Does aid for trade really improve trade performance?*

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Although the concept of aid for trade has quickly gained prominence among aid donors as well as aid recipients, relatively little is known about its impact on trade-related performance. This paper uses statistical evidence to examine the effects of aid for trade on the costs of trading and on the level of and changes in exports. Using data on a large subset of developing countries over time, we find that *aid for trade facilitation* reduces the costs of trading. We also use a novel identification strategy to compute the impact of aid to economic infrastructure and to productive capacities on exports. The results of this analysis suggest that both *aid to economic infrastructure* and *aid to productive capacity* have a positive and significant impact on exports. But in the case of the latter the effects seem to be driven by an allocation skewed towards already well performing sectors. The sectoral analysis reveals that *aid to infrastructure* is particularly beneficial for mining and manufacturing exports, while it has no effect for tourism and a marginally positive impact in food exports.

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1. Background and motivation

Aid for trade (AfT) has rapidly become a popular concept among trade and donors community alike. A main objective of this type of aid is to assist developing countries to overcome constraints to trade so to benefit from increased trade integration. Despite the clarity of this objective, the evidence on the effectiveness of AfT in improving trade-related performance is still (surprisingly) scant. This paper is one of the first to fill this evaluation gap by examining the effects of AfT on the costs of trading and on the level of and changes in exports.

The idea of AfT stemmed from two considerations. First, the elimination of tariff (and non-tariff) barriers is a necessary but not sufficient condition for increasing substantially the level of exports of developing countries. The Least Developed Countries (LDCs) are the starkest example of that, as they have long been enjoying preferential market access for goods into most high income markets but their share in world exports has constantly decreased in the last three decades.[1] Second, with increasing pressures towards multilateral trade liberalisation in the WTO Doha round, several developing countries, most notably preference receiving and net food importing countries, are likely to face further costs to adjust to the liberalised trading system (e.g. increased in food imports, loss of tariff revenues, increased import competition).[2]

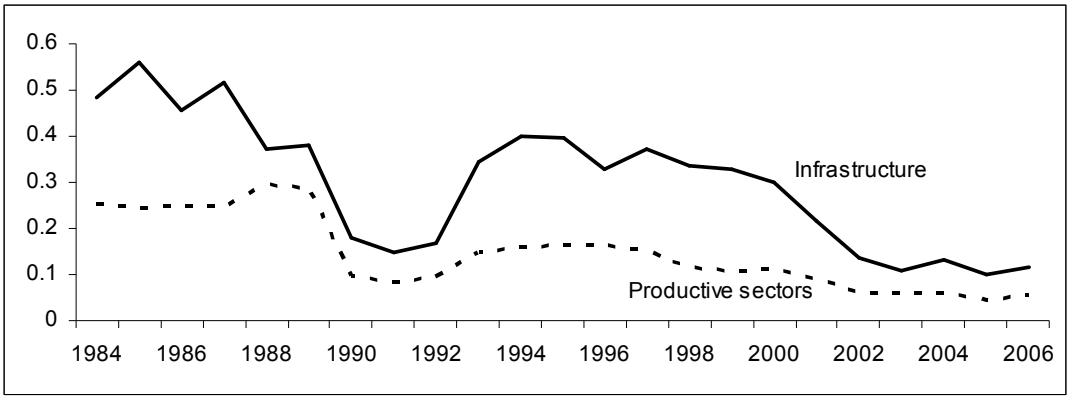
The ensuing discussions around AfT have mainly focused on the need to scale up the volumes of this type of assistance, ensuring that the extra resources be additional to the existing aid package and on the rationale for AfT (e.g. Hoekman and Prowse, 2005; Evenett, 2005; Calì et al., 2006). On the other hand there is still a relative paucity of quantitative evidence on the actual effects of AfT. There is little understanding of whether AfT is effective in achieving the desired objectives and what type of AfT works and what does not. Te Velde et al (2006) argue that there is generally little quantitative evidence provided on the evaluation of EC Trade Related Assistance activities. The EC's own assessment was based on interviews and analysis of documents, with no quantitative estimation of the impact of these activities on trade and economic development. The impact evaluation of AfT has been carried out predominantly by highlighting success stories which are usually self-assessed (see e.g. UNIDO, 2008 for a wide array of these examples). This lack of systematic assessment is one of the key obstacles to move beyond the descriptive stage and design its implementation.

Proper impact assessments of AfT could also help shed some light on the question of whether the relative decline in trade-related spending in total Official Development Assistance (ODA) is justified. The share of aid going to economic infrastructure and to the productive sectors (the two broad trade-related categories in the ODA data classified by the OECD) decreased dramatically after a mid-1990s donor consensus that social sectors had to be supported (Figure 1).

[1] See UNCTAD (2006).

[2] The Concept Paper prepared by the WTO to guide the Task Force on Aid for Trade (WTO 2006) defines AfT in terms of developing countries' expectations. It states that developing countries 'expect Aid-for-Trade to go well beyond the scope of the IF [Integrated Framework, ndr], and help them to cover the costs of implementing WTO Agreements, macroeconomic adjustment, training and institution-building, and supply-side capacity and infrastructure.'

Figure 1 Share of total aid to economic infrastructure and productive sectors



Source: OECD CRS disbursements

This paper aims to help fill this evaluation gap, by undertaking a systematic cross-country and over time evaluation of AfT impact. Through this analysis we aim to develop a better understanding of whether and how AfT can help developing countries trade and improve their economic performance. A relevant antecedent in this respect is the recent work by Brenton and von Uexkull (2008), who use quantitative techniques to examine the systematic effects of product-specific aid for trade on countries' exports. We seek to bring out new evidence, looking at the overall impact of trade-related assistance at the macro level as well as on specific trade-performance indicators. In addition our coverage is wider than that of Brenton and von Uexkull (2008) in that it accounts for all AfT disbursements rather than only for a subset of projects directed to specific products as in Brenton and von Uexkull.

The analysis does not delve into definitional issues around AfT and uses a data-driven definition of AfT. According to this definition, AfT is composed of all the sub-categories of *aid to economic infrastructure* and *aid to productive sectors* in the OECD/DAC Creditor Reporting System database (OECD, 2009). This choice does not solve the debate around what types of projects and categories to include in AfT, but it is functional to use the data available in a systematic way.[3]

The paper is organised as follows. Section 2 reviews the related literature on impact assessment of aid; section 3 examines some of the main channels through which AfT is expected to affect trade performance and presents a simple export demand model to illustrate them. Section 4 develops the empirical framework and describes the data used to test the theoretical hypotheses. Section 5 presents the results of the analysis and section 6 concludes.

2. Aid for Trade effectiveness – related literature

There is a vast empirical literature on the macro relationships between aid, growth and investment, although not specifically on the effects of AfT. This literature tries to investigate

[3] Although the Task Force identified six categories of AfT (i.e. Trade policy and regulations; Trade development; Trade-related infrastructure; Building productive capacity; Trade-related adjustment; Other trade-related needs), both definitional and conceptual difficulties prevent a clear-cut classification of the projects into these categories (see Turner (2008) for an illustration of some of these measurement issues).

the effects of aid on growth on the basis of a neoclassical growth model, where aid provides a boost to capital accumulation and thus to growth.[4] The findings of this literature have been at best mixed, with no consensus on the direction of the effects, let alone on their size.

Let us consider first the effects of general aid. Burnside and Dollar (2000) argue that aid has no identifiable additional effect on growth once other factors have been accounted for, including economic policies. According to the authors, aid raises growth only in countries with 'good' policies. Hansen and Tarp (2001) use different econometric specifications and find that aid is effective and that the results do not depend on policy. In a number of recent studies, Rajan and Subramanian (2005; 2007) use longer time spans and show that the impact of aid on growth is less positive. The authors (2005) use an innovative strategy to examine the impact of aid across sectors within one country. In this way, they can better control for omitted variables bias or model specification. Their main finding is that aid has systematic adverse effects on a country's competitiveness, which is reflected in a reduction of the share of labour-intensive and tradable industries in the manufacturing sector. They suggest that these are Dutch disease effects, related to the real exchange rate overvaluation caused by aid inflows. Using a large panel of countries and a careful instrumentation strategy to correct for the bias in conventional OLS estimation, Rajan and Subramanian (2007) do not find any positive relationship between aid and growth.

After analysing 97 different empirical studies on the impact of aid on growth Doucouliagos and Paldam (2007) conclude that the impact of aid on growth is not significant. A number of factors may explain the inconclusiveness of these research efforts. Bourguignon and Sundberg (2007) argue that these mixed results are not surprising, given the heterogeneity of aid motives and the complex causality chain linking foreign aid to growth. Further, the impact of aid might depend on domestic economic policies, institutions and other conditions. Hansen and Tarp (2001) point to the lack of a satisfactory theoretical framework underpinning the empirical analysis. The simple neoclassical growth model of capital accumulation does not offer a framework to derive an exact empirical specification for a very complex relationship such as the one between aid and growth. Moreover the direction of causality (from aid to growth or vice versa) is to some extent still an unresolved issue.

A more promising route in identifying the effects of aid on economic growth seems to be that of disaggregating the impact of aid by type or category. McPherson and Rakowski (2001) use a multi-equation system and find that the impact of aid on GDP per capita growth is positive but indirect through investment. Also emphasising that aid affects growth through investment, Gomanee et al. (2002) find that every one percentage point in the ratio of aid to GNP contributes one-third of one percentage point to growth in a sample of sub-Saharan African countries. Clemens et al. (2004) split aid into different types and identify the types of aid that could plausibly stimulate growth in the short run, which include budget and balance of payments support, investments in infrastructure and aid for productive sectors. The authors find that these types of aid have a large positive effect on short-term growth: a $1 increase in aid raises the present value of output by $8, although this effect decreases at the margin. These results survive a number of checks for robustness, but they are based on a short time horizon (1997–2001).

[4] See Burnside and Dollar (2000) and Rajan and Subramanian (2007) for illustrations.

