

ECONOMIC
RESEARCH
FORUM



منتدى
البحوث
الاقتصادية

2009

working paper series

DOES TRADE FACILITATION MATTER
IN BILATERAL TRADE?

Chahir Zaki

Working Paper No. 472

DOES TRADE FACILITATION MATTER IN BILATERAL TRADE? *

Chahir Zaki

Working Paper 472

March 2009

Chahir Zaki, Centre d'Economie de la Sorbonne, UMR8174, Pôle TEAM, Université Paris 1 Pantéon Sorbonne and Paris School of Economics
E-mail : chahir.zaki@univ-paris1.fr

Disclaimer: I would like to thank Lionel Fontagné, Marcelo Olarreaga and Bernard Hoekman for their important comments. I am also grateful to Catherine Bros, Fabian Gouret, Rémi Bazillier, Fida Karam and Rodrigo Paillacar. This work has benefited from the financial support of the Economic Research Forum (ERF), however, it does not reflect the opinion of the ERF, but only that of the author.

Abstract

This paper estimates an augmented gravity model incorporating different aspects of trade facilitation in developed and developing countries. Trade facilitation is defined as measures that aim at making international trade easier by eliminating administrative delays, simplifying commercial procedures, increasing transparency, security and the place of new technologies in trade. This paper provides new theoretical and empirical enhancements. On the one hand, the model is based on theoretical foundations related to monopolistic competition and border effects. The originality of this paper is that trade facilitation facets are included in the model. On the other hand, the empirical achievement of the paper is that it uses different databases allowing us to take into account many features of trade facilitation. I use several databases coming from different sources: Doing Business (World Bank) and Institutional Profiles (CEPII). My main findings show that transaction time for imports and the number of documents for exports have a negative impact on trade. Our sample is split into sub-samples in order to take into account the impact of development level. It turns out that trade facilitation aspects have not the same impact on developed and developing countries. Finally, we conclude that some perishable (food and beverages), seasonal (wearing apparels) and high-value added products are more sensitive to import time than other products. Hard industries are rather sensitive to export documents.

تقيم هذه الورقة نموذج الثقل المتزايد الذي يضم مختلف جوانب التسهيلات التجارية في الدول المتقدمة والدول النامية. وتُعرف التسهيلات التجارية بأنها الإجراءات التي تهدف إلى جعل التجارة الدولية أكثر سهولة، وذلك بوضع حد للمعوقات الإدارية، وتبسيط الإجراءات التجارية، وزيادة الشفافية، والأمان، ومكانة التقنية الحديثة في التجارة. وتتيح هذه الورقة تعزيزات نظرية وتجريبية جديدة فمن ناحية يقوم النموذج على أسس نظرية تتعلق بالتنافس الاحتكاري وتأثيرات الحدود. وتكمن أهمية هذه الورقة في أن النموذج يتضمن الجوانب الخاصة بالتسهيلات التجارية. ومن ناحية أخرى يقوم الإنجاز التجريبي لهذه الورقة على أنها تستخدم قواعد بيانات مختلفة مما يتيح لنا أن نأخذ في اعتبارنا كثيراً من الملامح الخاصة بالتسهيلات التجارية. فأنا أستخدم عدة قواعد للبيانات من مصادر مختلفة: أداء العمل التجاري (البنك الدولي)، ولمحات عالمية (CEPII) وتدل النقاط الرئيسية التي توصلت إليها على أن وقت الصفقة الذي تستغرقه الواردات، وكذا عدد الوثائق الخاصة بالصادرات لها تأثير سلبي على التجارة. وتنقسم العينة التي استخدمناها إلى عينات فرعية، حتى نأخذ في اعتبارنا تأثير مستوى النتيجة وقد ثبت أن جوانب التسهيلات التجارية ليس لها ذات التأثير على الدول المتقدمة والنامية. ونخلص في النهاية إلى أن بعض المنتجات سريعة التلف (كالغذاء والمشروبات) وكذا الموسمية (كالملابس) والمنتجات المضافة عالية القيمة تكون أكثر حساسية عن مستواها بالنسبة للوقت الذي يستغرقه الاستيراد. أما الصناعات المعمرة فحساسة إلى حد ما بالنسبة لوثائق التصدير.

1. Introduction

Making International Trade Easier is the most straight forward definition of Trade Facilitation. However, the term trade facilitation encompasses various important aspects such as: simplification of commercial procedures; harmonization of commercial rules; transparent information and procedures; the recourse to new technologies that allow for trade promotion; and more secure means of payment (quicker, and more reliable which will accelerate the delivery of exchanged goods). For the World Customs Organization, trade facilitation means “the avoidance of unnecessary trade restrictiveness. This can be achieved by applying modern techniques and technologies, while improving the quality of controls in an internationally harmonized manner.” Therefore, it is noteworthy that trade facilitation does not take into account traditional barriers: neither tariff, nor non-tariff barriers. It incorporates new transaction costs, institutional costs, administrative delays, etc. In summary, these barriers can be called non-official barriers because they are not classified in an official framework between governments and organizations. They are also non-tariff ones because they do not incorporate any tariff barriers.

Two groups of reasons explain the importance of taking into account trade facilitation in gravity models, starting with economic ones. After reducing tariff and non-tariff barriers, trade partners have discovered that there are other impediments to trade (OECD, 2002a). Reduction of such non-official non-tariff barriers is likely to have more impact on trade than the reduction of classical ones. Moreover, the increased commercial regimes complexity, often referred to as a Spaghetti Bowl, the increased supply chains’ interdependency, as well as the imported products delivery delays have turned into severe constraints on production. On the other side, the cost of non-facilitation is very high. Non-official barriers account for 2 to 15% of the exchanged goods value. A number of previous papers have confirmed the importance of non-visible barriers. Cernat (2001) supports the idea that the key to the African trade enigma lies in trade facilitation. Finally, as trade facilitation measures may be largely resource wasting and redundant, the welfare coming from their elimination becomes greater when more restrictions are addressed. Eliminating the waste in real resources, rather than generating rents that are captured by interest groups (quota rents) or government (tariff revenues) is a much better way of going about the matter. Hence, if there are neither rents nor revenues for a country to lose by removing restrictions, which is the case in trade facilitation aspects, benefits would be greater from eliminating them than if the measures created rents.

