and recipient populations respectively, ldist is distance between Germany and recipient country j, lexchrn is the bilateral exchange rate at current prices, lbaidg is gross bilateral German aid to country j and leuaidg is European Union aid to country j. A system of two equations is estimated, one in levels and the second one in first differences.

**Table 5. Dynamic gravity model estimation results for BMZ and non-BMZ countries**  
(Equation in levels, yearly data)

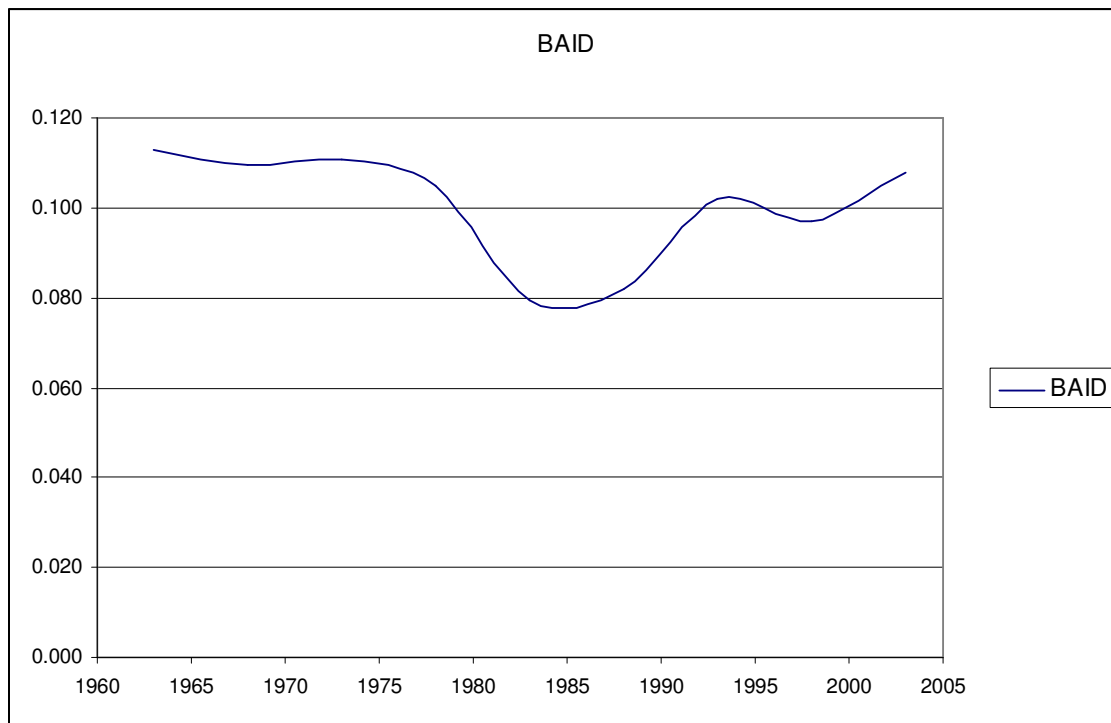
<b>2SLS Fixed Effects</b>	<b>BMZ countries (2SLS FE)</b>		<b>Non-BMZ countries (2SLS FE)</b>	
<b>Variable</b>	<b>Coefficient</b>	<b>t-Stat.</b>	<b>Coefficient</b>	<b>t-Stat.</b>
<b>LYY</b>	0.193	6.660	0.373	6.570
<b>LPOPJ</b>	-0.220	-2.180	-0.048	-0.350
<b>LDIST</b>	-		-	
<b>LEXRN</b>	0.004	0.740	-0.031	-1.950
<b>LBAIDG</b>	0.064	5.200	0.032	1.900
<b>LEUAIDG</b>	-0.046	-3.190	0.044	2.200
<b>LX(-1)</b>	0.797	33.890	0.487	8.390
<b>Aid Long run coeff.</b>	0.316		0.0633	
<b>Time effects</b>	YES		YES	
<b>Adj R Sq</b>	0.901		0.917	
<b>Hausman</b>	469***		237***	
<b>F test <math>\alpha_j</math></b>				
<b>Return to Aid</b>		<b>3.621</b>		<b>1.349</b>

Note: All the variables are in natural logarithms. The dependent variable is bilateral exports at current prices, Lyy is the product of GDPs of Germany and recipient country j, lpopg and lpopj are German and recipient populations respectively, ldist is distance between Germany and recipient country j, lexchrn is the bilateral exchange rate at current prices, lbaidg is gross bilateral German aid to country j and leuaidg is European Union aid to country j. All the equations were estimated in levels. BMZ denotes Federal Ministry for Economic Cooperation and Development.

