Trade Facilitation and the EU-ACP Economic Partnership Agreements: Who Has the Most to Gain?

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Abstract

The aim of the paper is to assess the potential benefits from trade facilitation in terms of increased trade flows both on average and specifically for the six regional groupings of ACP countries negotiating Economic Partnership Agreements (EPAs) with the EU. We use data from the World Bank's Doing Business Database on the time required to export or import as indicators of cross-border transaction costs. A gravity model on two-way bilateral trade between 22 EU countries and 106 developing countries is estimated using a sample selection approach. We find that time delays both on the part of the exporter and the importer on average significantly decrease trade flows. We also find that this relationship is not linear: an extra day of waiting has smaller marginal effects if the time requirements are already high. On average, lowering border delays in the exporting country with one day from the sample mean would yield an export increasing effect of about 1 percent, while the same reduction in the importing country would give an import increase of about 0.5 percent. More specifically, we also find that countries negotiating in the EPA groups for SADC, West Africa, Eastern and Southern Africa (ESA), and the Caribbean have negative and significant effects from *export* transaction costs, as do EU and non-ACP developing countries. The effects for the SADC, West Africa and ESA groups are the largest. Countries in the Pacific, SADC, West Africa and the EU have significantly negative effects from *import* transaction costs, with the effects being largest for the two former groups. The results are generally robust to a number of alternative estimation methods such as Poisson estimation, IV estimation and the sample selection approach suggested by Helpman, Melitz and Rubinstein (2007).

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1 Introduction

The subject of trade facilitation, i.e. loosely speaking measures to lower transaction costs related to cross-border trade procedures, has emerged as an important issue in the current trade policy debate. This increased focus is no doubt related to the fact that many tariff and non-tariff barriers have been reduced or eliminated in the past rounds of multilateral trade negotiations, thus increasing the relative costs of inefficient trade procedures. It is perhaps also an easier subject to tackle than some other imminent questions, considering that no country gains in any obvious sense from having burdensome procedures. In the words of European Union (EU) Trade Commissioner Peter Mandelson: "there are no losers from trade facilitation reform, only winners"[1].

In the World Trade Organization (WTO), trade facilitation is one of the four so-called *Singapore issues*,[2] all of which at one stage was supposed to be included in the Doha Development Agenda, but where trade facilitation now is the only one remaining.[3] Negotiations on trade facilitation in the Doha Round have been successful, but the general breakdown of negotiations in the summer of 2006 made several countries increase their attention to regional trade agreements and negotiations. In the context of the EU's trade relations with developing countries, much of the focus was transferred to the ongoing negotiations about creating Economic Partnership Agreements (EPAs) with six regional groups following the Cotonou Agreement's pledge to replace the current non-reciprocal and non-WTO compatible preferences for African, Caribbean and Pacific (ACP) countries. Besides covering, among other things, issues of tariff and non-tariff barriers to trade, these negotiations are supposed to address all Singapore issues.

In this paper, our goal is firstly to assess how large effects export and import transaction costs related to cross-border trade procedures have on trade flows on average and hence how big the potential benefits from trade facilitation are, and secondly, to decompose these effects to see the specific potential for each EPA negotiating group as

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[1] See Nath and Mandelson (2006). Obviously, this is not strictly true, since some parties, such as customs officials, might lose from the inability to charge bribes, or from losing their jobs due to more efficient cross-border procedures. From a country welfare perspective though, one does indeed expect gains.

[2] The others being trade and investment, competition policy and transparency in government procurements.

[3] For an overview of the work going on in the WTO and in the negotiations, see WTO (2006).

well as for the EU.[4] To this end, we use data from the World Bank's (2007) Doing Business Database on the time required to export or import in 2005 as indicators of trade transaction costs. We estimate a gravity model on two-way bilateral trade between 22 EU countries and 106 developing countries using a sample selection approach. In the model, the average effects from export and import transaction costs are estimated separately, and the relationship between transaction costs and trade flows is allowed to be non-linear through the inclusion of quadratic transaction cost terms. By including several interaction terms, we can also estimate the specific effect that trade transaction costs have on the EU and each EPA group. Hence, we can get an estimate on how much trade would increase if the transaction costs could be lowered, i.e. by successful trade facilitation reform, both on average and specifically for EPA negotiating groups and the EU.

To the best of our knowledge, the potential effects of trade facilitation on EPA groups have not been estimated before. Besides looking at a new question, on of the main contributions of the paper compared with other papers in the general area of trade facilitation, is that it uses a less restrictive model, allowing trade facilitation in both the exporting *and* the importing country to affect bilateral trade flows, as well as allowing the effect of trade facilitation to be non-linear. Further, it takes recent methodological developments into account and, besides the main alternative of Heckman estimation, estimates the model using a Poisson Pseudo-Maximum-Likelihood estimator, instrumental variables estimation, and a new sample selection approach suggested by Helpman, Melitz and Rubinstein (2007). The data on the time requirements for *exports* have been used before, but not the data on border delays in the *importing* country.

To summarize our results, we find that time delays both on the part of the exporter and the importer, proxying export and import transaction costs, on average significantly decrease trade flows. We also find that this relationship is not linear: an extra day of waiting has smaller marginal effects if the time requirements are already high. On average, lowering border delays in the exporting country with one day (from the sample

[4] Trade facilitation could affect a country's economy through several links, such as trade flows, flows of foreign direct investment (FDI) or government revenue through the collection of trade taxes. In this paper, we only assess the effects on trade flows. For a discussion of these possible links, as well as an overview of studies, see Engman (2005).

mean) would yield an export increasing effect of about 1 percent, while the same reduction in the importing country would give an import increase of about 0.5 percent.

Further, we find that countries negotiating in the EPA groups for the Southern African Development Community (SADC), West Africa, Eastern and Southern Africa (ESA), and the Caribbean have negative and significant effects from *export* transaction costs, as do EU and non-ACP developing countries. Countries in the Pacific, SADC, West Africa and the EU have significantly negative effects from *import* transaction costs. Reducing border delays with one day from the within-group mean would increase exports with between 1 and 8 percent, and the percentage effects of reducing import border delays are generally of the same magnitude.

The next section will define trade facilitation more thoroughly and give an overview of the framework for the EPA negotiations. Section three presents some previous research. In section four, the methodology and data are discussed, where after the estimation results are presented and interpreted. Section five summarizes and concludes.

2 Background

2.1 Trade Facilitation Defined

Despite the recent years' increased attention to trade facilitation, there is no real consensus on how the term should be defined. Generally, there are at least two broad ways of looking at the issue: either to use a narrow focus on what has been called "at the border" procedures, or to use a wider perspective and also include so called "behind the border" measures.

One common way to narrowly define trade facilitation originates with the WTO, and is e.g. used by Engman (2005), stating that trade facilitation is "the simplification and harmonization of international trade procedures", where international trade procedures are the "activities, practices and formalities involved in collecting, presenting, communicating and processing data required for the movement of goods in international trade". This definition clearly limits the attention to what happens around the border.

With a slightly less narrow definition, the Doha Ministerial Declaration (WTO 2001) refers to trade facilitation as the "expediting [of] the movement, release and clearance of goods, including goods in transit". This leaves some room for looking at, for instance, transport infrastructure.[5]

Defining trade facilitation even more broadly, Wilson, Mann and Otsuki (2003; 2005) include both direct border elements such as port efficiency and customs administration, and some working more "inside the border", such as domestic regulatory environment and services infrastructure.

A nice summing up of the various ways to look at the matter is presented in Roy and Bagai (2005). They say that "trade facilitation [...] aims to make trade procedures as efficient as possible through the simplification and harmonization of documentation, procedures and information flows." They go on by saying that

> In a narrow sense, it addresses the logistics of moving goods through ports or customs. More broadly, it encompasses several inter-related factors such as customs and border agencies, transport infrastructure (roads, ports, airports etc.), services and information technology (as it relates to better logistics), regulatory environment, product standards, Technical Barriers to Trade [...] etc. in order to lower [the] cost of moving goods between destinations and across international borders.

In this study, we choose to work with the same kind of narrow perspective on trade facilitation as Engman (2005). Borrowing a line from Roy and Bagai (2005), our definition might be summarized as *measures to decrease the transaction costs arising from the "moving [of] goods through ports or customs"*.[6]

2.2 Economic Partnership Agreements

In June 2000, relations between the EU and ACP countries began to change with the signing of the Cotonou Agreement. This agreement, which entered into force in April

[5] Note that the negotiations in the WTO are supposed to cover GATT article V (freedom of transit), article VIII (fees and formalities connected with importation and exportation) and article X (publication and administration of trade regulations); see WTO (2006).

[6] Trade facilitation is clearly linked to the broader issue of Non-Tariff Barriers to Trade (NTBs), but the latter includes many more obstacles to trade. Even more generally, trade facilitation belongs to the literature on trade costs – for an overview see Anderson and van Wincoop (2004).

2003, stipulates that the non-reciprocal trade preferences previously applying to EU-ACP trade only should remain in place until December 31, 2007, at the latest. At this date, new WTO-compatible trade arrangements – Economic Partnership Agreements (EPAs) – should enter into force.[7]

Negotiations between the EU and ACP countries have now been underway since September 2002 to agree on the terms of the envisioned EPAs. The first phase of the negotiations took place at an all-ACP-EU level and addressed general issues of interest to all parties. A second phase of negotiations, launched 2003-2004, now takes place at a regional level, where six groupings of ACP countries negotiate separately with the EU. These regional negotiating groups are presented in table 1, with least developed countries (LDCs) in italics. It is evident that not only are the EPA-negotiating groups quite heterogeneous and contain both LDCs and non-LDCs, but there is also not necessarily any straightforward connection between these EPA groups and existing regional integration arrangements.[8]

Trade facilitation was not explicitly mentioned in the Cotonou Agreement, but in an explanatory memorandum outlining the mandate authorizing the European Commission to negotiate EPAs with ACP countries, it is stated that "EPAs should [...] aim at simplifying the requirements and procedures related to imports and exports" (European Commission 2002). In subsequent documents, it seems clear that the EU sees all Singapore issues, including trade facilitation, as important parts of EPA agreements (see European Commission 2007a). The ACP countries on their part mentioned trade facilitation as one of several trade issues in the guidelines for negotiations (ACP Council of Ministers 2002). Now, trade facilitation is explicitly an issue in all six EPA negotiations. For an overview of trade facilitation in the EPA negotiations, see Nyamache (2006).

