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The Impact of Aid for Trade Facilitation on the Costs of Trading

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Abstract

There have been ongoing discussions within the WTO Doha Round on Trade Facilitation and the wider Aid for Trade agenda to assist developing countries in reducing behind-the-border restrictions and to help them benefit from trade reform. Our paper contributes to this debate by analyzing the impact of foreign aid spent on Aid for Trade and Trade Facilitation on the costs of trading. In our empirical investigation, we conduct a panel data estimation for a sample of 99 developing countries for the period 2004-2009. Overall, we find that our aid measures have a negative effect on the costs of trading.

Keywords: Trade Facilitation, Aid for Trade, Trade Costs
JEL Codes: F13, F35, O19

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1. Introduction

As tariffs and non-tariff trade barriers have fallen in recent decades, interest in other trade costs have been growing. These other trade costs, for example, those related to trade regulations, the trade infrastructure, distribution, or communications, can be much higher than traditional trade barriers. According to estimates by Anderson and Van Wincoop (2004), the total tax equivalent of "representative" trade costs for industrialized countries is 170 percent, whereas direct tariff and non-tariff barriers are below 10 percent. They argue that trade costs in developing countries are even higher than in high-income countries. Given transaction costs in this order of magnitude, many countries, in particular developing countries, may not be able to take advantage of international trade.

Partly as a response to this problem, the Aid for Trade (AfT) initiative has been launched in December 2005 at the Ministerial Conference of the World Trade Organization (WTO) in Hong Kong. AfT is development assistance targeted at helping developing countries to better harness the benefits from international trade. It aims to harmonize and ameliorate existing structures of trade-related aid activities, taking into account both policy- and supply-related constraints that developing countries face in order to help them meet the challenges of integrating into the international trading system.

One major mechanism within the WTO's AfT initiative is trade facilitation, the only one of the four "Singapore issues" which is still being negotiated in the Doha Round.[1] The international trade community had increasingly expressed concern for greater transparency, efficiency and standardized customs procedures of international transportation of goods. The core objectives of trade facilitation in a broader sense are to improve the international trade infrastructure, to simplify and internationally harmonize customs procedures, and to enhance cooperation between customs authorities and other government offices such as certifying or licensing bodies. The overriding aim is to reduce transaction costs in international trade.

As a consequence, aid directed towards trade facilitation measures (Aid for Trade Facilitation, AfTF) has become a key element of the broader AfT initiative. It not only defines new trading rules but also involves the provision of resources to assist developing countries to better

[1] Besides trade facilitation, the "Singapore issues" comprise competition policy, foreign direct investment and government procurement.

integrate into the world trading system and in meeting the new obligations that are expected to arise from a WTO trade facilitation agreement.

The amount of foreign aid involved is by no means small. Between 2002 and 2008, donors' total Aid for Trade disbursements amounted on average to 19.3 billion US$ (constant 2008 prices), a share of around one third of sector allocable Official Development Assistance (ODA) (OECD 2010). Up to and during the WTO Ministerial Conference in Hong Kong in 2005, donors pledged to increase AfT. The European Commission and EU Member States pledged an additional 2 billion Euros a year by 2010, the United States promised to double aid to 2.7 billion US$ by the same year, and Japan pledged to provide 10 billion US$ over 3 years (OECD and WTO 2007). According to the OECD and the WTO (2009), donors are on track to meet or have already met their pledges. Furthermore, it can be expected that the relative share of AfT in overall ODA is going to increase over the medium term.

Given that trade costs matter and that considerable aid resources have been or will be provided in the years to come, it is not surprising that there is a growing interest in the effectiveness of the AfT initiative. Previous empirical studies on AfT and AfTF can be divided into two strands of literature. The first one consists of a number of studies that investigate the impact of either trade costs or trade facilitation on trade flows. Using various empirical techniques, such as cross-country econometric analysis, computable general equilibrium (CGE) models, and country case studies, most of these studies find that both trade costs and trade facilitation are important determinants of trade flows – with trade costs reducing them noticeably.[2] The second strand of literature focuses on the effects of AfT and AfTF on trade flows. Again, the studies usually find that resources spent on AfT and AfTF increase trade flows in recipient countries to a considerable degree.[3] Similar to the previous strand, the different papers use either case studies and/or econometric studies to assess the impact of AfT and AfTF on exports and imports.

This paper combines the two strands by empirically examining the impact of AfT and AfTF on trade costs. We argue that Aid for Trade can be a powerful and effective tool to lower trade costs in developing countries and thus to increase trade flows. We also investigate the impact

[2] See, for example, Limao and Venebles (2001), Wilson et al. (2003), Walkenhorst and Yasui (2005), Blonigen and Wilson (2008), Martinez-Zarzoso et al. (2008), Iwanow and Kirkpatrick (2007, 2009), Freund and Rocha (2010), and Djankov et al. (2010).
[3] See Nelson and Silva (2008), Brenton and Uexkull (2009), Helble et al. (2009), and Lederman et al. (2010).

of Aid for Trade on the time of trading.[4] Apart from the impact of Aid for Trade on trade costs and the time of trading, our analysis also matters with respect to the aid effectiveness debate. Since donors try to increase the effectiveness of aid resources spent and the funds involved are relatively large, we address a highly relevant policy issue in our empirical investigation.