**Figure 1. Estimates of time-varying coefficients for bilateral aid in the 2SLS fixed effects model**



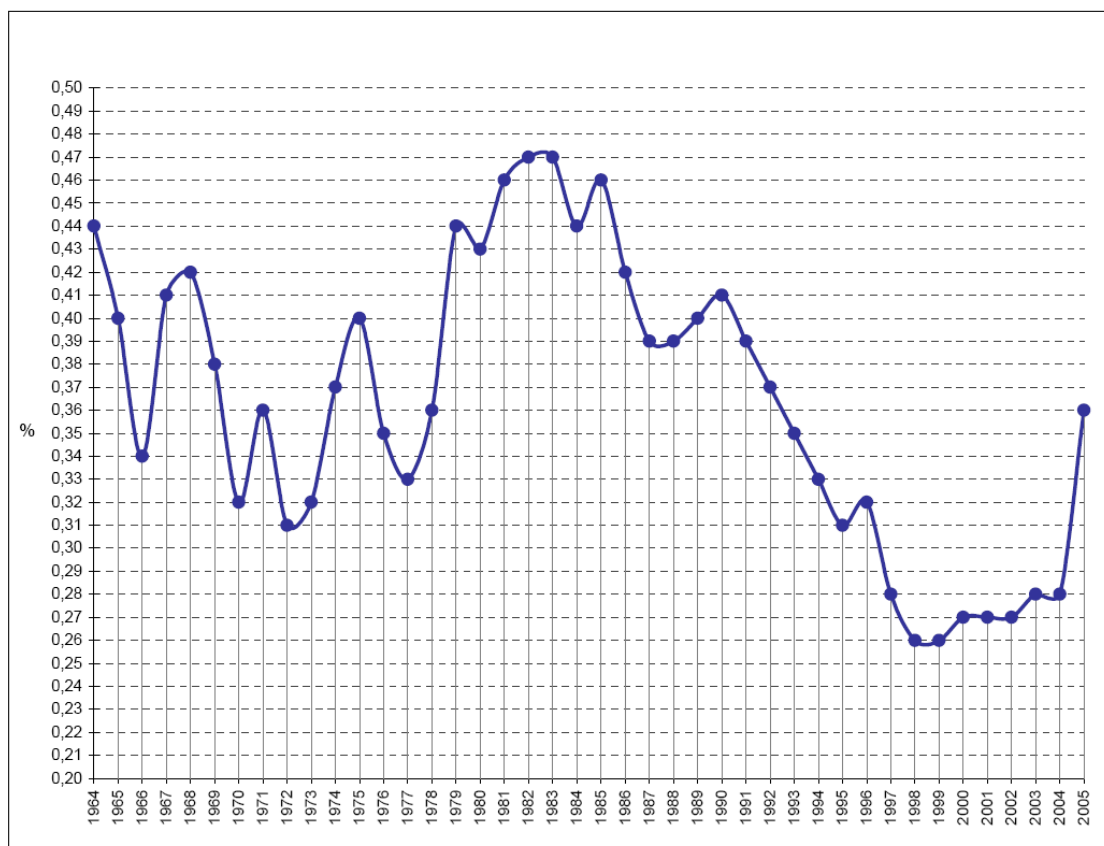
**Figure 2. Estimates of time-varying coefficients for bilateral aid for the fixed effects model**



Note: FE model estimated on 5 year averages.

