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Aid for Trade: Assessing the Effects on Recipient Exports of Manufactures and Primary Commodities to Donors and Non-donors*

Philipp Hühne, Birgit Meyer, and Peter Nunnenkamp

Abstract:
Considering that primary commodity dependence continues to be a major problem of various lower income countries, we analyze whether Aid for Trade (AfT) has helped recipient countries upgrade and diversify their exports. Estimating an asymmetric and aggregated gravity model, we find that AfT has been effective in promoting recipient exports of manufactures – whereas the effects on primary commodities are typically insignificant. These findings hold not only for trade relations with donor countries but also in south-south trade with other developing countries.

Keywords: aid for trade, recipient exports, export diversification, south-south trade.

JEL classification: F35, F14

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1. Introduction

Primary commodity dependence continues to be a major concern of various developing countries. The commodity sector often constitutes the key economic activity in terms of foreign exchange earnings, fiscal revenues, income growth, and employment creation: "Out of 151 developing countries, 100 depend on commodities for at least 50 per cent of their export earnings; moreover half of the countries in Africa derive over 80 per cent of their merchandise export income from commodities" (UNCTAD 2012: 11). Conversely, manufactures contribute a relatively small share to overall merchandise exports in developing countries with low and lower middle income. This share has hardly risen since the early 1990s, in contrast to the corresponding share for developing countries with upper middle income (Table 1).

As stressed by Collier (2003), primary commodity dependence and weak export diversification are problematic in several respects. In addition to the well-known problem of coping with volatile export prices of raw materials, primary commodity dependence tends to be associated "with various dimensions of poor governance" and increases "the risk of civil war" (Collier 2003: 140). In particular African countries have traditionally been plagued with these problems.

Against this backdrop, we analyze whether so-called Aid-for-Trade (AfT) has helped recipient countries upgrade and diversify their exports. AfT mainly consists of aid to improve the economic infrastructure and productive capacity in the recipient countries. These aid categories existed already prior to the official AfT initiative launched at the WTO Ministerial Conference in Hong Kong in 2005. The major objective of the AfT initiative was to overcome the supply-side and trade-related infrastructure constraints that had hindered the growth and diversification of exports of various developing countries (OECD and WTO 2011). While previous studies on the effects of aid on recipient exports focused on total exports (see Section 2 for details), we differentiate between exports of primary commodities and manufactures throughout our analysis.

Furthermore, we consider two distinct groups of trading partners, namely the donors of AfT and all low and middle income countries. This distinction allows us to capture third-country effects of AfT, while most previous studies focus on the bilateral trade relations between donors and recipients of aid. Strikingly, primary commodity dependence appears to be particularly strong in south-south trade. According to Figure 1, the share of manufactures in overall merchandise exports of AfT recipients has been lower in their trade with other low and middle income countries, compared to their trade with donor countries, since the early 1990s. In addition, by performing separate estimations for south-south trade relations we mitigate problems of endogenous aid that plague assessments of aid effectiveness in stimulating recipient-donor trade relations.

We shortly review the related literature in Section 2. We present the data used and our estimation approach in Section 3. Our empirical findings reported in Section 4 indicate that AfT is associated with higher recipient exports of manufactures, whereas their exports of primary commodities are not affected. This pattern holds for both sub-groups of trading partners. Section 5 concludes that AfT has been effective in upgrading and diversifying the exports of recipient countries.

2. Analytical background and previous findings

According to the seminal theoretical contribution of van Wijnbergen (1986: 135), "substantial but temporary aid flows will lead to temporary appreciation of the real exchange rate and will, therefore, ceteris paribus, lead to a decline in traded goods production and exports." Aid skeptics have often followed this line of reasoning on Dutch disease effects (e.g., Rajan and Subramanian 2011). As noted by Suwa-Eisenmann and Verdier (2007: 485), Dutch disease is probably "the most celebrated argument of a relationship between aid and trade flows."

In the present context of differentiating between exports of primary commodities and manufactures, it is particularly relevant that aid-induced Dutch disease can also impair export

diversification (Munemo 2011). Importantly, this applies not only to horizontal export diversification, i.e., the number of non-traditional products in the export basket, but also to vertical export diversification which "takes place by moving up the value chain to produce manufactured products" (Munemo 2011: 340). In the 1980s already, van Wijnbergen (1985) presented econometric evidence on aid-induced increases of real traded product wages in the manufacturing sector of African economies.

However, several arguments have been advanced against the view that AfT would impair export performance in general and export diversification in favor of manufactures in particular. First, Helble et al. (2012: 362) argue that specific AfT categories are "numerically small and therefore unlikely to precipitate any real exchange rate appreciation." Second, real exchange appreciation can be avoided by spending AfT on imports, rather than non-tradables (Suwa-Eisenmann and Verdier 2007). Third, Adam and Bevan (2006) reckon that, in the longer run, export-depressing Dutch disease effects are dominated by positive supply-side effects. This is mainly because aid-financed public infrastructure generates productivity spillovers which allow for higher and more diversified exports.

Donor motivations may provide another reason working against AfT-induced shifts toward manufactured exports of recipient countries. Selfish donors could be interested primarily in better access to raw materials, while they may fear fiercer competition by aid recipient countries in manufactured goods markets. Lundsgaarde et al. (2010: 739) offer the example of Gabon, a privileged recipient of French aid, to make the point that aid may "aim to assure the supply of crucial raw materials to donor firms that are produced, extracted or mined in the recipient country." However, Dreher and Fuchs (2014) do not find evidence that donor countries systematically provide more aid to recipient countries that are relatively abundant in natural resources.[1] More specifically, the allocation of AfT does not suggest that

[1] Dreher and Fuchs (2014) compare the allocation of Chinese aid with the allocation of aid from DAC donors. Their finding that neither 'new' donors such as China nor traditional DAC donors grant systematically more aid to resource rich recipient countries could have another implication for our empirical analysis below. This finding

important suppliers of raw materials are preferred targets of AfT in economic infrastructure. As shown in Figure 2, the share of manufactures in merchandise exports is correlated positively with AfT in infrastructure across aid recipient countries, which is in conflict with the pattern to be expected for selfish donors targeting resource rich recipient countries. Note also that mineral resources and mining (CRS code 322) play a minor role, attracting just 5.6 percent of AfT in production sectors during the 1995-2012 period, compared to 18.4 and 62.7 percent for industry (321) and agriculture (311), respectively.

In contrast to the effects of Dutch disease and donors' self-interest in accessing raw materials, foreign aid may induce a shift toward recipient exports of manufactures if it is effective in promoting economic growth and alleviating poverty. Aid-induced growth could reduce the primary commodity dependence of recipient countries and involve restructuring in favor of goods and services with higher income elasticities of demand. Non-traditional export items may thus benefit from scale economies which could, in turn, improve the international competitiveness of manufactured exports. It should be stressed, however, that it continues to be heavily disputed whether aid is effective in promoting economic growth (McGillivray et al. 2006; Doucouliagos and Paldam 2009).

