Quantifying the effect that aid for trade facilitation has on customs clearance in Sub-Saharan Africa in terms of time and cost

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Abstract

There is an international trend emerging for governments of donor countries to publicly account for the implementation and effectiveness of their Official Development Assistance. This also applies to the assistance provided by donors to customs administrations in developing countries. This study aims to quantify the effect of the much needed assistance provided to customs administrations in Sub-Saharan Africa, using recent panel data. It finds that aid for trade facilitation reduces the time needed for customs clearance and also that the costs of customs clearance (as derived from the World Bank's *Doing Business* series) do not provide an appropriate indicator of the capacity of customs administrations.

1. Introduction

High transaction costs represent a major hindrance to the development of trade in Sub-Saharan Africa (SSA). This has been identified by many studies, such as Limao and Venables (2001, pp. 20-5) and Portugal-Perez and Wilson (2009, pp. 382-3; 400-12). In its *Doing Business* series, the World Bank examined the time and costs entailed in preparing a 20-foot container for export at an exporters' premises in the largest business city, transporting the container and finally loading it onto a ship at the likely port of departure (World Bank 2011a). In 2009, the average time and costs entailed by customs clearance ('clearance time and costs') were USD1,915.58 and 33.6 days in SSA, and USD959.60 and 25.1 days in developing countries in the East Asian and Pacific region (EAP). The share of SSA and the EAP in world export was 3.5 per cent and 3.3 per cent in 1979 and 2.0 per cent and 14.0 per cent in 2009 respectively (World Bank 2011b). These figures indicate that high trade costs have prevented SSA from expanding its exports despite the fact that tariff rates have fallen steadily throughout the world due to international efforts. This is supported by the findings of Portugal-Perez and Wilson (2009, pp. 400-12) with respect to Africa.

Aid for trade (Aft), was officially launched in December 2005 at the World Trade Organization's (WTO) Sixth Ministerial Conference. It aims to enable developing countries to improve the trade-related skills and infrastructure needed to implement WTO agreements with the aim of expanding trade, increasing income, and reducing poverty (WTO 2011). Nowadays, most donors such as the World Bank have identified SSA as a priority recipient of AfT (OECD/WTO 2009, p. 14; Hoekman & Wilson 2010, p. 5).

For decades now, many customs administrations in developed countries and international organisations such as the World Customs Organization (WCO) have assisted customs administrations in developing countries to improve their capacity (Policy Research Institute, Ministry of Finance, Japan 1998, pp. 12-13; World Bank 2004, p. 97). Examples of assistance include training in customs clearance and tariff classification of imported goods, workshops for customs modernisation and integrity awareness

as well as diagnostics and recommendations to the customs administrations of developing countries (Matsumoto 2009, p. 28; WCO 2011a, pp. 4-7). The motivation for such efforts may reflect the role of Customs in international trade: after all, Customs plays a critical role in trade facilitation by administering and supervising trade-related procedures (Grainger 2008, p. 18). Improving the performance of customs administrations is therefore an effective way of ensuring trade facilitation. On the whole, the assistance provided to customs administrations in developing countries ('customs aid') has increased their capacity. This, in turn, serves to promote trade facilitation by reducing the time for customs clearance (Eland 2008, p. 6; Commonwealth Secretariat 2011).

In spite of this, customs aid is not exempt from the emerging trend for the governments of donor countries to publicly account for the implementation and effectiveness of their Official Development Assistance (ODA) which is funded by the taxpayer (OECD 2005,[2] 2008a[3]). In response, the WCO has studied indicators of the effects of aid (WCO 2010, pp. 8-10). In particular, expressing the effect of customs aid in figures directly related to customs performance (for example, reduction in clearance time and costs), could improve accountability to the taxpayers of donor countries. Moreover, this could also help donor customs administrations and international organisations measure the effects of past projects and identify areas of improvement.

This study aims to quantify the effect of the much needed customs aid in SSA, with reference to existing data and studies.

Section 2 reviews the available literature in order to identify appropriate data and methodology, which are presented in Section 3. The next section presents and discusses the regression results. Finally, Section 5 draws attention to the limitations of this study and makes policy recommendations.