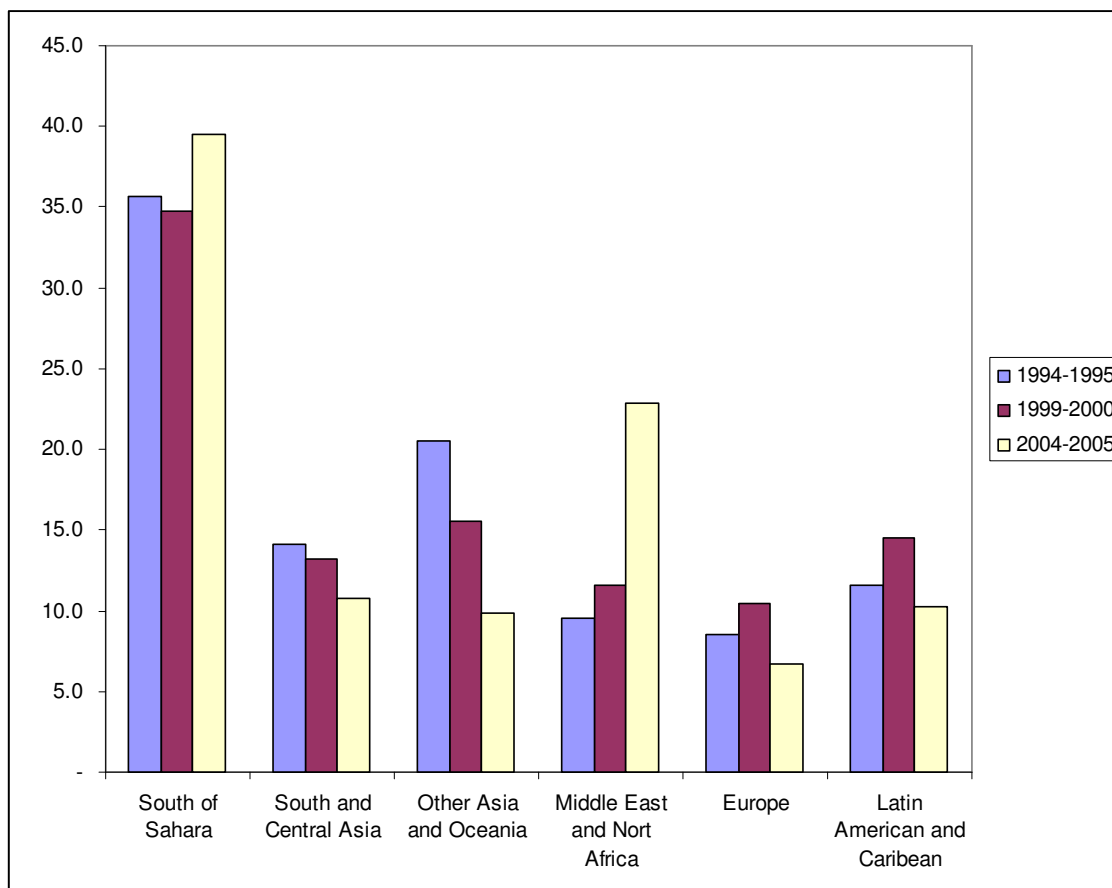
## Appendix

### A.1 German ODA to GNI ratio 1964-2005



Source: Federal Ministry for Economic Cooperation and Development: <http://www.bmz.de>.

## A.2. Regional distribution of German ODA



Source: OECD (<http://www.oecd.org/dataoecd>) and own elaboration.



**Table A.3.1. Static model estimation results**

<b>DAC Countries</b>	<b>OLS</b>	<b>Random Effects</b>	<b>Fixed Effects</b>
log of the GPD product $y_{g*}y_j$	0.728 (53.52)**	0.818 (31.66)**	0.768 (27.38)**
log of $pop_i$	-2.501 (19.13)**	- -	- -
log of $pop_j$	0.141 (8.95)**	0.085 (2.53)*	-0.253 (2.53)*
log of distance between capitals in km	-0.851 (29.78)**	-0.889 (9.61)**	- -
log of gross ODA of Germany 1000 current \$	0.146 (11.91)**	0.090 (7.89)**	0.084 (7.32)**
leuaidg1000	-0.136 (9.90)**	-0.034 (2.68)**	-0.029 (2.26)*
LDC	-0.516 (13.76)**	-0.413 (4.07)**	-0.392 (1.83)
ALA	0.115 (1.30)	0.067 (1.01)	0.06 (0.90)
colony	-0.008 (0.14)	-0.177 (0.86)	- -
AKP	-0.190 (5.24)**	-0.004 (0.09)	-0.02 (0.48)
independent state	1.354 (7.07)**	0.978 (6.55)**	0.965 (6.42)**
gatt wto membership	0.076 (2.52)*	-0.028 (0.79)	-0.039 (1.09)
log of bilateral nominal exchange rate units of local currency per €	-0.027 (4.99)**	-0.017 (2.38)*	-0.024 (3.20)**
Constant	45.873 (20.39)**	72.339 (9.29)**	40.164 (4.34)**
Observations	3837	3837	3837
Number of group(country)	-	131	131
Adjusted R-squared	0.870	-	-
R-squared within	-	0.699	0.700
R-squared between	-	0.918	0.798
R-squared overall	-	0.875	0.773
F-Stat./Wald-Stat.	1921.610	10181.140	160.800
Prob. F-Stat./Wald Stat.	0.000	0.000	0.000
Time fixed effects	No	Yes	Yes
Country effects	No	Yes	Yes