More specifically, AfT can induce a shift toward recipient exports of manufactures if it removes bottlenecks that hinder primarily manufacturing activities. In principle, different types of AfT could stimulate exports of manufactures more strongly than exports of primary commodities. However, AfT in production sectors may have limited effects in improving productivity in manufacturing industries, recalling that this type of AfT is concentrated in agriculture rather than industry. It appears more plausible to assume that AfT related to trade facilitation in a narrow sense (CRS code 331) reduces transaction costs which have discouraged primarily exports of manufactures. Most obviously perhaps, AfT related to

renders it rather unlikely that the effects of aid on recipient exports of primary commodities differ significantly between our two sub-groups of trading partners, i.e., donor countries (which comprise only DAC donors in our analysis) and low and middle income countries (which include 'new' donors such as China in our analysis).

economic infrastructure can stimulate exports in general, and exports of manufactures in particular. There is widespread agreement in the literature that infrastructure plays an important role for the export performance of countries (e.g., Suwa-Eisenmann and Verdier 2007; Helble et al. 2012; Vijil and Wagner 2012). Moreover, Calì and Te Velde (2011) as well as Vijil and Wagner (2012) find that AfT works through the infrastructure channel to promote recipient exports. According to Wood and Mayer (2001), improved infrastructure could raise the share of manufactures in overall exports of African countries. Likewise, Osakwe (2007) argues that better infrastructure is critical for export diversification in Africa.

All in all, ex-ante reasoning points to ambiguous effects of AfT on exports of manufactures and primary commodities. This calls for empirical research. Reviewing the earlier empirical literature, Hühne et al. (2014a) find that there a few systematic assessments of the effectiveness of aid items covered by the AfT initiative. Furthermore, recent empirical studies do not present a clear picture on whether foreign aid helps promote the exports of recipient countries. The findings of Calì and Te Velde (2011), Helble et al. (2012) and Hühne et al. (2014a) suggest that AfT has been effective in increasing recipient exports. Pettersson and Johansson (2013) find the effect of AfT on recipient exports to be small, compared to the effects of other types of aid. Brenton and von Uexkull (2009) show that product-specific technical assistance projects coincided with increased exports of supported product lines; but the selection of projects may have been biased towards promising product lines. According to Nowak-Lehmann et al. (2013), the impact of aid on recipient exports is insignificant. The earlier study of Munemo et al. (2007: 430) even finds that "a large amount of foreign aid adversely affects export performance of developing countries."

Most of these studies focus on total (non-oil) exports, often in a strictly bilateral donor-recipient setting.[2] More closely related to our work, Munemo (2011) assesses the

[2] Brenton and von Uexkull (2009) provide an obvious exception by considering product-specific technical assistance. Pettersson and Johansson (2013) consider exports in several sub-sectors, though not in the estimations with AfT as an explanatory variable. Calì and Te Velde (2011) match sector-specific exports with

effects of aid on export diversification in the recipient countries. He finds that more aid is associated with stronger export diversification, as reflected in the ratio of manufactured exports to GDP, unless aid exceeds 20 percent of the recipient country's GDP. However, Munemo (2011) considers total aid, rather than AfT. Moreover, Munemo does not differentiate between donors and non-donors as distinct groups of trading partners as we do in the following. Hühne et al. (2014b) focus on south-south trade, finding that AfT has strengthened the trade relations of AfT recipients with other developing countries. However, their analysis does not distinguish between trade in manufactures and primary commodities.

3. Data and method[3]

Data issues

The empirical analysis in Section 4 is based on data for the 1990-2012 period.[4] We do not use data for the more distant past because of serious under-reporting of donors on sector-specific aid in earlier years. Our sample consists of all recipient and donor countries listed in the International Development Statistics (IDS) of the OECD's Development Assistance Committee (DAC).[5] The IDS contains the project-based Creditor Reporting System (CRS) and the aggregate DAC statistics on the geographical distribution of financial flows. Following Michaelowa and Weber (2007), Kretschmer et al. (2013) and Hühne et al. (2014a), we combine these two databases to arrive at sector-specific disbursements of AfT.[6]

From the CRS we take sector-specific commitments of AfT by donor *j* to recipient *i* in sector *s* and year *t*, $aft_{sjit}^{com\ CRS}$. These data are adjusted to mitigate two potential biases: (i) a

corresponding items of AfT in production sectors. They stack the sector-specific observations to assess whether AfT in specific production sectors stimulates the exports of these sectors, finding no evidence of a causal relation.

[3] This section draws extensively on Hühne et al. (2014a).

[4] See also the summary statistics in Appendix 1.

[5] For details, see: http://stats.oecd.org/qwids/. Note that we use aid data as well as trade data in current prices. However, we include time dummies in all our estimations.

[6] Aid disbursements are generally preferred over aid commitments in the aid effectiveness literature. However, sector-specific disbursements are available only for the most recent past.

potential upward bias as donors typically promise more aid than is actually disbursed; (ii) a potential downward bias due to under-reporting of project-based aid in the CRS.[7] We account for the first bias by multiplying with the ratio of total aid disbursements over total aid commitments by donor *j* to recipient *i* in year *t* as available from DAC statistics. We account for the second bias by multiplying with the ratio of total aid commitments from DAC statistics over the accumulated project-based commitments as given in the CRS. As is common in the relevant literature, we assume that both biases would affect aid in all specific sectors to the same extent. Aggregating over all donors *j*, we obtain sector-specific disbursements of AfT:

$$aft_{sit} = \sum_j aft_{sjit}^{com\ CRS} \frac{aid_{jit}^{disb\ DAC}}{\sum_s aid_{sjit}^{com\ CRS}}$$

We consider sectors *s* of AfT in line with the official OECD-WTO initiative (OECD 2006). Accordingly, total AfT comprises the following sectors grouped into three AfT categories: (i) Trade Policies and Regulations (CRS Code 331), *aft_Pol*; (ii) Economic Infrastructure, *aft_Inf*, consisting of Transport and Storage (210), Communications (220), and Energy Generation and Supply (230); (iii) Building Productive Capacity, *aft_Prod*, consisting of Banking and Financial Services (240), Business and Other Services (250), Agriculture (311), Forestry (312), Fishing (313), Mineral Resources and Mining (322), Industry (321), and Tourism (332).

As noted before, these aid categories existed already prior to the AfT initiative of 2005, even though donors have pledged to commit additional funds since then. According to the OECD and WTO (2011), "aid for trade is not a new global fund, nor a new aid category. On the contrary, aid for trade is an integral part of regular official development assistance

[7] Under-reporting has become less serious over time, but cannot be ruled out for the early 1990s.

(ODA)." Throughout the period of observation, total AfT accounted for 26.1 percent of overall aid as reported in the CRS. AfT's share in total aid was roughly halved from 1995 to 2005 when donors increasingly focused on aid in social infrastructure such as education and health (see Figure 3). However, this trend was stopped and reversed after the WTO Ministerial Conference in Hong Kong in 2005 when the AfT program was launched. In current dollars, total AfT more than doubled since then, exceeding US$53 billion in 2012.