These economic reasons explain why a majority of countries that are part of the World Trade Organization (WTO) have launched trade facilitation initiatives. In November 2001, during Doha Development Round, many issues have been negotiated such as improving market access for developing countries, Singapore issues, liberalization of environmental goods and services and the access of developing countries to medicine. Being one of the Singapore issue, trade facilitation was included in the cycle agenda. Specifically, they focused on the following aspects: simplifying trade procedures, promoting technical assistance and taking into consideration the limited capacities of developing countries. Hence, Doha Ministerial Declaration recognizes the importance of “further acceleration of expedition, delivery and clearance of goods, including goods in transit, and the need for technical assistance and an increased capacity-building in this area”(WTO, 2001). Furthermore, at the Fourth Ministerial Conference in Doha, ministers agreed that “negotiations will take place after the Fifth Session of the Ministerial Conference on the basis of a decision to be taken, by explicit consensus, at that session on modalities for negotiations”(OECD, 2003a). In Hong Kong, trade facilitation processes were not really

successful. This is mainly due to the fact that developing countries are not ready to adopt a legal drafting on the substantive provisions of the agreement before more progress is made regarding technical assistance and capacity building. These successive meetings showed what an important and debatable issue trade facilitation is on the WTO agenda.

To assess the impact of trade facilitation on bilateral trade, I use a gravity model. The latter has become an essential tool for measuring the impact of tariff and non-tariff barriers on services and goods' commercial flows. Regarding previous literature on trade facilitation measures, there have so far been two shortcomings: studies are either descriptive such as the ones by the Organization of Economic Cooperation and Development (OECD), or they exhibit a strong legal orientation (OECD, 2002c, 2002d, 2003a, 2003b, and WTO, 2002). Besides, empirical literature on trade facilitation could be classified into three main groups. The first one includes studies that emerged in the wake of Mc Callum(1995), where models were used to quantify border effects. This trend has been improved theoretically by Bergstrand (1989,1990) and Bayer and Bergstrand (1999), Head and Mayer (2001a and 2001b), Feenstra (2002), Anderson and van Wincoop (2003) and Fontagné et al (2004 and 2005) who added a term called *BRC* or Border Related Costs, and that takes into account tariff and non-tariff barriers (quantitative restrictions, administrative barriers, technical barriers and sanitary and phytosanitary measures). All these improvements have influenced the theoretical base of gravity models, narrowing the gap between theoretical and empirical findings as they became increasingly used in empirical studies. The second group is characterized by models treating only one aspect of trade facilitation, which are referred to in this paper as mono-dimensional models. For instance, Freund and Weinhold (2000) examine the impact of the internet on trade, Hummels (2001) and Djankov et al (2008) investigate the effect of time on trade, Limao and Venables (2000) analyze the effect of efficient infrastructure on bilateral trade and last but not least, Dutt and Traca (2007) study the effect of corruption. The last group of empirical studies gathers models incorporating several aspects of trade facilitation, named multi-dimensional models. Wilson, Mann and Otsuki (2003, 2004) pioneered such studies by quantifying the impact of trade facilitation measures through a gravity model by adding ports efficiency, e-business intensity, regulatory and customs environments. They first applied this model on APEC countries, and later extended the model to a larger sample of countries. Hence, it could be deduced that these empirical studies suffer from three major problems: some studies neglect the aspects of barriers explicitly related to trade facilitation, and such an omission leads to an overestimation of the impact of classical barriers, like the studies included in the border effect category. Moreover, models used have poor theoretical foundations (such as studies of multi-dimensional models). This has two important implications. First, estimation results are biased due to omitted variables. Second, it turns out that the coefficients interpretation is relatively difficult. For instance, regarding trade facilitation aspects, their impact can be decomposed into two parts: the impact of trade facilitation itself and the impact of the elasticity of substitution. If this point is not taken into account, the effect of trade facilitation aspects will be underestimated. On the other hand, these studies have neglected some aspects of trade facilitation (the mono-dimensional models). Thus, the coefficients of the measures taken into consideration might be misleading in the sense they reflect not only their effect, but also the effect of other aspects. Therefore, it is important to study the impact of numerous trade facilitation measures in order to have consistent coefficients for each one of them. The innovation of the model developed in this paper, with respect to the works mentioned above, is that it introduces trade facilitation explicitly in the gravity model.

Hence, this paper provides new theoretical and empirical enhancements. First of all, I use a gravity model based on theoretical foundations related to monopolistic competition and border effects. The originality of this paper is that it also includes trade facilitation facets in a theoretical framework. Secondly, a crucial aspect of our analysis is that it studies the impact of trade facilitation aspects on the sectoral level in order to assess which products are more sensitive than others. To do so, I shed the light on three important aspects of trade facilitation: time (measuring transaction length), documents (capturing the impact of bureaucracy) and internet (as a proxy for technological intensity). In addition, the empirical achievement of the paper is that it uses different databases allowing us to check for the robustness of the model and to study more features of Trade Facilitation. I use databases coming from different sources: Doing Business (World Bank) and Institutional Profiles (CEPII).

This paper is organized as follows: Section 2 is devoted to data analysis as well as some stylized facts of trade facilitation. Section 3 develops theoretical foundations of the model used. Section 4 exposes the econometric specification of the model. Section 5 discusses the results. Section 6 is devoted to robustness checks and Section 7 concludes.

2. Descriptive Statistics and Some Stylized Facts

The sample used includes 175 countries. According to the World Bank classification 28% are low-income, 50% are lower-middle and upper-middle income and 22% are high-income countries distributed between OECD and non-OECD countries. The differences in country incomes allow us to take into account the state of trade facilitation in both developing and developed countries¹.

The Doing Business database developed by the World Bank is used. It contains several sections, the largest being “Trading Across Borders”. It brings together seven indicators related to procedures incorporated in trade. These indicators are: number of days of exports and imports, number of documents required for exports and imports, the cost of imports and exports and ease of doing business. Only the time and document aspects are taken into account². Figure 1 shows the relationship between the number of document to be filed and transaction time for exports and imports in selected countries of the sample. Thus, a country with an important bureaucracy involving many documents, has a long delay to export or to import. For instance, in Zimbabwe an exporter needs to file 9 documents in order to go ahead with his transaction while an importer needs to file 15 of them. The time to export is about 42 days and to import is 66. In contrast, all these aspects are much lower in Hong Kong. Hence, trade facilitation aspects are correlated among them. Moreover, such customs procedures may also be duplicative as paperwork and data requirements have already been required by local authorities in the home country. That is why it is very important to take into account such aspects for the exporter and for the importer simultaneously and not only one or the other.