[7] Since the existing preferences do not apply to all developing countries, they are not covered by the Enabling Clause, and hence have to operate under a WTO-waiver. For the new preferences to be WTO-compatible, they would have to be reciprocal. For a description of ACP preferences since the 1960s and an estimation of their effects, see Persson and Wilhelmsson (forthcoming).

[8] For a discussion of this and other EPA-related matters, see for instance Hinkle *et al* (2006).

Table 1. EPA Negotiating Groups

EPA Grouping	Countries
West Africa	*Benin*, *Burkina Faso*, *Cape Verde,* Côte d'Ivoire, *Gambia*, Ghana, *Guinea*, *Guinea-Bissau*, *Liberia*, *Mali*, *Mauritania*, *Niger*, Nigeria, *Senegal*, *Sierra Leone*, *Togo*
Central Africa	Cameroon, *Central African Republic*, *Chad*, *Congo (Dem. Rep.)*, Congo (Rep.), *Equatorial Guinea*, Gabon, *São Tomé and Principe*
Eastern and Southern Africa (ESA)	*Burundi*, *Comoros*, *Djibouti*, *Eritrea*, *Ethiopia*, Kenya, *Madagascar*, *Malawi*, Mauritius, *Rwanda*, Seychelles, *Sudan*, *Uganda*, *Zambia*, Zimbabwe
SADC (Southern Africa)	*Angola*, Botswana, *Lesotho*, *Mozambique*, Namibia, (South Africa), Swaziland, *Tanzania*
Caribbean	Antigua and Barbuda, Bahamas, Barbados, Belize, Dominica, Dominican Republic, Grenada, Guyana, *Haiti*, Jamaica, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago
Pacific	Cook Islands, Fiji, *Kiribati*, Marshall Islands, Micronesia, Nauru, Niue, Palau, Papua New Guinea, *Samoa*, *Solomon Islands*, Tonga, *Tuvalu*, *Vanuatu*

Note: East Timor does not participate in any EPA negotiation. Cape Verde announced in September 2006 that it left the West African EPA configuration (ECDPM 2006). Congo (Dem. Rep.) was first a part of the ESA negotiating group, but switched to the Central African group at the end of 2005. South Africa started as an observer in the SADC EPA group, but has now become a negotiating party (European Commission 2007b). Least developed countries in italics.

Given that parties in the ongoing EPA negotiations are dealing with the issue of trade facilitation, at the same time as there is a large number of other questions on the agenda, there is clearly a need to assess just how important trade facilitation is. If there is no clear evidence suggesting economic gains, scarce negotiating and implementation resources could be better allocated elsewhere. If however, there are large potential gains, this motivates a focus on trade facilitation.

3 Previous Studies

There is a growing literature on the effects of trade facilitation, but to the best of our knowledge, no previous study has looked at this issue in the context of the EU's relations with ACP countries. This section therefore gives an overview of some studies that quantify the effects of trade facilitation in general or in some specific other contexts. Generally, these papers have tended to use either a gravity approach or a Computable General Equilibrium (CGE) model.

3.1 Gravity Model Studies

Wilson, Mann and Otsuki (2005) use four separate indicators to measure trade facilitation: port efficiency, customs environment, regulatory environment and service sector infrastructure. The indicators are included in a gravity model for both the exporting and importing country (except for the customs environment, which is only included for the importing country). The underlying data, notably survey data from the Global Competitiveness Report, is only available for rather few countries, leaving them with a sample of 75 countries.[9]

The model is estimated with OLS with the dependent variable being manufactures imports. All trade facilitation indicators are positive and significant in the regressions. The authors further use these estimates to simulate what would happen if countries that are below-average on a certain trade facilitation indicator would improve halfway to the average for all countries. According to their findings, such a scenario would result in an increase in trade of about 10 percent, out of which 0.8 percent would come from customs environment improvements. Using a very similar design, Wilson, Mann and Otsuki (2003) looks at the effect of trade facilitation on trade within the Asia Pacific Economic Cooperation (APEC), with the main difference being that this paper only includes measures of trade facilitation for the importer, and uses fixed effects for exporters. In the authors' preferred specification, all trade facilitation indicators are significant.

Djankov, Freund and Pham (2006) use the same data as this paper, i.e. World Bank (2007), and estimate how time delays affect exports with the use of a gravity model.[10] Their preferred way of estimation is a difference gravity equation estimated on similar exporters, i.e. exporters that are similar in location and factor endowments and face the same trade barriers in foreign markets. Looking only at delays in the exporting country, their main result is that, on average, for each additional day that a product is delayed, trade is reduced by at least 1 percent. They also find that developing country

[9] Specifically, they have few developing countries, and especially only have data for Mauritius, Nigeria and South Africa for Sub-Saharan Africa. This is one major reason why we do not use the same data, since this would make it impossible to estimate effects on most EPA groups. Note that the variable *customs environment*, which is only included for the importing country, is the one that most closely resembles our indicators for potential trade facilitation.

[10] Note though that they use an earlier version of the data that has now been somewhat modified for a number of countries.

exports are significantly more affected by delays, and that exports of time-sensitive goods are more influenced by exporters having to wait at the border.

Nordås, Pinali and Grosso (2006) estimate a gravity model with a Heckman selection process to see both how time delays affect the size of observed trade flows, and also the probability that trade between two countries will occur. The authors study exports from 192 countries to Australia, Japan and the United Kingdom from 1996 to 2004. For all years but 2004, time for exports is proxied by a measure of the control of corruption, while data for 2004 appears to come from the World Bank's Doing Business Report. Control of corruption is generally found to affect both the probability and volume of exports positively, while the time for exports in most cases have a negative impact on both the probability to export and the exported volumes.

Soloaga, Wilson and Mejía (2006) use the same methodology and type of data as in Wilson, Mann and Otsuki (2005), but estimate the gravity model with a negative binomial regression. Unlike in the latter study, they choose to include customs efficiency also for the exporter. Most of the results are fairly similar to those obtained in Wilson, Mann and Otsuki (2005), but puzzlingly, while they find the expected positive and significant effect from customs efficiency in the exporting country, the corresponding coefficient is robustly *negative* and significant for the importing country.

3.2 Other Approaches

There are some studies that use CGE models to simulate the effects of trade facilitation. OECD (2003) finds that income gains as share of GDP would be 0.13 – 0.15 percent on a world-wide basis if all countries performed trade facilitation reforms, meaning that the gap towards best practice is closed by a certain percentage. The relative income gains of developing countries are found to be larger than for OECD countries, and Sub-Saharan Africa would see particularly high income gains. Francois, van Meijl and van Tongeren (2005), The Swedish National Board of Trade (2006) and Decreux and Fontagné (2006) all simulate the effects of potential outcomes of the Doha Round, covering the areas of non-agricultural market access, agricultural liberalization, services liberalization and trade facilitation. While using different ways to model trade facilitation, all studies find

that a large portion of the potential gains from a Doha Agreement would come from trade facilitation. Generally, developing countries as a group are found to be large gainers. Hertel and Keeney (2006), focusing on agricultural reforms under the Doha Round, also find large potential gains from trade facilitation. Lastly, Dennis (2006) finds that, when trade facilitation is added to regional liberalization initiatives within the Middle East and North Africa region, or with the EU, the welfare gains become between 3 and 4 times higher.

In addition to these CGE studies, another interesting study is Hummels (2001). In that paper, it is estimated that each additional day spent in transport reduces the probability that the US will import from a particular country by 1 – 1.5 percent. Also, each day that is saved in terms of shipping is estimated to represent 0.8 percent of the value of manufactured goods.

4 Methodology

This section starts by discussing the model that we estimate to find potential effects of trade facilitation on average and on each single EPA grouping. Then, we describe the data used to measure the trade transaction costs that trade facilitation is meant to lower. Lastly, the estimation results are presented and interpreted.

4.1 Model and Estimation Issues

To answer the question how cumbersome cross-border trade procedures affect trade flows on average, and also specifically what the effects look like for the EPA groups and the EU, we estimate a gravity equation including measures for export and import transaction costs. The model is estimated on two-way trade flows between EU countries and developing countries.

The gravity equation has been widely used to estimate the effects of e.g. preferential trading arrangements and various trade costs,[11] but has also at times been criticized for lacking a solid theoretical basis. There is, however, a growing consensus

[11] For an overview of its application to preferential trade, see Greenaway and Milner (2002).

that this is not the case, and among the papers often cited are Anderson (1979), Bergstrand (1985; 1989), Helpman and Krugman (1985) and Deardorff (1998). We choose to use a model originating with Anderson and van Wincoop (2003). They derive the gravity model using assumptions of constant elasticity of consumption (CES) preferences and goods being differentiated by place of origin. In the model, Anderson and van Wincoop assume unitary income elasticities, and include so called multilateral resistance terms.[12]

Based on Anderson and van Wincoop's derivation, in its original multiplicative form, the model used is:

$$M_{ij} = e^{\alpha_0}(Y_i Y_j)^{\alpha_1} D_{ij}^{\alpha_2} X_{ij}^{\beta} Z_i^{\gamma} W_j^{\varphi} region_i^{\lambda} region_j^{\mu} TFI_i^{\delta_1} TFE_j^{\phi_1} \\ *\exp[\theta_1(\ln TFI_i)^2 + \theta_2(\ln TFE_j)^2] e^{\varepsilon_{ij}} \quad (1)$$

In the model, M_{ij} is imports to country i from country j. Y_iY_j is the product of the countries' incomes measured as real GDP, and to be less restrictive than in the original model, income elasticities are allowed to differ from one. Trade flows are modelled to depend on the bilateral distance between the countries' capital, D_{ij}. We include a vector X_{ij} of bilateral variables that might affect trade: dummy variables capturing whether country i and j share a border, the same language, or have ever been in a colonial relationship. Further, there are two vectors of importer (Z_i) and exporter (W_j) specific variables: the latter includes land area, population size, a dummy for being landlocked, and a dummy for being a major oil exporter while the former in addition contains tariff level and a measure of tariff dispersion: for a description of all variables, including data sources, see the Appendix.[13] Since the effects of several variables might be expected to

[12] Capturing the fact that for any given level of bilateral barriers between countries i and j, if i has high barriers to its other trade partners, this will reduce the relative price of country j goods, and hence increase imports from j.