Our analysis takes this sectoral approach further. By focusing on AfT, we can depart from the aid-growth conundrum by isolating the impacts of specific types of aid on specific outcomes. The rationale and objectives behind AfT are clearly narrower than those behind general aid and this should allow for a more precise identification strategy. We test for the effects of total trade-related aid and specific types of AfT on trade-related outcomes, including the costs of trading and the level of and the changes in exports. These macro and sectoral strategies make our study more general than the micro empirical analysis of Brenton and von Uexkull (2008). They match data on technical assistance projects from German development cooperation (GTZ) for the period 1975-2000 and data of product specific AfT from the WTO/OECD database with data on developing countries' trade performance. A partial equilibrium adjustment model is used to study the impact of aid for trade on specific export goods – 88 export development programmes across 48 developing countries. The results suggest that exports have increased owing to the effect of donor-funded export development programmes in a number of countries. However although the programmes have preceded stronger export performance, causality cannot be clearly determined. Factors like the initial size of the export sector, or selection bias (i.e. technical assistance may target products with already promising prospects) appear to be the real reasons behind the stronger performance of the targeted commodities. We try to address some of these concerns, finding support for the hypothesis that part of the positive impact of AfT on exports may indeed be accounted for by an allocation skewed towards well performing sectors.

3. Expected pathways of AfT on trade performance

Why should certain types of aid produce particular effects on trade? We begin by identifying potential market and governance failures affecting the development of trade in a country, examining whether and what types of AfT may help address such failures. We then use a simple partial equilibrium model to show theoretically how some of these types of AfT could indeed improve trade performance.

3.1 How AfT can help address constraints to trade

Based on recent work by te Velde (2008), Table 1 summarises the main examples of market and governance failures that can harm the development of trade in developing countries. It also identifies possible policy responses to address these failures and examines whether such a response may be assisted by an AfT package and what part of the package would be relevant to the task (on the basis of its current classification in the OECD CRS aid statistics).

Table 1 suggests that if employed effectively AfT can be instrumental to achieve a number of trade-related goals, in line with the AfT categorisation proposed by the Task Force. These include: improving trade policy co-ordination (Task Force AfT category: trade development); developing standards to improve access for exports (trade facilitation); improving skill formation (trade-related adjustment); improving infrastructure (trade-related infrastructure); overcoming governance failures, such as weak institutions or weak administrative procedures (trade policy and rules).

The actual macroeconomic effects of AfT depend on the functioning of a number of channels, e.g. whether the exchange rate appreciates due to inflationary expansion, so that exports

decline, or whether aid actually improves trade competitiveness through better infrastructure. From an economic point of view, if more support goes via investment and productive uses, rather than to consumption or other projects with less growth potential, this will help to remove or reduce the Dutch disease effects of increased aid, as it is confirmed by Adam and Bevan (2006). They use a computable general equilibrium model to show that aid-funded increases in public investment yield potentially large medium-term welfare gains, as public infrastructure investments offset short-run Dutch disease effects.

Table 1: How aid for trade may address market and governance failures

Broad source / area of failure	Examples of failures	Responses: policies and activities	Role for aid for trade?
Market failures			
Coordination	Externalities ignored Linkages not exploited Complementarities not exploited	Capacity building for trade policy to identify linkages and externalities National trade strategy	Yes, training and institutional development
Developing, adapting and adopting technology	Incomplete and imperfect information, Network externalities.	Facilitate technology transfer and adoption Support for quality control to meet export standards	Yes, trade facilitation, Assisting co-ordination with the private sector
Skills formation	Under-investment in training due to inability to appropriate externalities (in training workers) due to imperfect information	Better coordination and/or subsidies for training Strengthen information flows	Mostly not included under aid for trade. Could be included in trade-related adjustment
Capital markets Access to finance	Difficult access to credit High interest rates	Credit schemes Formal sector subsidy based on improved information about borrowers.	Normally not included under aid for trade
Infrastructure	Lack of good quality infrastructure because lumpy investment gets postponed in uncertain times.	Provide incentives for public-private partnerships Provide grants in the case of low financial return / high economic return.	Yes, aid to economic infrastructure, better co-ordination with development finance institutions/ private sector
Governance failure			
Regulatory and administrative structure	Burdensome administrative requirements	Streamline administrative procedures and regulation;	Yes, aid for trade facilitation

Source: Adapted from te Velde (2008)

We do not have enough information to predict what channels may be relatively more important for trade-related outcomes. Our hypothesis is that both direct and indirect effects of AfT are potentially important to stimulate competitiveness and exports. These effects are the product of a complex causality chain running from aid to country outcomes and mediated by domestic policy-makers, implementation agencies, policies and country conditions.

Bourguignon and Sundberg (2007) define this chain as a "black-box". "If a dollar of aid produces little discernible change, was the objective ill-defined, the service delivery inefficient, bureaucratic measures inadequate, or was money diverted?" (Bourguignon and Sundberg (2007, p. 317). This problem applies to our analysis as well, but it is less significant than for models which estimate a relationship between aid and growth, as the links between AfT and trade-related performance are more direct. This in turn implies more precision in the definition of the aid objectives and less scope for the possibility of diverting money than when considering the entire aid envelope.

3.2 AfT in a simple export demand model

In order to formalise the intuitions of the previous section, we present a simple exports' demand model, which shows how some of the types of AfT presented above may influence exports. We modified the model developed by Fontagnè et al. (2002) to bring out the potential role of AfT in affecting some of the parameters which determine total exports.

In the model each country produces only one good, differentiated from the others by the place of origin; the supply of each good is fixed; and consumers have identical and homothetic preferences represented by a constant elasticity of substitution (CES) utility function. The collective utility function of individuals in country j is denoted by:

$$U_j = \left(\sum_{i=1}^{N} \varphi_i^{1/\sigma} C_{ij}^{(\sigma-1)/\sigma} \right)^{\frac{\sigma}{\sigma-1}} \qquad (1)$$

where σ is the elasticity of substitution between all goods, φ is the share of good from i in total expenditure in j and c_{ij} the value of consumption of the good produced in country i by individuals in country j, with $i, j \in [1, N]$.

The utility function is subject to the budget constraint stating that the value of goods consumed by individuals in country j needs to equate national income of j:

$$y_j = \sum_{i=1}^{N} C_{ij} p_{ij} \qquad (2)$$

where p_{ij} is the price in j of the good produced in i. Defining p_i as the exporter's supply price, then $p_{ij} = p_i \tau_{ij}$ where $\tau_{ij} \geq 1$ and includes all types of trade costs, e.g. transportation, tariffs, administrative costs of trade, information costs. These costs are modelled as the standard iceberg-type.[5]

Maximizing equation (1) subject to the budget constraint (2) and after some manipulation we obtain the total (real) consumption (i.e. import) of good i by country j:

[5] This means that if an amount x_{ij} of good is shipped from i to j, only x_{ij}/τ_{ij} will reach location j.

$$C_{ij} = \frac{\varphi_i Y_j}{\tau_{ij} p_i} \left(\frac{\tau_{ij} p_i}{\Pi_j} \right)^{1-\sigma} \quad (3)$$

where:

$$\Pi_j = \left(\sum_{i=1}^{N} \varphi_i \tau_{ij}^{1-\sigma} p_i^{1-\sigma} \right)^{\frac{1}{1-\sigma}} \quad (4)$$

is a CES index of the trade costs faced in exporting to *j*, i.e. an index of trade remoteness of country *j*; Y_j is total income in country j ($Y_j = p_j Q_j$). Following (3) the actual - free on board - value of exports of country *i* to country *j* is given by:

$$X_{ij} = C_{ij} p_i = \frac{\varphi_i Y_j}{\tau_{ij}^{\sigma}} \left(\frac{\Pi_j}{p_i} \right)^{\sigma-1} \quad (5)$$

Aggregating all bilateral exports from one source as defined in (5), we obtain the equation for the total value of exports from country *i*:

$$X_i = \frac{\varphi_i}{p_i^{\sigma-1}} \sum_{j=1}^{N} \frac{Y_j \Pi_j^{\sigma-1}}{\tau_{ij}^{\sigma}} \quad (6)$$

This implies that the exports from *i* are positively related to countries' preferences for goods from *i* (i.e. a measure of how appealing good *i* is in the global market), to the demand capacity of all potential importing countries *j* (Y_j) and negatively related to trade costs faced by *i* in exporting to all other destinations. The direction of influence of the price of *i* on exports depends on σ: in particular if σ>1 then $\partial X_i / \partial p_i < 0$. This condition states that when the elasticity of substitution (between goods) is high, an increase in price yields a more than proportionate reduction in export volumes.

AfT enters the picture in (6) essentially by influencing two parameters of the equation: α_i and τ_{ij}. First, AfT may affect exports by strengthening country i's production competitiveness, which would in turn raise φ_i. This is the kind of assistance that aid to productive capacity (*Apc*) could provide. We can think of this as an improvement in the quality of good *i* which induces a relative increase in the preference of the rest of world towards *i*. Given equation (6), other things being equal this would translate in an increase in exports.

Second, following Bouet et al. (2008), τ_{ij} can be expressed as a function of administrative and legal barriers, distance and infrastructure:

$$\tau_{ij} = (1 + t_{ij}) b_i b_j f(I_i, I_j) d_{ij} \quad (7)$$

where t_{ij} is the bilateral import duty applied by country *j* on exports from *i*, b_i (b_j) is the cost of processing exports (imports) in the exporting (importing) country; transportation costs are assumed to be a positive (linear) function of d_{ij} and a negative function of the level of

economic infrastructures I in country i and j (i.e. $\partial f / \partial I_i < 0$ and $\partial f / \partial I_j < 0$). A few studies have already quantified the effects of infrastructure provision on trade, finding a positive correlation.[6] AfT to country i may affect both b_i and I_i. In particular aid for trade facilitation (A_{TF}) may reduce the time and costs of processing trade (b_i); and aid to economic infrastructure (A_{INFRA}) may increase the level of I_i. To the extent that these types of AfT affect these variables, from (7) we have that $\partial \tau / \partial A_{TF} < 0$ and $\partial \tau / \partial A_{INFRA} < 0$.