2. Literature review

In order to develop a method of ascertaining how customs aid benefits trade in developing countries, the time and costs entailed by trade must directly relate to the capacity of customs administrations ('customs capacity'). In this respect, it would appear that clearance time and costs are the most appropriate indicators. However, there are no datasets covering such criteria at the global level, although some customs administrations have performed time release studies (TRS) that measure the time needed for clearance and published the results. As an alternative, this literature review focuses on studies whose dependent variables are the time for and/or cost of trade as derived from the World Bank's *Doing Business* series in relation to exporting and importing 20-foot containers. In the case of export, time and cost are measured as follows: the preparation of documents and procedures involved in exporting a 20-foot container at an exporter's premises in the largest business city in a country; transporting the container from the exporter's premises to the likely port of departure; the procedures administered by customs and other administrations; and finally, loading the container onto a ship (Djankov, Freund & Pham 2006, p. 2; World Bank 2011a). Literature reviews by Suwa-Eisenmann and Verdier (2007), Vijil, Huchet-Bourdon & Le Mouël (2010) and Hoekman and Wilson (2010) reveal that studies by Calì and te Velde (2011) and Busse, Hoekstra and Königer (2011) utilise the time and cost for exporting or importing a 20-foot container derived from the *Doing Business* series as dependent variables.

In addition, both studies use the OECD's Creditor Reporting System (CRS) for their aid data. The CRS provides stratified and grouped data on aid contributed by all member countries of the Development Assistance Committee (DAC) as well as some international organisations including the World Bank (OECD 2011). When Aft was launched in December 2005, a WTO taskforce recommended monitoring the six categories of Aft, including aid for trade policies and regulations ('ATP') and aid for trade-related infrastructure (WTO 2006, p. 2), as shown in Appendix 5. Accordingly, the OECD and WTO identified

grouped data in the CRS dataset (corresponding to the six categories of AfT). Both Calì and te Velde (2011) and Busse, Hoekstra and Königer (2011) utilise such grouped data in the CRS as independent variables.

Calì and te Velde (2011) conduct an empirical analysis into the effects that aid for trade facilitation (ATF) and ATP (both components of Aft) have on the costs of exporting and importing and the time needed to import. In order to create a model to estimate the effects of ATF and aid for trade-related infrastructure, they first develop a formula to determine trade costs using one developed by Bouet, Mishra & Roy (2008) as a basis. The latter can be summarised as follows: the cost of transportation is positively related to geographic distance and import tariffs between trading countries and negatively related to the standard of infrastructure in both countries. Based on this, Calì and te Velde (2011) develop a formula to determine the cost of trade, to which they add a negative correlation between aid and trade cost. Then, using a fixed effect model based on their formula, they reveal that the coefficient of ATF is statistically significant for all dependent variables. For example, they demonstrate that a 100 per cent increase in ATF would reduce the cost of importing by 5 per cent. This is equivalent to reducing the costs of unloading a 20-foot container from a vessel and transporting it to the importer's premises by USD82. They argue that ATF would have a significant effect, pointing to a study by the United Nations Conference on Trade and Development (UNCTAD) (UNCTAD 2003, p. 113) which estimated that approximately 7.3 million 20-foot containers were loaded or unloaded in Africa in the year 2000.

Busse, Hoekstra and Königer (2011) also analyse the effect of Aft, ATP and ATF on trade time and costs using a fixed effects model. They construct their model based on the understanding that ATF aims to reduce transaction costs by simplifying and harmonising trade-related procedures. Accordingly, ATF may well represent an independent variable that affects the dependent variables of the time and costs incurred by trade. They find that all tested aid variables lower trade costs to a degree that is economically meaningful. For example, increasing ATF by USD2.89 million would reduce the cost of importing a 20-foot container to developing countries by an average of USD21.13. They imply that this reduction would also be valid for the 68 million twenty-foot equivalent units (TEUs) imported to developing countries in 2008 (UNCTAD 2009).[4] On the other hand, their regression results show a less robust effect on trade time.

Both models are similar although Calì and te Velde (2011) adopt a log-log model and Busse, Hoekstra and Königer (2011) a level-level model. Hence, the model of this study can be a hybrid of both. With regard to trade cost and time, both studies measure these variables from the exporter's premises to lading (export) and vice versa (import). However, the *Doing Business* series also estimates the time and costs relating to customs clearance and technical control that accurately indicate the time and cost entailed by customs processes (apparently there are no studies on these variables). Hence, the first hypothesis (that is, taking the cost and time for customs clearance and technical control recorded in the *Doing Business* series as indicators of the cost of and time needed for customs clearance) is that:

H1: Aid for trade facilitation reduces time and/or cost for customs clearance in SSA.

Trade costs are measured in current US dollars in the *Doing Business* series, and by Calì and te Velde (2011) in their dependent variables, whereas Busse, Hoekstra and Königer (2011) use constant US dollars. Since the cost of trade is influenced by inflation rates in each reporting country, the study adjusts the costs entailed by customs clearance and technical control recorded in the *Doing Business* series to take account of the inflation rates of each country. Hence, the second hypothesis is that:

H2: Aid for trade facilitation reduces the cost of customs clearance in SSA as adjusted for local inflation.