[13] Most of these variables are quite standard and are meant to capture various forms of trade costs (such as being landlocked) or lack thereof (such as sharing the same language). Land area is not always used, but is included here as a proxy for infrastructure: particularly for developing countries, a large land area can be expected to be associated with higher transportation costs. Population is included to allow for the possibility of non-homothetic preferences. The inclusion of a dummy for oil exporters is motivated by the fact that the dependent variable is total trade. Since oil is a special commodity, not controlling for this in some way would risk giving misleading conclusions.

differ between developed and developing countries, the coefficients are allowed to be different for developing and EU countries respectively by also adding all variables interacted with an EU dummy. We include regional exporter effects for developing countries (see below) that by construction capture the EU tariff level, so the tariff variables are only included for developing countries.

Anderson and van Wincoop (2003) emphasize the importance of controlling for multilateral resistance, and suggest that one way of doing this is to include exporter and importer specific effects. Due to the country-specific nature of the export and import transaction costs whose effects we want to capture, we cannot include specific effects for every exporter and importer. However, we include region-specific exporter and importer effects. This should to some extent capture the multilateral resistance effects, as well as more generally effects of heterogeneity, as long as this heterogeneity is common within small regions, but differ between them. Specifically, we add exporter and importer specific dummy variables for every EPA group and likewise for seven different geographical regions. For a list of these, see the Appendix.

To capture the *average* potential impact of trade facilitation, there are measures of the degree of export transaction costs in the exporting country j: TFE_j, and import transaction costs in the importing country i: TFI_i. These are measured as the number of days needed to export or import a standardized good. The hypothesis is that transaction costs will decrease trade flows whether they occur in the exporting country or at the destination, so we expect these coefficients to be negative. Further, since the effects of transaction costs are not necessarily linear, but rather the marginal effect could be expected to decline at higher levels of costs, the square of these export and import transaction costs are also added to the model. We expect their coefficients to be positive. ε_{ij} is a disturbance term.

To be able to capture the specific effect that trade transaction costs have in each EPA group and in the EU, the model is extended by including interaction variables, where the variables capturing export and import transaction costs are multiplied with importer and exporter specific EPA and EU dummy variables. With this addition, the model becomes

(2) $$M_{ij} = e^{\alpha_0}(Y_i Y_j)^{\alpha_1} D_{ij}^{\alpha_2} X_{ij}^{\beta} Z_i^{\gamma} W_j^{\varphi} region_i^{\lambda} region_j^{\mu} TFI_i^{\delta_1+\delta_2 EU_i+\sum_{m=1}^{6}\delta_{2+m}EPA_i^m} TFE_j^{\phi_1+\phi_2 EU_j+\sum_{n=1}^{6}\phi_{2+n}EPA_j^n} * \exp[\theta_1(\ln TF_i)^2+\theta_2(\ln TF_j)^2]e^{\varepsilon_{ij}}$$

Taking logs of both sides of equation (2), the extended model can also be written in its perhaps more familiar log-linear form:

(3) $$\begin{aligned}\ln M_{ij} = {} & \alpha_0 + \alpha_1 \ln(Y_i Y_j) + \alpha_2 \ln D_{ij} + \beta X_{ij} + \gamma Z_i + \varphi W_j + \lambda region_i + \mu region_j \\ & \delta_1 \ln TFI_i + \delta_2 EU_i * \ln TFI_i + \sum_{m=1}^{6}\delta_{2+m} EPA_i^m * \ln TFI_i + \\ & \phi_1 \ln TFE_j + \phi_2 EU_j * \ln TFE_j + \sum_{n=1}^{6}\phi_{2+n} EPA_j^n \ln TFE_j + \\ & \theta_1(\ln TFI_i)^2 + \theta_2(\ln TFE_j)^2 + \varepsilon_{ij}\end{aligned}$$

In the extended model, δ_1 and ϕ_1 captures the average effects on trade flows from import and export transaction costs respectively, for countries *that are not members of the EU or any EPA grouping*. To get the effect for EU and EPA countries, the *additional* effect stemming from transaction costs for these countries must be added to this main effect by summing the relevant coefficients.

To estimate this model, we choose to use a simple sample selection model. As noted by e.g. Helpman, Melitz and Rubinstein (2007), when the gravity model is estimated with OLS on its log-linear form, as is often the case, all country-pairs that have zero trade flows are excluded from the regression, which introduces a bias. One way to solve this problem is to first model a selection process where the probability that a country-pair trades is estimated using probit estimation, and then use this information in a second step estimation of trade volumes. This is just the standard Heckman procedure for sample selection. Following Helpman, Melitz and Rubinstein (2007), we use data from the World Bank (2007) on the costs and procedures involved in starting a business in various countries, as the additional variables included only in the selection equation. The idea is that that these variables only affect the fixed trade costs, but not variable trade costs, and by only including them in the first stage equation, one can get identification of

the second stage trade flow equation. All other variables are assumed to affect both the probability that trade occurs, and trade volumes.[14]

4.2 Data

The data used to measure the potential for trade facilitation comes from the World Bank (2007) Doing Business Database. In the *Trading Across Borders* section of the database, local trade professionals have answered a number of survey questions about, among other things, how much time it would take to export or import a certain standardized good.[15]

Transaction costs at border crossings can arise due to a number of reasons, but likely, the time required to export or import a good will be a good proxy for all these transaction costs. For instance, having to collect many signatures or fill out many documents might involve direct costs, but it will also increase the time needed to get the good through customs. Port congestion and waiting due to insufficient staffing etc, will also lead to higher time requirements. In turn, as noted by Djankov, Freund and Pham (2006), long time delays will act as a tax on exports (or imports) due to at least three factors: depreciation of the good, resources being allocated to storage and transport instead of other uses, and the fact that long delays are associated with increased uncertainty about delivery times. Therefore, we argue that border delays are not only a good indicator for the customs environment, but more specifically, a good proxy for the transaction costs that trade facilitation is meant to lower.[16]

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[14] On the basis of a theoretical model – building on the model in Melitz (2003) – that accounts for both firm heterogeneity and fixed trade costs, Helpman, Melitz and Rubinstein (2007) argue that one should not only correct for sample selection, but also for the impact of the fraction of exporting firms. We use their approach for the second correction as a robustness test and find that the results do not differ much.

[15] To make the data comparable across countries, it is assumed that the hypothetical trading firm is a private and fully domestically owned business with a minimum of 200 employees that is located in the country's most populous city and exports more than 10 percent of its sales to international markets. The good is assumed to be non-hazardous and not include any military arms or equipment, not to require refrigeration or any special environment, not to require any special phytosanitary or environmental safety standards, and to be shipped in a dry-cargo, 20-foot, full container load. Trade is assumed to take place by ocean transportation through the closest or main port from the most populous city (the port may be located in another city or country). For more specifics, see World Bank (2007), or Djankov, Freund and Pham (2006) that offers an excellent review of the data.

[16] As we are working with a relatively narrow definition of trade facilitation, concentrating on what happens at the border, there might be some concern that the time measure picks up too many aspects, i.e. also obstacles behind the border. This should not be a major problem however, since about 75 percent of

The data on the number of days needed to export or import the standardized good is available for 155 countries for 2005. Part of the data has been used to measure trade facilitation in Djankov, Freund and Pham (2006). However, unlike that paper, we use the data over time needed for both exports *and imports*, corresponding to the hypothesis that not only what a country does on its own matters, but the situation in its trading partners will also affect bilateral trade flows.

There are some possible concerns with using this data as an indicator of potential trade facilitation. OECD (2003) note that the indirect costs that arise due to waiting at the border might differ, not only between countries, which we do measure with our data, but also within countries due to the sensitivity of the good and the size of the firm. If this is the case, the measure of trade facilitation we use is not ideal, since this by design only captures the time it takes a large firm to export or import a relatively time-insensitive good. A further problem with the data, related to this, is that for every country, we only know the *average* time needed to export or import to all countries. If the composition of trade varies with trading partners, this is not a very good measure for the transaction costs in a specific bilateral trade flow. We try to explore the consequences of this in the robustness section below, but we would argue that the specific sample that we use reduces the problem. We include bilateral trade flows between EU countries and developing countries, where the composition of trade can be expected to be more even than if we had also included trade between developing countries, or between industrialized countries. Further, there is likely a high correlation between the time requirements for different kinds of goods, so if border delays for the survey's standardized good are large, this should be a good indicator of a generally inefficient customs environment.

Using the Doing Business Database to measure the potential for trade facilitation gives us a sample of 22 EU countries: Cyprus, Luxembourg and Malta disappear. To get a well-defined sample of developing countries, all countries that were eligible for preferences under the Generalized System of Preferences (GSP) are included. As is the case with the EU, some countries disappear due to missing data. The sample of

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the delays in the sample are due to "administrative hurdles" – customs procedures, tax procedures, clearances and cargo inspections (Djankov, Freund and Pham, 2006).

developing countries can be seen in the Appendix, together with a description of the other data used, including sources.