The paper is structured as follows: In the next section, we explain the research design. To begin with, we introduce the set of dependent variables measuring the cost and time to trade. Then, we explain the choice of the three aid variables used, ranging from total AfT to more specific aid categories such as Trade Policies and Regulations and Trade Facilitation. We use a large panel dataset for almost 100 developing countries and up to six years of data (2004-2009). Section 3 embraces the empirical results. We find that aid for trade reduces trade costs and that the effect is of economic significance. However, the impact depends on the particular aid category. For the time of trading, the evidence is less robust, but still some evidence of a reduction in the time of trading due to our aid measures can be found. The paper concludes with some policy implications in Section 4.

2. Research Design

Dependent Variables

As dependent variables, we deploy developing countries' cost and time of trading. Our variables are taken from a sub-indicator in the World Bank's (2010a) Doing Business Database, that is, Trading across Borders. For this sub-indicator, the World Bank collects information on the costs as well as the time to complete all procedures to import or export a standardized product.[5] The information has been provided by local freight forwarders, shipping lines, customs brokers, port officials and banks. Importantly, for importing goods time and cost are measured from the vessel's arrival at the port of entry to the cargo's delivery at the warehouse. For exporting goods, procedures range from packing the goods at the

[4] A recent study by Djankov et al. (2010) shows that the time of trading has a significant impact on the trade volume.

[5] Apart from cost and time, the World Bank also collects data on the number of documents required to export and import. We focus on cost and time, as the number of documents in fact is included in the cost measure. See World Bank (2010a) for details.

warehouse to their departure from the port of exit. In order to be able to compare the data across countries, quite strong assumptions are used concerning the business and the traded goods, rendering the corresponding trade costs rather hypothetical costs.[6] However, we consider real trade costs to be highly correlated with these surveyed theoretical trade costs. Furthermore, by using data referring to costs of containerized trade, we actually capture a good deal of total trade costs. Another advantage of the Trading across Borders cost and time measures is that ocean transport is not included. Thus, the variables used are adequate for an analysis of Aid for Trade in a particular country.

For trade costs, we compute real cost to export or import (labeled *CostExp* and *CostImp*, respectively) using nominal figures that are deflated by the US Consumer Price Index. Both variables measure the fees levied on a 20-foot container in US$. All fees associated with completing the procedures to export or import the goods are incorporated, such as costs for documents and customs clearance, terminal handling charges and inland transport. The cost measure does not include tariffs or trade taxes. Only official costs are recorded. On the other hand, time to export or import (*TimeExp* and *TimeImp*, respectively) measure (in days) the time necessary to comply with all procedures required to export/import goods.

Although *CostExp* and *CostImp* are highly correlated, we find differences in the factors influencing both cost variables in the subsequent analysis. This justifies the use of both dependent variables separately rather than relying on an aggregate cost of trade variable or reporting only one of both. The same argument holds for both time measures.

The analysis covers the period 2004-2009[7]. The period under consideration is restricted by information for our dependent variables which is unavailable before 2005. In order to preclude any asymmetric effects, countries that have a population of less than one million people (as of 2009) have been excluded from the sample. Moreover, countries with insufficient data on one or more of the control variables, such as Belarus, Cuba or Timor-

[6] For example, the business is medium-sized, trading a product that travels in a dry cargo, 20-foot, full container load. It weighs 10 tons, is valued at $20,000, and shipped to or from the country's largest overseas trading partner through the main port. See World Bank (2010a) for more information.

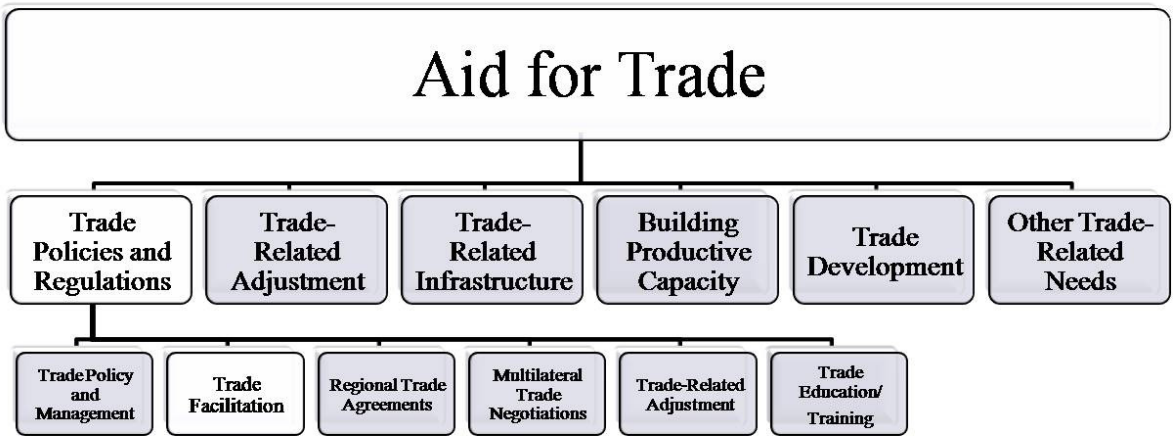
[7] The sub-indicator time of trading is available for the period 2005-2009, the cost of trading indicator only for the period 2006-2009.

Leste, have been left out too. That leaves us with a sample of 99 developing countries, including 33 Least Developed Countries (LDCs).[8]

Main Independent Variables

According to the WTO (2006), AfT consists of a number of heterogeneous trade-related aid categories, such as trade policies and adjustment measures and supply-side related categories like infrastructure, capacity building and development (Figure 1). In our analysis, we focus on total AfT as our broadest measure and two of its subcategories, Trade Policies and Regulations and Trade Facilitation (white areas in Figure 1). As both subcategories deal with more specific trade facilitation issues than total AfT, we expect a stronger effect on our dependent variables.