In order to make the hypotheses on the relation between exports and AfT explicit, let us assume a simple inverse relation between trade costs and infrastructure and let us re-express total infrastructure in country i as the sum of A_{INFRA} and domestically-financed economic infrastructure I_D such that (7) becomes:

$$\tau_{ij} = \frac{(1+t_{ij}) b_i (A_{TF}) b_j d_{ij}}{(A_{INFRA} + I_D)_i + I_j} \qquad (7')$$

plugging (7') into (6) the export equation then becomes:

$$X_i = \frac{[\varphi_i (A_{PC})](A_{INFRA} + I_D)_i^{\sigma}}{p_i^{\sigma-1}[b_i (A_{TF})]^{\sigma}} \sum_{j=1}^{N} \frac{Y_j \Pi_j^{\sigma-1}}{K_{ij}^{\sigma}} \qquad (8)$$

Where $K_{ij} = \frac{(1+t_{ij}) b_j d_{ij}}{I_j}$

This is a given component in our empirical model, as the analysis looks at the effects of AfT on total country's exports (rather than bilateral exports) over time. Thus we are able to use country fixed effects, which take care of the effects of bilateral distance d_{ij} (i.e. the country's location in our framework). Also, given the framework we use, we are not interested in bilateral trade costs as such but rather in unilateral trade costs, i.e. the costs of trading of country i with all other countries. Because of this, the other determinants of trade costs in K_{ij} specific of the importing country j (i.e. b_j and I_j) can be approximated by time dummies in a panel data analysis (capturing the average level of these determinants across countries in any year). Finally, we would ideally need to have the bilateral tariffs (t_{ij}) faced by country i in each country; such tariffs have a fairly high variation across countries but a relatively small one over time, thus country fixed effects should be able to capture most of the variation in this case.

According to equation (8), various types of AfT have all a positive impact on exports. In particular:

$$\frac{\partial X_i}{\partial (A_{PC})_i} = \frac{\partial X_i}{\partial \varphi_i} \frac{\partial \varphi_i}{\partial (A_{PC})_i} > 0 \text{ (as both terms are positive)}$$

[6] For example François and Manchin (2007) estimate that an increase of one standard deviation (from the mean) in the communications infrastructure raises the volume of trade by roughly 11 per cent, compared to a 7 per cent effect on transport infrastructure and a 2 per cent effect on trade for tariffs. Buys et al. (2006) find that upgrading a primary road network connecting the major 83 urban areas in sub-Saharan Africa would expand overland trade the region by around US$250 billion over 15 years.

$$\frac{\partial X_i}{\partial (A_{TF})_i} = \frac{\partial X_i}{\partial b_i}\frac{\partial b_i}{\partial (A_{TF})_i} > 0$$ (as both terms are negative)

and $$\frac{\partial X_i}{\partial (A_{INFRA})_i} = W_i Z_{ij} (A_{INFRA} + I_D)_i^{\sigma-1} > 0$$ where W_i and Z_{ij} are constant positive from equation (8) (referred to country *i* and country pairs *i-j* respectively).

Due to data availability, we empirically implement a reduced form of (8), measuring $\frac{\partial X_i}{\partial (A_{PC})_i}$ and $\frac{\partial X_i}{\partial (A_{INFRA})_i}$. We also separately compute $\frac{\partial b_i}{\partial (A_{TF})_i}$. We cannot include b_i in the empirical analysis of (8) as data is available only for the last three years. But the analysis of the A_{TF} impact on b_i is important, as the costs faced and the time taken by firms to trade goods are significant determinants of a country's competitiveness. Djankov et al. (2006) find that each additional day that a product is delayed prior to shipping reduces trade by at least 1 per cent.

4. Empirical framework

Following the theoretical framework in the previous section we use two ways of assessing the impact: first, a relatively narrow one looking at the effects of a specific category of AfT (i.e. trade facilitation) on the costs of trading; second, a broader assessment of the effects of AfT on exports which represents an empirical implementation of equation (8).

4.1 Aid for trade and the costs of trading

First, we estimate whether particular types of AfT have affected trade costs, namely whether A_{TF} has had any impact on b_i defined in equation (7). This is measured by investment climate indicators at the macro level, such as the time taken by customs to clear imports and exports, and the cost of exporting and importing goods across countries and over time (conditioning on other variables). These variables measure separately the time and the costs (in US$) of handling and transporting a 20-foot container to (or from) the port of departure (or entry). In the case of costs, these include costs for documents, administrative fees for customs clearance and technical control, terminal handling charges and fees for in-country transport. The cost measure does not include tariffs or trade taxes. Only official costs are recorded. These cost and time variables capture the efficiency with which exports and imports are handled within the country of interest. For instance, in the case of exports, procedures start after the goods are packed at the factory and include all official costs until the goods' departure from the point of exit. For imports, procedures start when goods are unloaded from a vessel at the port of entry or when the vehicle carrying them has crossed the border and go on until delivery at the factory or warehouse. Therefore these measures are not affected by the degree of isolation of the country (e.g. its distance from its trading partners), as the costs of transporting the goods from (or to) the point of departure (or destination) are excluded. In any instance we use country fixed effects in some of the specifications to account for the potential influence of any time invariant country-specific factor, such as geography and location.

We use both a semi-log (equation 9) and a log-log specification (equation 9') for the test at the macro level:

$$\ln(IC)_{it}^{Z} = \alpha_i + \beta Atf_{it-1} + \Gamma Z_{it-1} + \gamma_t + \varepsilon_{it} \qquad (9)$$

$$\ln(IC)_{it}^{Z} = \alpha_i + \phi \ln(1 + Atf)_{it-1} + KZ_{it-1} + \gamma_t + \mu_{it} \qquad (9')$$

where *IC* is a trade-related investment climate indicator for country i, such as the cost of trading, *Atf* is aid for trade facilitation (in million US$) lagged one year, α_i is country fixed-effects, γ_t are time effects and *Z* is a vector of other determinants of *IC*, ε and μ are the error terms.[7]

Specifications (9) and (9') test whether this type of AfT does indeed determine significant changes in the procedural costs of and the time taken to trade across borders. They are testing for $\frac{\partial b_i}{\partial (A_{TF})_i}$ in (8). This is a direct test, as virtually the entire *Atf* is aimed at reducing the costs of trading across borders. According to the data description by OECD/DAC (2009), trade facilitation assistance is aimed at the "Simplification and harmonisation of international import and export procedures (e.g. customs valuation, licensing procedures, transport formalities, payments, insurance); support to customs departments; tariff reforms".[8]

We will also test the effects of aid for trade education/training (*Atredu*) on IC variables. This type of aid is directed at "human resources development in trade, including university programmes in trade" (OECD/DAC, 2009).

Other controls which may also affect trade include variables landlocked status, regional effects (for the specification without fixed effects), income levels, population size and governance indicators. Being landlocked affects overland trading costs, as it is more costly to take the goods to the port of departure. Regional effects may capture structural differences across continents in processing and transporting goods. Income levels are important because higher levels are usually associated with better institutions and rules. Population may affect road (or railway) congestion in the country, which is one of the determinants of internal transport costs. Governance indicators measure perceptions of the effectiveness of government, including in handling trade-related administrative procedures.

4.2 Aid for trade and exports

We next estimate the effects of AfT on exports directly, using an augmented export demand equation which is directly derived from (8):

[7] We use ln(1+Atpr) to avoid missing and negative values. The main results are robust to using ln(Atpr) as well.

[8] This is reinforced by the data description given by WTO/OECD (2008) according to which "…trade facilitation relates to a wide range of activities such as import and export procedures (e.g. customs or licensing procedures); transport formalities; and payments, insurance, and other financial requirements […] Cutting red tape at the point where goods enter a country and providing easier access to this kind of information are two ways of "facilitating" trade."

$$E_{it} = \alpha_i + \gamma_1 Apc_{it-2} + \gamma_2 Ai_{it-2} + \gamma_3 MP_{it} + \gamma_4 p_{it} + \lambda_t + \varepsilon_{it} \qquad (10)$$

where E is the (log of) exports value in constant prices (country i, time t), *Apc* is (log of 1 +) aid disbursed to productive capacity and *Ai* is (log of 1 +) aid disbursed to economic infrastructure, MP is a market potential measure, and p is the level of prices (both in log); α_i country effects, λ_t estimation period effects. Unlike expression (9), we use two year lag for the AfT variables here, as AfT may take some time before affecting the level of exports as their impact is mediated through other variables. On the other hand the impact of *Atf* on trading costs is more direct and thus a year lag seems more appropriate. The results from (10) are generally robust to including one instead of two lags (results are available upon request). MP is computed as a distance weighted measure of other countries' GDP:

$$MP_{it} = \sum_{j=1}^{N} \frac{GDP_{jt}}{d_{ij}}$$

where GDP_{jt} is total GDP of country j at time t and d_{ij} is the distance in Km between country *j* and country *i* (measured as the great circle distance between the respective capital cities).[9] Expression (10) is an exact empirical implementation data of (8), except for a few parameters for which data is limited or not available. In particular, this is the case for the preference parameter φ and for domestically-financed economic infrastructure I_D, while K is approximated via country and time effects as explained above. We use *Apc* in place of φ, assuming that its effects on exports are displayed via (unmeasured) changes in φ (i.e. $\frac{\partial X_i}{\partial \varphi_i} \frac{\partial \varphi_i}{\partial (A_{PC})_i}$). Data on domestic infrastructure is very patchy and this would severely limit the sample, thus we only use aid to economic infrastructure. As both I_D and A_{INFRA} have the same expected effect on exports, a potential bias may arise using only the aid variable if domestic finance for infrastructure investment is systematically correlated to A_{INFRA}. If this correlation is country and time variant, then it could bias γ_2 in (10). However, there is no clear evidence that such a correlation is country-specific and time-varying. For example if aid covered only parts of the infrastructure costs, then I_D and A_{INFRA} would be positively correlated, but it could be that the share covered by aid does not vary much over time for a specific country (in that case the coefficient would not be biased). It could also be the case that A_{INFRA} flows where the expected value of I_D may be low. In that case the correlation would be negative (biasing downward the coefficient). It is hard to establish whether there is such a correlation and what direction it may take. This issue will be tackled through instrumentation, as discussed below.

Ideally we would want to use the Real Effective Exchange Rate (REER) as a control for prices of the domestic economy relative to its trading partners in (10). However the use of REER would halve the number of observations available, thus we use the Consumer Price Index instead. We also show the robustness of the results to using REER instead of CPI with the subsample of observations for which REER is available. In any instances, it is reassuring to note that the types of controls included in (10) are similar to those used by the literature on

[9] We also check the robustness of the results to using a foreign market potential measure computed by Mayer (2008) through bilateral trade data.

exports' determinants (e.g. Senhadji and Montenegro, 1999; Santos-Paulino and Thirlwall, 2004).