3. Methodology and data

3.1 Data for dependent variables

As explained in the previous section, the time and costs entailed by clearance and technical controls derived from the *Doing Business* series represent dependent variables of this study. Since the *Doing Business* series online dataset does not offer any time series data for clearance time and costs in relation to exports and imports, it is necessary to collect data from each country's yearly report on the World Bank's website (with the exception of 2010). This means that the analysis in this study is based on a short panel dataset: ranging from three to four years (that is, 2007 to 2010).

As explained in the previous section, the study reflects the fact that trade costs have been influenced by inflation rates in each reporting country by adjusting the cost reported in the *Doing Business* series to account for the inflation rates of each country. For this purpose, the *Doing Business* series cost data reported in current US dollars is converted into the local currency of each reporting country on an annual basis using the applicable exchange rates. Costs in the local currency are then adjusted by the inflation rate of reporting countries and finally, the adjusted values are converted into US dollars to make international comparison possible. Appendix 1 summarises the dependent variables.

3.2 Data for the main independent variables

Aid variables are the main independent variables in the model adopted by this study. Appendix 1 also summarises the independent variables including data sources.

Like Calì and te Velde (2011) and Busse, Hoekstra and Königer (2011), this study derives aid data from the OECD's CRS. Appendix 5 shows the structure of aid categories in the CRS that make up Aft. As shown in Appendix 5, Aft consists of six categories including ATF. This consists of five sub-categories, one of which is ATF. This is the first aid variable adopted by the study's model. It aims to simplify and harmonise international import and export procedures and to support customs administrations and tariff reform (OECD 2008b, p. 6), which would directly reduce clearance time and costs. The second dependent variable is *ATP*, derived by subtracting *ATF* from *ATP*. Since it includes sub-categories that are not as closely related to clearance time and costs as those of *ATF*, it is unlikely to be as effective in reducing these variables.

In 2009, Aft amounted to 65,157.95 current US million dollars. Of this, *ATF* accounted for USD132.66 (that is, 0.2 per cent) and ATP for USD855.24 (that is, 1.3 per cent) of Aft. This indicates that *ATF* and *ATP* are not dominant categories in Aft which means there are many developing countries that do not receive *ATF* and/or *ATP*. Accordingly, zeroes are left in the dataset of this study in order to avoid possible sample selection bias.

3.3 Other control variables

In addition to aid variables, Calì and te Velde (2011) adopt data on GDP per capita and population as other control variables. Busse, Hoekstra and Königer (2011) adopt data on GDP per capita, trade volume, the regulatory quality indicator derived from the World Bank's Governance Indicators (WGI) project (World Bank 2011c) and fuel price, which are primary candidates for other control variables in the model of this study. Wilson, Mann & Otsuki (2003) use a gravity model and estimate the effect of the following four trade facilitation indicators on trade volume in the Asia-Pacific Economic Cooperation (APEC) members: 'Port efficiency' (indexes capturing efficiency of trade), 'Customs environment' (indexes capturing the degree of corruption), 'Regulatory environment' (indexes capturing obedience of

environmental protective measures), and 'E-business' (the percentage of companies that use the internet for e-commerce). These indicators are also considered to be possible other control variables in the model adopted by this study.

The criteria for selecting other control variables are as follows: first and foremost, variables have to be relevant to the objective of this study. Clearance time and costs serve as dependent variables of this study; hence, factors unrelated to customs clearance are excluded (for example, fuel price). Second, the availability of data is another important criterion. Wilson, Mann & Otsuki (2003) mainly use data derived from the World Economic Forum (WEF) Global Competitiveness Report, which covers 139 economies in its 2010-11 edition. This number includes 80 per cent of APEC members but only 60 per cent of SSA countries (WEF 2010). Therefore, the data utilised by this study is basically collected from datasets prepared by the World Bank, which cover a broader range of countries.

Taking these criteria into account, the model incorporates the following five dependent variables that affect control factors that influence clearance time and costs. Appendix 1 summarises other control variables.

Real GDP per capita (*GDPpc*) displays a negative correlation to clearance time and costs. This may be because the higher the GDP per capita, the higher the level of developments in customs technique. However, as Busse, Hoekstra and Königer (2011, p. 8) point out, trade processing costs might increase in line with GDP per capita. Hence, it is expected that GDP per capita will be more effective in reducing time than costs.

Next, trade volume (*Trade*), consisting of both import and export, is added to the model. An increase in trade will drive the expansion of trade facilities and provoke calls to expedite trade-related processes, leading to reductions in clearance time and costs. Paradoxically, increased trade is also a cause of greater congestion which is likely to increase time and costs. As Busse, Hoekstra and Königer predict (2011, p. 8), the effects of trade volume would therefore be ambiguous.