The trade data are from the United Nations Comtrade database.[8] Following Head et al. (2010) and Pettersson and Johansson (2013), we use Comtrade data as reported by the importing country; i.e., we use the imports of country A from country B, instead of the exports of country B to country A, whenever Comtrade reports both series. In rare cases when exports of B to A are larger than imports of A from B or when imports are not reported by country A, we use the corresponding export data if these are reported by country B.[9]

Data on GDP (GDP_{it}) and population (POP_{it}) are from the World Bank's World Development Indicators (WDI) (http://data.worldbank.org). The distance between the recipient country's and the donor countries' most populated agglomerations ($Dist_{ij}$) is taken from the CEPII database to construct our market access variable (see below).[10]

Estimation approach

Our estimation strategy is based on the gravity model, first introduced in the analysis of international trade by Tinbergen (1962). Since foreign aid flows from advanced countries to less developed countries we consider an asymmetric version of the model of Anderson and

[8] We downloaded the data in current US$ according to SITC revision 2 (Standard International Trade Classification) in July 2014 (http://comtrade.un.org/db/default.aspx).

[9] In these cases, the export data are 'inflated' to account for the fact that import data reported by the importer are typically higher than the corresponding export data reported by the exporter. The adjustment factor is given by the average margin of imports over the corresponding exports.

[10] Available at http://www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=6. For further description of the data see Mayer and Zignago (2011).

van Wincoop (2003). We aggregate the bilateral components of the gravity model and estimate the following relationship:[11]

$$Export_{it} = GDP_{it}{}^{\beta_1} \, AfT_{it}{}^{\beta_2} \, D_{it}{}^{\beta_3} \exp(\delta_1 \mu_i + \delta_2 \lambda_t) \quad (1)$$

where $Export_{it}$ represents either the exports of manufactured goods, X_Man_{it}, or the exports of primary commodities, X_Prim_{it}, of recipient country i in year t to trading partners j;[12] μ_i are recipient country fixed effects and λ_t are time fixed effects. In our baseline estimation, trading partners j comprise all countries across the world. Subsequently, we differentiate between donor countries and all low and middle income countries as trading partners of recipient country i. Exports to the latter group reflect recipient country i's integration into south-south trade.

AfT_{it} is our explanatory variable of principal interest, defined as total AfT (or major sub-categories: aid for economic infrastructure, productive capacity, or trade facilitation) received by country i from all donor countries. We control for the recipient country's GDP (GDP_{it}).

Our approach aggregates the exports of individual recipient countries over all relevant trading partners (see above for the three relevant groups). Hence, we construct a proxy on market access and trade costs, D_{it}, for each recipient country, as the weighted sum of trade costs and market opportunities in relation to all relevant trading partners j.

$$D_{it} = \sum_j GDP_{jt}^{\widehat{\theta}_1} \; POP_{jt}^{\widehat{\theta}_2} \; Dist_{ij}^{\widehat{\theta}_3} \quad (2)$$

[11] This approach is theoretically well founded. Polak (2006) and Redding and Venables (2004) follow a similar strategy.

[12] Manufactured goods X_Man_{it} comprise SITC categories 5-8; we consider all remaining SITC categories to approximate exports of primary commodities X_Prim_{it}. In additional estimations, we consider recipient exports of each specific SITC category (at the one-digit level) as the dependent variable.

We follow Polak (1996), Redding and Venables (2004) and Warin et al. (2009) and derive D_{it} by using the estimated coefficients of a standard gravity model as weights (see Polak 1996: 535). The auxiliary calculation includes a set of dyadic gravity-type variables which would otherwise be lost due to aggregation, such as $Dist_{ij}$, which is the distance between recipient i and trading partners j. Consequently, D_{it} fully accounts for the factors shaping the supply of exports by recipient i to trading partners j.

We run nested regressions pooling both types of exports, X_Man_{it} and X_Prim_{it}, rather than performing separate regressions for each type of exports.[13] Nesting allows us to employ Wald tests to test for differences in the importance of our explanatory variables on both types of exports. Note, however, that we introduce two dummy variables: The first is set equal to one for manufactured exports of the recipients and zero otherwise, while the second is set equal to one for the exports of primary commodities of the recipients and zero otherwise. We then interact these dummy variables with *AfT* and the other explanatory variables, mirroring individual regressions for exports of manufactures and primary commodities.

4. Results

Exports to all trading partners

In this section, we consider the exports of AfT recipient countries to all trading partners, including the donors of AfT as well as all low and middle income countries. Table 2 presents our baseline results. For each explanatory variable we show two coefficients revealing the effects on (i) the exports of manufactures of recipient country i to all trading partners and (ii) the exports of primary commodities of recipient country i to all trading partners. In addition, the p-values of the Wald tests are given in the first line for each explanatory variable to assess

[13] When running the additional estimations with SITC-specific exports as the dependent variable, we nest recipient exports to donor countries and recipient exports to all low and middle income countries. The Wald tests then test for differences in the importance of our explanatory variables on the exports to both sub-samples of trading partners.

whether the two coefficients differ significantly from each other. All explanatory variables are lagged by one year in Table 2.

Regarding our variable of principal interest, we consider total AfT in column (1) before differentiating between the three specific AfT categories, i.e., economic infrastructure in column (2), productive capacity in column (3), and trade policy and regulations in column (4). The control variables are the same in the estimations with different AfT categories.

The coefficients on the control variables are largely as expected. The recipient country's GDP proves to be significantly positive at the one percent level in all four estimations. This applies to both exports of manufactures and primary commodities. Moreover, the corresponding Wald tests indicate that the effect of the recipient country's GDP is similarly strong on both types of exports. The variable capturing export opportunities in relation to all trading partners (*Market Access*) is significant and positive whenever exports of manufactures represent the dependent variable. By contrast, this variable is statistically insignificant at conventional levels with exports of primary commodities as the dependent variable. This suggests that the construction of our proxy on market access and trade costs, D_{it}, according to equation (2) above is more appropriate for manufactured exports than for exports of primary commodities. This is hardly surprising considering that demand for raw materials is relatively inelastic, making factors such as the geographical distance between trading partners less likely to shape the demand for important raw materials offered by a limited number of AfT recipients.

Turning to AfT as our variable of principle interest, column (1) of Table 2 shows that total AfT is positively associated with exports of manufactures, though only at the ten percent level of significance. Taking the coefficient at face value, a doubling of total AfT would imply an increase in manufactured exports by slightly less than four percent – a relevant, though modest effect in quantitative terms. The coefficient on AfT is smaller and insignificant with exports of primary commodities as the dependent variable in column (1). Nevertheless,

the corresponding Wald test does not point to significantly different effects of total AfT on both types of recipient exports.[14]

A similar pattern can be seen in columns (2) and (3) of Table 2. The quantitative impact of AfT on manufactured exports is somewhat stronger when considering the two major sub-categories of AfT meant to improve economic infrastructure (column 2) and productive capacity (column 3) in the recipient country. At the same time, both sub-categories resemble total AfT in that they have no significant effects on recipient exports of primary commodities.[15] Note also that the Wald test reported for AfT in infrastructure borders statistical significance at the ten percent level. The results on AfT in column (2) are consistent with the earlier observation in Figure 2, suggesting that the allocation of AfT in infrastructure favors recipients with higher shares of manufactures in overall merchandise exports. More surprisingly perhaps, AfT in column (3) does not lead to significantly higher exports of primary commodities even though the agricultural sector receives the majority of AfT aiming at improved productive capacity. It seems that AfT in agriculture is concentrated on local-market oriented farming by smallholders, rather than world-market oriented cash crops.