Descriptive Statistics

It is interesting to look at some descriptive statistics for the measures of potential trade facilitation. Starting with the time that is required to export a good, as is evident from table 2, there are large differences between country groups. While the average time among the Pacific countries is only 17 days, less than five days more than the EU average, countries in Sub-Saharan Africa are generally much less efficient. The situation in Eastern and Southern Africa and Central Africa is particularly striking, where the averages are 52 and 53 days respectively, going as high up as 87 days for Chad.

Table 2. Days Needed for Exports

Region	*Mean*	*Min*	*Max*	*Obs*
West Africa	40.8	21	69	11
Central Africa	52.7	27	87	6
Eastern and Southern Africa	51.8	16	80	12
SADC	41.6	30	74	7
Caribbean	34.3	17	58	4
Pacific	17.1	11	30	8
European Union	12.7	3	29	22
Non-EU, Non-EPA	32.7	13	105	59
Total	32.2	3	105	129

Source: Author's calculations. Data from the World Bank (2007) Doing Business Database.

Within the EU, there are also large differences, with time delays ranging from only 3 days in Estonia up to 29 in Greece. The group of countries that neither belongs to any EPA group, nor to the EU has an average of about 33 days, which is quite a lot lower than the Sub-Saharan Africa EPA groups, but higher than the average for Pacific countries. This group of *non-ACP*[17] developing countries forms the reference group in the regressions, so it is interesting to note how diverse the group is: the difference between the minimum and the maximum number of days is over 90 days.

[17] Strictly speaking, East Timor is *non-EPA* but not *non-ACP*. Considering that this is the only exception – South Africa is included in the SADC group for the estimations – these two terms will be used interchangeably.

The same pattern arises when we look at the time required for importing a good, presented in table 3. Again, countries in Sub-Saharan Africa have high time barriers on average, compared with non-ACP developing countries, while Pacific countries are close to the EU mean. There are big differences within the groups though. In Eastern and Southern Africa for instance, importers only have to wait an average of 16 days in Mauritius, while the corresponding delay is 124 days in Burundi. As expected, it generally takes a longer time to import a good than to export it.

Table 3. Days Needed for Imports

Region	*Mean*	*Min*	*Max*	*Obs*
West Africa	51.5	26	89	12
Central Africa	62.8	29	111	6
Eastern and Southern Africa	66.8	16	124	12
SADC	47.0	25	85	7
Caribbean	39.3	17	60	4
Pacific	18.7	8	32	10
European Union	15.2	5	34	22
Non-EU, Non-EPA	42.4	13	139	60
Total	40.2	5	139	133

Source: Author's calculations. Data from the World Bank (2007) Doing Business Database.

4.3 Empirical Results

The results from the Heckman estimation of the model is presented in table 9 in the Appendix.[18] The model is first estimated without separating the effects for EPA configurations and EU countries; see column 1. Starting with the usual gravity variables, the results are generally in line with what could be expected. The product of the exporter's and the importer's GDP is highly significant with a coefficient fairly close to unity. Distance has the expected negative and highly significant effect on imports. Land area, perhaps surprisingly, has a positive and significant effect on exports for developing countries, but this effect is significantly smaller for EU exporters. By contrast, land area is not significant for importing developing countries, while it has a significantly more negative effect for EU countries. For developing countries, population size does not

[18] The model is estimated using STATA's *Heckman, twostep* command with bootstrapped standard errors.

affect either exports or imports, while EU countries have significantly more positive effects from population size both for exports and imports. Having a common border, sharing the same language and having been in a colonial relationship has positive significant effects on trade flows. Landlocked developing countries both export and import significantly less, and EU countries have a significantly less negative effect on exports from being landlocked. LDCs both export and import significantly less, as do major oil exporters. The average tariff in developing countries has a significant negative impact on imports, and there is also a significant negative effect from the tariff dispersion variable: if high tariffs are concentrated on certain sectors, interpreted as tariff peaks, this is negative for trade flows.

Looking at the variables of real interest, both the average level of export transaction costs and import transaction costs have the expected negative coefficients, and both are highly significant. The magnitude of the coefficient for export transaction costs is somewhat larger at -1.5, with the corresponding coefficient for import transaction costs being about -1.3. These coefficients are of the same magnitude as the coefficient for distance. Interestingly, the squared trade facilitation variables are also significant and have the expected positive sign. A reasonable interpretation must therefore be that border delays, proxying indirect trade transaction costs, on average have a significant negative effect on trade flows both when they occur in the exporting country, and at the destination. The marginal effect of an extra day of waiting is however not constant: when the level of transaction costs is already high, waiting a little longer will be less harmful than it would have been at lower levels.[19]

Turning now to the baseline model estimated with interaction effects for EPA groups and the EU, the results can be seen in column two of table 9. For most variables, the results are very similar to the model without interaction effects. The results for the

[19] Since we use a Heckman procedure, the first stage probit estimation gives us some extra results concerning the impact of various variables on the *likelihood* that positive trade flows occur between two countries. This paper focuses on the effect on trade *volumes* from trade transaction costs, so we will not have much to say about this issue, but the results are displayed in table 9. For most variables, the effect on the likelihood of trade and on trade volumes goes in the same direction, but there are some exceptions, such as the fact that being a major oil exporter has a negative effect on import volumes, but increases the likelihood that imports at all will take place. Further, in some specifications, we get different signs for the import transaction costs variables in the first and second stage estimations. We do not have a good explanation for this.

trade facilitation variables are reproduced in table 4. It is important to note the different interpretation: Before the inclusion of interaction effects for EPA and EU countries, the main transaction cost variables for exports, *TFE*, and imports, *TFI*, measured the average effect of transaction costs *for all countries*. Now, they measure the average effect for the reference group not included in any interaction terms, i.e. developing, non-ACP countries. Before we describe these results, note that the coefficients for the squared transaction cost terms are still positive, but only significant at the exporting side.

Starting with column 1, the reference group of developing non-ACP countries has a negative and significant coefficient for export transaction costs. Apart from this, only the coefficients for ESA and SADC are significant and negative. Thus, countries in ESA and SADC have a significantly *larger* negative effect than the average non-ACP developing country.

Table 4. Estimated Effects from Export and Import Transaction Costs

Region	*TFE Coefficient*	*Sum TFE*	*TFI Coefficient*	*Sum TFI*
West Africa	-1.029	-2.865	-0.583	-0.586
	[0.033]**	[0.004]***	[0.045]**	[0.437]
Central Africa	-0.026	-1.862	0.254	0.251
	[0.984]	[0.212]	[0.762]	[0.828]
Eastern and Southern Africa	-0.582	-2.418	-0.68	-0.683
	[0.069]*	[0.004]***	[0.014]**	[0.420]
SADC	-3.253	-5.089	-2.225	-2.228
	[0.030]**	[0.003]***	[0.052]*	[0.062]*
Caribbean	-0.245	-2.081	0.061	0.058
	[0.605]	[0.015]**	[0.890]	[0.941]
Pacific	-0.201	-2.037	-2.551	-2.554
	[0.857]	[0.134]	[0.000]***	[0.010]***
European Union	0.015	-1.821	-0.626	-0.629
	[0.960]	[0.002]***	[0.024]**	[0.238]
Average Developing Country, non-EPA	-1.836	-1.836	-0.003	-0.003
	[0.023]**	[0.023]**	[0.997]	[0.997]

Note: Estimated coefficients for export transaction costs (TFE) and import transaction costs (TFI) from the baseline model are displayed in columns 1 and 3, while columns 2 and 4 show the sum of the reference group effect and the deviation, thus giving the full effect for each relevant group. Robust bootstrapped p-values in brackets. Stars denote significance at the 1% (***), 5% (**) and 10% (*) levels.

To see the full effect for all groups, the relevant coefficients are added together in column two. As can be seen, all coefficients are fairly large and have the expected negative sign, and are further significant for all groups but Central Africa and the Pacific. So for

countries in West Africa, ESA, SADC, the Caribbean and the EU, export transaction costs have significantly negative effects on export flows. The largest negative effects are found for SADC.[20]

Looking now at the corresponding coefficients for import transaction costs, a first thing to notice in column three is that the reference group coefficient is not significantly different from zero. Hence, we cannot find any negative effects from import transaction costs for the average non-ACP developing country. This means that the other coefficients in column three really could be interpreted as the full import transaction cost effects, since they capture the deviation from the reference group, i.e. the deviation from zero. Noting that the coefficients for Western Africa, ESA, SADC, the Pacific and the EU all are negative and significant, one can therefore interpret this as saying that these groups, unlike the average non-ACP developing countries, experience a significantly negative effect from import transaction costs. For completeness, the relevant coefficients are also added together in column four, but we would argue that column three is the relevant one to study. One interesting thing to notice is that, for almost all cases, the coefficients for export transaction costs are larger than for import transaction costs, suggesting that border delays at the origin would be more of a problem than inefficient border procedures at the destination. The only exception to this rule is the group of Pacific countries, where we cannot find any evidence of significant effects from export transaction costs, while they have a large, significantly negative effect from import transaction costs.

Having found evidence suggesting that delays at the border by giving rise to transaction costs can influence trade flows, a natural policy question is how much that can be gained by reducing these border delays. Using coefficients from the baseline regression without interaction effects, we find that for the whole sample, lowering border delays from the mean with one day would yield an export increasing effect of about 1

[20] It is important to note that because of the quadratic term included in the model, these coefficients are not actual elasticities. The expression for the elasticities will also include the level of transaction costs, so that higher levels of costs are associated with smaller elasticities.

percent. The corresponding import trade facilitation would result in an increase of about 0.5 percent.[21]

Turning again to the interaction effects specification, Tables 5 and 6 contain some illustrative examples of how much the EPA groups could gain in terms of increased exports and imports by engaging in trade facilitation.