Figure 1: Aid for Trade Categories



Note: Trade-Related Adjustment is an individual category according to the WTO definition on Aid for Trade; however, in reporting, it falls in the category Trade Policies and Regulations. The same holds for Trade Development which is subsumed in the category Building Productive Capacity in the OECD CRS.
Source: Own illustration, based on WTO (2006) and OECD (2010).

Data for our aid variables is taken from the OECD Creditor Reporting System (CRS) (OECD 2010) which provides disaggregated data for Aid for Trade activities and is considered the prominent aid activity database.[9] Our first variable, *AfT*, measures all ODA directed towards Aid for Trade, consisting of all six AfT categories. The second variable, *TradePolicy*, draws upon the subcategory Trade Policies and Regulations, covering trade issues that have a more

[8] All countries included in the analysis are listed in Appendix C1.
[9] The completeness (coverage ratio) of our data is over 90 percent since 2002 and reached nearly 100 percent starting with 2007 flows (OECD 2010).

decisive effect on how exports and imports are administrated, such as trade policy and negotiations, training, and trade facilitation.[10] It amounts to 673 million US$ on average per year (constant 2008 prices), which is 3.5 percent of AfT (OECD 2010). Our hypothesis is that such specific trade-related development funding is not necessarily plagued by general aid effectiveness concerns. There is less heterogeneity of aid channels and motives, and we may avoid generic statements on how aid impacts trade. Our analysis is thus detached from the aid-trade or aid-growth nexus dealt with in the literature.

For our third aid variable, *TradeFacilitation*, we separate out even more specific aid flows directly related to improving the cost- and time-efficiency of trading. It comprises all ODA directed towards Trade Facilitation, a subcategory of Trade Policies and Regulations, which is recorded at the lowest possible level of AfT and amounts to around 88 million US$ per year (in constant 2008 prices) (OECD 2010). It aims at lowering trade transaction costs, including the simplification and harmonization of international import and export procedures (e.g., customs valuation, licensing procedures, transport formalities, payments, and insurance), the support to customs departments and tariff reforms. Thus, we use a quite narrow definition of what belongs to AfTF.

All three aid variables refer to disbursements and are given in million US$ at constant 2008 prices.[11] They are accumulated to not only measure a country's current received aid, but to account for aid flows in previous years which may also impact our response variables. We believe that resources spent on aid for trade have a lasting effect; they not only reduce trade costs for one year but may cause a permanent reduction in trade costs. The trade costs of any given year reflect the outcome of aid flows of all previous years together. By taking accumulated aid flows, or so to speak the "stock" of aid spent, we adequately account for this dependency of trade costs on aid, and furthermore provide for equivalence to our cost and time measures (which are also stock variables)[12]

[10] Trade Policies and Regulation is combined with Trade-Related Adjustment in the CRS database as of 2008. Flows going to the category Trade-Related Adjustment are marginal so far and therefore excluded.
[11] All other variables that are measured in nominal US dollars are adjusted for inflation too. See Appendix A for data sources. Descriptive statistics can be found in Appendix B.
[12] We only accumulate aid flows spent during the period 2004-2009, as we only consider changes in trade costs during that period. Using a horizon wider than 2004-2009 does not make sense from an econometrical perspective as in a fixed effects estimation increasing all observations of one country by the same amount (aid spent before 2004) does not change the estimation results. Since there are quite a few missing observations in the data, we consider a second variant of our *TradeFacilitation* variable where we fill up all missing observations with zeros. It is possible that the missing data are in fact zeros, as we consider a very specific category over several years. Also, by including zeros we may avoid sample selection bias. Both versions deliver almost

Other Control Variables

Needless to say, the cost and time of trading are influenced by other factors too. As the first control variable, we use (real) GDP per capita (*GDPpc*). A higher per-capita income is associated with a better trade infrastructure and less behind-the-border restrictions, which should lower cost and time of trading. However, per-capita income is also linked to labor costs, which impact trade costs positively. Thus, for *GDPpc* we expect an ambiguous impact on trade costs but a positive association with time to trade.

Next, we include the (real) value of merchandise exports plus imports (*Trade*). More trade is linked to higher efficiency in transport and customs procedures and thus lower costs. The more imports and exports, the easier a country may realize economies of scale in trading through learning processes, more effective use of customs and administrative cost savings. The same logic applies to the time of trading. However, large increases in trade volume may lead to congestions effects at ports and/or borders (in the short run) and prolong the trading time. The impact of *Trade* on both time variables is therefore uncertain a priori.

We also control for the regulatory quality (*RegQuality*), proxied by the World Bank Good Governance measure on the quality of regulations in a country. This perception-based indicator measures the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. The better the national administration – as a proxy for government regulations in the transport sector – the lower the cost and time of trading. Conversely, red tape and inefficient government regulations may drive up trading costs and time. Since a higher value of *RegQuality* corresponds to better governance outcomes, we expect a negative association with our trade cost and time measures.

The last control variable refers to the local pump price for diesel fuel in US$ per liter (*FuelPrice*). It is considered a determinant of trade costs as inland transportation and handling partly rely on motorized vehicles running on fuel. We use this indicator in the trade costs regressions only and expect a negative impact on both cost variables.