There are still a couple of potential problems with running specification (10). First, the AfT variables are possibly endogeneous to exports. This is the case for example if better performing and/or faster reforming countries tend to receive more AfT than others. This would generate an upward bias in the AfT coefficients. Also, there could be some error in the measurement of the AfT variables, as this is based on voluntary reporting of disbursements by donors to the OECD secretariat. Such error could be caused by inefficiency in reporting and/or misclassification of projects and if it is correlated to (time varying) unobserved characteristics of recipients could make the AfT coefficients inconsistent. In order to control for these potential issues, we use an instrument for AfT based on the degree of respect for civil liberties, as measured by Freedom House (2009). There is consistent evidence that donors tend to give relative more aid to countries which are considered to respect civil liberties and human rights (Alesina and Dollar, 2000; Macdonald and Hoddinott, 2004 for Canada). The Millennium Challenge Corporation, one of the major providers of US AfT, explicitly uses Freedom House indicators on respect for civil liberties and for political rights as criteria for recipient countries to be eligible for assistance. Other than being a good predictor of future aid allocation, this variable (*civil liberties*) is also not related to exports in any meaningful way, thus satisfying the exclusion restriction's conditions. It is hard to find any clear link between a country's respect of civil liberties and its capacity to export. This is also confirmed by the insignificant coefficient of *civil liberties* when we include it in specification (10).[10]

Another potential issue with the estimation of (10) is its lack of dynamics property. It is generally acknowledged (Senhadji and Montenegro, 1999; Santos-Paulino and Thirlwall, 2004) that exports are fairly persistent over time, as they tend to depend on previous exports. Thus we test our results also against a dynamic specification. In particular, we estimate a version of (10), which includes the lagged value of exports:

$$E_{it} = \alpha_i + \gamma_1 Apc_{it-2} + \gamma_2 Ai_{it-2} + \gamma_3 MP_{it} + \gamma_4 p_{it} + \gamma_5 E_{it-1} + \lambda_t + \varepsilon_{it} \qquad (11)$$

The problem with estimating (11) through standard OLS is that E_{it-1} is endogenous to the error term ε_{it}, which gives rise to the dynamic panel bias (Bond, 2002).[11] The easiest way to solve this problem is to take the first differences of the variables in (11) so to purge the fixed effect terms:

$$\Delta E_{it} = \gamma_1 \Delta Apc_{it-2} + \gamma_2 \Delta Ai_{it-2} + \gamma_3 \Delta MP_{it} + \gamma_4 \Delta p_{it} + \gamma_5 \Delta E_{it-1} + \lambda_t + \Delta\varepsilon_{it} \qquad (12)$$

where $\Delta E_{it} = E_{it} - E_{it-1}$

[10] Not shown here, available from the authors upon request.

[11] To see this, let us re-write the lagged dependent variable under the within-group transformation in (11) as: $E_{it-1} = E^*_{it-1} - \frac{1}{T-1}\sum_{k=2}^{T} E^*_{ik}$ and $\varepsilon_{it} = \varepsilon^*_{it} - \frac{1}{T-1}\sum_{k=2}^{T} \varepsilon^*_{ik}$ where the asterisk indicates the observed value of the variable (while the LHS variables are the transformed ones through the within-group transformation). But the terms E^*_{it-1} and $\frac{1}{T-1}\varepsilon^*_{it-1}$ are correlated (for all values of t), determining the correlation between E_{it-1} and ε_{it}.

By construction ΔE_{it-1} is correlated with $\Delta\varepsilon_{it}$ in (12) (as E_{it-1} is correlated to ε_{it-1}). Hence we resort to the Generalised Methods of Moments (GMM) estimator which generates internal instrument using appropriate lagged values of the explanatory variables (Arellano and Bond, 1991). The GMM technique serves also as a robustness test for the impact of AfT variables on exports, as it allows controlling for (weak) endogeneity of the AfT variables by using a different type of instrumental variables to that employed above. To make the analysis more robust, we also use the excluded instrument *civil liberties* in the GMM estimation of (12).

As the measurement error of the AfT variables could be determined not only by random errors but also by recipients-specific characteristics (e.g. if the disbursement process is cumbersome and thus under-reported in certain countries), we also employ the GMM-system estimator (Blundell and Bond, 1998). This estimator uses the explanatory variables in levels in the regression and instruments them through their past values of first differences. In this way it allows controlling for unobserved recipient-specific effects that are potentially correlated with the explanatory variables.

AfT and sectoral exports

Aid to productive capacities (*Apc*) is usually targeted at specific sectors; it is typically provided to firms or (public and private) institutions active in a particular sector. Thus the identification of its effects on total exports - as it is the case in the specifications above - may be weak. Moreover specifications (10) and (12) may still suffer to some extent from omitted variable bias of cross-country regressions due to unobservable time varying differences across countries (e.g. country-specific shocks to productivity or institutions). These issues call for an identification strategy based on inter-sectoral and intrasectoral (over time) differences in exports.

We divide *Apc* into aid to the different sectors and then relate sectoral aid to sector-specific exports. This helps to identify whether sectors in the same country that receive more aid experience relatively faster growth in their exports (between group component), as well as whether exports of a sector grow faster in years in which that sector receives relatively higher levels of aid (within group component). This strategy allows controlling for all time varying within country factors that may influence exports, such as effective demand, policies, size of the economy, economic fundamentals, country-level shocks, etc. Because of this, we can also use value of exports as the dependent variable instead of real exports (as in the specification (2)), which allows us to have more observations. We use four large sectors of the economy for which export data (from the World Development Indicators) are available: food production, manufacturing, mineral extraction and tourism. These account for all exports of goods and part of services exports of the countries in the panel. We match these sectors with their counterparts in the aid data: agriculture and fishing, industry, mining and tourism.

We estimate the following equations:

$$E_{ijt} = \alpha_{it} + \lambda_{jt} + \gamma_{ij} + \delta_1 Apc_{ijt-1} + \varepsilon_{ijt} \qquad (13)$$

and

$$\Delta E_{ijt} = \Delta\alpha_{it} + \Delta\lambda_{jt} + \Delta\gamma_{ij} + \Delta E_{ijt-1} + \delta_1 \Delta Apc_{ijt-1} + \Delta\varepsilon_{ijt} \qquad (14)$$

where E is the (log of) value of exports (for country i, sector j and time t), Apc is (log of 1 +) aid to productive capacity, α_{ij} is country-year fixed effects, λ_{jt} is time-varying sector fixed effects, γ_{ij} is sector-country fixed effects. Given the discussion above, we estimate (13) through OLS and (14) through GMM. Note that we do not have appropriate external instruments (i.e. country-sector-time specific variable) for Apc_{ijt}.

4.3 Data

We employ data from a variety of sources. Aid data come from the OECD/DAC (2009) Creditor Reporting System (CRS) database on disbursements. This database has covered a number of AfT activities since the mid 1970s, and reporting to the CRS is improving. However, data until 1994 have substantial gaps, thus we base most of the analysis on the post-1994 period. We use different types of AfT data from this database, including aid for trade facilitation, aid for trade-related education, aid to productive capacity (both total and sectoral), and aid for economic infrastructure. These categories as well as the basic structure of the database are described in box 1.

Box 1. Aid for trade data in the OECD CRS database

The OECD Development Co-operation Directorate bases its classification of the destinations of aid on the specific area of the social or economic structure in the receiving country that the aid transfer is intended to foster. The categories therefore refer to the overarching goal (e.g. trade facilitation), rather than the service provided through the funds (e.g. funding of regional trade agreements (RTAs) or training). The system of purpose codes summarises this classification in five digits: the first three refer to the respective DAC5 sector, and the remaining two represent numbering from more general (10–50) to more specific (60–90).

- **Ainf** *Aid to Economic Infrastructure*, coded as number 200, includes Transport & Storage, Communications, Energy, Banking & Financial Services and Business & Other Services, each with its own sub-components.
- **Apc** *Aid to Production sectors*, coded as 300, includes the 4 sectors treated separately *Agriculture-Forestry-Fishing*, *Industry-Mining-Construction*, *Trade Policy & Regulations* and *Tourism*.
- **Atf** *Aid for Trade Facilitation*, coded as 33120, is a single category
- **Atredu** *Aid to Trade education/training*, coded as 33181, is also a single category.

Tourism has only one final component: Tourism policy and administrative management. The other destinations for sectoral aid for productive capacity all have multiple ramifications and are further focused. Under the category Agriculture-Forestry-Fishing, *Agriculture* (coded 311) has 18 final components, ranging from the general Agricultural policy and administrative management (31110) to the specific Livestock/veterinary services (31195). The same applies for *Fishing* (313) which incorporates five possible destinations for aid. Also, the category Industry-Mining-Construction has among its sub-sections *Industry* (321) and *Mineral resources and Mining* (322), which we use for proxying aid to manufacturing and minerals sectors respectively in the analysis below.

Source: OECD CRS website; also see Turner (2008)

Data on investment climate indicators have become available for a large number of countries through the World Bank's "Doing Business Report". We use the "Trading across borders"

section of this survey, which gathers data on the number of documents, the time and costs required to process exports and imports of goods across borders.

Exports data and most other controls, including population, CPI and GDP data are from World Bank (2009). We also use REER from the IMF (2009). Data on bilateral distances between capital cities come from Mayer and Zignago (2006), who compute geodesic distances through the great circle formula. Data on foreign market potential is computed by Mayer (2008) for the period 1970-2003. Government effectiveness indicators come from Kaufmann et al. (2008), while the index of *civil liberties* is computed by Freedom House (2009). This index is measured on a one-to-seven scale, with one representing the highest degree of freedom and seven the lowest.