Table 2 exhibits the correlation between time and document variables. Time for export and import are highly correlated (0.94), while correlation for import and export documents is 0.7. Other cross correlations are 0.6 on average. Therefore, since time and documents across countries are correlated, the exclusion of documents in the regressions may cause time variation across countries to reflect time and documents inefficiencies’ channels of influence. Hence, an omitted

1For countries list, see Tables 5 and 6 in Appendix 3.

2For descriptive statistics among variables, see Table 1 in Appendix 2.

variables bias may be present. The addition of the documents in regression is intended to distinguish between bureaucracy and the length impact on trade.

Table 3 exhibits the average number of days and number of documents for developed and developing countries. Regarding the number of documents, the gap between them is not very significant, except for the importer's documents for export and import. Nonetheless, there is a pronounced difference between developed and developing economies in the time variable, especially for the importer time for export and import.

Finally, being landlocked increase transaction costs and a large part of this cost may be explained by trade facilitation aspects. Table 4 shows evidence of the differences between landlocked countries and countries that aren't landlocked. The average export time for the former is 36 days and for the latter is 22 days. It is even worse for import time (44 and 26 days respectively). The same analysis applies to the number of documents, but to a lesser extent as shown in Table 6.

After presenting to what extent developed and developing countries are heterogeneous with respect to trade facilitation aspects, it is obvious that studying their impact on trade between these countries is quite relevant.

3. Theoretical Foundations of the Model

This paper uses the model initially developed by Fujita et al (1999), and Head and Mayer (2001a). The model is extended by taking into account trade facilitation aspects in its derivation. The authors develop a gravity model from a monopolistic competition model that has been slightly modified by Fontagné et al (2005) by introducing a term called "Border Related Costs," which includes all tariff and non-tariff barriers. The originality of this paper is that it disaggregates this term into several parts. The first part is related to tariff barriers, the second one is dedicated to the preferential trade agreements impact and finally a term which explicitly incorporates the trade facilitation aspects.

The theoretical foundation of the gravity model is the Dixit-Stiglitz-Krugman model of trade under monopolistic competition. The main assumptions of the monopolistic competition model used in this paper are as follows:

- The representative consumer maximizes a Constant Elasticity of Substitution (CES) utility function.
- Production functions are characterized by increasing returns to scale.
- Firms have identical technology.
- Commercial transactions costs are: transport cost measured by distance, tariff cost, non-tariff barriers which is composed of the presence of a Preferential Trade Agreement (PTA) between two countries and the trade facilitation aspects taken into consideration.

The problem of maximization is given by:

$$\max U_i = \left[\sum_{j=1}^N \sum_{h=1}^{n_j} a_{ij} c_{ijh} \right]^{\frac{\sigma-1}{\sigma}} \quad (1)$$

$$s.c. y_i = \sum_i \sum_{h=1}^{n_j} p_{ij} c_{ijh} \quad (2)$$

$$m_{ij} = c_{ij} p_{ij}$$

$$p_{ij} = p_j \tau_{ij}$$

$$m_i = \sum_k m_{ik}$$

Where: a_{ij} : bilateral preference term.

c_{ijh} : Consumption of variety h by the consumer i coming from each country j.

σ : Substitution elasticity.

p_j : Plant price of country j.

m_{ij} : CIF value of imports of country i coming from country j.

m_i : Expenditure on all goods coming from all countries including the home country.

τ_{ij} : Transaction costs between countries i and j.

By resolving the maximization problem in (1) subject to the constraint in (2), we have:

$$m_{ij} = \frac{a_{ij}^{\sigma-1} n_j p_{ij}^{1-\sigma}}{\sum_k a_{ik}^{\sigma-1} n_k p_{ik}^{1-\sigma}} m_i \quad (3)$$

$$m_{ii} = \frac{a_{ii}^{\sigma-1} n_i p_{ii}^{1-\sigma}}{\sum_k a_{ik}^{\sigma-1} n_k p_{ik}^{1-\sigma}} m_i \quad (4)$$

Dividing these two equations then disaggregating the price term into two parts (i.e. plant price and transaction costs) we obtain:

$$\frac{m_{ij}}{m_{ii}} = \left(\frac{a_{ij}}{a_{ii}}\right)^{\sigma-1} \frac{n_j}{n_i} \left(\frac{p_j}{p_i}\right)^{1-\sigma} \left(\frac{\tau_{ij}}{\tau_{ii}}\right)^{\sigma-1} \quad (5)$$

Where: $\frac{m_{ij}}{m_{ii}}$: relative imports.

For the firm j:

$$l_j = F + \gamma q_j \quad (6)$$

$$\pi_j = p_j q_j - w_j l_j \quad (7)$$

Where:

l_j : Labor in firm j.

F: fixed labor cost.

γ : The inverse of firms' productivity.

q_j : Firm j production.

π_j : Firm j profits.

w_j : Wage in firm j.

Replacing equation (6) in equation (7), we have the profits equation. Through the pricing equation and the free-entry condition, the representative firm's output equilibrium is given by the following equation:

$$q_j = \frac{F(\sigma-1)}{\gamma} \quad (8)$$

With identical technologies,

$$q_j = q \forall j = 1, \dots, N \quad (9)$$

Hence, the production value is calculated as follows:

$$v_j = qp_j n_j \quad (10)$$

$$v_i = qp_i n_i \quad (11)$$

Where v_j : value of production of industry j.

Dividing (10) by (11) and rearranging, we obtain:

$$\frac{n_j}{n_i} = \frac{v_j p_i}{v_i p_j} \quad (12)$$

Regarding transaction costs:

$$\tau_{ij} = d_{ij}^{\delta} (1 + brc_{ij}) \quad (13)$$

Where:

d_{ij} : Bilateral distance between the two countries i and j (which proxies for transport cost).

brc_{ij} Border related costs between the two countries i and j.

The term brc equals to:

$$(1 + brc_{ij}) = (1 + t_{ij}) (\exp(\eta E_{ij} + \theta PTA_{ij} + \zeta Conti_{ij} + \mu_1 TF_i + \mu_2 TF_j)) \quad (14)$$

Where:

t_{ij} : Ad valorem bilateral tariff.

PTA_{ij} : A dummy variable = 1 if i and j belong to the same preferential trade agreement (PTA).

$Conti_{ij}$: A dummy variable equals 1 if the two countries are contiguous.