Table 5. Percentage Trade Effects of Reducing Export Time with One Day

Region	*Mean-1*	*Min-1*	*Max-1*
West Africa	2.6	6.9	1.1
Eastern and Southern Africa	0.9	7.1	0.3
SADC	8.2	12.3	4.1
Caribbean	1.0	4.3	0.1
European Union	4.9	74.7	0.6

Note: Figures show the percentage effects on exports from lowering the time needed at the border with one day from the mean number of days, the minimum number, and the maximum number. Concerning the calculation, see footnote 21.

Starting with table 5, our results suggest that exports from these country groupings would rise with between 1 and 8 percent if waiting time at the border was reduced with one day from the mean. The largest effects are found for SADC, that could get over 8 percent extra trade. Effects are sizeable also for West Africa, the Caribbean and ESA with increases of 1 - 2.6 percent. Noticeably though, even though the coefficient itself was not very large for the EU, thanks to the initial low level of transaction costs, a one-day reduction would give rise to an export increase of over 4 percent. This result highlights the importance of taking the non-linear effect of trade facilitation into account. This is

[21] Since the model includes a squared transaction cost term, the formula used to calculate percentage import or export changes is $\Delta = \frac{\left(TF_{New}^{\delta(\phi)} * \exp\left(\theta\left(\ln TF_{New}\right)^2\right) - TF_{Initial}^{\delta(\phi)} * \exp\left(\theta\left(\ln TF_{Initial}\right)^2\right)\right)}{TF_{Initial}^{\delta(\phi)} * \exp\left(\theta\left(\ln TF_{Initial}\right)^2\right)}$, where $\delta(\phi)$ refers to either the import (export) transaction cost coefficient from the baseline model without interactions, or, in the specification with EPA interactions, the sum of the reference group effect and the relevant EPA group deviation, and θ is the coefficient for the squared import or export transaction cost term. When calculating the effects from import transaction costs in the EPA interaction specification, the expression simplifies since the coefficient θ_2 is not significantly different from zero. In this case, we also choose to use the coefficients for the EPA or EU interaction terms directly, since the reference group effect also is non-significantly different from zero.

further illustrated in columns two and three, where it is evident that countries that already have small border delays would get larger effects from reducing them with one day.

Table 6. Percentage Trade Effects of Reducing Import Time with One Day

Region	*Mean-1*	*Min-1*	*Max-1*
West Africa	1.1	2.3	0.7
Eastern and Southern Africa	1.0	4.5	0.6
SADC	4.9	9.5	2.7
Pacific	15.1	40.6	8.4
European Union	4.3	15.0	1.9

Note: Figures show the percentage effects on imports from lowering the time needed at the border with one day from the mean number of days, the minimum number, and the maximum number. Concerning the calculation, see footnote 21.

Looking at the potential effects from import trade facilitation in table 6, the differences between various initial levels of border delays are less pronounced, which is natural since these figures are calculated without taking non-linearity into account (on the grounds that the relevant coefficient was not significantly different from zero). West Africa, SADC and the EU see sizeable effects, but smaller than in the export case. The effect for Eastern and Southern Africa is about the same, but the main difference is that when looking at imports, Caribbean countries do not have any significant effect, while Pacific countries according to our results would get a vary large effect.[22]

4.4 Robustness

To make sure that the results are general and not just depend on the estimation method or the particular model being estimated, we subject the results to a number of robustness checks. Firstly, we try alternative estimation methods. Santos Silva and Tenreyro (2006), argue that the gravity equation should be estimated using a Poisson Pseudo-Maximum-Likelihood (PPML) estimator on its original multiplicative form. The PPML estimator is, unlike the method of estimating the log-linearized equation with ordinary least squares

[22] Unlike for the export transaction cost, the baseline model sample contains only observations from three Pacific countries – Papua New Guinea, Solomon Islands and Vanuatu – concerning import transaction costs. Hence, one should be cautious not to interpret these results too strongly.

(OLS), consistent, even in the presence of heteroskedasticity. Since a Breusch-Pagan test for heteroskedasticity suggests that this might indeed be a problem, we try estimating with the PPML estimator on the gravity equation in its multiplicative form.[23] The results are displayed in table 9. We consider the Poisson estimation to be the main alternative to a sample selection process, so the model is estimated both with (column 3) and without (column 4) interaction terms for EPA groups.

Further, as noted by Djankov, Freund and Pham (2006), endogeneity might be a concern, since trade volumes might not only be affected by border delays, but also in its turn affect waiting time. For instance, large trade volumes might cause congestion, thus intensifying the problems with inefficient procedures, or, it could on the other hand put more pressure on the government to actually use efficient procedures. To see whether this affects our results, we estimate the model with IV estimation, using the number of documents needed for exports and imports and the level of corruption in the exporting and importing country as instruments for the trade transaction variables.[24] The results are shown in column 5 of table 9.

As noted above, Helpman, Melitz and Rubinstein (2007) argue that when estimating the gravity equation, one should not only control for sample selection, which the ordinary Heckman procedure does, but also for the fraction of exporting firms. We use their proposed estimation strategy (from now on the HMR approach), but unlike them, we do not estimate the second stage non-linear equation with maximum likelihood, but choose to use non-linear least squares. The results are shown in column 6.

Reassuringly, for almost all variables, the results are the same regardless of estimation method. Looking specifically at the transaction cost variables, export transaction costs have a very robust negative significant effect on trade flows, and the squared term is also robustly positively significant. Results for import transaction costs are somewhat less robust: ignoring for now the specification with interaction terms, the

[23] Santos Silva and Tenreyro (2006) note that for the PPML estimator to be consistent, the data do not have to be Poisson distributed, and in fact, the dependent variable does not even have to be an integer. The model is estimated on the original multiplicative form of the model using STATA's *poisson* command with robust standard errors.

[24] These variables are less likely to be influenced by trade flows. The model is estimated using STATA's *ivreg2* command with robust standard errors. We find it difficult to instrument for all interaction terms, so we use the model with only average effects for all countries.

import transaction cost coefficient is negative and significant using Heckman, IV and the HMR approach, but not using Poisson estimation. The corresponding squared term is always positive, but only significant using Heckman or HMR. This suggests firstly that one may be slightly more confident regarding the export transaction costs results, and secondly that even if endogeneity is a problem, taking it into account does not alter any results in a fundamental way.

Looking also at the results for the EPA interaction terms, table 10 reproduces table 4, but also includes the same coefficients estimated with Poisson. Here, it is evident that even though the magnitude of the coefficients might differ, in almost all cases the qualitative conclusions are the same. The only exceptions to this rule is that in the Poisson estimation, all EPA groups and the EU have significant, negative total effects from export transaction costs, while Central Africa and the Pacific do not in the Heckman estimation, and further that the EU does not have any negative effect from import transaction costs in the Poisson regression. This further strengthens the conclusion that our results are general: even though the average effect of import transaction costs is not significant with a Poisson estimation, the effects for our regions of special interest is very similar also when using Poisson.

Besides estimation methods, another important robustness check is to make sure that the conclusions are not the results of one single model specification. Since adding more variables nearly always leads to a loss of observations – especially in a developing country context – we choose to keep the baseline model parsimonious, but in table 11 in the Appendix, the model is estimated with various additional control variables.

To make sure that our trade facilitation variables are not picking up wider aspects of trade costs, we follow Wilson, Mann and Otsuki (2005) and include separate measures for what they call *port efficiency*, *regulatory environment*, and *service sector infrastructure*. In the first category, they include indices of port facilities and inland waterways plus air transport. The closest thing we can come to this without loosing unacceptably many observations is to include the number of aircraft departures. In the second category Wilson, Mann and Otsuki include transparency of government policy and control of corruption. We include control of corruption. Lastly, Wilson, Mann and Otsuki include speed and cost of internet access and effect of internet on business as

measures of service sector infrastructure. We include the similar number of internet users per 1000 people.

We also include the proportion of GDP coming from agriculture. The reason for this is that our measures for cross-border transaction costs really only apply to a certain standardized good that is not very time-sensitive. Agricultural exports are likely more time-sensitive, which means that problems with long waiting at the border could be worse for agricultural exporters. We also try including the share of exports and imports respectively from the US, again as a way to control for the *content* of trade.

Including these extra control variables generally does very little to alter the results. With the only exception of the squared export transaction cost variable that becomes insignificant in the specification including control of corruption, all results for the transaction cost variables remain the same. Control of corruption further has the expected positive coefficient: less corrupt countries both export and import more. Besides this, the only additional variable that has a significant effect is share of agriculture in GDP: having a large agricultural sector is associated with larger imports.

The conclusions we draw from these robustness tests are that our model and results are quite robust to both alternative estimation approaches and different specifications, and that our conclusions regarding the specific effects on EPA groups also seem to hold. In fact, our estimation strategy reassuringly seems to be both robust and conservative, in that in all almost cases for which it yields significant effects, the main alternative of Poisson estimation also yields the same result, but the latter generally suggest larger effects and also significance in some extra cases. This suggests that we may be fairly confident about the results we find. It should be borne in mind though that the *average* results for export transaction costs seem more robust than those for import transaction costs: the latter are significant with three of our estimation choices, but not using Poisson estimation.

5 Conclusions

In this paper, we have assessed how large effects export and import transaction costs related to cross-border trade procedures have on trade flows on average and hence how big the potential benefits from trade facilitation are. We have further also estimated these effects separately for EPA negotiating groups and for the EU. Using data from the World Bank's (2007) Doing Business Database on the time required to export or import as indicators of trade transaction costs, we have estimated a gravity model on two-way bilateral trade between EU countries and developing countries using a sample selection approach.

We find that time delays both on the part of the exporter and the importer, proxying export and import transaction costs, on average significantly decrease trade flows. We also find that this relationship is not linear: an extra day of waiting has smaller marginal effects if the time requirements are already high. The effects of export transaction costs are larger. On average, lowering border delays in the exporting country with one day (from the sample mean) would yield an export increasing effect of about 1 percent, while the same reduction in the importing country would give an import increase of about 0.5 percent.