Third, the model also considers the quality of regulations (*RegQuality*) as derived from the WGI project (World Bank 2011c) and tested in the study by Busse, Hoekstra and Königer (2011). *RegQuality* expresses perceptions of the government's ability to formulate and implement effective policies and regulations including export and import regulations (World Bank 2011c). Therefore, *RegQuality* is considered an indicator for the degree of administrative burden involved in customs clearance. Accordingly, an improvement in *RegQuality* would reduce clearance time and costs.

Fourth, control of corruption (*ConCorrupt*) – derived from the WGI – is added to the model to ascertain how corruption affects clearance time. The temptation to accept bribes causes unnecessary interventions by trade-related bodies (including Customs), which causes delays. Therefore, this variable would positively relate to increased clearance times. One thing to note is that the cost captured in the World Bank's *Doing Business* series does not cover unofficial payments (World Bank 2011a), which means that the influence of corruption is only partially recorded in the costs recorded in that series.

Lastly, the number of net users (*NetUser*) is also added to the model as an indicator for the prevalence of IT, which can reduce clearance time and costs. For example, a computerised customs clearance system called ASYCUDA (**A**utomated **SY**stem for **CU**stoms **DA**ta) enabled Bolivian Customs to randomly select cargo for inspection and to limit physical inspection to 20 per cent of the cargo (World Bank 2004, p. 2). However, there does not appear to be any global data on the introduction of computerised customs clearance systems by customs administrations. In order to ensure such systems are fully exploited, traders should be allowed to access them. Accordingly, the model adopted by this study includes the number of net users per 100 people derived from the World Bank World Development Indicators (WDI).

3.4 Methodology

As explained in the previous section, this study adopts a fixed effect model for four years of panel data. It is a hybrid of the models adopted by Calì and te Velde (2011) and Busse, Hoekstra and Königer (2011) and is expressed as follows:

$$TimeExp_{it} \ (TimeImp_{it}) \text{ or } CostExp_{it} \ (CostImp_{it}) = B_i + B_1 \ ATF_{it-1} + B_2 \ ATP_{it-1} + B_3 \ GDPpc_{it-1} + B_4 Trade_{it-1} + B_5 \ RegQuality_{it-1} + B_6 \ ConCorrupt_{it-1} + B_7 \ NetUser_{it-1} + B_8 \ YEAR_t + u_{it}$$

where:

it indicates country i and year t,

B_i represents the country fixed effect,

$YEAR_t$ represents year dummies, and

u_{it} represents error term.

As with studies by Calì and te Velde (2011) and Busse, Hoekstra and Königer (2011), all variables except the time dummy feature a time-lag of one year. This reflects the delay that exists between an acceptance of aid and its effect and features in all aid variables. Furthermore, lagged explanatory variables may reduce the likelihood of a reverse causality problem occurring.

4. Results and discussion

4.1 The effects on clearance time

Appendix 2 presents the results of the investigation into how ATF, ATP and other control variables affect clearance time. The Hausman test rejects the equality of the fixed and random effect models, suggesting that the former provides a preferable estimate.

As can be seen in Appendix 1, the coefficient of *ATF* is statistically significant at 5 per cent in the case of export and 1 per cent in the case of import. It suggests that increasing *ATF* by one million US dollars would reduce the time needed to clear a 20-foot container by 0.22 days for export and 1.17 days for import. Considering the mean time for clearance is 3.94 days for export and 5.63 days for import, these estimates are equivalent to reductions of 5.7 per cent for export and 20.8 per cent for import. Thus, this result offers support for *H1* (that is, *aid for trade facilitation reduces (cost and/or) time for customs clearance in SSA*). The different results for export and import may be due to two reasons: first, import procedures offer more scope for improvement than export procedures because the former are more numerous (for example, payment of tariff); alternatively, more *ATF* may be devoted to import than export – a fact that CRS data fails to detect.

According to reports of the Informa Cargo Information (2010) and World Bank (2009), at least 12.6 million 20-foot equivalent units (TEUs) passed through SSA ports in 2009 (see Appendix 3). Therefore, increasing *ATF* by one million US dollars would have a significant effect.

ATP is not statistically significant for either export or import. Arguably, this is because (as predicted), *ATP* includes sub-categories that are not as closely related to clearance time as *ATF*. Therefore, *ATP* is likely to be less effective in reducing clearance time.

Trade is not statistically significant, which corresponds to its ambiguous effect (as predicted).

NetUser is not statistically significant, although the signs of the co-efficients are negative. This corresponds to the prediction prior to regression analysis.

GDPpc, RegQuality, and *ConCorrupt* are not statistically significant; in addition, the signs of their co-efficients do not correspond to expectations prior to regression analysis.