E_{ij} : intercept.

TF_i and TF_j : indicators related to trade facilitation aspects faced by the importer and the exporter respectively. As mentioned earlier, trade facilitation measures take several forms. For instance, from Doing Business, time and document for export and for import are taken into account. Regarding institutional profiles, all its trade facilitation aspects are used for robustness check.

As to preferences:

$$a_{ij} = \exp(e_{ij} - (\beta - \lambda L_{ij})(E_{ij} + PTA_{ij})) \quad (15)$$

Where:

e_{ij} : The random part of preferences.

β : The systematic part of preferences or the home bias.

L_{ij} : Dummy variable = 1 if i and j share the same language. If L_{ij} changes from 0 to 1, the home bias changes from β to $\beta - \lambda$.

4. Econometric Specification of the Model

Combining the natural logarithm of equation (5) with the elements developed above will result in the following equation:

$$\ln\left(\frac{m_{ij}}{m_{ii}}\right) = (\sigma - 1) \ln\left(\frac{a_{ij}}{a_{ii}}\right) + \ln\left(\frac{n_j}{n_i}\right) + (1 - \sigma) \ln\left(\frac{p_j}{p_i}\right) + (\sigma - 1) \ln\left(\frac{\tau_{ij}}{\tau_{ii}}\right) \quad (16)$$

By replacing the preferences and transaction costs obtained from (14) and (15) in (16) then simplifying the following terms: $L_{ii} = 0$, $E_{ii} = 0$, $PTA_{ii} = 0$; $t_{ii} = 0$; $E_{ij} + PTA_{ij} = 1$; $Conti_{ii} = 0$, removing the repeated terms of the importer which are $\mu_1 TF_i$ and multiplying $(\sigma - 1)$ by the terms in brackets yields the following model:

$$\ln\left(\frac{m_{ij}}{m_{ii}}\right) = \ln\left(\frac{v_j}{v_i}\right) - \sigma \ln\left(\frac{p_j}{p_i}\right) + \delta(\sigma - 1) \ln\left(\frac{d_{ij}}{d_{ii}}\right) - (\sigma - 1) \ln(1 + t_{ij}) + (\sigma - 1) \lambda L_{ij} + (\sigma - 1)(\theta - \beta) PTA_{ij} + (\sigma - 1) \zeta Conti_{ij} + (\sigma - 1)(\eta - \beta) E_{ij} + (\sigma - 1) \mu_2 (TF_i + TF_j) + \varepsilon_{ij} \quad (17)$$

Where: $(\sigma - 1)(\eta - \beta)$: the border effects which are not related to a PTA membership.

$(\sigma - 1)(\theta - \beta)$: Supplementary trade due to a PTA membership.

$(\sigma - 1) \mu_2$: Variation in trade due to trade facilitation aspects.

ε_{ij} : The error term equals to $(\sigma - 1)(e_{ij} - e_{ii})$.

Regarding the trade facilitation aspects, it is logical that the aspects related to customs inefficiencies should have a negative effect on trade. By disaggregating them, we should also have a negative effect for the number of days of exports and imports and the number of documents needed for exports and imports. All these items discourage trade as they increase exports and imports delays which cause many losses (imported or exported products may perish, tastes may change, etc.). Two more aspects have an important effect on bilateral trade: the fact of being landlocked and being an island. The former reduces trade due to many transit costs generating time waste and additional costs and the latter increases it because of maritime facilities and the presence of many ports. However, the drawbacks of being landlocked may be overcome if landlocked countries improve their trade facilitation aspects, especially through infrastructure improvements. Similarly, being an island does not guarantee higher level of trade

without good infrastructure and efficient ports to handle exported and imported goods. Widespread internet boosts trade. Finally, infrastructure supposedly increases trade because it facilitates the transport of exported products from production locations to ports and the imported products from ports to local markets.

5. Estimations Results

Which Aspects of Trade Facilitation Affect Bilateral Trade?

The results presented in Table 8 show three regressions. The first one is the most disaggregated as it takes into account exporters' and importers' time and documents for exports and for imports (eight variables in total). The first disaggregated model is more adequate as it generates more precise results. The second one disaggregates time into time for exportation and time for importation, and document into documents for exports and documents for imports. The third incorporates time and documents as aggregated variables. The analysis will be divided into two parts. The first one includes usual results in line with the abundant literature on gravity (same sign and almost similar coefficients values). The second one will discuss trade facilitation results. It is noteworthy that sectoral dummies are added to the regressions to capture sectoral specific characteristics.

Regarding the first group of results, we find a coefficient of 0.78 for relative production, a negative impact for distance (-0.7), a positive effect for contiguity, PTA, colonial links, common colonizer and common languages (with coefficients equal to 1.9, 0.96, 0.53, 1.5 and 1.2 respectively). Tariffs have a significant negative impact on relative imports (-0.21). This coefficient is very important as it represents the substitution elasticity. This elasticity is crucial to our analysis as all the coefficients of the trade facilitation variables result from the interaction between the trade facilitation measure and the substitution elasticity. Interestingly, the constant is very high. This coefficient gives the border effect and it is significantly high because it reports the border effect among countries that do not belong to a PTA.

As for trade facilitation aspects in the aggregated regressions, a landlocked exporter or importer impedes trade (0.36 and 0.30 respectively), showing that ocean transportation is significantly cheaper. However, when time and documents are disaggregated (in column 3, Table 8), being landlocked is found to be insignificant for both importer and exporter. These two results are interpreted as follows: once we control efficiently for the impact of trade facilitation variables, the fact of being landlocked becomes insignificant. Thus, a country may overcome the negative impact induced by its landlocked situation by improving its infrastructure and its trade facilitation aspects. One of the most important features of our regressions is that the more we disaggregate our variables, the more we can figure out the most relevant impediments to trade. Column 3 shows that, generally, time has a significant and negative effect on trade. In contrast, internet usage has a positive effect on trade with a coefficient equal to 0.18. Column 2 exhibits a more disaggregated version where time for import and documents for export are the real impediments to trade. Finally, column 3 presents the most detailed regression where exporters' and importers' time for import remains the most significant barrier to exchanged goods. It is quite clear that internet usage is significant through all the regressions, for the exporter as well as the importer. Hence, trade facilitation would have an important contribution in increasing trade through computerized customs authorities.