Moreover, countries negotiating in the EPA groups for SADC, West Africa, Eastern and Southern Africa, and the Caribbean have negative and significant effects from export transaction costs, as do EU and non-ACP developing countries. The effects for the SADC, West African and ESA groups are the largest. Reducing border delays with one day from the within-group mean would increase exports with between 1 and 8 percent. The results are somewhat different for import transaction costs, where countries in the Pacific, SADC, West Africa and the EU have significantly negative effects from import transaction costs, with the effects being the largest for the two former groups. The percentage effects of reducing import border delays with one day are generally of the same magnitude as those for export border delays, with the exception of the Pacific countries, where results suggest increases of around 15 percent.

Concerning the average effects of trade facilitation, our results confirm the conclusions drawn by Djankov, Fruend and Pham (2006), Nordås, Pinali and Grosso

(2006) and Soloaga, Wilson and Mejía (2006) that *export* trade facilitation have positive potential effects, and the magnitude of these effects closely resemble those suggested by Djankov, Freund and Pham (2006). Estimations of the potential effects of *import* trade facilitation have been rarer in the literature, but our results do confirm those obtained by Wilson, Mann and Otsuki (2003; 2005). Our results highlight a number of issues though. Firstly, they illustrate the importance of including indicators for trade facilitation in both the exporting *and* the importing country: inefficient border procedures matter, regardless or where they occur. Secondly, our results clearly suggest that the effect of cumbersome border procedures is not linear, so a failure to take this into account can risk biasing ones results. This will be particularly important when analysing the policy implications of trade facilitation reforms. Thirdly, and related to this, it seems to be important to allow the effects of trade facilitation to differ for country groups. By just estimating one average effect and then using this to calculate potential trade impact of reform, one will run a serious risk of drawing misleading conclusions.

To draw some policy conclusions, our results suggest that there are indeed positive gains to be won by making it simpler for goods to cross borders. This general conclusion also holds for most, though not necessarily all, EPA groups. For some, gains would even be considerably larger than for the average country. Obviously, reforming the customs environment can entail certain costs, but compared with other areas of negotiation in the current discussions with the EU about EPAs, at least the benefits from trade facilitation are clear and sizeable. It is important to note, though, that the potential benefits from trade facilitation are not necessarily tied to the EPA framework: the relevant countries could increase their trade unilaterally by engaging in their own reform. Since trade facilitation has positive effects both when it is performed at the origin and at the destination, an agreement about mutual reforms would, however, yield larger potential gains. If ACP countries e.g. aim to increase their exports, one way of doing this would be through EU import trade facilitation. This emphasizes the importance of reaching an agreement. Moreover, since trade facilitation can involve not only *simplification* but also *harmonization*, one could argue that EPA countries perhaps have a better chance of influencing which standards one is to harmonize around through negotiations, rather than just unilateral reform.

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Appendix

Sample of Developing Countries

Table 7. Sample of EPA countries

EPA group	Country
West Africa	Benin, Burkina Faso, Côte d'Ivoire, Ghana, Guinea*, Mali, Niger#, Nigeria, Senegal, Sierra Leone*, Togo
Central Africa:	Cameroon, Central African Republic, Chad, Congo Dem*. Rep., Congo Rep., São Tomé and Principe*
Eastern and Southern Africa	Burundi*, Eritrea*, Ethiopia, Kenya, Madagascar, Malawi, Mauritius, Rwanda, Sudan, Uganda, Zambia, Zimbabwe
SADC	Angola*, Botswana*, Lesotho*, Mozambique, Namibia*, South Africa, Tanzania
Caribbean:	Dominican Republic, Guyana, Haiti*, Jamaica
Pacific	Fiji*, Kiribati*, Palau*, Papua New Guinea, Samoa*, Solomon Islands, Tonga*, Vanuatu

Note: * (#) signifies no data on import (export) transaction costs in the baseline regression.

Table 8. Sample of non-EPA Developing Countries

Region	Country
South Asia	Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka
South-East Asia	Cambodia, Indonesia, Lao PDR, Malaysia, Philippines, Thailand, Timor-Leste, Vietnam
Eastern Europe and Central Asia	Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyz Republic, Moldova, Russian Federation, Ukraine, Uzbekistan
Middle East	Iran, Iraq, Kuwait, Oman, Saudi Arabia, United Arab Emirates, Yemen
Mercosur	Argentina, Brazil, Paraguay, Uruguay
Mediterranean	Algeria Egypt, Jordan, Lebanon, Morocco, Syrian Arab Republic, Tunisia
Drug	Bolivia, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Nicaragua, Panama, Peru, Venezuela
Other	Chile, China, Mexico, Mongolia

Note: The geographical division into regions follows European Commission (2006). "Drug" signifies countries eligible for preferences under the GSP special arrangements to combat drug production and trafficking, the so called *drug regime*. Note that regions are constructed so that all countries within a region have the same access to the EU market.

Variables and Data Sources

All data are for 2005 unless otherwise stated.

Trade data: Imports for 2005 from the IMF (2006) *Direction of Trade Statistics*.
GDP: From the World Bank (2006) *World Development Indicators*.
Distance: Distance in kilometers between capital cities from CEPII (2006).
Land area: World Bank (2006) *World Development Indicators*.
Population: World Bank (2006) *World Development Indicators*.
Contiguity: Importer and exporter share a common border. From CEPII (2006).
Common language: CEPII (2006).
Colony: Importer and exporter have been in a colonial relationship. From CEPII (2006).
Landlocked: CEPII (2006).
LDC: Country is a least developed country.
Oil dummy: Country is a major oil exporter according to the IMF's definition. See IMF (2006)
Average tariff: Average applied tariff level, calculated using data at the HS2 level from the MAcMap Database, CEPII (2007). See also Bouët *et al* (2004).
Tariff dispersion: A Herfindahl-type index is calculated with the formula $h = \sum_s \left(tariff_s / \sum_s tariff_s \right)^2$, using the tariff data from CEPII (2007). The index ranges from 0 to 1.
Trade facilitation: See presentation in the text. Data from the World Bank (2007) Doing Business Database downloaded February 2007.
Procedures to start a business: The number of procedures needed to register a firm. Data from the World Bank (2007) Doing Business Database.
Costs to start a business: The official cost in percent of per capita GNI of each procedure needed to register a firm. Data from the World Bank (2007) Doing Business Database.
Documents for exports and imports: Data from the World Bank (2007) Doing Business Database downloaded February 2007.
Infrastructure: domestic and international takeoffs of air carriers registered in the country. Data for 2004 from the World Bank (2006) *World Development Indicators*.
Information Technology: Internet users per 1000 people in 2004 from the World Bank (2006) *World Development Indicators*.
Control of Corruption: Data from the Transparency International (2006) *Corruption Perceptions Index*.
Share of agriculture: Agriculture's share of GDP in 2004 from the World Bank (2006) *World Development Indicators*.
Trade pattern: Share of exports to and imports from the US, from IMF (2006).

Table 9. Estimation Results

Variable	1		2		3	4	5	6
	Heckman	*Probit*	Heckman	*Probit*	Poisson	Poisson	IV	HMR
yy	1.059	0.651	1.067	0.648	0.783	0.787	1.075	0.909
	[0.000]***	[0.000]***	[0.000]***	[0.000]***	[0.000]***	[0.000]***	[0.000]***	[0.000]***
Dist	-1.301	-0.566	-1.424	-0.627	-1.479	-1.424	-1.311	-0.942
	[0.000]***	[0.139]	[0.000]***	[0.076]*	[0.000]***	[0.000]***	[0.000]***	[0.000]***
Area exp	0.188	-0.053	0.177	-0.075	0.245	0.24	0.175	0.196
	[0.001]***	[0.416]	[0.006]***	[0.398]	[0.000]***	[0.000]***	[0.003]***	[0.001]***
Area exp_eu	-0.311	0.673	-0.319	0.743	-0.375	-0.346	-0.261	-0.459
	[0.000]***	[0.006]***	[0.000]***	[0.002]***	[0.000]***	[0.000]***	[0.000]***	[0.000]***
Area imp	-0.051	-0.074	-0.028	-0.082	0.062	0.028	-0.021	0.009
	[0.155]	[0.560]	[0.566]	[0.579]	[0.182]	[0.524]	[0.586]	[0.824]
Area imp_eu	-0.811	-0.08	-0.813	-0.082	-0.678	-0.637	-0.719	-0.785
	[0.000]***	[0.644]	[0.000]***	[0.710]	[0.000]***	[0.000]***	[0.000]***	[0.000]***
Pop exp	-0.08	0.044	-0.04	0.069	0.078	0.037	-0.118	-0.082
	[0.262]	[0.671]	[0.595]	[0.562]	[0.396]	[0.643]	[0.098]*	[0.240]
Pop exp_eu	0.335	-0.323	0.275	-0.397	0.224	0.255	0.351	0.382
	[0.000]***	[0.179]	[0.001]***	[0.076]*	[0.012]**	[0.001]***	[0.000]***	[0.000]***
Pop imp	-0.045	-0.26	-0.079	-0.284	-0.041	-0.003	-0.048	-0.031
	[0.516]	[0.126]	[0.281]	[0.111]	[0.490]	[0.966]	[0.423]	[0.603]
Pop imp_eu	0.806	0.423	0.849	0.47	0.527	0.465	0.808	0.684
	[0.000]***	[0.018]**	[0.000]***	[0.031]**	[0.000]***	[0.000]***	[0.000]***	[0.000]***
Contiguity	0.754	2.794	0.68	2.634	0.425	0.469	0.909	0.758
	[0.003]***	[0.025]**	[0.055]*	[0.055]*	[0.007]***	[0.003]***	[0.003]***	[0.004]***
Common language	0.698	0.077	0.668	0.094	0.488	0.509	0.732	0.653
	[0.000]***	[0.850]	[0.000]***	[0.821]	[0.000]***	[0.000]***	[0.000]***	[0.000]***
Colony	0.69	0.022	0.696	0.102	0.414	0.386	0.63	0.691
	[0.000]***	[0.993]	[0.000]***	[0.968]	[0.000]***	[0.000]***	[0.000]***	[0.000]***