4.2 Effects on clearance costs

The Hausman test does not reject the equality of the fixed effect and random effect models and so the results of both are shown in Appendix 4. As both aid variables are statistically insignificant, the results do not offer any support for either *H1* or *H2* (that is, *aid for trade facilitation reduces the cost of customs clearance in SSA as adjusted for local inflation)*. That said, none of the other control variables are statistically significant either.

These results seem reasonable because the *Doing Business* series records only official costs (World Bank 2011a), such as those for lodging import declaration forms. Such costs are not directly related to the capacity of customs administrations but rather reflect fiscal policies. It therefore does not seem appropriate to measure the performance of customs administrations using the official costs recorded in the *Doing Business* series.

5. Conclusions

The objective of this study is to quantify the effect of much needed customs aid in SSA. Using *ATF* and *ATP* as indicators of customs aid, the study reveals that increasing *ATF* by one million US dollars would reduce the time needed to clear a 20-foot container by 0.22 days (5.7 per cent) for export and 1.17 days (20.8 per cent) for import. Considering that SSA ports handle at least 12.6 million TEUs each year, increasing *ATF* would have a significant impact. These results explain the effectiveness and significance of customs aid in SSA.

This study also reveals that the costs of clearance and technical control recorded in the *Doing Business* series cannot serve as an indicator of customs capacity or the effectiveness of customs aid. Opportunity costs linked to customs clearance appear to be a more appropriate measurement of customs capacity. However, it is very difficult to adequately assess the opportunity costs of each traded article. Clearance time therefore appears a more appropriate indicator for measuring customs capacity. The problem here is that the *Doing Business* series offers the only global dataset that captures time for customs clearance. Moreover, it collects the data from a questionnaire submitted to several well-qualified trade bodies in each country (World Bank 2011a). Ideally, more reliable data on clearance time is needed.

The WCO TRS Guide (WCO 2011b) was recently updated with a view to addressing trade links to landlocked countries (Mikuriya 2011). Considering that 34 per cent of SSA countries are landlocked, this appears especially well-suited to SSA. The TRS provides a uniform method of measuring the time for clearance and other processes. It does so by actually measuring the time needed for goods to pass through processes (including customs clearance) over a period of at least seven consecutive working days in a statistically reliable way (for example, random sampling if a customs administration cannot handle all goods). The TRS Guide recommends SSA countries to periodically conduct TRS in order to identify potential bottlenecks in the supply chain – which is one of the primary objectives of the TRS (WCO 2011c) – as well as to construct an essential dataset for quantifying how customs aid affects customs modernisation (as performed by this study). This would meet the increasing demand for accountability regarding the effectiveness of public sector aid projects.

The CRS does not cover aid provided by non-DAC members such as China and this limitation should be kept in mind when interpreting the results of this study. More comprehensive datasets on aid would improve the accuracy of future studies on this subject. That said, collecting data on the aid provided by all donors in all areas appears daunting to say the least and so it might be more expedient to do so using the WCO's network. The WCO could improve empirical studies and the coordination of efforts to support customs administrations in developing countries. Since the WCO is the only international organisation with a substantial international membership which is specialised in customs matters, it appears the most appropriate body to collect and exploit information on customs aid. Were the WCO to undertake this task, it would enhance its standing as a policymaker in relation to the assistance provided to customs administrations in developing countries and help its efforts to provide its members with a better service.

Appendices

Appendix 1: Summary of statistics for the variables

Variable	Obs	Mean	Std. Dev.	Min.	Max.	Source
TimeExp (days per container)	174	3.94	1.91	1.00	10.00	World Bank *Doing Business* (DB)
CostExp (USD per container, which is adjusted by the method in Note 3)	171	177.55	138.56	9.26	754.64	World Bank DB
TimeImp (days per container)	174	5.63	3.32	1.00	15.00	World Bank DB
CostImp (USD per container, adjusted by the method in Note 3)	171	197.81	152.23	12.75	779.11	World Bank DB
ATFt-1 (disbursed ODA in million constant USD, deflated by US inflation rate [base year is 2004])	174	0.21	0.71	0.00	6.97	OECD CRS
ATRt-1 (disbursed ODA in million constant USD, deflated by US inflation rate [base year is 2004])	174	2.31	4.60	0.00	33.67	OECD CRS
GDPpct-1 (constant USD, deflated by US inflation rate [base year is 2004])	174	3,226.63	5,344.46	262.78	29,984.66	World Bank World Development Indicators (WDI)
Tradet-1 (Sum of merchandise imports and exports, billion constant USD, deflated by US inflation rate [base year is 2004])	174	9.60	24.24	0.07	159.12	World Bank WDI
RegQualityt-1 (ranging from -2.5 to 2.5, with higher values corresponding to better governance outcomes)	174	-0.69	0.60	-2.30	0.85	World Bank WGI
ConCorruptt-1 (ranging from -2.5 to 2.5, with higher values corresponding to better governance outcomes)	174	-0.59	0.59	-1.63	0.97	World Bank WGI
NetUsert-1 (the number of users per 100)	172	6.57	10.98	0.23	72.35	World Bank WDI