AfT in column (4) of Table 2 covers the smallest sub-category, namely trade facilitation in the narrow sense (CRS code 331: Trade Policies and Regulations). The results on this sub-category of AfT are particularly striking. In contrast to the bulk of AfT, higher AfT in this sub-category is associated with higher recipient exports of both types. The quantitative impact on recipient exports of manufactures more than doubles to about ten percent (when doubling AfT). The quantitative impact on recipient exports of primary commodities appears to be smaller (about seven percent), but the corresponding Wald test

[14] In additional estimations (not shown to save space), we extended the lag of the AfT variables to two years. Endogeneity concerns may be mitigated in this way. Furthermore, this modification takes into account that AfT effects on recipient exports could be delayed. The results on recipient exports of manufactures are hardly affected when extending the lag of AfT, while the results on recipient exports of primary commodities then also prove to be significant and positive. Once again, the Wald test does not point to significantly different effects of total AfT on both types of recipient exports.

[15] However, the coefficients on both sub-categories of AfT are significant and positive when extending the lag of the AfT variables to two years, as was the case for total AfT.

does not point to statistically significant differences between the two types of exports. Taken together, the results in column (4) corroborate the findings of Hühne et al. (2014a) on the effectiveness of the smallest category of AfT in intensifying the overall trade relations between recipient and donor countries.

Exports to donors and developing countries

In the next step, we split the overall sample of trading partners into two sub-groups: DAC donor countries of AfT and all low and middle income countries. This distinction serves two purposes. First, by assessing the effects of AfT on recipient exports to the donors of AfT, we follow large parts of the literature which has focused on recipient-donor trade relations (see Section 2). Our results are thus better comparable to those of previous studies. Second, considering recipient exports to all low and middle income countries is interesting in its own right, recalling from Figure 1 that primary commodity dependence is relatively strong in south-south trade (which has traditionally been regarded as a means to strengthen economic ties among developing countries; see, e.g., South Commission 1990). In addition, evaluating the effects of AfT on south-south trade helps address endogeneity concerns. It may be difficult to disentangle the effects of aid on the trade relations between donors and recipients insofar as the allocation of aid is shaped by the self-interest of donors to promote their own exports or to get better access to raw materials in the recipient countries. By contrast, the effects of aid on trade relations with third countries such as other developing countries are less likely to be distorted by the endogeneity of aid (Hühne et al. 2014b).[16]

We re-estimate our baseline model for the two sub-groups of trading partners and report the results for recipient exports to DAC donors in Table 3, and those for recipient

[16] It should be noted that non-DAC countries have increasingly emerged as so-called 'new' donors. China is the most prominent case in point. The available evidence suggests, however, that non-traditional sources of official aid continue to play a minor role, compared to the overall volume of DAC aid (Dreher et al. 2011). Furthermore, the findings of Dreher and Fuchs (2014) contradict the widely held view that Chinese aid is motivated mainly by getting access to raw materials. Dreher et al. (2011: 1950) conclude from a comparison of DAC and non-DAC donors that "concerns that commercial self-interest distorts the allocation of aid seem to be overblown for both groups."

exports to low and middle income countries in Table 4. As can be seen, the results in Table 3 largely resemble those for the overall sample of trading partners in Table 2. As concerns the control variables, there is one notable exception, however. In contrast to Table 2, our market access variable is statistically insignificant at conventional levels in three of the four estimations shown in Table 3 even when recipient exports of manufactures represent the dependent variable. Note that the size of the coefficients on *Market Access* is hardly affected when limiting the sample of trading partners to DAC donors, but the estimates are less precise so that the variable loses its significance.[17]

The coefficients on our AfT variables are again insignificant in Table 3 when recipient exports of primary commodities represent the dependent variable. In contrast, the size of all four coefficients on the AfT variables (and mostly also the level of statistical significance) increases in Table 3, compared to Table 2, when recipient exports of manufactures represent the dependent variable. The quantitative impact now varies between an increase of 6.7 percent in manufactured exports when total AfT doubles (column 1) and an increase of 13.6 percent when aid for trade facilitation in the narrow sense doubles (column 4). Taken together the results for the two types of recipient exports in Table 3 are consistent with earlier findings of Hühne et al. (2014a) who report a weaker quantitative impact of AfT on overall exports (manufactures plus primary commodities) of recipient countries to donor countries. At the same time, the nested estimations for the two types of exports in Table 3 suggest that AfT effects are unlikely to be distorted due to endogenous aid. If at all, selfish donor motives in the allocation of AfT should have resulted in an upward bias of the coefficient on AfT with recipient exports of primary commodities representing the dependent variable. In contrast to regarding AfT as a means to access raw materials, it is hardly plausible to assume that donors

[17] Arguably, our proxy of market access fails to capture cost factors which could be particularly important as a determinant of manufactured exports of AfT recipients to advanced DAC donor countries (e.g., in the context of international outsourcing and offshoring).

favored more competitive recipients in manufactured goods markets when deciding on the allocation of AfT.

Turning to the sub-sample of low and middle income countries as trading partners, Table 4 reveals much stronger results on our market access variable, compared to Table 3. All coefficients on *Market Access* prove to be statistically significant at the one percent level, independent of whether recipient exports of manufactures or primary commodities represent the dependent variable in the nested regressions. While the coefficients are rather small with manufactured exports as the dependent variable, compared to the overall sample of trading partners and the sub-sample of donor countries, they are estimated more precisely than before. More surprisingly perhaps, the statistically significant coefficients with primary commodities as the dependent export variable suggest that the demand for raw materials is more elastic in lower income countries than in advanced countries; this would explain why our proxy of market access and trade costs performs better in capturing the demand for raw materials in lower income countries.

Importantly, the results on our AfT variables of principal interest are fairly robust when running the estimations for the sub-sample of low and middle income countries as trading partners of AfT recipients. The quantitative impact of AfT on recipient exports of manufactures to all other low and middle income countries appears to be somewhat weaker than for the corresponding estimations in Table 3 with DAC donors as trading partners. Nevertheless, Table 4 underscores the earlier finding that the quantitative impact on manufactured exports is particularly strong for the smallest AfT category, i.e., aid for trade facilitation in column (4). Moreover, this AfT category is once again the only one which is also associated with higher exports of primary commodities in a significant way. Other categories of AfT have no significant effect on recipient exports of primary commodities to low and middle income countries, which is in line with previous findings for the overall sample of trading partners and the sub-sample of donor countries.