Obviously, trade facilitation aspects do not affect bilateral trade between developing countries and between developing and developed ones in the same way. The following section presents to what extent trade facilitation aspects differ between high-income and low-income economies.

Trade Facilitation vs. Level of Development: What Are the Differences Between Developed and Developing Countries?

In this section, the regression results show to what extent our findings are changed by the trade partner's level of development. Many studies underlined the fact that developing countries would capture two thirds of the gains from a DDA agreement on trade facilitation. In order to control for development level, four regressions are run: the first one between developing exporters³ and importers, the second regression between developing exporters and developed importers, the third one between developed exporters and developing importers and the last one between developed ones.

Table 9 shows the regression results. As mentioned above, the analysis will be split into two parts. The first one is related to the impact of usual variables on trade and the second one focuses on the impact of trade facilitation measures.

Regarding the usual variables it is worth noting that distance has a higher impact on trade between developing countries than on trade between a developing and a developed one. This can be explained by the fact that high income countries use developed means of transportation which reduce the distance cost. Distance has the least negative effect between developed economies. Meanwhile tariffs have a less significant negative impact between a high-income exporter and a low-income importer country (0.19) than between two low-income countries (0.39). This variable is not significant between two high-income countries. These results are intuitive for many reasons. First of all, trade liberalization between developed economies lowered the tariff levels. Hence, they do not represent a serious impediment to trade between them. However, this is not the case between developing countries that are more concerned by tariffs than developed countries and whose tariffs level remains at high levels for many products. A first glance at the data shows that the average tariff for high developed economies is approximately 4.43%, while for developing ones it is 15.27%. Similarly, common language enhance trade more between developed countries than between developed and developing ones or between developing ones. The common colonizer variable is more significant when the flow is between two developing countries than between a developed and a developing country. Obviously, this is due to the fact that most developed countries were colonizers whereas developing ones were colonies. It is noteworthy that PTA has a higher effect on bilateral trade between two developing countries than between a developing and a developed one. This result may be explained by the fact that increasing trade between developing countries needs many liberalization efforts through a legal framework organizing such a process. However, numerous political conflicts discourage trade between them and reduce PTA effect.

As for trade facilitation measures, it is noticed that time severely impedes trade between developed and developing countries or between developing ones. The study finds that time for imports has a lower negative effect on flows between two low income countries (0.07%) than on flows between low and high income countries (0.03%). This result proves how developing

³Developed countries are defined as being high-income OECD and high-income non-OECD. Developing countries are those belonging to one of the following categories: upper-middle income countries, lower-middle income ones and low-income ones

countries need to enhance their trade facilitation aspects, especially imports time in order to increase trade not only between them but also with developed economies. This result is robust in other regressions as I found that the coefficients of trade facilitation features have higher values when the trade flow is between high-income and low-income countries than between two low-income countries. Moreover, documents requested to export significantly hinder trade by 30% between a developing exporter and a developed importer. Widespread internet access and use is more significant between developed countries than between developing ones, pointing to the weak technology infrastructure in these countries. It should be noted that one of the most important aspects of trade facilitation for developing countries is infrastructure. This is due to the fact that infrastructure is the major impediment to trade in developing countries, which is not the case in developed ones. Hence, these countries should spend more on infrastructure in order to have large paved roads, well-prepared ports and efficient customs, which in turn will reduce the number of days and documents requested to export or to import.

Which Products Are Most Sensitive to Trade Facilitation Aspects?

As a matter of fact, not all products are impacted in the same way by trade facilitation. Some products are more sensitive to trade facilitation than others such as perishable goods (food and agricultural goods), seasonal products (garments), products with short market lifetime (high technology products) and intermediate goods. Hence, Tables 10 and 11 show numerous regressions for many manufacturing sectors⁴. One problem associated to the products covered by the two databases arises. Trade and Production covers the manufacturing sectors (300), while Doing Business covers only some specific products⁵. However, the regressions are performed even for sectors that may not be compatible with the Doing Business assumptions of traded products. Our intuition here is to use the Doing Business variables as a proxy in order to evaluate the impact of time and documents on the traded products. Intuitively, we will see that for sectors compatible with the Doing Business assumptions, time and documents have a higher significant effect than for ones not included in it.

Regarding the impact of time on different products, beverages and food are quite sensitive to imports time. Undoubtedly, such perishable products need fast clearance and quick delivery to be used before they perish. One of the most interesting results regarding food, as well as textiles and apparel is the one associated with the impact of contiguity. It is evident that, as time matters for such products, food and garments trade will increase if two countries share common borders. The reason is simple: the former will perish and the latter must be delivered quickly to be used in season and not after. Moreover, it is worth mentioning that import documents have a significant negative effect on apparel.

Nonetheless, our results show that many products are not sensitive to trade facilitation such as tobacco which is not affected by time, documents or internet.

Last but not least, many high value-added products (e.g. transport equipment), are affected not only by imports time but also by exports and imports documents. This result seems to be a bit paradoxical because, presumably, equipments are sensitive neither to time nor to documents. Moreover, they are neither perishable, nor seasonal, nor with a short market lifetime.

⁴For the list of sectors included in our analysis, see Table 7 in Appendix 3.

⁵For more details about the products assumptions, see Appendix 1. It is noteworthy that our results do not change even if we eliminate the products that are not compatible with Doing Business assumptions, namely food and beverages.

Nonetheless, they have a crucial role in the production process as they are used to transfer intermediate inputs, exported goods from production locations to ports and imported ones from ports to markets. Finally, like transport equipment, electrical machinery is impacted by documents also for the same reason (which is the case for the output of many high-value added or hard industries, such as non ferrous metals, fabricated metal products, machinery other than electrical and professional and scientific equipment). Some of these sectors (which are either intermediate or high-value-added products) need a lot of documents in order to guarantee their conformity to the international norms of high-technology products. Moreover, those same sectors are not affected by the use of internet.

In brief, it is quite clear that trade facilitation's impact is higher for products with higher value-added, and for perishable, seasonal and intermediate goods. Thus, it covers quite an important range of products which is why it will generate many gains through quicker (less time and documents) and more computerized (more technology) trade.

Calculating Consistent Estimates for the Impact of Trade Facilitation

The objective of this part is to calculate the precise estimates of trade facilitation and distance coefficients as well as the elasticity of substitution. The elasticity of substitution (σ) is obtained by adding one to the tariff coefficient ($\sigma - 1$). To obtain the distance elasticity (δ), the distance coefficient ($\delta(\sigma - 1)$) is divided by the tariff one. Finally, regarding trade facilitation aspects, the trade facilitation coefficient ($\mu(\sigma - 1)$) is divided by the tariff coefficient to acquire the μ which is the real impact of trade facilitation aspects.