Notes:

1. Due to the limitation of data on time and cost for customs clearance, 45 countries are covered in the dataset (although according to the World Bank's definition there are 47 countries in SSA). The 45 countries covered are Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo Dem. Rep., Congo Rep., Cote d'Ivoire, Djibouti, Equatorial Guinea, Eritrea, Ethiopia*, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia**, Madagascar, Malawi, Mali, Mauritania, Mauritius*, Mozambique, Namibia, Niger, Nigeria, Rwanda*, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda*, Zambia*, and Zimbabwe*. (* and ** indicate countries that have only three or two years' datasets respectively due to lack of data.)
2. Zimbabwe has to be excluded from the analyses on costs owing to the lack of adequate inflation data.
3. Convert current USD (that is, the reporting currency), into local currencies by official exchange rate, deflate them by local inflation rate (base year 2004), and then convert them into USD.
4. Inflation data obtained mainly from World Bank World Development Indicators and complemented by the IMF World Economic Outlook Database.

Appendix 2: The effect of ATF, ATP, and other control variables on time for customs clearance, 2007-2010

	(1)	(2)
Variables	**TimeExp**	**TimeImp**
ATF_{t-1}	-0.217**	-1.168***
	(-2.204)	(-6.210)
ATP_{t-1}	-0.0125	-0.000769
	(-1.042)	(-0.0334)
$GDPpc_{t-1}$	-1.21e-05	0.000210
	(-0.113)	(1.022)
$Trade_{t-1}$	-0.00787	-0.0317
	(-0.596)	(-1.253)
$RegQuality_{t-1}$	0.532	-0.446
	(0.773)	(-0.338)
$ConCorrupt_{t-1}$	0.269	0.441
	(0.483)	(0.413)
$NetUser_{t-1}$	-0.0107	-0.0135
	(-0.488)	(-0.321)
$Year_{2008}$	0.130	-0.575**
	(1.019)	(-2.354)
$Year_{2009}$	0.000768	-0.764***
	(0.00562)	(-2.924)
$Year_{2010}$	-0.0960	-0.807***
	(-0.693)	(-3.045)
Constant	4.688***	6.114***
	(8.089)	(5.512)
Observations	172	172
R-squared	0.099	0.379
Number of countries	45	45

Notes: t-statistics in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Appendix 3: Volume of containers in Sub-Saharan Africa

Country (Listed from West to East)	Port*	TEU	Year	World Ranking in 2009 by source (a)	Source
Mauritania	Nouakchott	62,269	2009	346	(a)
Mauritania	Nouadhibou	N.A.			
Senegal	Dakar	331,076	2009	184	(a)
Gambia	Banjul	100,000	2005		(b)
Guinea Bissau	Bissau	N.A.			
Guinea	Conakry	753,287	2006		(b)
Sierra Leone	Freetown	31,718	2006		(c)
Liberia	Monrovia	50,000	2007		(b)
Côte d'Ivoire	Abidjan	610,185	2009	134	(a)
Côte d'Ivoire	San Pedro	66,844	2009	339	(a)
Ghana	Tema	555,009	2008		(a)
Ghana	Takoradi	50,000	2005		(b)
Togo	Lome	460,000	2006		(b)
Benin	Cotonou	300,000	2008		(a)
Nigeria	Lagos	1,276,000	2008		(e)
Nigeria	Onne	87,000	2009	317	(a)
Nigeria	Port Harcourt	10,000	2005		(b)
Nigeria	Warri	N.A.			
Nigeria	Calabar	N.A.			
Cameroon	Douala	270,000	2008		(a)
Gabon	Owendo	57,778	2009	350	(a)
Gabon	Port Gentil	N.A.			
Congo (Republic)	Pointe Noire	321,000	2008		(a)
Congo (Democratic Republic)	Matadi	200,000	N.A.		(f)
Angola	Luanda	377,208	2006		(b)
Angola	Lobito	346,000	2005		(b)
Namibia	Walvis Bay	265,663	2009	207	(a)
South Africa	Cape Town	766,127	2009	115	(a)
South Africa	Port Elizabeth	314,723	2009	190	(a)
South Africa	Ngqura	70,208	2009	333	(a)
South Africa	East London	41,845	2009	365	(a)
South Africa	Durban	2,523,105	2009	41	(a)
South Africa	Richards Bay	10,305	2008		(a)
Mozambique	Maputo	92,284	2008		(a)
Mozambique	Beira	85,716	2008		(a)
Mozambique	Nacala	49,770	2008		(a)
Madagascar	Toamasina	132,278	2009	278	(a)
Mauritius	Port Louis	406,862	2009	161	(a)
Tanzania	Dar es Salaam	327,000	2009	185	(a)
Tanzania	Tanga	12,278	2008		(a)
Tanzania	Matwara	6,445	2008		(a)
Kenya	Mombasa	618,816	2009	132	(a)
Djibouti	Djibouti	195,000	2005		(b)
Eritrea	ASSAB	N.A.			
Sudan	Port Sudan	406,862	2009	157	(a)
Total		**12,640,661**			