Exports in specific SITC categories

In the final step of our empirical analysis, we assess the effects of AfT on recipient exports of specific SITC categories (at the one-digit level).[18] Therefore, we adjust the estimation approach. Specifically, we now nest recipient exports to the two sub-groups of trading partners, DAC donor countries and all low and middle income countries, as alternative representations of the dependent export variable (instead of nesting the exports of manufactures and primary commodities). Accordingly, the Wald tests now test for significant differences in the impact of AfT and other explanatory variables between the sub-groups of trading partners.

The results of this exercise are reported in Table 5. Recall that SITC categories 5-8 have been subsumed under manufactured exports before, while all other SITC categories have been subsumed under primary commodities. The results on the control variables are largely as before, except that the recipient countries' GDP loses its significance in the estimations with exports of SITC categories 0-4 to low and middle income trading partners (south-south trade in primary commodities). Interestingly, we once again find that the proxy of market access performs better, in terms of statistical significance, in several SITC categories of primary commodities when considering south-south trade, rather than recipient exports to donors. This applies especially to food products (SITC 0) where the Wald test proves to be highly significant. On the other hand, the Wald tests point to a significantly stronger effect of *Market Access* on recipient exports of manufactured SITC categories 5 and 6 to DAC donor countries.

Turning to the effects of AfT, the results for specific SITC categories in Table 5 largely corroborate the previous finding that total AfT has been effective in stimulating manufactured exports of recipient countries to both sub-samples of trading partners, whereas AfT appears to be largely unrelated to recipient exports of primary commodities. The

[18] At this stage, we restrict the analysis to total AfT and omit the three sub-categories of AfT in order to avoid clutter.

quantitative impact of AfT seems to be particularly strong for exports of SITC 6, comprising manufactured goods classified mainly by materials, to both groups of trading partners. The coefficients on AfT vary somewhat more between the two groups in SITC 7 and 8, but the corresponding Wald tests do not reveal significant differences. The insignificant effect of AfT on exports of chemicals may be attributed to the minor importance of SITC 5 in the export portfolio of AfT recipients. Considering the total sample of all trading partners, SITC 5 accounted for less than five percent of total exports throughout the period of observation – which is just a fraction of the corresponding shares of the other manufacturing SITC categories 6, 7, and 8 (Figure 4).

Likewise, some of the weak results for specific SITC categories of primary commodities may be attributed to their marginal importance in the overall export portfolio of AfT recipients. SITC category 4 (oils and fats) provides a case in point (Figure 4). In contrast, SITC 3, comprising mineral fuels, contributes a large share to overall exports, while AfT played a marginal role in this sector (see Section 2). The picture is more ambiguous for SITC categories 0 and 1, where AfT appears to be associated with higher exports of food products to donor countries and higher exports of beverages and tobacco to developing countries. Note, however, that all Wald tests for the AfT variable reported in Table 5 point to insignificant differences between the effects of AfT on recipient exports to donor countries and the effects of AfT on exports to low and middle income countries.

5. Conclusion

Considering that primary commodity dependence continues to be a major problem of various developing countries, we analyzed whether AfT has helped recipient countries upgrade and diversify their exports. Specifically, we assessed the effects of AfT on recipient exports of manufactures which contribute a relatively small share to overall merchandise exports of many lower income countries. Our estimation strategy is based on the well-known gravity

model; we aggregate bilateral recipient exports over all relevant trading partners since it is "the effect of aid on the total and not the bilateral level of exports that is of greatest importance for development" (Pettersson and Johansson 2013: 687).

Our empirical analysis complements previous research on the trade effects of AfT in several respects. First of all, we distinguish between recipient exports of manufactures and primary commodities while the earlier literature focuses on total exports. Nesting these two types of exports, we test for significant differences in the impact of AfT. At the same time, we distinguish between two groups of trading partners of AfT recipient countries: (i) the DAC donor countries providing AfT and (ii) all low and middle income countries to capture the effects of AfT on south-south trade. Finally, we perform additional estimations where we consider recipient exports of specific SITC categories. At this stage, we nest SITC-specific exports to the two groups of trading partners – again to test for significant differences in the impact of AfT.

We find that AfT has been effective in promoting recipient exports of manufactures. In contrast, the effects of AfT on primary commodity exports are typically statistically insignificant. A similar pattern emerges from the estimations for recipient exports of specific SITC categories: The effects of AfT tend to be positive and significant for SITC categories of manufactures, whereas the effects are mostly insignificant for SITC categories comprising primary commodities. Taken together, this clearly suggests that AfT has contributed to the upgrading and diversification of recipient exports. The quantitative impact is modest, however; a doubling of total AfT is associated with an increase in manufactured exports to all trading partners by about four percent.

Importantly, the findings on manufactures and primary commodities hold for recipient exports to both groups of trading partners. This has several implications. In general terms, it is reassuring that we find similar effects of AfT beyond the bilateral donor-recipient relations where the endogeneity of aid may bias the results. Endogeneity concerns are rather unlikely to

distort the effects of AfT on trade with ‘third countries’ such as south-south trade with other low and middle income countries. This is even though some trading partners in the south, in particular China, have emerged as ‘new’ donors of official aid. More specifically, our findings do not support the widely held belief that AfT is mainly motivated by the donors’ self-interest in accessing raw materials in the recipient countries. Finally, the positive effects of AfT on manufactured exports to trading partners with low and middle income are relevant in their own right, since the persistent dependence of various countries on primary commodities is not least due to traditional south-south trade patterns.