Variable	1		2		3	4	5	6
Landlocked exp	-0.724	-0.293	-0.637	-0.418	0.219	0.17	-0.666	-0.626
	[0.000]***	[0.171]	[0.002]***	[0.126]	[0.380]	[0.466]	[0.000]***	[0.001]***
Landlocked exp_EU	0.982	0.157	0.853	0.266	-0.153	-0.081	0.934	0.945
	[0.000]***	[0.594]	[0.000]***	[0.455]	[0.575]	[0.752]	[0.000]***	[0.000]***
Landlocked imp	-0.434	0.691	-0.44	0.656	0.157	0.183	-0.328	-0.636
	[0.000]***	[0.025]**	[0.000]***	[0.028]**	[0.344]	[0.287]	[0.003]***	[0.000]***
Landlocked imp_eu	-0.236	-0.545	-0.207	-0.522	-0.169	-0.21	-0.177	-0.058
	[0.196]	[0.102]	[0.330]	[0.185]	[0.510]	[0.427]	[0.329]	[0.747]
LDC exp	-1.125	-0.523	-1.037	-0.532	-0.561	-0.805	-1.173	-0.900
	[0.000]***	[0.008]***	[0.000]***	[0.020]**	[0.063]*	[0.006]***	[0.000]***	[0.000]***
LDC imp	-0.435	-0.059	-0.535	-0.03	-0.899	-0.988	-0.638	-0.395
	[0.000]***	[0.813]	[0.000]***	[0.925]	[0.000]***	[0.000]***	[0.000]***	[0.001]***
Oil exp	-0.98	-1.276	-0.964	-1.196	-0.359	-0.339	-0.933	-0.550
	[0.000]***	[0.179]	[0.000]***	[0.448]	[0.019]**	[0.028]**	[0.000]***	[0.036]**
Oil imp	-0.534	5.549	-0.582	5.384	-0.527	-0.559	-0.625	-0.923
	[0.000]***	[0.000]***	[0.000]***	[0.000]***	[0.000]***	[0.000]***	[0.000]***	[0.000]***
Average tariff Dev	-0.191	-0.755	-0.288	-0.626	-0.131	-0.144	-0.297	-0.059
	[0.049]**	[0.001]***	[0.009]***	[0.054]*	[0.162]	[0.121]	[0.001]***	[0.503]
Tariff dispersion Dev	-0.325	0.025	-0.263	-0.053	0.128	0.092	-0.28	-0.298
	[0.000]***	[0.889]	[0.001]***	[0.782]	[0.122]	[0.289]	[0.000]***	[0.000]***
Trade Facilitation Exp (TFE)	-1.506	-0.298	-1.836	-1.045	-3.648	-2.373	-1.31	-1.284
	[0.000]***	[0.581]	[0.023]**	[0.417]	[0.000]***	[0.000]***	[0.001]***	[0.001]***
Trade Facilitation Imp (TFI)	-1.267	1.449	-0.003	1.174	0.097	-0.022	-0.682	-1.179
	[0.000]***	[0.028]**	[0.997]	[0.543]	[0.926]	[0.959]	[0.041]**	[0.001]***
TFE2	0.174	0.028	0.248	0.138	0.579	0.395	0.138	0.135
	[0.017]**	[0.781]	[0.042]**	[0.489]	[0.000]***	[0.000]***	[0.071]*	[0.074]*
TFI2	0.147	-0.33	0.021	-0.267	0.01	0	0.065	0.151
	[0.009]***	[0.010]***	[0.834]	[0.302]	[0.944]	[0.996]	[0.239]	[0.007]***

Variable	1		2		3	4	5	6
TFE EU			0.015	0.301	0.43			
			[0.960]	[0.579]	[0.185]			
TFE West Africa			-1.029	0.812	-1.223			
			[0.033]**	[0.123]	[0.005]***			
TFE Central Africa			-0.026	1.082	-1.947			
			[0.984]	[0.335]	[0.197]			
TFE Eastern and Southern Africa			-0.582	-0.95	-3.242			
			[0.069]*	[0.169]	[0.000]***			
TFE SADC			-3.253	-2.424	0.563			
			[0.030]**	[0.050]**	[0.579]			
TFE Caribbean			-0.245	0.048	-0.1			
			[0.605]	[0.988]	[0.814]			
TFE Pacific			-0.201	0.157	-0.91			
			[0.857]	[0.811]	[0.411]			
TFI EU			-0.626	-0.03	-0.171			
			[0.024]**	[0.972]	[0.646]			
TFI West Africa			-0.583	0.172	-1.353			
			[0.045]**	[0.857]	[0.001]***			
TFI Central Africa			0.254	-0.729	-0.032			
			[0.762]	[0.827]	[0.958]			
TFI Eastern and Southern Africa			-0.68	-1.563	-1.083			
			[0.014]**	[0.179]	[0.001]***			
TFI SADC			-2.225	4.499	-2.387			
			[0.052]*	[0.021]**	[0.001]***			
TFI Caribbean			0.061	-5.308	-0.219			
			[0.890]	[0.013]**	[0.663]			
TFI Pacific			-2.551	0.437	-2.965			
			[0.000]***	[0.596]	[0.000]***			

Variable	1		2		3	4	5	6
Procedures to start business exp		-0.037		-0.133				
		[0.853]		[0.546]				
Procedures to start business imp		-0.19		-0.21				
		[0.288]		[0.378]				
Cost to start business exp		0.154		0.231				
		[0.082]*		[0.009]***				
Cost to start business imp		0.146		0.146				
		[0.043]**		[0.167]				
Inverse Mills Ratio	-0.665		-0.682					0.356
	[0.014]**		[0.025]**					[0.177]
HMR Delta								0.165
								[0.082]*
Constant	-22.663	-24.981	-23.439	-22.881	-7.446	-9.176	-25.188	-18.088
	[0.000]***	[0.000]***	[0.000]***	[0.000]***	[0.001]***	[0.000]***	[0.000]***	[0.000]***
Observations	3643	3643	3643	3643	3818	3818	3371	3384
Censored observations	259		259					259
Pseudo R2					0.901	0.898		
Adjusted R2							0.75	0.7605

Note: Robust p-values in brackets. Stars denote significance at the 1% (***), 5% (**) and 10% (*) levels. The selection process for the HMR column is exactly the same as the one in the first column.

Table 10. Robustness Trade Facilitation Coefficients

Region	Heckman	Poisson	Heckman	Poisson	Heckman	Poisson	Heckman	Poisson
	TFE Coefficient	*TFE Coefficient*	*Sum TFE*	*Sum TFE*	*TFI Coefficient*	*TFI Coefficient*	*Sum TFI*	*Sum TFI*
West Africa	-1.029	-1.223	-2.865	-4.871	-0.583	-1.353	-0.586	-1.256
	[0.033]**	[0.005]***	[0.004]***	[0.000]***	[0.045]**	[0.001]***	[0.437]	[0.255]
Central Africa	-0.026	-1.947	-1.862	-5.595	0.254	-0.032	0.251	0.065
	[0.984]	[0.197]	[0.212]	[0.002]***	[0.762]	[0.958]	[0.828]	[0.961]
Eastern and Southern Africa	-0.582	-3.242	-2.418	-6.89	-0.68	-1.083	-0.683	-0.986
	[0.069]*	[0.000]***	[0.004]***	[0.000]***	[0.014]**	[0.001]***	[0.420]	[0.350]
SADC	-3.253	0.563	-5.089	-3.085	-2.225	-2.387	-2.228	-2.29
	[0.030]**	[0.579]	[0.003]***	[0.031]**	[0.052]*	[0.001]***	[0.062]*	[0.077]*
Caribbean	-0.245	-0.1	-2.081	-3.748	0.061	-0.219	0.058	-0.122
	[0.605]	[0.814]	[0.015]**	[0.000]***	[0.890]	[0.663]	[0.941]	[0.905]
Pacific	-0.201	-0.91	-2.037	-4.558	-2.551	-2.965	-2.554	-2.868
	[0.857]	[0.411]	[0.134]	[0.001]***	[0.000]***	[0.000]***	[0.010]***	[0.012]**
European Union	0.015	0.43	-1.821	-3.218	-0.626	-0.171	-0.629	-0.074
	[0.960]	[0.185]	[0.002]***	[0.000]***	[0.024]**	[0.646]	[0.238]	[0.918]
Average Developing Country, non-EPA	-1.836	-3.648	-1.836	-3.648	-0.003	0.097	-0.003	0.097
	[0.023]**	[0.000]***	[0.023]**	[0.000]***	[0.997]	[0.926]	[0.997]	[0.926]

Note: Estimated coefficients for export transaction costs (TFE) from the baseline model estimated with Heckman and Poisson are displayed in columns 1 and 2 respectively, while columns 3 and 4 show the sum of the reference group effect and the deviation. Likewise for import transaction costs (TFI) in columns 5-8. Robust bootstrapped p-values in brackets. Stars denote significance at the 1% (***), 5% (**) and 10% (*) levels.