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identical results concerning the size and the sign of the coefficients. For practical reasons, we fill up the flow data with zeros from the year the first value is reported for each country to be able to accumulate the data.

Econometric Technique

We estimate a fixed-effects model to control for other non-observed country-specific effects. The specification of our model reads as follows:

$$COST_{it} = \beta_i + \beta_1 AID_{it-1} + \lambda' X_{it-1} + YEAR_t + \varepsilon_{it} \quad (1)$$

where the dependent variable $COST_{it}$ stands for either cost (or time) of trading of country *i* in period t and AID_{it-1} being the main variable of interest (*AfT*, *TradePolicy* or *TradeFacilitation*). β_i represents the country fixed-effect and X_{it-1} is a set of other control variables that includes GDP per capita (*GDPpc),* the value of merchandise trade (*Trade),* regulatory quality (*RegQuality)* and, in the cost regression, the cost of fuel (*FuelPrice*). $YEAR_t$ is a full set of time dummies which is supposed to capture period specific effects and changes in the time and cost of trading over time. ε_{it} stands for the error term.

Partly to mitigate potential reverse causality problems, all explanatory variables enter our model lagged by one year. Preferably, one would like to deal with this potential problem more comprehensively with the help of an instrumental variable approach. However, further explanatory variables, such as regulatory quality, are potentially subject to reverse causality, and it would be simply impossible to find both adequate and valid instruments.

There is another reason why reverse causality is not likely to influence our results. As explained above, we use highly specific aid categories in our empirical investigation with relatively small amounts of aid. As a share of total sector allocable ODA (2002-2008 average), *Trade Policy* and *Trade Facilitation* amount to some 1 percent and 0.14 percent, respectively. Given these small shares, costs and the time of trading are not very likely to have an impact on aid flows. However, this argument is less convincing for *AfT* (around one third of total sector allocable ODA). For this variable, using lags will mitigate the potential reverse causality problem.

There are two further reasons why we use lagged independent variables. First, we expect time lags between aid and its effect on time and costs of trading. If a developing country receives

more aid or improves its regulatory quality in a particular year, changes in the cost and time of trading are more likely to take effect in the following year, as it takes some time to implement changes in laws and regulations. Second, there are different reporting periods in the data: The Doing Business Report publishes data on the cost and time of trading in September of each year, collecting data in the months before. Aid data, on the other hand, is annual data referring to the calendar year.

To check for the robustness of our results, we took the natural logarithm of both dependent and independent variables (log model) as well as of the independent variables only (semi-log model). Using a log or semi-log model would particularly make sense if we wanted to reduce very high variations in the data or considered our model as non-linear. Neither is the case, so all our variables enter in levels eventually.

3. Empirical Results

Following the model specification and the introduction of the variables, we now turn to the empirical results. We start with the determinants of trade costs, include all control variables and add the three different aid variables separately (Table 1). As dependent variable, we alternately use cost to export (*CostExp)* and cost to import (*CostImp*). The fuel price variable is added in a further regression, since the respective samples decline by two countries and eight observations when *FuelPrice* is included.

In line with our expectations, the coefficient for the measure of regulatory quality (*RegQuality*) is negative and significant at the 10 percent level in all regressions that explain cost to export.[13] The export sector seems to be actually benefiting from governments' improved trade regulations while we do not find any influence on the cost to import.

For *GDPpc* and *FuelPrice*, we do not obtain any significant results. For per-capita income levels this result is hardly surprising, given the ambiguous impact of both labor costs and the

[13] We also test other political variables such as bureaucratic quality and control of corruption from the International Country Risk Guide (2009) and government effectiveness (World Bank 2010c). We find a negative, mostly significant influence for bureaucratic quality and government effectiveness – which yields analogous interpretations as *RegQuality*. Like all other unreported results, they can be obtained from the authors upon request.

trade infrastructure on trade costs. Including the cost of fuel as an additional determinant of trade costs only marginally changes the values of our aid coefficients. Fuel as a cost factor should lead to higher trading costs; however, fuel prices are often subject to administrative regulations. Even though the oil price on the world market is highly volatile, in some countries fuel prices are "administrative prices". The government fixes fuel prices with no or slow adjustments to changing world market prices. In our sample, in some countries there is no or too little variation in fuel prices to explain changing trade costs.

For *Trade*, we also do not find significant results. The exceptions are the two regressions for total AfT and cost to import (columns 3 and 4). Here, the *Trade* coefficient is positive and significant while the aid variable *AfT* is negative and highly significant. Excluding the trade variable does not change the results for the aid variable (results not shown). In contrast, excluding the aid variable renders *Trade* not significant, suggesting a unidirectional collinearity problem between *Trade* and *AfT*. As a robustness check for *Trade*, we include the value of exports and imports separately and trade as a share of GDP. We do not detect a different influence on cost to export/import than for the value of total trade.

Turning to our aid variables, we obtain – as already mentioned in the previous paragraph – negative and highly significant coefficients (at the 1 percent level) for the *AfT* variable in the cost to import regressions (columns 3 and 4). The more specific aid variable *TradePolicy* (columns 5 to 8) always yields negative and significant coefficients (at the 10 percent level or better). What is more, the coefficient of the most precise aid variable *TradeFacilitation* (columns 9 to 12) has the expected negative sign and is highly significant (at the 1 percent level).[14] These results indicate that aid for trade, in particular if highly targeted, can have a significant impact on the costs of trading.