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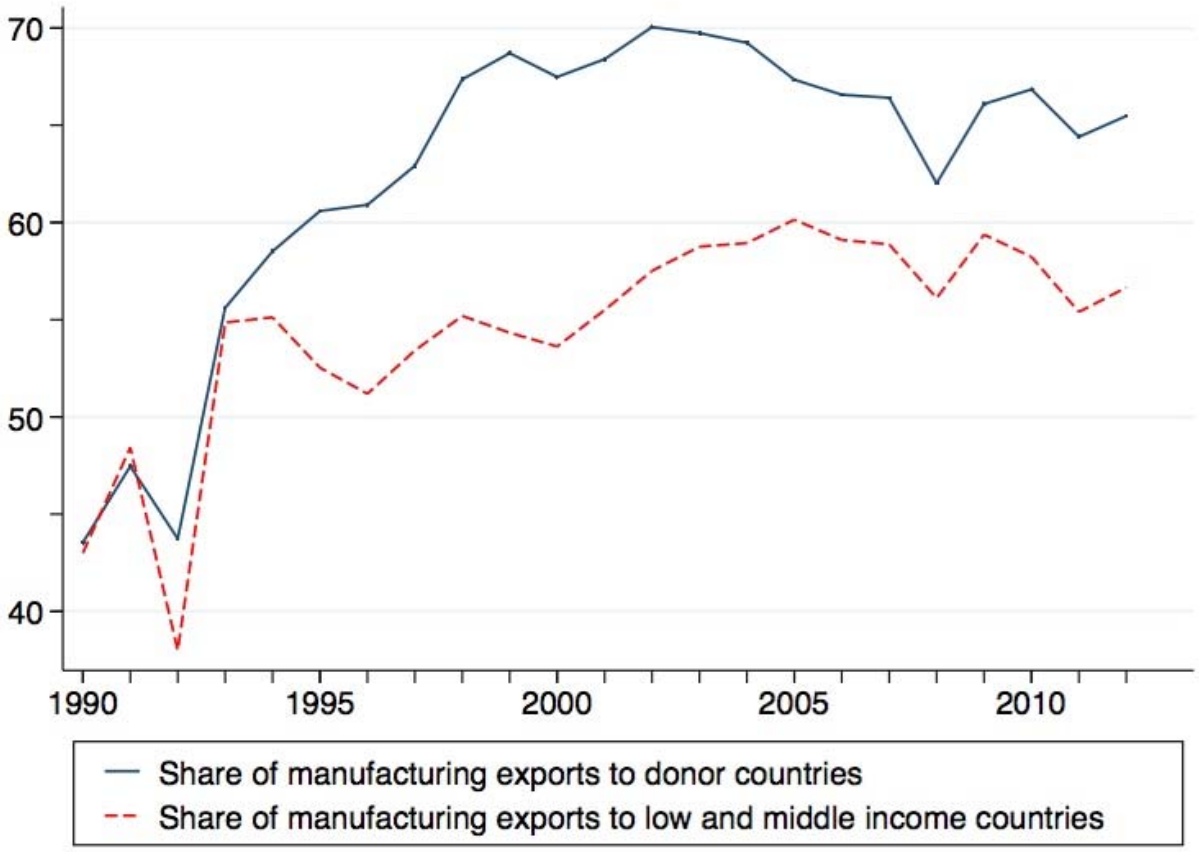
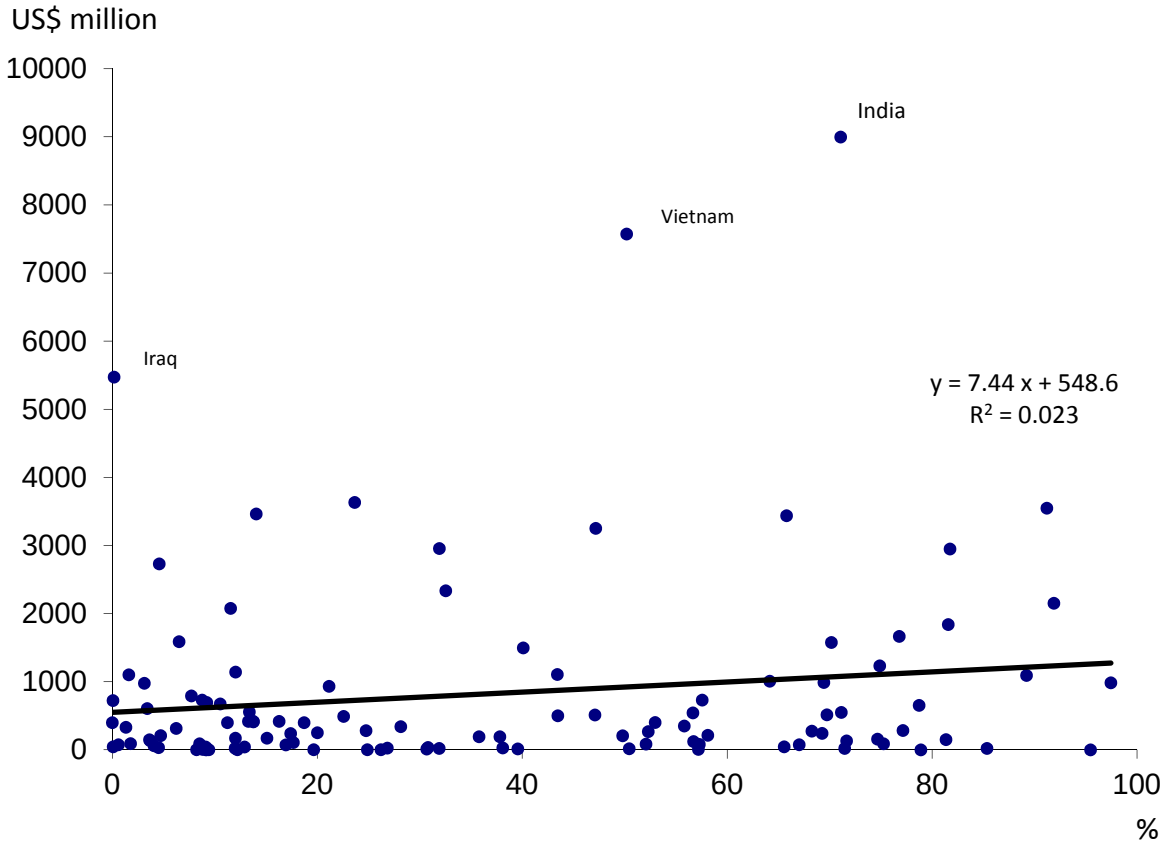
Figure 1 – Share of manufactures in overall merchandise exports of AfT recipients to donor countries and low and middle income countries, 1990 to 2012



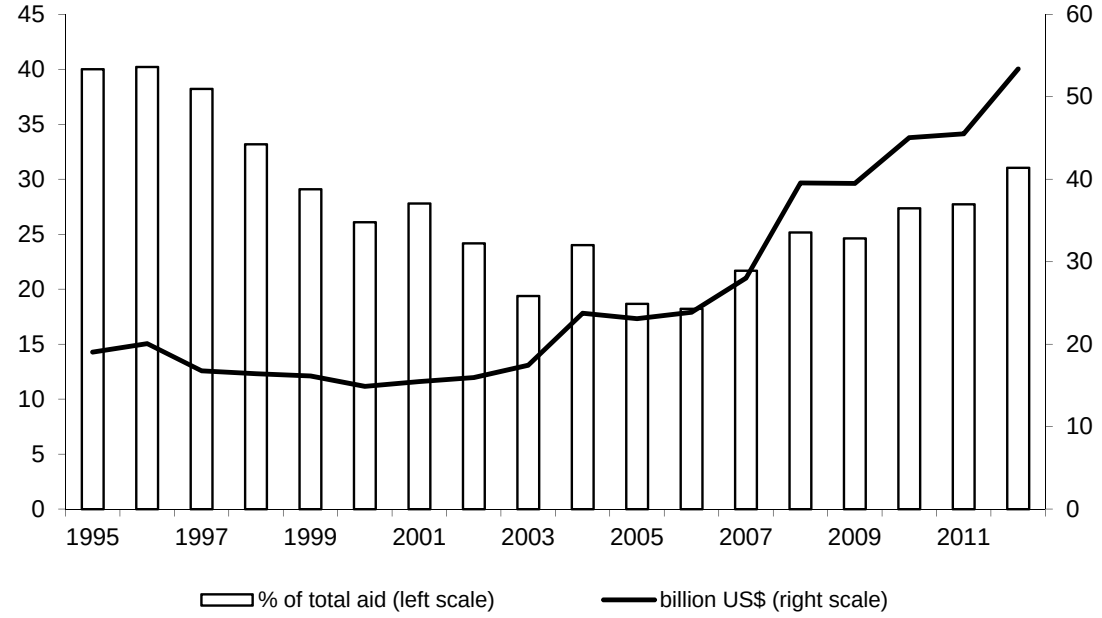
Source: Comtrade

Figure 2 – Share of manufactures in merchandise exports (%) and AfT in infrastructure (US$ million): Correlation across aid recipient countries