Table 12 shows the results of this simple exercise for the main regressions⁶. Our elasticity of substitution has, on average a value of 1.25. The average value for the distance elasticity is 2.5. The most interesting results are the ones regarding trade facilitation aspects. For instance, when the time coefficient is 0.00075, its μ is 0.0023. Similarly, while the document for exports (time for imports) coefficient is 0.21 (0.0008), its μ is 0.99 (0.0038). Finally, for internet, the OLS results yield 0.147, but its true μ is 0.45. Thus, it is quite obvious that the impact of trade facilitation aspects is underestimated because their coefficients resulting from OLS regressions are not deflated by the substitution elasticity term. By doing so, their impact increase.

6. Robustness Check

With Different Methods of Estimation

Obviously our variables of interest, namely time of imports and documents for exports, may suffer from an endogeneity problem. To eliminate such a problem, instrumental variables method has been used. These endogenous variables have been instrumented by many variables. First, for exports documents, which determine the impact of bureaucracy on trade, I have chosen the origin of the legal framework as an instrumental variable. The latter has been captured by a variable determining whether a country has been colonized by a French or an English colonizer. The relationship is quite evident as the literature has proven that French-colonized countries have a more complicated bureaucracy as they are based on the French civil law. In contrast, English colonies that adopted the common law had a less complicated regime. As to time of imports, it has been instrumented by the number of procedures and the number of days requested to start a business and to enforce contracts. The former and the latter are quite correlated to transaction

⁶The results of this exercise for the other regressions are available upon request.

time as they show to what extent the overall procedures in a country are complicated. This, in turn, affects the time of delivery and clearance of goods. Finally, according to Leamer's (1990) comparative advantage approach, I have added to the instrumental variables factor endowments (labor, capital and human capital) in order to capture the country specific impact that depends on the variables that capture country characteristics, especially endowments. Columns IV1 to IV3 in Table 13 show that our results remain robust and that documents for export and time of imports are highly significant. I have performed three regressions (following the same order as in previous regressions) going from the most aggregated (IV1) to the most disaggregated (IV3). First, in IV1, time and documents are highly significant. Second, in the average level of aggregation, our variables of interest, namely time for imports and documents for exports, remain highly significant with some puzzling results (time for exports and documents for imports). Finally, IV3 shows that when all these are disaggregated, four out of 8 aspects remain highly significant with the expected sign. In particular, the number of exporter's documents requested to export and import and the importer's time requested to export and import are very significant, pointing to the same result that documents matter more for export and time matters more for import. The most interesting result is that documents for exports remain quite robust through the regressions showing that such documents are the serious impediment that hinders trade between countries. That is why the initiative of trade facilitation "making a paperless world" is crucial in order to simplify procedures and reduce time of delivery and clearance of traded goods.

A second problem arises in gravity models regarding the log-linearization of the gravitational equation. That is why Silva and Tenreyro (2005) proposed the use of Poisson Pseudo-Maximum Likelihood (PPML) technique as it has two advantages. On the one hand, it provides consistent estimates in the presence of heteroskedasticity, which distorts the interpretation of the model. On the other hand, it deals with zeros values of the dependent variable. This section presents the robustness check for our results by comparing OLS and Poisson results. Table 13 exhibits the results of PPML for the sake of comparison with OLS results. Regarding classical gravity variables, as OLS yields significantly larger effects for geographical distance, PPML generates lower coefficients for this variable. More importantly, our variables of interest (time, documents and internet) remain highly significant. For instance, importers' time for exports and for imports, exporters' time for export, as well as exporters' number of documents required for imports. Moreover, in the more aggregated version of Poisson regressions, documents for export remain highly significant. However, some variables do not have the predicted sign when the Poisson technique is used. These puzzling results are associated with the positive impact of exporters' time for import and of the importers' documents for imports, the negative impact of internet and the positive impact of time in the aggregated regression. One of the reasons explaining the differences between OLS and Poisson results is the fact that our dependent variable changes — in the Poisson regressions, it is a level-variable, meanwhile in the OLS ones it is a logarithmic one.

To conclude, some of our results remain robust even when techniques other than OLS are used, showing that trade facilitation aspects, especially time and documents significantly hinder bilateral trade.

A Different Database for More Trade Facilitation Aspects

This section uses a different database to check the robustness of our model. The objective of such analysis is twofold: on the one hand, it takes into account more trade facilitation aspects and on the other hand it identifies to what extent the gravity model is robust.

Table 14 presents the results using Institutional Profiles database. It is noticeable that the gravity model is robust. All classical variables are highly significant and have the expected sign. Regarding trade facilitation aspects, information and customs efficiency have a positive and significant effect on trade. On the other hand, we find that transaction security reduces trade by 11% as predicted after the 9-11 events. Actually, developed countries fixed many constraints in order to secure trade. These constraints reduced trade flows coming from developing countries as shown in the regressions results. Fraud has a significant negative effect on trade. The internet remains significant and boosts trade. A very important result is the one regarding geographical variables (being landlocked or an island). Once we control for many trade facilitation aspects, all these variables become non-significant. Hence, more trade facilitation means overcoming trade barriers induced by geographical impediments.

7. Conclusion

This paper quantifies the impact of numerous trade facilitation aspects on bilateral trade. This paper makes both theoretical and empirical contributions to the study of the impact of trade facilitation aspects on bilateral trade. From a theoretical standpoint, a gravity model that includes in its derivation trade facilitation aspects has been developed. From an empirical standpoint, the impact of trade facilitation variables on trade is assessed using several databases.

Our main findings are that transaction time for imports and number of documents for exports decrease trade. Our sample is split into sub-samples in order to take into account the impact of development level. It turns out that trade facilitation aspects do not have the same impact on developed and developing countries. Clearly, they would stimulate trade more between developed and developing countries than between developing ones only. Finally, we conclude that some perishable (food and beverages), seasonal (garments), intermediate and high-value added products are sensitive to imports time. Hard industries are rather sensitive to export documents. To check the robustness of our model, instrumental variables and Poisson techniques have been used and it turns out that our results remain robust, especially for export documents and imports time. Moreover, I rerun the regressions on a different database, namely Institutional Profiles, in order to take into consideration many trade facilitation aspects.