Apart from statistical significance, the quantitative effect of the three aid measures is of economic significance too. Taking the estimated coefficient on *TradeFacilitation* and cost to import as the dependent variable (-7.314) at face value, an increase in aid by 2.89 million US$ (that is, one standard deviation of *TradeFacilitation*) would lead – on average – to a decrease in the cost of importing a 20-foot container by some 21.13 US$. With an average cost to import in our sample of 1,723 US$ this corresponds to a reduction of 1.2 percent. For *AfT*

[14] While the samples of *AfT* and *TradePolicy* comprise all 99 countries, the *TradeFacilitation* sample is restricted to 85 countries due to missing or insufficient observations for the remaining 14 countries.

(*TradePolicy*) an increase by one standard deviation decreases the cost of importing by 73.69 US$ (84.94 US$) which corresponds to a reduction of import costs by 4.3 percent (4.9 percent). In contrast to the respective percentage changes, we observe a higher impact per dollar spent for our two specific aid measures in comparison to total Aid for Trade.

If we apply these estimates to the number of containers traded in developing countries, the economic (and financial) significance of Aid for Trade increases even further. In 2008, containerized trade received by developing economies was approximately 68 million twenty feet equivalent units (TEUs).[15] Increasing resources spent on the broadest measure *AfT* by one standard deviation reduces cost of exporting or importing one container by 73.69 US$ on average, as explained in the previous paragraph. This causes a total reduction of trade costs in developing economies by some 5 billion US$.

Based on these results, we can (roughly) estimate the impact of our aid measures on trade flows. According to estimates by Limão and Venables (2001), who analyze the negative effects of transport costs on trade, the elasticities for trade volumes with respect to trade costs range from -2.0 to -3.5.[16] Assuming similar elasticities for our trade cost measures, for *TradeFacilitation* we find that reducing trade costs by 1.5 percent leads to an increase in trade volumes in the range of 3 to 8.75 percent. Taking into account that these aid flows are very specific and in volume rather exiguous, their impact can be considered substantial.

Finally, the overall fit of the cost estimations as measured by the R^2 is between 0.16 and 0.22. Given the heterogeneous country sample and the short period of time, a better fit was hardly to be expected.

[15] According to UNCTAD (2009b), in 2008 world total of containerized trade was estimated at 137 million TEUs. 49.7 per cent of global seaborne imports were received by developing economies. As a rough approximation, 68 million TEUs were received by developing economies. Since our sample consists of 99 developing countries including all large developing countries, such as China, India and Brazil, we are covering almost all developing countries trade flows.

[16] While Limão and Venables use the cost of shipping a standard 40-foot container, our trade cost measure refers to a 20-foot container. Also, their variable includes ocean transport and excludes insurance. They find that land transport in comparison to ocean transport is around seven times more costly per unit distance. Still, we think that using their elasticities is appropriate for our calculations of the impact on trade flows.

Table 1: Aid for Trade and the Costs of Trading

Independent variables	Dependent variables											
	CostExp		CostImp		CostExp		CostImp		CostExp		CostImp	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
GDPpc (t-1)	0.0641 (0.833)	0.0650 (0.862)	-0.0541 (-0.574)	-0.0412 (-0.434)	0.0497 (0.623)	0.0528 (0.675)	-0.0276 (-0.287)	-0.0163 (-0.169)	0.0787 (0.762)	0.0760 (0.759)	-0.0174 (-0.158)	-0.0052 (-0.047)
RegQuality (t-1)	-289.9* (-1.737)	-305.3* (-1.782)	-101.3 (-0.705)	-74.88 (-0.514)	-292.1* (-1.670)	-311.7* (-1.732)	-110.9 (-0.732)	-81.36 (-0.530)	-427.9* (-1.897)	-458.7* (-1.941)	-229.6 (-1.121)	-203.2 (-0.955)
FuelPrice (t-1)		71.95 (0.651)		-38.09 (-0.271)		90.45 (0.805)		-53.45 (-0.366)		42.37 (0.297)		-26.97 (-0.162)
Trade (t-1)	-0.0403 (-0.248)	-0.0482 (-0.296)	0.239** (2.257)	0.236** (2.095)	-0.00363 (-0.0374)	-0.0237 (-0.243)	-0.0398 (-0.343)	-0.0323 (-0.253)	-0.0267 (-0.282)	-0.0390 (-0.407)	-0.112 (-0.935)	-0.102 (-0.802)
AfT (t-1)	-0.00697 (-0.173)	-0.0103 (-0.255)	-0.122*** (-3.506)	-0.119*** (-3.403)								
TradePolicy (t-1)					-1.890* (-1.707)	-1.945* (-1.806)	-3.231*** (-3.310)	-3.167*** (-3.195)				
TradeFacilitation (t-1)									-7.255*** (-2.783)	-7.239*** (-2.738)	-7.314*** (-2.829)	-7.165*** (-2.708)
Observations	396	388	396	388	391	383	391	383	326	318	326	318
Countries	99	97	99	97	99	97	99	97	85	83	85	83
R^2	0.16	0.16	0.22	0.21	0.17	0.17	0.21	0.21	0.17	0.17	0.19	0.18

Notes: * significant at 10% level; ** significant at 5% level; *** significant at 1% level; t-values, reported in parentheses, are corrected for heteroskedasticity; constant term and time dummies not shown.