Note: * the selection of ports is based on source (a) which covers almost all container ports.

Sources:

(a) Informa Cargo Information 2010, *Containerisation International Yearbook 2011*, Informa UK Ltd., London.
(b) World Bank 2009, *Africa infrastructure country diagnostic, background paper 8: beyond the bottlenecks: ports in Africa*, World Bank, Washington, DC.
(c) Sierra Leone Investment & Export Promotion Agency 2009, *Invest in Sierra Leone*, SLIEPA, Freetown.
(d) Swedish Maritime Administration 2010, *Shipping and the Port Sector in Sub-Sahara Africa*, Swedish Maritime Administration, Norrköping.
(e) USAID 2010, *Lagos-Kano-Jibiya transport corridor performance analysis*, USAID, Washington, DC.
(f) World Bank 2010, *The Republic of Congo's infrastructure: a continental perspective*, World Bank, Washington, DC.

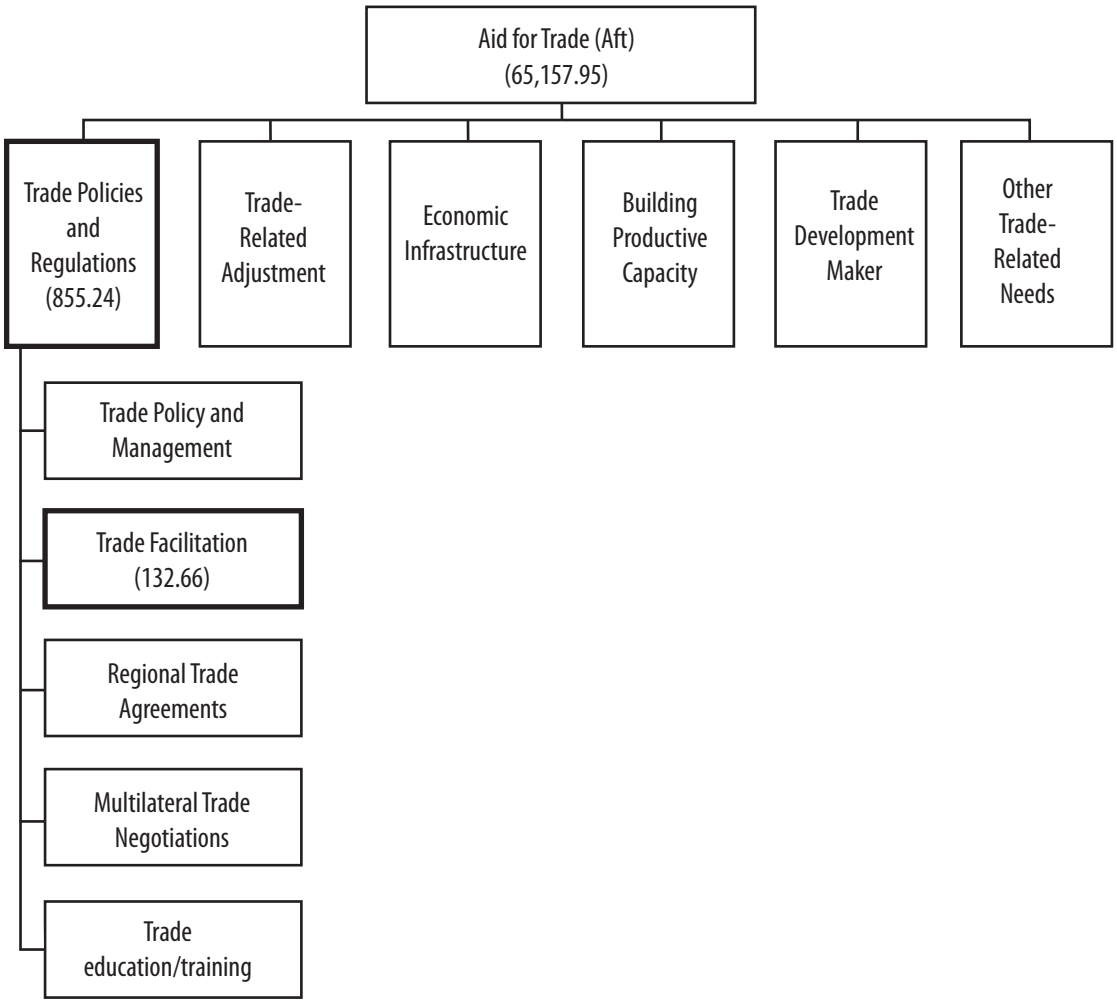
Appendix 4: The effect of ATF, ATP, and other control variables on time for customs clearance, 2007-2010