Notes: Share of manufactures in 2005; sum of AfT in infrastructure (CRS code 200) in 2006-2010.
Source: World Bank, WDI; OECD-DAC, Creditor Reporting System

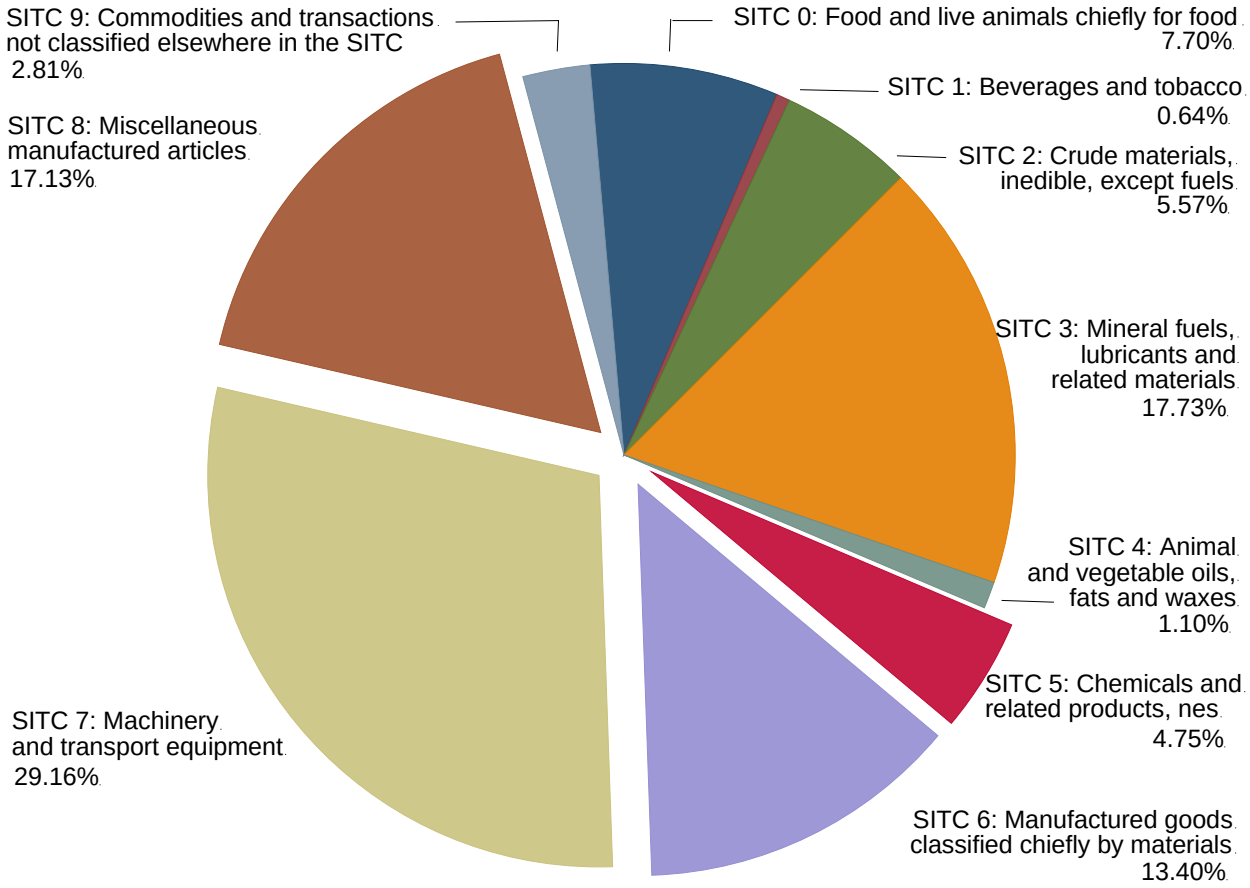
Figure 3 – Aid-for-Trade, 1995–2012 (billion US$ and share in total aid) [a]



[a] Commitments in current US$

Source: OECD-DAC, Creditor Reporting System.

Figure 4 – Structure of exports of AfT recipients by SITC categories (% of total exports), average for the 1990-2012 period



Source: Comtrade

Table 1 – Manufactured exports by income groups of AfT recipient countries, 1990-2012 (% of merchandise exports) [a]

	1990	2000	2005	2010	2012
Low income	n.a.	49.7	52.6	n.a.	n.a.
Lower middle income	47.3[b]	53.3	57.4	45.9	49.0
Upper middle income	56.8	69.9	70.0	68.3	72.3

[a] Manufactures comprise SITC categories 5-8 (excluding SITC 68). – [b] 1991.

Source: World Bank, WDI.

Table 2 – Effects of AfT on recipient exports of manufactures and primary commodities: All trading partners

	(1) Total	(2) Infrastructure	(3) Productive capacity	(4) Policy
Aid for Trade				
Wald test	0.255	0.100	0.156	0.248
Manufacturing	**0.0389***	**0.0494****	**0.0501****	**0.107*****
	(0.0197)	(0.0208)	(0.0210)	(0.0358)
Primary commodities	0.0184	0.0179	0.0223	**0.0683*****
	(0.0178)	(0.0176)	(0.0188)	(0.0228)
Market Access				
Wald test	0.131	0.125	0.130	0.137
Manufacturing	**0.744****	**0.749****	**0.746****	**0.738****
	(0.317)	(0.317)	(0.317)	(0.315)
Primary commodities	0.358	0.358	0.359	0.357
	(0.223)	(0.222)	(0.223)	(0.221)
GDP				
Wald test	0.629	0.613	0.617	0.640
Manufacturing	**0.895*****	**0.891*****	**0.888*****	**0.889*****
	(0.303)	(0.303)	(0.303)	(0.303)
Primary commodities	**1.042*****	**1.045*****	**1.040*****	**1.032*****
	(0.171)	(0.171)	(0.170)	(0.170)
Observations	5,294	5,294	5,294	5,294
Number of id	258	258	258	258
overall R2	0.0743	0.0556	0.0666	0.0635

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; country and year fixed effects included in each specification. The average trade cost and market access is calculated using the weights of Polak (1996). All variables are in logs.