From a policy implication point of view, this study gives quite important results. First, as more documents imply lengthier time, the initiative of a “paperless world” is crucial for trade facilitation. Reducing or even eliminating documents required to be replaced by electronic ones submitted through a single window would highly simplify trade procedures, reduce time of inspection and delivery of imported products. Recall that impediments induced by red tape costs do not have any rent or revenue lost once they are dismantled. Thus, the welfare implications are quite high as administrative costs are a real “deadweight loss”. Last, trimming down such impediments would benefit all trade partners, which is not the case for tariff elimination.

The main shortcomings of this paper are strictly related to data issues. First, regarding the infrastructure quality, many aspects must be taken into account such as ports efficiency, paved roads, and so on, in order to have a more precise estimation of their impact on trade flows. Furthermore, this model should be estimated using panel data when data availability allows this. Finally, ad valorem equivalents (AVE) of time and documents should be estimated based on this gravity model to give an idea about how strongly these barriers impede trade. The latter could hence be used in policy modeling, especially computable general equilibrium models. These are very interesting areas subject to future research.

References

- Anderson, James E. (1979). "A Theoretical Foundation for the Gravity Equation," *American Economic Review*, 69: 106-116.
- Anderson, James E. and Eric Van Wincoop (2003). "Gravity with Gravititas: A Solution to the Border Puzzle," *American Economic Review*, 93: 170-92.
- Balistreri, Edward J. and Russell H. Hillberry (2001). "Trade Friction and Welfare in the Gravity Model: How Much of the Iceberg Melts?" Mimeo, U.S. International Trade Commission, Washington, D.C.
- Batra, G., D. Kaufmann, and A.H.W. Stone (2003). "Investment Climate Around the World: Voices of the Firms from the World Business Environment Survey." Washington, D.C.: World Bank.
- Baier, Scott L. and Jeffrey H. Bergstrand (2001). "The Growth of World Trade: Tariffs, Transport Costs, and Income Similarity," *Journal of International Economics*, 53(1): 1-27.
- Bergstrand, Jeffrey H. (1989). "The Generalized Gravity Equation, Monopolistic Competition, and the Factor-Proportions Theory in International Trade," *The Review of Economics and Statistics*, 71(1):143-53.
- Bergstrand, Jeffrey H. (1990). "The Heckscher-Ohlin-Samuelson Model, the Linder Hypothesis and the Determinants of Bilateral Intra-industry Trade," *Economic Journal*, 100(403): 1216-29.
- Blonigen, Bruce A. and Wesley W. Wilson (2006). "New Measures of Port Efficiency Using International Trade Data," NBER Working Paper Series, Working Paper 12052, February.
- Cernat, Lucian (2001). "Assessing Regional Trade Arrangements: Are South-South More Trade Diverting?" Division on International Trade in Goods and Services, and Commodities, Study Series No. 16, United Nations Conference on Trade and Development, United Nations, New York and Geneva.
- Djankov, Simeon, Caroline Freund and Cong S. Pham (2006). "Trading on Time," World Bank, January.
- Dollar, D., M. Hallward-Driemeier and T. Mengistae (2003). "Investment Climate, Infrastructure and Trade: A Comparison of Latin America and Asia," Paper prepared for the Conference of Sectoral Reform in Latin America, Stanford Center for International Development, 13 to 15 November 2003.
- Feaver Donald and Kenneth Wilson, (2005). "Preferential Trade Agreements and their Implications for Customs Services," Economic Policy Research Unit, Working Paper Series, Working Paper No. 05-03, December.
- Feenstra, Robert (2002). "Border Effects and the Gravity Equation: Consistent Methods for Estimation," *Scottish Journal of Political Economy*, 49(5), November.

- Földvári, Péter (2006). "Chapter 4: On the Theory and Application of Gravity Models," in *The Economic Impact of the European Integration on the Netherlands: A Quantitative Analysis of Foreign Trade and Foreign Direct Investments*, Universiteit Utrecht.
- Fontagné, Lionel, Thierry Mayer and Soledad Zignago (2004). "Trade in the Triad: How Easy is the Access to Large Markets?" CEPII Working Paper, No. 2004-04, April.
- Fontagné, Lionel, Thierry Mayer and Soledad Zignago (2005). "A Re-evaluation of the Impact of Regional Agreements on Trade Patterns," September, mimeo.
- Freund, Caroline and Diana Weinhold (2000). "On the Effect of the Internet on International Trade," International Finance Discussion Papers, No. 693, Board of Governors of the Federal Reserve System.
- Fujita, Masahisa; Paul Krugman and Anthony J. Venables (2000). "The Spatial Economy: Cities, Regions, and International Trade," *Southern Economic Journal*, 67(2): 491-493.
- Head, Keith, and Thierry Mayer (2002a). "Effet frontière, intégration économique et forteresse Europe," *Economie et Prévision*, 136(2): 285-314.
- Head, Keith, and Thierry Mayer (2002b). "Illusory Border Effects: Distance Mismeasurement Inflates Estimates of Home Bias in Trade," CEPII Discussion Paper 2002-01.
- Hummels, David (2001). "Time as a Trade Barrier," Mimeo, Department of Economics, Indiana: Purdue University.
- Hummels, David, Ishii, Jun and Yi, Kei-Mu (2000). "The Nature and Extent of Vertical Specialization in International Trade," *Journal of International Economics*, vol. 54(1), pages 75-96, June.
- Iwanow, Tomasz and Colin Kirkpatrick (2007). "Trade Facilitation, Regulatory Quality and Export Performance," Working Paper Series No. 19/2007, Impact Assessment Research Center, Institute for Development Policy Management, University of Manchester.
- Kim, S., H. Lee and I. Park (2004). "Measuring the Impact of APEC Trade Facilitation: A Gravity Analysis," Paper presented in the Reunion of the Economic Committee of the APEC, 30 September 2004, Santiago, Chili.
- Limao, N. and A. Venables (2000). "Infrastructure, Geographical Disadvantage and Transport Costs," World Bank, Policy Research Working Paper number 2257.
- McCallum, John (1995). "National Borders Matter : Canada-U.S. Regional Trade Patterns," *The American Economic Review*, 83(2):615-62.
- Nicita, Alessandro and Marcelo Olarreaga (2001). "Trade and Production, 1976-99," Policy Research Working Paper Series 2701, The World Bank.