5. Results

5.1 Aid for trade and the cost of trading

Table 2 presents results of estimating (9) and (9') using the costs of exporting as the main dependent variable and without including country effects. We first restrict the sample to the 90 recipient countries which have positive *Atf* data for at least one year. This limits the potential error in reporting aid data, i.e. if the zeros are in fact non-reported data rather than actual zero *Atf*. The results indicate a negative and significant effect of *Atf* on the cost of exporting (column 1). A one million increase in *Atf* (equivalent to a 171% increase relative to the mean value) is associated with a 6% (or US$ 70) reduction in the cost of packing goods and load them into a 20-foot container, transporting them to the port of departure and loading them on the vessel or truck. Considering that in the year 2000, the number of 20-foot containers loaded and unloaded in African ports reached almost 7.3 million, including 2.5 million in sub-Saharan countries (UNCTAD, 2003), the return on *Atf* is likely to be substantial. The coefficient of Atf does not change if we include even those countries for which *Atf=0* (column 2). The control variables are in line with expectations: good governance reduces the costs of exports, while being landlocked considerably increase them. Asia and Europe have the lowest costs, with Africa having the highest.[12] The other variables are not significant, including population and GDP per capita. The insignificance of the latter is surprising but it is likely to be determined by two contrasting effects: on the one hand higher income per capita is associated with higher costs of non-tradables, which in turn drive the costs of exporting up; on the other hand, higher income tends to be associated with higher efficiency in handling transport, logistics and administrative procedures, which bring the costs down. This is confirmed by the negative and significant coefficient of GDP per capita when using the time of processing exports - whose value is purged of the price effect - as the dependent variable (column 9). The results are robust also to using the double-log specification as in (9') although the cost reduction is much higher in this case: a 1 mln increase in *Atf* is associated with a US$ 178 decrease in costs of exports (column 3).[13] We also test for the effects of *Atf* on changes (in percentage) in costs of exporting between 2006 and 2008. This is a pure cross-sectional analysis with almost 80 countries. We regress this

[12] We include Oceania into Asia.

[13] The average value of ln(1+ Atf)=0.35; thus a 100% increase in (1+Atf) is equivalent to an increase in *Atf* by 1.35 million, which is associated with a 20% decrease in costs of exporting. This means that a 1 mln rise in Atf is associated with a reduction in costs of 14.5% (US$ 178).

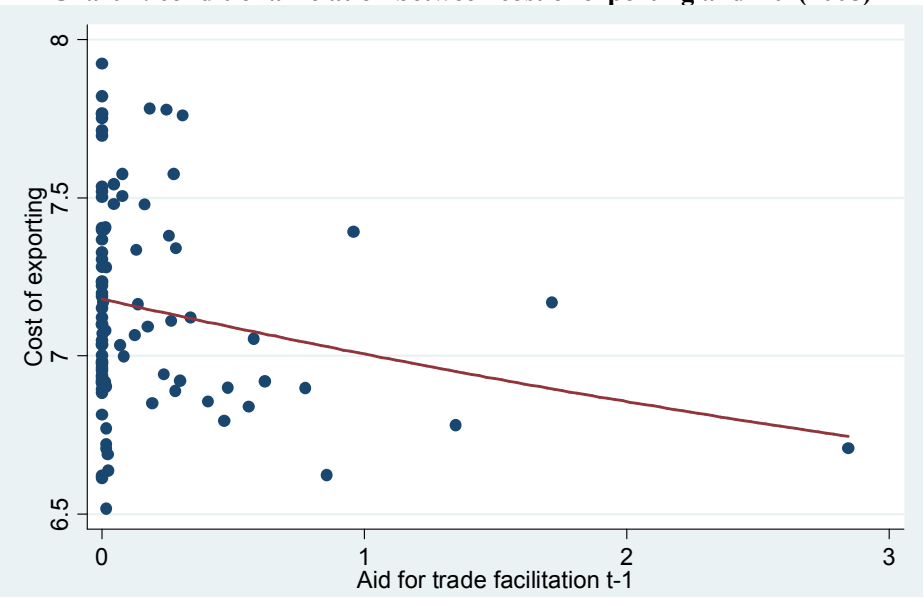
change on the average yearly value of *Atf* between 2005 and 2007, the initial level of cost of exporting (i.e. in 2006) and the other controls (column 4). Using average Aft helps also reduce the possibility that cross-country year-to-year fluctuations of aid are driving the results. The cost-reducing effect of *Atf* is slightly larger than in previous semi-log specifications and still highly significant. This effect holds also when using total *Atf* between 2005 and 2007 as the main regressor (column 5), with a similar elasticity to that reported in columns 1 and 2 (a 100% increase in *Atf* is associated with a reduction in costs of 3%). This result holds also when excluding Egypt (column 6), which is a usual influential observation in aid regressions (here it is the largest recipient of *Atf* over the period and a well performing country in terms of reduction in the costs of exporting). The impact of *Atf* is over five times larger, although less significant probably given the few degrees of freedom, when restricting the sample only to Africa (and excluding Egypt) – column 7 - suggesting that the scope for reducing the costs of exporting may be substantial where these costs are relatively high.

The cost reducing effect of total *Atf* shrinks considerably when including also those countries in the sample that report zero values of *Atf* (column 8). This could be caused either by measurement error or by the fact that those countries that have never received *Atf* over the period considered may be on average better performers than the others and their inclusion would reduce the aid coefficient. We also test the robustness of the results to using different dependent variables. *Atf* is associated with reductions both in the time taken to process exports, with similar elasticity as in the case of costs of exporting (column 9), and in the number of documents needed to export (column 10) – with smaller elasticity here probably due to the higher persistence of this variable over time. We also test for the effects of aid to trade related education (*Atredu*) on the costs of exporting finding a negative (though not significant) effect in a specification in levels (column 11). However this result is not robust to using change in the cost of exporting as a dependent variable (column 12), while *Atf* remains significant and with similar value of the coefficients.

Chart 2 suggests that the negative relationship found in the regressions is not due to the presence of outliers or influential observations (Egypt is excluded from the picture), but it is mainly driven by differences across countries.

Table 3 presents the results of the fixed effects specifications that relate the changes in *Atf* to the changes in the cost of exporting controlling for time invariant characteristics of countries. The coefficient of *Atf* is still significant but is half of that in the specification without fixed effects (column 1). Now an increase in *Atf* of US$ 1 million is associated with a reduction in the cost of exporting of around US$ 30 (i.e. 2.5% at the mean). This means that slightly over half of the impact of *Atf* is captured by time invariant characteristics of recipient countries. This elasticity is robust to the exclusion of Egypt, although it shrinks a little (column 2). The *Atf* coefficient loses intensity and significance when we consider also the countries without any *Atf* (column 3), which confirms the downward bias of such an inclusion. Again, the double-log specification yields a higher *Atf* elasticity of cost reduction (column 4), which is around twice as large as column 1. On the other hand the intensity of the effect of *Atf* on the timing of exports is analogous to that on the cost of exporting (column 5), while it is insignificant (and mildly positive) on the number of documents necessary to export (column 6). *Atredu* is negative in both specifications without and with countries with aid values equal to zero (columns 7-8), although it is significant only in the former.

Chart 2: conditional relation between cost of exporting and Atf (2008)



The relationship shown in the graph comes from a cross section analogous to that in Table 2 (column 1) but only for the year 2008

Overall *Atf* seems to have a significant cost-reducing effect on the costs of handling exports, and back of the envelope calculations indicate that this appears to be an investment with an interesting return, especially for African countries. These results appear all the more remarkable as cost of trading variables show substantial persistence over time especially considering the short time frame of this analysis. It would be interesting to look at the impact of this type of AfT as new data comes on stream.

Despite being neat, these results need to be interpreted with a note of caution as it has not been possible to properly control for the potential endogeneity of *Atf*. This would be the case for instance if *Atf* was allocated on the basis of the relative performance of countries in terms of export processing. We couldn't find a suitable instrument for *Atf* as this is only a tiny fraction of total ODA, and instruments like civil liberties or other instruments already used by the literature, such as arms' imports are not much correlated to *Atf*. Some evidence presented above suggest that those developing countries reporting no *Atf* do perform better than the others (that is why their inclusion reduced the value of the *Atf* coefficient). This means that if performance does indeed influence *Atf* allocation, the consequent endogeneity would probably bias the coefficient of aid downward (as poorer performing countries would receive proportionately more *Atf*). In that case our coefficients of aid should be considered as lower bounds of the actual *Atf* elasticities of cost reduction.

5.2 Aid for trade and exports

5.2.1 Macro Analysis

Table 4 presents the results using the augmented export demand equation as in (10). The results suggest the positive impact of aid to economic infrastructure (*Ainfra*) on exports, while

aid to productive capacity (*Apc*) does not seem to have a significant effect on exports. The first two columns show that this is the case for the period 1995-2007, lagging the aid variables two years. The effect of *Ainfra* (*Apc*) is slightly less positive (more negative) when considering all observations (column 1) than when restricting the sample only to the observation with values of aid different from zero (column 2). If these are 'true' zeros, this may indicate that those developing countries receiving no aid are performing relatively better. One way to overcome this potential bias due to possible misreporting is to take the period after 1999, when the frequency of zeros in the aid variables is much lower. We will make extensive use of this reference period in the subsequent regressions. The estimated coefficients suggest that a 100% increase in *Ainfra* is associated to an increase in real exports by between 2.3 and 2.9%. This means that increasing *Ainfra* by US$ 71 million is associated to an increase in exports (after two years) by between US$ 480 and 608 million. These figures are valid also when the aid variables are lagged by one period (*Apc* remains insignificant) – column 3. The other controls have the expected sign: the consumer price index (CPI) bears a negative sign, as its increase indicates a relative deterioration of domestic competitiveness, while market potential has a positive and significant effect. Restricting the analysis to the later period (1999-2007) slightly raises the coefficient of *Ainfra*, and interestingly turns the coefficient of *Apc* positive and significant (although at the 10% level only) – column 4. This positive effect of *Apc* disappears when lagging *Apc* one year only (not shown here), supporting the idea that this type of aid displays its effects with a substantial lag. Taken these results at their face value, they indicate that the support granted to the productive sector may have improved over time.[14] However, we still need to control for the endogeneity of the aid variables.