In addition to the two trade cost variables, we also look at time to export (*TimeExp*) and time to import (*TimeImp*). The results for both additional dependent variables are shown in Table 2. In all six time regressions, the strongest results can be found for regulatory quality, for which we always obtain a negative and significant coefficient at the 10 percent level or better. The effect is of sizable dimension too. For the estimate reported in column 3 (-7.09), for example, an increase in *RegQuality* by one standard deviation (0.603) decreases the time to export by 4.27 days. Given a mean of 31.67 for *TimeExp*, this result matters not only in terms of percentage changes (-13.5 percent), it has an impact on trade flows as well. According to estimates by Djankov et al. (2010), each additional day that a product is delayed prior to being shipped reduces trade by more than 1 percent. They show that the effect is even larger for time-sensitive agricultural and manufacturing products. Hence, the regulatory framework can be an important obstacle for trade flows in developing countries.

For the other two control variables, we find significant albeit small positive effects for *GDPpc* (in some regressions) and for *Trade* (in all regressions). A positive coefficient for *Trade* may indicate that congestion effects at ports and/or borders are more relevant in the short run than the potential efficiency gains from a higher trade volume in the long run. Yet the coefficients' size reveals that this effect is statistically significant, but economically negligible.

As for the three aid variables, we find that the results with time as dependent variable are less distinguished than for costs. Although the coefficients of all aid variables are negative as expected, only the coefficient for *TradePolicy* on *TimeExp* is statistically significant at the 5 percent level (column 3). But even if we use this estimate, the quantitative impact of an increase in *TradePolicy* is less pronounced as compared to *RegQuality*. An increase in *TradePolicy* by one standard deviation (26.29) decreases the time to export by 0.57 days, which is a much lower figure in comparison to an improvement in the quality of regulations.

Overall, the aid variables' main objective is to make trade more cost-efficient. Reducing the time for trading is one (important) channel by which trade costs can be lowered. However, we cannot observe this correlation in our results. The effect of the aid variables on reducing costs might be through channels other than the time of trading (e.g., the improvement of more direct measures like fees, more efficient bureaucratic procedures or a reduction in uncertainty and corruption).

Table 2: Aid for Trade and the Time of Trading

Independent variables	Dependent variables					
	TimeExp	TimeImp	TimeExp	TimeImp	TimeExp	TimeImp
	(1)	(2)	(3)	(4)	(5)	(6)
GDPpc (t-1)	0.00176 (0.995)	0.00468* (1.928)	0.00227 (1.280)	0.00627** (2.486)	0.00230 (1.075)	0.00688** (2.275)
RegQuality (t-1)	-6.180** (-2.316)	-5.579* (-1.755)	-7.090*** (-2.655)	-6.444* (-1.979)	-6.940** (-2.274)	-8.877* (-1.984)
Trade (t-1)	0.0119*** (3.142)	0.0140*** (2.680)	0.00882*** (3.178)	0.00846** (2.599)	0.00779*** (3.291)	0.0103*** (3.026)
AfT (t-1)	-0.00120 (-1.131)	-0.00225 (-1.351)				
TradePolicy (t-1)			-0.0219** (-2.400)	-0.0346 (-1.383)		
TradeFacilitation (t-1)					-0.0335 (-0.448)	-0.0486 (-0.374)
Observations	487	487	478	478	375	375
Countries	99	99	99	99	85	85
R^2	0.30	0.32	0.31	0.33	0.32	0.37

Notes: * significant at 10% level; ** significant at 5% level; *** significant at 1% level; see Table 1 for further notes.

Next, we return to trade costs as dependent variables and split the sample into different country groupings. We would like to know if the influence of the three aid variables on the cost of trading changes if we focus on several subsamples. We rely on the same model specification as in Table 1, that is, including fuel costs, but only report the coefficients (and t-values) for the three aid variables in view of space constraints. The results for the three aid variables are reported in columns rather than rows, that is, *AfT* in columns 1 (*CostExp*) and 2 (*CostImp*), *TradePolicy* in columns 3 and 4, and *TradeFacilitation* in columns 5 and 6 of Table 3. To facilitate comparison, the main results from Table 1 are listed again in the first row of Table 3.

First, we split the sample and replicate the analysis for LDCs and non-LDCs. In fact, LDCs are the main target group of Aid for Trade. Average trade costs in LDCs are considerably higher than in non-LDCs (1,805 versus 1,260 US$ for cost to export and 2,246 versus 1,453 US$ for cost to import, respectively). In the reduced LDC sample, reported in the second row, none of the aid coefficients has a significant effect on the cost of trading. In the sample of non-LDC countries, on the other hand, all aid variables are highly significant (at the 1 percent level) and increase both in size and significance level in comparison with the benchmark

regressions. Only the *AfT* coefficient on the cost to export is not significant (as in the benchmark regression).

Interpreting these results, one might be tempted to conclude that aid effectiveness in LDCs is lower or even nonexistent (UNCTAD 2008). Reasons for this are partly seen in absorption capacity constraints. However, looking at our data, we observe that aid flows to LDCs are lower on average in all three categories. For instance, average Trade Facilitation flows to LDCs amounted to 0.6 million US$ in 2008, compared to 1.56 million US$ for non-LDCs. Apart from absorption capacity constraints, we argue that very low aid flows are too marginal to show any influence on the cost of trading. Accordingly, our hypothesis is that aid flows only become effective when they reach a certain (threshold) level.