	(1)	(2)	(3)	(4)
Variables	**CostExp**		**CostImp**	
	FE	**RE**	**FE**	**RE**
ATF_{t-1}	5.172	6.081	2.981	4.954
	(0.479)	(0.606)	(0.243)	(0.435)
ATP_{t-1}	0.248	0.183	-0.109	-0.00455
	(0.187)	(0.144)	(-0.0723)	(-0.00315)
$GDPpc_{t-1}$	0.0155	0.00426	0.0176	0.00167
	(1.315)	(1.163)	(1.313)	(0.412)
$Trade_{t-1}$	0.183	-0.275	0.0913	-0.311
	(0.126)	(-0.370)	(0.0553)	(-0.377)
$RegQuality_{t-1}$	-41.60	-41.83	-49.64	-47.75
	(-0.675)	(-1.131)	(-0.709)	(-1.156)
$ConCorrupt_{t-1}$	-0.532	0.0946	-0.783	0.0569
	(-0.220)	(0.0676)	(-0.285)	(0.0365)
$NetUser_{t-1}$	-16.31	-13.61	-7.367	-4.854
	(-1.162)	(-1.022)	(-0.462)	(-0.320)
$Year_{2008}$	-14.83	-11.91	-8.574	-5.471
	(-0.985)	(-0.886)	(-0.501)	(-0.358)
$Year_{2009}$	-26.60*	-26.49*	-27.41	-27.15*
	(-1.740)	(-1.930)	(-1.577)	(-1.740)
$Year_{2010}$	86.61	127.6***	120.9*	156.1***
	(1.381)	(3.602)	(1.695)	(3.972)
Constant	86.61	127.6***	120.9*	156.1***
	(1.381)	(3.602)	(1.695)	(3.972)
Observations	169	169	169	169
R-squared	0.062		0.056	
Number of countries	44	44	44	44

Notes: t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix 5: The structure of Aft in the OECD CRS



Note: Trade-Related Adjustment is a category of Aft. However, it is not separately categorised in CRS and up to 2008 it was considered under Trade Policies and Regulations (OECD 2008b). In 2009 this category amounted to USD36.07 million, which accounts for only 4 per cent of the Trade Policies and Regulations category. Therefore, the study does not consider the existence of Trade-Related Adjustment category in its regression analyses. This approach is also adopted by Busse, Hoekstra and Königer (2011).

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Notes

1 This paper is the author's personal research and all views represented are his own. This study does not represent views of the organisation the author works for.

2 The Paris Declaration on Aid Effectiveness was adopted by international agreement endorsed at the second High Level Forum on Joint Progress toward Enhanced Aid Effectiveness organised by the OECD in 2005. Article 3(iii) of the Declaration states as follows:

> Enhancing donors' and partner countries' respective accountability to their citizens and parliaments for their development policies, strategies and performance.

3 The Accra Agenda for Action adopted by international agreement at the third High Level Forum on Joint Progress toward Enhanced Aid Effectiveness organised by the OECD in 2008 Article 10 states as follows:

> Achieving development results – and openly accounting for them – must be at the heart of all we do. More than ever, citizens and taxpayers of all countries expect to see the tangible results of development efforts. We will demonstrate that our actions translate into positive impacts on people's lives. We will be accountable to each other and to our respective parliaments and governing bodies for these outcomes.

4 Busse, Hoekstra and Königer adopt the following method to calculate '68 million TEUs' (Busse, Hoekstra & Königer 2011, p. 12):

> According to UNCTAD (2009b, p. 24), the world total of containerised trade in 2008 was estimated at 137 million TEUs. 4,063.9 million tonnes of seaborne trade were unloaded in developing countries in 2008 (UNCTAD 2009b, p. 185), whereas the total seaborne trade unloaded in 2008 was 8,180.7 million tonnes. This means that developing economies received 49.7 per cent of global seaborne imports. The authors used the following calculation: 137 million TEUs multiplied by 49.7 equals 68 million TEUs. They draw attention to the fact that this calculation should only be considered a rough estimate (Busse, Hoekstra & Königer 2011, p. 12).

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