We do that first for the *Ainfra* variable only for a number of reasons. First we have one reliable excludable instrument available – civil liberties (CL) – and that happens to explain a much larger part of *Ainfra* than *Apc*. Second, leaving *Apc* out in the estimation of equation (10) turns out to affect the value of *Ainfra* (and the explanatory power of the regression) very marginally, while the opposite is not true (not shown here). The coefficient of *Ainfra* seems to be robust to the endogeneity of aid; and the IV estimation (using CL as instrument for *Ainfra*) suggests that this endogeneity biases the coefficient of *Ainfra* downward. The IV coefficient is almost three times larger than the OLS one (cf. column 5 vs. column 6). The value of the F-statistics of the first stage along with the high significance of the CL coefficient indicates that the latter is a valid instrument for *Ainfra*. The downward bias from endogeneity may suggest that countries with poorer export capacity tend to receive proportionally more aid, which is somewhat intuitive. We also run IV with both aid variables, adding population and its square (both in log) to the list of excluded instruments. These may in fact be considered only weakly exogenous, although we exclude them on the grounds that they are insignificant when added in the estimation of equation (10).[15] For the post-1998 period the IV coefficients of the aid variables estimate with this battery of instruments are both positive but insignificant (column 7). Both coefficients are larger than their OLS counterparts, and *Apc* becomes three times larger than *Ainfra*. The fall of the *Ainfra* coefficient (relative to column 5) may be due to the lower explanatory power of the battery of instruments used (the F-statistics in column 7 is three times smaller than in column 5). Also, the instruments do not seem to have a strong

[14] Given the consistency of the *Ainfra* coefficients across the different samples, we can probably rule out the other potential explanation for this change in the *Apc* coefficient, i.e. that reporting has improved over time thus limiting the measurement error of the earlier period, which was driving the insignificant results of the 1995-2007 period.

[15] Results available from the authors upon request.

predictive power for *Apc* (the F-statistics for *Apc* is below the acceptance level). When we extend the period to 1995-2007, the coefficient of *Ainfra* increases (although it remains insignificant), while that of *Apc* turns negative (column 8). Again the F-statistic for *Apc* is low, and in this case the equation seems to be slightly over-identified.

As we mentioned we would ideally use the REER rather than CPI as a measure of relative prices in the export demand equation (10). The results are robust to using REER instead of CPI, as shown in the comparison between columns 1 and 2 in Table 5 (which have the same samples). In fact the coefficients of the aid variables become slightly more positive and significant when using REER instead of CPI, and the explanatory power of the regression also increases suggesting that REER may indeed be a more appropriate control. However as this variable is available for a limited number of countries, the number of observations is less than halved than then using CPI (although the value of the *Ainfra* coefficient is remarkably similar to that using the extended sample, cf. Table 5, column 2 with Table 1, column 4). We also test the robustness of the results to using the foreign market potential measure constructed by Mayer (2008), who estimates it from a gravity specification.[16] Again, the availability of this variable restricts our sample, especially as it is not available after 2003. This reduces the positive effects of the aid variables, especially *Apc*, which turns negative as its virtuous impact on exports occurs mainly in recent years (column 3). However, using the FMP measure by Mayer instead of our standard market potential measure does not affect the values of the aid coefficients (in fact it slightly raises the beneficial impact of *Ainfra* and reduces the negative effect of *Apc* – cf. column 3 vs. column 4).

Again, we restrict the analysis to the African continent, as this is the region with the lowest capacity to trade and the weakest infrastructure endowment (e.g. Commission for Africa, 2005). We estimate equation (10) for Africa using one lag for *Ainfra*, as its effect with two lags is very small (and insignificant). This suggests that benefits from increased infrastructure come to fruition quite rapidly. Both the OLS and the IV estimations suggest that the impact of *Ainfra* is larger for African countries than for developing countries as a whole (columns 5-7). The coefficient is larger by a factor of between 1.3 and 2, confirming a substantial potential premium to the investment in infrastructure in Africa (relative to other regions). The coefficient of *Apc* has a similar pattern to that for the entire sample, i.e. negative and insignificant for the 1995-2007 period, and positive (although not significant) for the post-1998 period.

We also check the robustness of the results to employing a dynamic specification using GMM estimators, again with different samples and periods. The first four columns of Table 6 present the results for the difference GMM estimator, and the latter four for the system GMM. The findings consistently support the substantial positive impact of *Ainfra* and the insignificant impact of *Apc*. The size of the coefficients is remarkably close to that of the previous tables. In particular, the rise in *Ainfra* by 100% is associated with the proportionate growth of exports by between 2 and 2.6%. The Arellano-Bond test suggests the absence of autocorrelation of order 3 in the errors in first difference. Moreover, the Hansen J test cannot reject the overidentifying moment conditions generated by the instruments. Somewhat in contrast to the preceding tables, the coefficient of *Ainfra* is slightly larger for the 1995-2007

[16] Mayer (2008) computes the foreign market potential (FMP) in the following way. He estimates the bilateral trade costs as the residual of the regression of bilateral trade on exporter and importer fixed effects; FMP is the sum of each estimated importer fixed effect by the relevant bilateral trade cost (excluding countries' own fixed effect among importers).

period than for the post-1998 period (cf. columns 1-2 with column 3). As this estimation relates growth rates, this may just be the effect of higher levels of the variables in the latter period, which may induce lower growth rates. The differential effect of *Ainfra* in Africa is very limited with the coefficient almost identical to that for the entire sample (column 4). Interestingly the effects of market potential are insignificant in Africa, which may suggest that constrains of different kind to intra-regional trade prevents the positive effects of larger demand potential in the region on exports. *Apc* seems to have some positive impact on exports in Africa (column 4), but this result does not hold to using the system GMM estimator (column 8). The latter confirms the significant and positive effect of *Ainfra* on exports with the value of the coefficients in line with those from the difference GMM (columns 5-7). The coefficient of lagged exports is very close to one, suggesting a high degree of persistence in exports. Again, the effect of *Apc* on exports is not significant. Finally, the coefficient of *Ainfra* using the system GMM is insignificant for Africa (column 8). As the GMM system estimator uses fixed effects, this may suggest that recipients-specific characteristics may be driving the results for Africa in the difference GMM (for instance if the measurement error is correlated to these characteristics). However, the results of the fixed effects regressions above suggest otherwise, thus the interpretation of this drop in the *Ainfra* coefficient for Africa would require further investigation.

5.2.2 Sectoral analysis

The weak results for *Apc* may be driven by problems with the identification strategy, e.g. *Apc* has mainly sectoral effects and considering its impact on the whole of exports may be misleading. Moreover, to the extent that aid has general equilibrium effects (e.g. Dutch Disease type), aid to one sector may impact on other sectors' competitiveness, thus biasing the effects of *Apc* on total exports. These concerns call for an analysis at the sectoral level through the estimation of (variants of) equation (13). We study how the inter-sectoral as well as intra-sectoral (over time) variation in aid and exports are related, using data from four sectors: food production, manufacturing, mineral extraction and tourism.

Table 7 presents the results. A preliminary analysis suggests the use of a one year lag for the aid variables (although the main results are unchanged with two year lag). Sectoral aid seems to have a positive and marginally diminishing effect on exports at the sectoral level, while the impact of *Ainfra* is positive but not significant (column 1). These results hold also when extending the sample to the 1985-2007 period (column 2). The coefficients of sectoral aid become larger (and maintain their significance) when including country-year effects (column 3), and these are robust to the inclusion of country-year pairs for which a value of zero for sectoral aid is reported (column 4). However, when we control for sector-country effects (and no country-year effects) the aid-export relation becomes a linear one and the aid coefficient becomes insignificant (column 5). This suggests that the positive impact of sectoral aid appears to be driven by an allocation of aid which is skewed towards already well performing sectors. Thus there is no evidence of a causal relation from sectoral aid to exports, which is consistent with Brenton and von Uexkull (2008). For example most of the *Apc* to small developing islands is targeted to tourism, which is also the largest exporter. This is not surprising: aid goes towards those sectors that are organised and that are able to organise their demands more effectively. Adding *Ainfra* and the other standard controls (plus the log of population and its square) slightly raise the coefficient of sectoral aid. Nevertheless this remains not significant both using the entire sample for 1995-2006 (column 6) and the

restricted one excluding observation with zero value of aid (column 7). *Ainfra* has a positive and significant effect on sectoral exports and its coefficient is close to that of the specifications with total exports, indicating that its impact is fairly robust across sectors. Market potential and CPI have the expected sign, and interestingly population has a U-shaped relation with sectoral exports. This relation was instead insignificant in the specifications with total exports as the RHS variable. Controlling also for time variant country-specific effects turns the coefficient of sectoral aid to negative, although not significant both with the extended (column 8) and the restricted sample (column 9). These results are confirmed by the dynamic estimation using difference GMM – column 10 (results with system GMM are similar and are available upon request).

We also examine the effects of the two main types of AfT for the four broad sectors separately in Table 8. For each sector we estimate a static specification with fixed and year effects (columns 1, 4, 7 and 10) and two dynamic specifications, with difference GMM (columns 2, 5, 8 and 11) and system GMM (columns 3, 6, 9 and 12). The period is 1995/2006 and we use the extended sample of developing countries including those observations with zero values of aid.[17] The results suggest that *Ainfra* is particularly beneficial for mining and manufacturing, while it has no effect for tourism and a marginally positive impact in food. These results may be consistent with the importance of transport and energy infrastructure in mining and manufacturing production relative to the other sectors. The impact of *Apc* is generally positive although not significant across sectors. It seems to be beneficial to exports particularly in tourism (although the coefficient in the difference GMM is negative, cf. column 2). On the other hand, aid to mining has a negative coefficient (but not for system GMM), which would require further scrutiny. Interestingly market potential is important for tourism, mining and manufacturing exports but not for food, which tends to have a low income elasticity of demand.

6. Conclusions

AfT has rapidly become a popular concept among trade and donors community alike. A main objective of this type of assistance is to assist developing countries to overcome constraints to trade so to benefit from increased trade integration. Despite the clarity of this objective, the evidence on the effectiveness of AfT in improving trade-related performance is still (surprisingly) scant. This paper is one of the first to fill this evaluation gap by examining the effects of AfT on the costs of trading and on the level of and changes in exports. It also extends previous literature on aid effectiveness, moving away from the aid-growth conundrum by matching sub-sets of aid with more specific outcome variables than growth.

The findings suggest that AfT can have a positive impact if well targeted. Aid for trade facilitation reduces the costs of trading: a one million dollars increase in *Aid for trade facilitation* (equivalent to a 171% increase relative to the mean value) is associated with a 6% or US$ 70 in the cost of packing goods and load them into a 20-foot container, transporting them to the port of departure and loading them on the vessel or truck. Considering the huge number of 20-foot containers loaded and unloaded in developing countries, the return on increases in *Aid for trade facilitation* is likely to be substantial.