Table 11. Robustness: Additional Variables

Variable	Infrastructure		IT		Corruption		Agriculture		Trade pattern	
	Heckman	*Probit*	Heckman	*Probit*	Heckman	*Probit*	Heckman	*Probit*	Heckman	*Probit*
yy	1.132	0.535	1.07	0.643	0.919	0.355	1.183	0.604	1.059	0.552
	[0.000]***	[0.001]***	[0.000]***	[0.000]***	[0.000]***	[0.002]***	[0.000]***	[0.000]***	[0.000]***	[0.000]***
Dist	-1.324	-0.814	-1.32	-0.594	-1.322	-0.552	-1.219	-0.619	-1.303	-0.88
	[0.000]***	[0.121]	[0.000]***	[0.064]*	[0.000]***	[0.066]*	[0.000]***	[0.088]*	[0.000]***	[0.003]***
Area exp	0.097	-0.117	0.187	-0.049	0.19	-0.051	0.091	-0.072	0.213	0.065
	[0.171]	[0.293]	[0.001]***	[0.450]	[0.000]***	[0.499]	[0.138]	[0.431]	[0.001]***	[0.389]
Area exp_eu	-0.165	0.816	-0.31	0.714	-0.327	1.04	-0.221	0.709	-0.328	0.466
	[0.057]*	[0.091]*	[0.000]***	[0.006]***	[0.000]***	[0.002]***	[0.003]***	[0.057]*	[0.000]***	[0.053]*
Area imp	-0.136	-0.01	-0.05	-0.073	-0.012	-0.003	-0.001	-0.129	-0.044	-0.028
	[0.000]***	[0.971]	[0.173]	[0.608]	[0.766]	[0.983]	[0.986]	[0.421]	[0.244]	[0.842]
Area imp_eu	-0.72	-0.166	-0.815	-0.149	-0.841	0.1	-0.838	-0.104	-0.822	-0.216
	[0.000]***	[0.574]	[0.000]***	[0.442]	[0.000]***	[0.695]	[0.000]***	[0.702]	[0.000]***	[0.400]
Population exp	0.031	0.154	-0.099	0.049	0.023	0.395	-0.134	0.106	-0.117	-0.02
	[0.724]	[0.368]	[0.140]	[0.686]	[0.755]	[0.022]**	[0.081]*	[0.484]	[0.157]	[0.868]
Population exp_eu	0.182	-0.557	0.341	-0.336	0.348	-0.488	0.179	-0.204	0.372	-0.133
	[0.009]***	[0.179]	[0.000]***	[0.210]	[0.000]***	[0.120]	[0.006]***	[0.529]	[0.000]***	[0.512]
Population imp	-0.003	-0.314	-0.05	-0.249	0.093	-0.021	-0.216	-0.197	-0.065	-0.276
	[0.961]	[0.352]	[0.479]	[0.168]	[0.235]	[0.913]	[0.006]***	[0.330]	[0.282]	[0.167]
Population imp_eu	0.711	0.514	0.81	0.495	0.824	0.352	0.724	0.5	0.844	0.598
	[0.000]***	[0.062]*	[0.000]***	[0.013]**	[0.000]***	[0.151]	[0.000]***	[0.045]**	[0.000]***	[0.011]**
Contiguity	0.862	2.433	0.745	2.647	0.884	3.1	0.921	2.792	0.779	2.375
	[0.001]***	[0.102]	[0.018]**	[0.023]**	[0.001]***	[0.038]**	[0.000]***	[0.079]*	[0.015]**	[0.002]***
Common language	0.495	0.484	0.665	0.11	0.665	0.176	1.145	-0.477	0.691	-0.177
	[0.003]***	[0.840]	[0.000]***	[0.943]	[0.000]***	[0.942]	[0.000]***	[0.807]	[0.000]***	[0.900]
Colony	0.661	4.974	0.692	4.89	0.621	4.454	0.351	0.504	0.692	5.032
	[0.000]***	[0.000]***	[0.000]***	[0.000]***	[0.000]***	[0.000]***	[0.005]***	[0.838]	[0.000]***	[0.000]***
Landlocked exp	-0.592	-0.502	-0.748	-0.233	-0.663	-0.356	-0.574	-0.257	-0.719	-0.409
	[0.002]***	[0.216]	[0.000]***	[0.375]	[0.000]***	[0.157]	[0.000]***	[0.238]	[0.000]***	[0.134]

Variable	Infrastructure		IT		Corruption		Agriculture		Trade pattern	
Landlocked exp_EU	0.876	0.392	1.012	0.085	0.892	0.14	0.877	0.041	0.976	0.174
	[0.000]***	[0.461]	[0.000]***	[0.819]	[0.000]***	[0.683]	[0.000]***	[0.911]	[0.000]***	[0.608]
Landlocked imp	-0.286	0.602	-0.391	0.672	-0.445	0.48	-0.397	0.6	-0.388	0.581
	[0.012]**	[0.176]	[0.001]***	[0.015]**	[0.000]***	[0.196]	[0.000]***	[0.018]**	[0.001]***	[0.021]**
Landlocked imp_eu	-0.313	-0.392	-0.271	-0.615	-0.169	-0.506	-0.335	-0.56	-0.266	-0.404
	[0.112]	[0.409]	[0.057]*	[0.068]*	[0.393]	[0.223]	[0.066]*	[0.113]	[0.141]	[0.262]
LDC exp	-1.106	-0.7	-1.256	-0.509	-1.162	-1.131	-0.793	-0.746	-1.125	-0.418
	[0.000]***	[0.056]*	[0.000]***	[0.035]**	[0.000]***	[0.001]***	[0.000]***	[0.020]**	[0.000]***	[0.068]*
LDC imp	-0.378	-0.818	-0.337	-0.109	-0.74	-0.225	-0.585	-0.075	-0.514	-0.008
	[0.005]***	[0.055]*	[0.005]***	[0.772]	[0.000]***	[0.489]	[0.000]***	[0.850]	[0.000]***	[0.980]
Oil exp	-0.865	-1.482	-1	-1.248	-0.633	-0.935	-0.356	-1.578	-0.936	-1.493
	[0.001]***	[0.003]***	[0.000]***	[0.168]	[0.035]**	[0.018]**	[0.251]	[0.277]	[0.001]***	[0.270]
Oil imp	-0.575	5.193	-0.531	5.514	-0.539	5.855	-0.602	5.611	-0.545	5.78
	[0.000]***	[0.000]***	[0.000]***	[0.000]***	[0.000]***	[0.000]***	[0.001]***	[0.000]***	[0.000]***	[0.000]***
Average tariff Dev	-0.276	-1.027	-0.184	-0.764	-0.284	-0.647	-0.223	-0.697	-0.159	-0.874
	[0.000]***	[0.013]**	[0.039]**	[0.005]***	[0.004]***	[0.041]**	[0.085]*	[0.045]**	[0.045]**	[0.000]***
Tariff dispersion Dev	-0.357	-0.316	-0.323	0.015	-0.212	0.033	-0.195	0.183	-0.339	-0.144
	[0.001]***	[0.247]	[0.000]***	[0.934]	[0.021]**	[0.898]	[0.021]**	[0.517]	[0.000]***	[0.446]
Trade Facilitation Exp (TFE)	-1.372	-0.545	-1.491	-0.294	-1.004	0.164	-1.67	-0.377	-1.466	-0.227
	[0.000]***	[0.438]	[0.000]***	[0.552]	[0.011]**	[0.708]	[0.000]***	[0.444]	[0.000]***	[0.602]
Trade Facilitation Imp (TFI)	-1.237	0.939	-1.255	1.339	-1.425	2.597	-1.007	1.909	-1.241	1.553
	[0.000]***	[0.453]	[0.000]***	[0.084]*	[0.000]***	[0.003]***	[0.001]***	[0.015]**	[0.000]***	[0.042]**
TFE2	0.167	0.056	0.167	0.03	0.101	-0.006	0.229	0.062	0.164	0.021
	[0.025]**	[0.680]	[0.020]**	[0.758]	[0.204]	[0.933]	[0.003]***	[0.535]	[0.028]**	[0.815]
TFI2	0.157	-0.259	0.151	-0.317	0.181	-0.479	0.111	-0.411	0.142	-0.347
	[0.005]***	[0.316]	[0.004]***	[0.028]**	[0.000]***	[0.002]***	[0.047]**	[0.005]***	[0.007]***	[0.014]**
Infrastructure exp	-0.071	0.185								
	[0.179]	[0.116]								
Infrastructure imp	0.015	0.159								
	[0.792]	[0.127]								

Variable	Infrastructure		IT		Corruption		Agriculture		Trade pattern	
IT exp			-0.073	0.086						
			[0.416]	[0.459]						
IT imp			0.065	-0.031						
			[0.148]	[0.812]						
Control of corruption exp					0.685	1.309				
					[0.000]***	[0.005]***				
Control of corruption imp					0.287	1.337				
					[0.092]*	[0.005]***				
Share of agriculture exp							-0.037	0.045		
							[0.630]	[0.820]		
Share of agriculture imp							0.204	0.183		
							[0.014]**	[0.482]		
Trade pattern exp									-0.029	0.139
									[0.614]	[0.062]*
Trade pattern imp									0.024	0.303
									[0.607]	[0.005]***
Procedures to start business exp		-0.143		-0.057		0.013		0.038		0.058
		[0.689]		[0.803]		[0.967]		[0.905]		[0.789]
Procedures to start business imp		-0.199		-0.264		-0.21		-0.224		-0.348
		[0.641]		[0.174]		[0.428]		[0.454]		[0.173]
Cost to start business exp		0.154		0.188		0.182		0.111		0.07
		[0.209]		[0.052]*		[0.119]		[0.328]		[0.442]
Cost to start business imp		0.307		0.142		0.234		0.062		0.145
		[0.038]**		[0.135]		[0.042]**		[0.555]		[0.124]
Inverse Mills Ratio	-0.162		-0.633		-1.091		-1.158		-0.487	
	[0.664]		[0.026]**		[0.007]***		[0.000]***		[0.123]	
Constant	-25.944	-20.397	-22.678	-24.965	-21.837	-29.457	-24.146	-25.433	-22.608	-18.331
	[0.000]***	[0.005]***	[0.000]***	[0.000]***	[0.000]***	[0.000]***	[0.000]***	[0.000]***	[0.000]***	[0.000]***
Observations	3007	3007	3618	3618	3381	3381	3189	3189	3592	3592
Censored observations	179		253		172		204		240	

Note: Robust p-values in brackets. Stars denote significance at the 1% (***), 5% (**) and 10% (*) levels.