Table 3 – Effects of AfT on recipient exports of manufactures and primary commodities: Exports to donor countries

	(1) Total	(2) Infrastructure	(3) Productive capacity	(4) Policy
Aid for Trade				
Wald test	0.052	0.008	0.038	0.106
Manufacturing	**0.0666****	**0.0841*****	**0.0742*****	**0.136*****
	(0.0259)	(0.0270)	(0.0271)	(0.0445)
Primary commodities	0.0165	0.0118	0.0188	**0.0665****
	(0.0225)	(0.0219)	(0.0234)	(0.0290)
Market Access				
Wald test	0.302	0.287	0.305	0.313
Manufacturing	0.764	**0.778***	0.759	0.749
	(0.463)	(0.462)	(0.463)	(0.461)
Primary commodities	0.310	0.309	0.308	0.309
	(0.262)	(0.263)	(0.262)	(0.262)
GDP				
Wald test	0.195	0.179	0.193	0.216
Manufacturing	**0.891****	**0.884****	**0.888****	**0.900****
	(0.366)	(0.363)	(0.366)	(0.368)
Primary commodities	**1.393*****	**1.399*****	**1.392*****	**1.382*****
	(0.207)	(0.207)	(0.208)	(0.207)
Observations	5,292	5,292	5,292	5,292
Number of id	258	258	258	258
overall R2	0.425	0.415	0.447	0.404

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; country and year fixed effects included in each specification. The average trade cost and market access is calculated using the weights of Polak (1996). All variables are in logs.

Table 4 – Effects of AfT on recipient exports of manufactures and primary commodities: Exports to low and middle income countries

	(1) Total	(2) Infrastructure	(3) Productive capacity	(4) Policy
Aid for Trade				
Wald test	0.322	0.354	0.283	0.296
Manufacturing	**0.0475****	**0.0465****	**0.0554****	**0.115*****
	(0.0233)	(0.0232)	(0.0252)	(0.0436)
Primary commodities	0.0240	0.0246	0.0270	**0.0685****
	(0.0221)	(0.0220)	(0.0226)	(0.0327)
Market Access				
Wald test	0.316	0.309	0.318	0.302
Manufacturing	**0.422*****	**0.419*****	**0.422*****	**0.416*****
	(0.146)	(0.146)	(0.146)	(0.147)
Primary commodities	**0.553*****	**0.552*****	**0.553*****	**0.551*****
	(0.190)	(0.190)	(0.191)	(0.191)
GDP				
Wald test	0.437	0.430	0.442	0.434
Manufacturing	**0.703****	**0.709****	**0.699****	**0.701****
	(0.272)	(0.274)	(0.272)	(0.276)
Primary commodities	**0.475***	**0.477***	**0.473***	**0.469***
	(0.244)	(0.244)	(0.244)	(0.245)
Observations	5,290	5,290	5,290	5,290
Number of id	258	258	258	258
overall R2	0.265	0.260	0.469	0.499

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; country and year fixed effects included in each specification. The average trade cost and market access is calculated using the weights of Polak (1996). All variables are in logs.

Table 5 – Effects of AfT on recipient exports of specific SITC categories: Nested exports to donor countries and developing countries

SITC category	0	1	2	3	4	5	6	7	8	9
Commodity group	Food and live animals	Beverages and tobacco	Crude materials, inedible, except fuel	Mineral fuels, lubricants and related materials	Animal and vegetable oils, fats and waxes	Chemicals and related products	Manufactured goods, chiefly by materials	Machinery and transport equipment	Miscellaneous manufactured articles	Commodities and transactions not classified elsewhere
Aid for Trade										
Wald test	0.256	0.234	0.832	0.410	0.249	0.641	0.469	0.523	0.355	0.903
Trade with donors	**0.0886*** **	0.0623	0.0432	-0.156	0.0125	0.0636	**0.118*** **	**0.0614** **	**0.0587** **	0.0345
	(0.0313)	(0.0660)	(0.0296)	(0.118)	(0.0800)	(0.0578)	(0.0367)	(0.0262)	(0.0278)	(0.0465)
South-south trade	0.0450	**0.156** **	0.0340	-0.0523	0.110	0.0339	**0.0904*** **	0.0415	**0.0941*** **	0.0283
	(0.0360)	(0.0745)	(0.0301)	(0.0877)	(0.0807)	(0.0302)	(0.0271)	(0.0286)	(0.0309)	(0.0525)
Market Access										
Wald test	0.000	0.799	0.849	0.729	0.563	0.039	0.011	0.525	0.892	0.223
Trade with donors	-0.307	**1.742** **	0.217	**2.671** *	**1.785** *	**2.438*** **	**1.202*** **	**1.157** **	**1.021** **	0.718
	(0.380)	(0.772)	(0.720)	(1.452)	(0.932)	(0.904)	(0.385)	(0.554)	(0.414)	(0.589)
South-south trade	**1.401*** **	**1.529*** **	**0.376** *	**2.144*** **	**1.264*** **	**0.447** **	0.133	**0.857*** **	**0.958*** **	**1.473*** **
	(0.302)	(0.374)	(0.207)	(0.357)	(0.450)	(0.208)	(0.198)	(0.246)	(0.202)	(0.365)
GDP										
Wald test	0.135	0.150	0.028	0.094	0.034	0.516	0.515	0.550	0.052	0.131
Trade with donors	**0.897*** **	0.800	**0.778** **	**2.469** **	**2.514** **	**1.239** **	0.742	**0.645** **	**1.184*** **	**1.852*** **
	(0.301)	(0.610)	(0.298)	(1.190)	(0.971)	(0.574)	(0.581)	(0.306)	(0.310)	(0.448)
South-south trade	0.310	-0.307	0.0992	0.627	0.631	**0.853*** **	**1.071*** **	0.468	**0.479** *	**0.843** *
	(0.382)	(0.683)	(0.335)	(0.783)	(0.769)	(0.323)	(0.281)	(0.327)	(0.287)	(0.504)
Observations	5,291	5,291	5,291	5,291	5,291	5,291	5,291	5,291	5,291	5,291
Number of id	258	258	258	258	258	258	258	258	258	258
overall R2	0.000651	0.000476	0.0233	0.00458	0.000502	0.00874	0.0725	0.0210	0.128	0.541

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; country and year fixed effects included in each specification. The average trade cost and market access is calculated using the weights of Polak (1996). All variables are in logs.

Appendix 1 – Summary statistics

Variable	Obs.	Mean	Std. dev.	Min	Max
GDP	2841	6.20E+10	2.40E+11	1.60E+07	4.52E+12
AfT Total	3059	23.93434	104.4133	-12.13519	2246.332
AfT Infrastructure	3059	1.246445	8.38248	-7.105142	342.2176
AfT Productive capacity	3059	11.58625	52.04139	-20.25916	942.5631
AfT Policy	3059	11.10164	64.7952	-12.02743	1813.048
Trade with all					
Primary commodities	2967	6.57E+09	1.68E+10	1666	1.95E+11
Manufacturing	2968	1.19E+10	8.88E+10	66770	2.16E+12
Market Access	2968	1.47E+13	4.87E+12	2.59E+11	3.09E+13
Trade with donors only					
Primary commodities	2963	3.74E+09	9.56E+09	5773	1.01E+11
Manufacturing	2964	6.93E+09	5.10E+10	5.92E+03	1.11E+12
Market Access	2965	1.03E+13	3.09E+12	7.25E+11	2.06E+13
South-south trade only					
Primary commodities	2963	2.36E+09	7.09E+09	841	1.03E+11
Manufacturing	2965	3.12E+09	2.25E+10	1577	6.27E+11
Market Access	2966	3.40E+12	1.66E+12	2.04E+10	8.46E+12

Note: All variables before taking logs. In the estimations negative and zero observations for AfT are set to one before taking logs.