[17] Results are robust to using a restricted sample as well as a larger period of time (results from these specifications are available upon request).

Ainfra has a positive (and causal) effect on exports, although the elasticity of the proportionate growth of export with respect to Ainfra is fairly small in magnitude – between 0.02 and 0.03. It is larger when at around 0.11 when controlling for the endogeneity of aid, suggesting that worse performing exporters tend to receive relatively higher amounts of *Ainfra*. On the other hand *Apc* does not seem to exert any significant impact on total exports. Once we correct for the sectoral allocation of *Apc* (i.e. matching it with exports of those sectors which *Apc* accrues to) a U-shaped relation of Apc on exports emerges. But the effect disappears when we account for different sectoral characteristics at the country level. This suggests that the effects of Apc may be driven by an allocation skewed towards already well performing sectors (in line with what Brenton and Von Uexkull (2008) hypothesised).

The sectoral analysis reveals that *Ainfra* is particularly beneficial for mining and manufacturing exports, while it has no effect for tourism and a marginally positive impact in food exports. These results may be consistent with the importance of transport and energy infrastructure in mining and manufacturing production relative to the other sectors. The impact of *Apc* is generally not significant across sectors except in tourism.

These findings may bear a number of policy implications. To the extent that AfT has a heterogeneous impact on trade-related performance, this may suggest a re-consideration of the AfT allocation across activities and sectors. In addition, the lack of evidence for the beneficial impact of assistance to productive sectors calls for a closer scrutiny of such assistance. We measure an average effect, which is likely to be produced by some positive impacts and some negative ones. Further research on both of them would be needed to tease out the critical factors for successful assistance (and the contexts in which such assistance is more likely to be successful). The results also suggest that the lack of infrastructure may be a powerful constraint to increasing exports especially in Africa (where the effects of Ainfra are larger). This is consistent with evidence on the positive impact of infrastructure on African growth (e.g. Estache et al., 2005).

Finally, the data currently available allows expanding the scope of this work to assist in answering questions which are potentially relevant for AfT strategies. For example, it would be interesting to measure the impact of more refined AfT categories to identify what types of assistance (e.g. what types of infrastructure aid) is more effective in improving trade performance. It would also be important to identify other potential effects of AfT, such as those on the exchange rate. Finally, to the extent that different regions may have different needs, looking at the impact in specific geographical areas may be another useful extension of the present work.

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Table 2: Explaining the costs of exports (ln of US $ per container)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	ln(X Cost)	ln(X Cost)	ln(X Cost)	Δ(X Cost)	Δ(X Cost)	Δ(X Cost)	Δ(X Cost)	Δ(X Cost)	ln(X time)	ln(X docs)	ln(X Cost)	Δ(X Cost)
Year	All	All	All	2008	2008	2008	2008	2008	All	All	All	2008
Sample	Atf>0	All	Atf>0	Atf>0	Atf>0	no Egypt	Africa	All	Atf>0	Atf>0	tf&edu >0	tf&edu >0
Atf(t-1)	-0.057***	-0.059***							-0.042***	-0.017*	-0.058***	
	(-5.68)	(-6.65)							(-4.31)	(-1.73)	(-4.01)	
Ln Atf(t-1)			-0.196***									
			(-4.39)									
Avg Atf (t-1)				-0.085***								
				(-3.38)								
Tot Atf (t-1)					-0.027**	-0.021**	-0.114	-0.010				-0.024*
					(-2.24)	(-2.14)	(-1.06)	(-1.34)				(-1.91)
Atredu (t-1)											-0.255	
											(-1.45)	
Tot Atredu (t-1)												0.026
												(0.54)
Ln(X Cost) (t-2)				-0.200***	-0.397***	-0.390***	-0.302*	-0.241***				-0.298***
				(-3.87)	(-3.73)	(-3.71)	(-1.73)	(-3.52)				(-3.45)
Gov. Eff (t-1)	-0.223***	-0.197***	-0.216***	-0.039	-0.118	-0.139	-0.011	-0.077	-0.055	-0.113***	-0.172	-0.016
	(-3.93)	(-4.48)	(-3.86)	(-1.00)	(-1.10)	(-1.30)	(-0.12)	(-1.40)	(-0.86)	(-2.90)	(-1.56)	(-0.30)
Ln pop (t-1)	-0.016	-0.028***	-0.014	0.012	0.027**	0.027**	0.026	0.017*	0.000	0.012	-0.028	0.026**
	(-0.93)	(-2.80)	(-0.84)	(1.34)	(2.30)	(2.34)	(0.65)	(1.95)	(0.010)	(1.30)	(-1.01)	(2.20)
Ln GDP (t-1)	-0.002	0.000	-0.008	-0.017	0.030	0.047	-0.046	0.030	-0.138***	0.018	-0.008	-0.024
	(-0.049)	(0.014)	(-0.23)	(-0.74)	(0.53)	(0.81)	(-0.93)	(1.00)	(-3.43)	(0.64)	(-0.11)	(-0.59)
Landlocked	0.573***	0.513***	0.579***	0.175***	0.338***	0.327***	0.258	0.206***	0.456***	0.158***	0.588***	0.331***
	(7.49)	(10.3)	(7.68)	(3.83)	(3.58)	(3.49)	(1.57)	(3.33)	(5.89)	(3.22)	(4.07)	(3.30)
Asia	-0.340***	-0.245***	-0.327***	-0.071	-0.126*	-0.157**		-0.132***	0.038	0.015	-0.319***	-0.089
	(-5.51)	(-5.69)	(-5.33)	(-1.57)	(-1.79)	(-2.27)		(-3.23)	(0.69)	(0.35)	(-3.36)	(-1.31)
America	-0.152*	-0.153**	-0.133	0.083	0.020	-0.020		0.001	-0.058	-0.118**	-0.144	0.058
	(-1.86)	(-2.51)	(-1.64)	(1.37)	(0.23)	(-0.24)		(0.012)	(-0.72)	(-2.07)	(-1.17)	(0.61)
Europe	-0.352***	-0.289***	-0.326***	-0.050	-0.152	-0.188		-0.113	-0.408***	-0.162**	-0.090	-0.081
	(-3.29)	(-4.22)	(-3.06)	(-0.92)	(-1.11)	(-1.38)		(-1.51)	(-2.81)	(-2.19)	(-0.49)	(-0.88)
Country Eff.	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Year Eff.	YES	YES	YES	NO	NO	NO	NO	NO	YES	YES	YES	NO
Observations	201	408	201	77	85	84	29	132	201	201	89	58
R-squared	0.550	0.442	0.552	0.380	0.372	0.383	0.336	0.277	0.488	0.168	0.581	0.429

*Robust t-statistics in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%;*

Table 3: Explaining the costs of exports (ln of US $ per container), fixed effects

Dep	(1) ln(XCost)	(2) ln(XCost)	(3) ln(XCost)	(4) ln(XCost)	(5) ln(Xtime)	(6) ln(Xdocs)	(7) ln(XCost)	(8) ln(XCost)
Sample	Atf>0	Atf>0 & no Egypt	No Egypt	Atf>0	Atf>0	Atf>0	Atf & Atredu>0	All
Atf(t-1)	-0.025***	-0.020**	-0.008		-0.024***	0.001	-0.029***	-0.019**
	(-3.53)	(-2.26)	(-1.07)		(-2.71)	(1.35)	(-3.93)	(-2.17)
Ln Atf(t-1)				-0.074**				
				(-2.14)				
Atredu (t-1)							-0.293***	-0.129
							(-3.28)	(-1.34)
Gov. Eff (t-1)	0.099	0.063	0.068	0.105	0.159	0.222	0.380**	0.083
	(0.78)	(0.49)	(0.65)	(0.79)	(0.75)	(1.23)	(2.18)	(0.80)
Ln pop (t-1)	8.622*	5.960	-9.692	10.273*	11.878	15.018	20.711	-7.540
	(1.83)	(1.16)	(-1.51)	(1.84)	(1.30)	(2.65)***	(1.61)	(-1.21)
Ln pop (t-1) sq.	-0.274*	-0.191	0.316	-0.326*	-0.383	-0.470	-0.813**	0.249
	(-1.91)	(-1.21)	(1.54)	(-1.89)	(-1.26)	(-2.82)***	(-2.31)	(1.25)
Ln GDP (t-1)	0.018	0.076	0.149	0.232	-1.332**	1.028	-0.662	0.131
	(0.051)	(0.22)	(0.88)	(0.66)	(-2.04)	(1.57)	(-1.07)	(0.78)
Country Eff.	YES	YES	YES	YES	YES	YES	YES	YES
Year Eff.	YES	YES	YES	YES	YES	YES	YES	YES
Observations	201	197	404	201	201	201	89	408
R-squared	0.372	0.335	0.151	0.330	0.361	0.398	0.561	0.154
Nr of count.	86	85	85	86	86	86	48	125

*Robust t-statistics in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%*

Table 4: Total exports and aid for trade (1995-2007)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Method	FE	FE	FE	FE	FE IV	FE	FE IV	FE IV
Period	1995-07	1995-07	1995-07	1999-07	1999-07	1999-07	1999-07	1995-07
Sample	Aid>0	All	Aid>0	All	All	As (5)	All	All
Aid for infra (t-2)	0.029**	0.023		0.034**	0.111***	0.039***	0.062	0.104
	(2.00)	(1.62)		(2.48)	(2.94)	(2.97)	(0.88)	(1.00)
Aid to prod. capacity (t-2)	-0.007	-0.016		0.025*			0.193	-0.131
	(-0.39)	(-1.03)		(1.88)			(0.84)	(-0.36)
Aid for infra (t-1)			0.028*					
			(1.93)					
Aid to prod. capacity (t-1)			0.002					
			(0.09)					
CPI	-0.030	-0.019	-0.029	-0.075*	-0.071***	-0.076*	-0.047	-0.056
	(-0.68)	(-0.49)	(-0.69)	(-1.98)	(-3.46)	(-1.96)	(-1.42)	(-1.48)
Market potential	5.628***	5.221***	5.820***	4.944***	5.449***	4.848***	5.882***	4.915***
	(3.95)	(4.13)	(4.09)	(4.62)	(7.89)	(4.58)	(5.90)	(3.63)
Observations	991	1101	1019	776	805	805	772	854
R-squared	0.620	0.621	0.624	0.623	0.580	0.615	0.499	0.504
Countries	100	100	100	100	100	100	97	97
Excluded instruments								
Civil Liberties (t-3)					-0.402***		-0.333***	-0.250***
					(-5.66)		(-4.64)	(-3.51)
Pop (t-3)							5.292	7.968
							(0.90)	(1.50)
Pop sq. (t-3)							-0.261	-0.346**
							(-1.42)	(-2.05)
1st stage F-Stat (for Aid for Infra)					32.09***		10.41***	8.16***
Civil Liberties (t-3)							-0.094*	-.072
							(-1.97)	(-1.52)
Pop (t-3)							1.708	5.006
							(0.35)	(1.11)
Pop sq. (t-3)							-0.040	-0.159
							(-0.26)	(-1.12)
1st stage F-Stat (for Aid to prod. cap)							1.25	1.06
Hansen J-stat of overid.							1.309	2.778*