To verify this hypothesis for our three aid categories, we rank all recipient countries by the cumulative amount of aid they have received between 2005 and 2008. We use these rankings to split the sample in different subsamples to compare the results for the group of the top recipients with the bottom group. In 2008 the top 20 recipients of *TradeFacilitation* have received 1.72 million US$ on average while the remaining countries have only received 1.09 million US$. In row 4 we report the results for the top 20 recipients of the three aid categories; in row 5 we have excluded the top 20 recipients.[17] For the sample of the top aid recipients we find a strong influence of aid on the costs variables (at the 1 or 5 percent level). Excluding those top recipients from the sample leaves us without significant effect of the aid variables on costs.[18] Hence, there is strong evidence that the effect of aid on trade costs is dominated by those countries receiving above-average aid. It seems that – on average – only larger development projects are successful in reducing trade costs.

[17] The sample consists of 63 countries (rank 21-83) for *TradeFacilitation* and of 77 countries rank (21-97) for *AfT* and *TradePolicy*. To avoid arbitrary choices different subsamples have been considered (e.g., top 20, 25, 30 up to the top 60 recipients). In all cases we obtain negative and significant coefficients for the aid variables. In the subsamples with the second largest aid recipients (e.g., top 21-40 (rank 21-40), top 26-50 and so on) we do not find any significant results. Our significant results seem to be mainly driven by the top 20 or top 25 recipients of aid.

[18] We also check for influences arising from other country clusters. Comparing low-income countries and middle-income countries, we detect similar results as for LDCs and non-LDCs although with smaller coefficients.

Table 3: Robustness Checks and Extensions

	AfT (t-1)		TradePolicy (t-1)		TradeFacilitation (t-1)	
	CostExp	CostImp	CostExp	CostImp	CostExp	CostImp
Sample	(1)	(2)	(3)	(4)	(5)	(6)
Benchmark (as in Table 1)	-0.0103 (-0.255)	-0.119*** (-3.403)	-1.945* (-1.806)	-3.167*** (-3.195)	-7.239*** (-2.738)	-7.165*** (-2.708)
LDCs	0.245 (1.127)	-0.0551 (-0.638)	-0.667 (-0.362)	-2.469 (-1.367)	13.69 (0.779)	-8.553 (-0.493)
Non-LDCs	-0.0472 (-1.377)	-0.121*** (-2.982)	-3.204*** (-3.783)	-3.537*** (-3.225)	-8.903*** (-4.186)	-6.658*** (-2.680)
Top 20 aid recipients	-0.100 (-1.105)	-0.0906*** (-3.933)	-2.556** (-2.376)	-2.497** (-2.473)	-8.876*** (-4.377)	-8.099** (-2.363)
Without top 20 aid recipients	-0.121 (-0.634)	-0.247 (-1.157)	-4.433 (-0.614)	-4.509 (-0.459)	-26.12 (-0.421)	-8.123 (-0.149)

Notes: * significant at 10% level; ** significant at 5% level; *** significant at 1% level; only main variables of interest shown; all model specifications are as in Table 1 when *FuelPrice* is included; see Table 1 for further notes.

4. Conclusion

As direct border restrictions to trade have been or are being eliminated by many developing countries, it is becoming obvious that integrating into the world economy increasingly depends on eliminating behind-the-border restrictions and investing in ports and roads. Trade Facilitation and the wider Aid for Trade agenda deal with these topics and set the preconditions for countries to enhance their international competitiveness and lower their transactions costs. This paper establishes the crucial link between different aid measures and the cost and time of trading.

High trade costs are often seen as an obstacle to development led by opening up to trade. It is intuitive that trade-related development assistance should lead to more cost- and time-efficient trade procedures in the countries concerned. Our results indeed confirm that AfT and AfTF may lower trade costs and therefore play an important role in helping developing countries to benefit from trade. Importantly, the impact is not only significant in statistical terms. We find that the effects are of economic significance as well. Aid spent on Trade Policies and Regulations and particularly, on Trade Facilitation, have a leverage effect on trade – the comparatively small aid figures may cause quite large trade volume increases. For

the time of trading as our second dependent variable, the evidence is less robust, but we find some evidence of a reduction in the time of trading due to aid used to improve trade policies.

However, we do not find significant results for the sample of LDCs. We argue that this is not necessarily due to LDC-inherent disadvantages but may also be caused by relatively low aid flows to these countries. We find that the Top 20 aid recipients in all three categories dominate the effect on trade costs. It seems that lowering transaction costs requires a considerable amount of aid per country. Based on these results, LDCs should receive more (and well-targeted) trade-related aid, given that they are in the focus of the Aid for Trade agenda.

Our results also support the conclusion that the government's effective ruling and putting up regulations is paramount for bringing down the cost and time of trading. Both our aid measures and regulatory quality independently affect the cost and time of trading negatively. For explaining the time of trading, only regulatory quality seems to be important, while for explaining trade cost, both the aid measures and regulatory quality seem to be decisive. Improvements in the level of regulatory quality, however, are only effective in reducing export costs. Efforts to enhance government regulative powers and institutional quality in developing countries thus should go along with foreign support to further development.