**Table A.3.2. Static model estimation results. Five year intervals**

DAC Countries	OLS	Random Effects	Fixed Effects
log of the GPD product $y_g^*y_j$	0.722 (24.80)**	0.922 (19.52)**	0.845 (14.98)**
log of popi	-2.669 (9.51)**	- -	- -
log of popj	0.140 (4.22)**	-0.018 (0.35)	-0.334 (1.82)
log of distance between capitals in km	-0.867 (14.43)**	-0.857 (7.81)**	- -
log of gross ODA of Germany 1000 current \$	0.138	0.119	0.11
leuaidg1000	(5.16)** -0.109 (3.69)**	(4.99)** -0.022 (0.88)	(4.29)** -0.018 (0.67)
LDC	-0.544 (6.84)**	-0.352 (2.63)**	-0.412 (1.25)
ALA	0.146 (0.56)	0.000 (0.00)	-0.004 (0.02)
colony	-0.125 (1.06)	-0.195 (0.81)	- -
AKP	-0.167 (2.05)*	0.092 (1.22)	0.069 (0.82)
independent state	0.624 (2.33)*	0.316 (1.65)	0.292 (1.38)
gatt wto membership	0.133 (2.01)*	-0.038 (0.56)	-0.057 (0.74)
log of bilateral nominal exchange rate units of local currency per €	-0.026 (2.36)*	-0.009 (0.76)	-0.018 (1.24)
Constant	49.533 (10.22)**	-1.609 (1.22)	-2.327 (0.76)
Observations	845	845	845
Number of group(country)	-	131	131
Adjusted R-squared	0.880	-	-
R-squared within	-	0.775	0.777
R-squared between	-	0.916	0.796
R-squared overall	-	0.892	0.787
F-Stat./Wald-Stat.	1921.610	3739.640	134.560
Prob. F-Stat./Wald Stat.	0.000	0.000	0.000
Time fixed effects	No	Yes	Yes
Country effects	No	Yes	Yes

#### A.4 DAC list of ODA recipients

Least Developed Countries	Other Low Income Countries (per capita GNI < \$825 in 2004)	Lower Middle Income Countries and Territories (per capita GNI \$826-\$3 255 in 2004)	Upper Middle Income Countries and Territories (per capita GNI \$3 256-\$10 065 in 2004)
Afghanistan Angola Bangladesh Benin Bhutan Burkina Faso Burundi Cambodia Cape Verde Central African Rep. Chad Comoros Congo, Dem. Rep. Djibouti Equatorial Guinea Eritrea Ethiopia Gambia Guinea Guinea-Bissau Haiti Kiribati Laos Lesotho Liberia Madagascar Malawi Maldives Mali Mauritania Mozambique Myanmar Nepal Niger Rwanda Samoa Sao Tome & Principe Senegal Sierra Leone Solomon Islands Somalia Sudan Tanzania Timor-Leste Togo Tuvalu Uganda Vanuatu Yemen Zambia	Cameroon Congo, Rep. Côte d'Ivoire Ghana India Kenya Korea, Dem.Rep. Kyrgyz Rep. Moldova Mongolia Nicaragua Nigeria Pakistan Papua New Guinea Tajikistan Uzbekistan Viet Nam Zimbabwe	Albania Algeria Armenia Azerbaijan Belarus Bolivia Bosnia and Herzegovina Brazil China Colombia Cuba Dominican Republic Ecuador Egypt El Salvador Fiji Georgia Guatemala Guyana Honduras Indonesia Iran Iraq Jamaica Jordan Kazakhstan Macedonia, Former Yugoslav Republic of Marshall Islands Micronesia, Fed. States Montenegro Morocco Namibia Niue Palestinian Adm. Areas Paraguay Peru Philippines Serbia Sri Lanka Suriname Swaziland Syria Thailand • Tokelau Tonga Tunisia Turkmenistan Ukraine • Wallis & Futuna	• Anguilla Antigua and Barbuda Argentina Barbados Belize Botswana Chile Cook Islands Costa Rica Croatia Dominica Gabon Grenada Lebanon Libya Malaysia Mauritius • Mayotte Mexico • Montserrat Nauru Oman Palau Panama Saudi Arabia (1) Seychelles South Africa • St. Helena St. Kitts-Nevis St. Lucia St. Vincent & Grenadines Trinidad & Tobago Turkey • Turks & Caicos Islands Uruguay Venezuela

• Territory.