*Dependent variable is value of total exports in constant 2000 US$. All variables are in log; all regressions include year effects; Robust t-statistics in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%*

Table 5: Total exports and aid for trade (1995-2007), robustness

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Method	FE	FE	FE	FE	FE	FE	FE IV
Period	1999-07	1999-07	1995-07	1995-07	1995-07	1999-07	1999-07
Countries	All	All	All	All	Africa	Africa	Africa
Sample	All	As (1)	Aid>0	As (3)	Aid>0	All	All
Aid for infra (t-2)	0.040*	0.036	0.014	0.013			
	(1.76)	(1.56)	(1.08)	(1.02)			
Aid for infra (t-1)					0.050	0.068*	0.145
					(1.40)	(1.97)	(1.55)
Aid to prod. capacity (t-2)	0.015	0.013	-0.018	-0.020	-0.024	0.045	
	(0.80)	(0.64)	(-1.16)	(-1.35)	(-0.65)	(1.26)	
CPI		-0.039	-0.001	-0.004	-0.006	-0.063*	-0.039
		(-0.49)	(-0.026)	(-0.11)	(-0.13)	(-1.79)	(-0.93)
REER	0.293*						
	(1.74)						
Market potential	6.628***	6.583***		5.345***	5.628	5.525	5.276*
	(3.58)	(3.40)		(5.64)	(1.21)	(1.41)	(1.90)
Mayer mkt potential			0.190				
			(1.34)				
Observations	369	369	657	657	424	308	324
R-squared	0.576	0.555	0.493	0.510	0.510	0.443	0.405
Countries	48	48	94	94	39	39	39
Excluded instrument							
Civil Liberties (t-3)							-0.327***
							(-3.71)
1st stage F-Stat (for Aid for Infra)							13.78***

*Dependent variable is value of total exports in constant 2000 US$. All variables are in log; all regressions include year effects; Robust t-statistics in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%*

Table 6: Total exports and aid for trade (1996-2007), GMM specifications

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Method	**Difference GMM**				**System-GMM**			
Period	1995-07	1995-07	1999-07	1999-07	1995-07	1995-07	1999-07	1999-07
Countries	All	All	All	Africa	All	All	All	Africa
Sample	All	Aid>0	All	All	All	Aid>0	All	All
Exports (t-1)	0.739***	0.705***	0.730***	0.788***	0.995***	0.992***	1.000***	0.989***
	(12.1)	(10.9)	(12.2)	(20.7)	(192.4)	(214.2)	(168.3)	(114)
Aid for infra (t-2)	0.026***	0.024***	0.020**		0.020***	0.015***	0.021***	
	(3.12)	(2.64)	(2.16)		(4.06)	(3.16)	(3.07)	
Aid for infra (t-1)				0.021*				0.004
				(1.69)				(0.70)
Aid to prod. capacity (t-2)	-0.014	-0.009	0.003	0.016	-0.009	-0.003	-0.003	-0.008
	(-1.21)	(-0.67)	(0.25)	(1.09)	(-0.99)	(-0.31)	(-0.27)	(-0.63)
CPI	-0.020	-0.029	-0.029	-0.033**	-0.004	-0.010	-0.018*	-0.027***
	(-1.14)	(-1.60)	(-1.55)	(-2.30)	(-0.47)	(-1.28)	(-1.90)	(-3.58)
Market potential	1.813***	2.252***	1.817***	0.466	0.026**	0.026**	0.031**	0.022
	(3.61)	(3.95)	(3.44)	(0.31)	(2.33)	(2.14)	(2.07)	(0.63)
Observations	988	906	748	296	1092	984	770	305
Countries	97	97	97	38	99	99	99	39
A-B test for AR(3) in 1st diff	0.52	0.45	-0.73	-0.72	1.36	1.31	-0.74	-0.45
Hansen J	71.08	67.62	75.13	23.59	77.69	78.78	82.0	22.93

*Dependent variable is value of total exports in constant 2000 US$. All variables are in log; endogenous variables are lagged exports; Ainfra and Apc across all the specifications; civil liberties is included as excluded instrument in all regressions include year effects. Robust t-statistics in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%*

Table 7: Sectoral exports and sectoral aid for productive capacity (1985-2006)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Method	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	Diff GMM
Period	1995-06	1985-06	1985-06	1995-06	1995-06	1995-06	1995-06	1995-06	1995-06	1995-06
Sample	Aid>0	Aid>0	Aid>0	All	All	Aid>0	All	Aid>0	All	Aid>0
Aid sector (t-1)	0.678***	0.510***	0.713***	0.728***	0.008	0.017	0.014	-0.020	-0.015	-0.028
	(9.89)	(8.50)	(8.43)	(9.17)	(0.61)	(1.20)	(1.02)	(-1.11)	(-0.84)	(-0.91)
Aid sector (t-1) sq.	-0.092***	-0.069***	-0.081***	-0.104***						
	(-6.16)	(-5.38)	(-4.66)	(-5.75)						
Aid Infra (t-1)	0.031	0.020				0.037***	0.030***			
	(1.19)	(0.88)				(3.33)	(2.86)			
Market Potential	6.979***	4.845***				3.472***	2.532***			
	(3.21)	(2.89)				(5.41)	(4.29)			
CPI	-0.006	-0.033				-0.046**	-0.035			
	(-0.12)	(-1.10)				(-2.11)	(-1.60)			
Pop						-12.19***	-10.44***			
						(-4.63)	(-4.23)			
Pop squared						0.381***	0.314***			
						(4.74)	(4.15)			
Exports (t-1)										0.304***
										(2.63)
Country Effects	YES	YES								
Sector-year Eff.	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Sect.-country Eff	NO	NO	NO	NO	YES	YES	YES	YES	YES	NO
Country-year Eff	NO	NO	YES	YES	NO	NO	NO	YES	YES	YES
Countries	118	121	129	137	137	121	124	134	137	73
Observations	3943	4579	3337	5041	5041	4097	4661	4404	5041	2349
R-squared	0.763	0.761	0.842	0.789	0.961	0.965	0.961	0.977	0.975	
Arellano-Bond test for AR(2) in first differences										0.27

*Dependent variable is the value of sectoral exports (sectors: food, tourism, manufacturing and mining); all variables are in log; Robust t-statistics in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%.*

Table 8: Sectoral exports and aid for trade (1995-2006)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		Tourism			**Food**			**Manufacturing**			**Mining**	
		Diff	Sys		Diff	Sys		Diff	Sys		Diff	Sys
	FE	GMM	GMM	FE	GMM	GMM	FE	GMM	GMM	FE	GMM	GMM
Aid sector (t-1)	0.055	-0.020	0.046	0.044	0.030	0.025	0.009	0.040	0.021	-0.092**	-0.065	0.032
	(0.92)	(-0.48)	(1.44)	(1.54)	(0.93)	(1.07)	(0.30)	(1.09)	(0.92)	(-2.00)	(-1.09)	(0.48)
Aid Infra (t-1)	0.024	0.017	-0.000	0.044*	0.024	0.000	0.016	0.062*	0.020	0.028	0.080	0.064*
	(0.97)	(0.43)	(-0.012)	(1.68)	(0.83)	(0.024)	(0.67)	(1.72)	(0.91)	(0.78)	(1.20)	(1.69)
CPI	0.096	0.048	0.019	-0.100*	-0.132	-0.010	-0.040	0.093	0.049	-0.144	-0.040	-0.003
	(1.29)	(1.01)	(1.12)	(-1.82)	(-1.31)	(-0.43)	(-0.89)	(0.86)	(1.66)	(-1.22)	(-0.15)	(-0.064)
Market Potential	4.566**	3.370***	0.144***	2.406	1.430	0.037	3.095**	1.688	0.093*	0.383	1.896	0.190
	(2.08)	(2.74)	(3.65)	(1.30)	(1.38)	(1.28)	(2.54)	(1.18)	(1.97)	(0.18)	(0.85)	(1.61)
Pop	-3.605	1.456	-0.020	-7.209	-4.322	0.079	-9.223	-11.32**	0.111*	-23.944	-25.657*	0.647**
	(-1.02)	(0.45)	(-0.44)	(-1.55)	(-1.06)	(1.53)	(-1.50)	(-2.27)	(1.96)	(-1.65)	(-1.87)	(2.09)
Pop squared	0.098	-0.027	0.001	0.220	0.127	-0.002	0.297	0.372**	-0.003	0.705	0.752*	-0.018**
	(0.90)	(-0.27)	(0.90)	(1.53)	(1.05)	(-1.22)	(1.59)	(2.53)	(-1.61)	(1.59)	(1.87)	(-2.03)
Exports (t-1)		0.374***	0.950***		0.268*	0.983***		0.398***	0.978***		0.256***	0.908***
		(3.94)	(68.2)		(1.81)	(59.0)		(5.29)	(62.8)		(3.17)	(21.5)
Excl. instrument		CL	CL		CL	CL		CL	CL		CL	CL
Observations	1226	977	1097	1149	925	1054	1146	923	1051	1140	912	1042
Countries	118	114	116	120	109	113	120	108	113	119	109	113
R-squared	0.358	.	.	0.182	.	.	0.247	.	.	0.180	.	.

Dependent variable is value of exports of the sector indicated in the second row; all regressions include year and country effects; all variables are in log; endogenous variables in the GMM specifications are lagged exports; Ainfra and Apc; all regressions include year effects; Robust t-statistics in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%