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Appendix A: Definition of Variables and Data Sources

Variable	Definition	Data source
AfT	Cumulative Aid for Trade, gross disbursements (constant 2008 US$ million).	OECD (2010)
TradePolicy	Cumulative Aid for Trade Policies and Regulations, gross disbursements (constant 2008 US$ million).	OECD (2010)
TradeFacilitation	Cumulative Aid for Trade Facilitation, gross disbursements (constant 2008 US$ million).	OECD (2010)
CostExp	Cost associated with exporting a 20-foot container in US$, deflated using the US Consumer Price Index.	World Bank (2010a)
CostImp	Cost associated with importing a 20-foot container in US$, deflated using the US Consumer Price Index.	World Bank (2010a)
TimeExp	Time necessary to comply with all procedures required to export a 20-foot container in days.	World Bank (2010a)
TimeImp	Time necessary to comply with all procedures required to import a 20-foot container in days.	World Bank (2010a)
Trade	Value of merchandise trade (exports and imports) in billion US$, deflated using the US Consumer Price Index.	UNCTAD (2009a)
GDPpc	GDP per capita (constant 1990 US$).	UNCTAD (2009a)
FuelPrice	The pump price for diesel fuel in US$ per liter, deflated using the US Consumer Price Index.	World Bank (2010b)
RegQuality	Regulatory quality measures the ability of the government to formulate and implement sound policies and regulations, ranging from -2.5 to +2.5, where higher figures represent better governance.	World Bank (2010c)

Appendix B: Descriptive Statistics for the Total Sample, LDC Sample and Top 20 Sample

Total sample					
Variable	Obs.	Mean	Std. Dev.	Minimum	Maximum
AfT	396	373.39	604.03	2.23	4,895.33
TradePolicy	391	8.91	26.29	0	302.59
TradeFacilitation	326	1.16	2.89	0	36
CostExp	396	1,443.37	852.76	390	5,293.77
CostImp	396	1,723.07	1,053.11	385	5,922.63
TimeExp	488	31.67	16.77	9	89
TimeImp	488	36.97	20.04	9	104
Trade	495	62.91	205.01	0.17	2,466.92
GDPpc	495	1,676.53	1,924.47	102.81	10,505.13
FuelPrice	488	0. 71	0.33	0.01	1.73
RegQuality	495	-0.42	0.6	-2.13	1.58
Sample LDC					
Variable	Obs.	Mean	Std. Dev.	Minimum	Maximum
AfT	132	348.98	417.64	2.28	2,104.73
TradePolicy	132	7.24	13.76	0	106.8
TradeFacilitation	107	0.75	1.4	0	9.28
Sample TOP 20					
Variable	Obs.	Mean	Std. Dev.	Minimum	Maximum
AfT	80	1,174.16	933.42	144.41	4,895.33
TradePolicy	79	29.73	53.05	.06	302.59
TradeFacilitation	77	3.59	2.89	5.18	36

Appendix C: Country Sample

Table C.1: Total Country Sample

Albania, Algeria, ***Angola***, Argentina, Armenia, Azerbaijan, **Bangladesh**, **Benin**, Bolivia, Botswana, Brazil, **Burkina Faso**, ***Burundi***, **Cambodia**, *Cameroon*, ***Central African Republic***, **Chad**, Chile, China, Colombia, *Rep. of Congo*, **Dem. Rep. of Congo**, Costa Rica, Cote d'Ivoire, Croatia, Dominican Republic, Ecuador, Egypt, El Salvador, ***Eritrea***, **Ethiopia**, Macedonia, *Gabon*, ***Gambia***, Georgia, Ghana, Guatemala, **Guinea**, **Guinea-Bissau**, **Haiti**, Honduras, India, Indonesia, Iran, Jamaica, Jordan, Kazakhstan, Kenya, Kyrgyz Republic, **Laos**, **Lesotho**, ***Liberia***, **Madagascar**, **Malawi**, Malaysia, **Mali**, **Mauritania**, Mauritius, Mexico, Moldova, Mongolia, Morocco, **Mozambique**, Namibia, **Nepal**, Nicaragua, **Niger**, *Nigeria*, *Oman*, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, **Rwanda**, *Saudi Arabia*, Senegal, ***Sierra Leone***, South Africa, Sri Lanka, **Sudan**, Swaziland, Syria, Tajikistan, **Tanzania**, Thailand, **Togo**, Trinidad and Tobago, Tunisia, Turkey, **Uganda**, Ukraine, *Uruguay*, Uzbekistan, Venezuela, Viet Nam, **Yemen**, **Zambia**.

Note: Countries in italics are not included in the sample for *TradeFacilitation*. Countries in bold are LDCs.

Table C.2: Top 20 Recipients According to Aid Category

Top 20 Recipients for *TradeFacilitation* (cumulative disbursements 2006-2008)
Egypt, Dominican Republic, Ukraine, **Mali**, Jordan, Guatemala, Pakistan, **Cambodia**, Nicaragua, Albania, Moldova, Viet Nam, **Lesotho**, **Madagascar**, Kenya, **Mozambique**, Peru, Armenia, Kyrgyz Republic, Honduras.
Top 20 Recipients for *TradePolicy* (cumulative disbursements 2006-2008)
Egypt, **Bangladesh**, **Burundi**, Viet Nam, **Burkina Faso**, Jordan, China, **Tanzania**, Kenya, Senegal, Indonesia, Dominican Republic, **Mozambique**, Cote d'Ivoire, South Africa, **Uganda**, **Cambodia**, Ukraine, India, **Mali**.
Top 20 Recipients for *AfT* (cumulative disbursements 2006-2008)
India, Viet Nam, Indonesia, China, Turkey, Egypt, **Ethiopia**, **Bangladesh**, Philippines, **Tanzania**, Morocco, **Uganda**, Pakistan, **Mozambique**, Ghana, Sri Lanka, Kenya, **Madagascar**, **Mali**, Nigeria.

Note: Countries in bold are LDCs.