(1) Saudi Arabia passed the high income country threshold in 2004. In accordance with the DAC rules for revision of this List, it will graduate from the List in 2008 if it remains a high income country in 2005 and 2006.

As of November 2006, the **Heavily Indebted Poor Countries (HIPC)**s are : Benin, Bolivia, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Comoros, Congo (Dem. Rep.), Congo (Rep.), Côte d'Ivoire, Eritrea, Ethiopia, Gambia, Ghana, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Kyrgyz Republic, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Nepal, Nicaragua, Niger, Rwanda, São Tomé and Príncipe, Senegal, Sierra Leone, Somalia, Sudan, Tanzania, Togo, Uganda and Zambia.

Source: OECD, <http://www.oecd.org/dataoecd>.

## A. 5. Country Classifications

<u>Countries</u>	<u>BMZ</u>	<u>LDC</u>	<u>ACP</u>
1	Afghanistan	Afghanistan	Angola
2	Albania	Angola	Antigua and Barbuda
3	Algeria	Bangladesh	Barbados
4	Armenia	Benin	Belize
5	Azerbaijan	Bhutan	Benin
6	Bangladesh	Burkina Faso	Botswana
7	Belarus	Burundi	Burkina Faso
8	Benin	Cambodia	Cape Verde
9	Bolivia	Cape Verde	Central African Republic
10	Bosnia-Herzegovina	Central African Republic	Chad
11	Brazil	Chad	Comoros
12	Burkina Faso	Comoros	Congo, Dem. Rep.
13	Burundi	Congo, Dem. Rep.	Congo, Rep.
14	Cambodia	Djibouti	Cote d'Ivoire
15	Cameroon	Equatorial Guinea	Cuba
16	Chad	Eritrea	Djibouti
17	Chile	Ethiopia	Dominica
18	China	Gambia	Dominican Republic
19	Colombia	Guinea	Equatorial Guinea
20	Congo, Dem. Rep.	Guinea-Bissau	Eritrea
21	Costa Rica	Haiti	Ethiopia
22	Croatia	Kiribati	Fiji
23	Dominican Republic	Laos	Gabon
24	Ecuador	Lesotho	Gambia
25	Egypt	Liberia	Ghana
26	El Salvador	Madagascar	Grenada
27	Eritrea	Malawi	Guinea
28	Ethiopia	Maldives	Guinea-Bissau
29	Georgia	Mali	Guyana
30	Ghana	Mauritania	Haiti
31	Guatemala	Mozambique	Jamaica
32	Honduras	Myanmar	Kenya
33	India	Nepal	Kiribati
34	Indonesia	Niger	Lesotho
35	Iran	Rwanda	Liberia
36	Jordan	Samoa	Madagascar
37	Kazakhstan	Sao Tome and Principe	Malawi
38	Kenya	Senegal	Mali
39	Kyrgyz Republic	Sierra Leone	Marshall Islands
40	Laos	Solomon Islands	Mauritania
41	Lebanon	Somalia	Mauritius
42	Lesotho	Tanzania	Micronesia
43	Madagascar	Timor-Leste	Mozambique
44	Malawi	Togo	Namibia
45	Mali	Uganda	Niger
46	Mauritania	Vanuatu	Nigeria
47	Mexico	Yemen	Palau
48	Moldova	Zambia	Papua New Guinea
49	Mongolia		Rwanda
50	Morocco		Samoa
51	Mozambique		Sao Tome and Principe

52 Myanmar  
53 Namibia  
54 Nepal  
55 Nicaragua  
56 Niger  
57 Nigeria  
58 Pakistan  
59 Paraguay  
60 Peru  
61 Philippines  
62 Rwanda  
63 Senegal  
64 Serbia and  
Montenegro  
65 South Africa  
66 Sri Lanka  
67 Sudan  
68 Syria  
69 Tajikistan  
70 Tanzania  
71 Thailand  
72 Tunisia  
73 Turkey  
74 Uganda  
75 Ukraine  
76 Vietnam  
77 Zambia

Senegal  
Seychelles  
Sierra Leone  
Solomon Islands  
Somalia  
South Africa  
St. Kitts and Nevis  
St. Lucia  
St. Vincent and the Grenadines  
Sudan  
Suriname  
Swaziland  
Tanzania  
  
Timor-Leste  
Togo  
Tonga  
Trinidad and Tobago  
Uganda  
Vanuatu  
Zambia  
Zimbabwe