- OECD (2002a). “La relation entre les accords commerciaux régionaux et le système commercial multilatéral: facilitation des échanges,” prepared by Evokia Mosé, Working Party of the Trade Committee, TD/TC/WP(2002)17/FINAL, June.
- OECD (2002b). “Avantages pour les entreprises de la facilitation des échanges,” prepared by T. Matsudaira and Evokia Mosé, Working Party of the Trade Committee, TD/TC/WP(2001)21/FINAL, August.
- OECD (2002c). “Comment aborder la transparence et la simplification des formalités aux frontières: réflexions sur la mise en œuvre des propositions relatives à l'article X du GATT dans certains pays,” prepared by Evokia Mosé, Working Party of the Trade Committee, TD/TC/WP(2002)36/FINAL, November.
- OECD (2002d). “Comment aborder la transparence et la simplification des formalités aux frontières: réflexions sur la mise en œuvre des propositions relatives à l'article VIII du GATT dans certains pays,” prepared by Evokia Mosé, Working Party of the Trade Committee, TD/TC/WP(2002)50/FINAL, December.
- OECD (2003a). “Comment aborder la transparence et la simplification des formalités aux frontières: réflexions sur la mise en œuvre des propositions relatives à l'article V du GATT dans certains pays,” prepared by Evokia Mosé, Working Party of the Trade Committee, TD/TC/WP(2002)51/FINAL, September.
- OECD (2003b). “Réflexions sur les méthodes possibles pour mettre en œuvre les principes relatifs à la facilitation des échanges figurant dans les Articles V, VII et X du GATT,” prepared by Evokia Mosé, Working Party of the Trade Committee, TD/TC/WP(2003)12/FINAL, October.
- Silva, Joao Santos and Silvana Tenreyro (2005). “The Log of Gravity,” CEP Discussion Paper No 701, Centre for Economic Performance, London School of Economics and Political Science, July.
- Wilson John S., Catherine Mann, Yuen Pau Woo, Nizar Assanie, and Inbom Choi (2002). “Trade Facilitation: A Development Perspective in the Asia-Pacific Region,” Asia Pacific Economic Cooperation: Singapore, October.
- Wilson John S., Catherine Mann and Tsunehiro Otsuki (2003b). “Trade Facilitation and Economic Development: Measuring the Impact,” World Bank Policy Research Working Paper 2988, Development Research Group, Trade, March.
- Wilson John S., Catherine Mann and Tsunehiro Otsuki (2004). “Assessing the Potential Benefit of Trade Facilitation: A Global Perspective,” World Bank Policy Research Working Paper 3224, February.
- WTO (2002). “Review, Clarification and Improvement of GATT Articles V, VIII and X Proposals Made by Delegations,” Council for Trade in Goods, G/C/W/434, November.

Appendices

Appendix 1: Data Description

This appendix presents the definition as well as the source of each variable used in our database. Data have been collected from several sources. First, data on bilateral trade as well as tariff and production come from CEPII's⁷ "Trade and Production" database⁸. This database is constructed from several sources. First of all, the original data (Alessandro Nicita and Marcelo Olarreaga, 2001) come from the United Nations sources: COMTRADE and UNIDO. Despite a wide covering, the World Bank files contain a lot of missing values for production figures in recent years. This is the reason why, the Trade and Production database was largely extended using more recent versions of the UNIDO CD-ROM together with OECD STAN data for OECD members. Regarding trade data, the mirror inflows, available in Alessandro Nicita and Marcelo Olarreaga (2001), were used along with the CEPII database on international trade (BACI)⁹, which is also based on COMTRADE data. The data used is a cross section in 2004. The distance variable comes from the distance database developed by the CEPII. The methods used in this database allow for generating many indicators on internal distance, weighted distance, etc. This allows us to estimate the model derived in Section 5.

Finally, as for the variables related to trade facilitation, we use two databases:

Doing Business¹⁰ developed by the World Bank:

Definition: Doing Business compiles procedural requirements for exporting and importing a standardized cargo of goods by ocean transport. Every official procedure for exporting and importing the goods is recorded—from the contractual agreement between the two parties to the delivery of goods—along with the time and cost necessary for completion. All documents required for clearance of the goods across the border are also recorded. For exporting goods, procedures range from packing the goods at the factory to their departure from the port of exit. For importing goods, procedures range from the vessel's arrival at the port of entry to the cargo's delivery at the factory warehouse. Payment is made by letter of credit.

Assumptions: Local freight forwarders, shipping lines, customs brokers and port officials provide information on required documents and cost as well as the time to complete each procedure. To make the data comparable across countries, several assumptions about the business and the traded goods are used. Since 2007, assumptions were refined to adjust for particularities of land-locked countries and reduce variations related to documentation involving private parties. In the case of landlocked countries any port related data is based on information provided by the relevant sea port country. Inland transport costs are based on number of kilometers. The time to obtain a letter of credit refers to a first time application and any documentation between the shipper and trader is excluded.

Regarding the business, it must have 60 or more employees, be located in the country's most populous city. The business must be also a private, limited liability company. It does not operate

⁷Centre d'Etudes Prospectives et d'Informations Internationales. They are available on CEPII's website.

⁸As the available data from "Trade and Production" end in 2004 and the available ones from "Doing Business" begin in 2006, these two databases have been merged under the following assumption: being institutional variables, Doing Business aspects would not vary much between 2004 and 2006 making them possible to combine.

⁹BACI is the new CEPII world database for international trade analysis at the product-level.

¹⁰This part presents the scope and the description of Doing Business. It is available on www.doingbusiness.org

within an export processing zone or an industrial estate with special export or import privileges. Finally, it is domestically owned with no foreign ownership. Exports more than 10% of its sales.

As to traded products taken into account, they should travel in a dry-cargo, 20-foot, full container load. The product is not hazardous nor does it include military items. It does not require refrigeration or any other special environment. Finally, it does not require any special phytosanitary or environmental safety standards other than accepted international standards.

Variables Definition: Regarding *documents*, Doing Business defines them being all documents required to export and import the goods are recorded. It is assumed that the contract has already been agreed upon and signed by both parties. Documents include bank documents, customs declaration and clearance documents, port filing documents, import licenses and other official documents exchanged between the concerned parties. Documents filed simultaneously are considered different documents but with the same time frame for completion. As to *time*, it is recorded in calendar days. The time calculation for a procedure starts from the moment it is initiated and runs until it is completed. If a procedure can be accelerated for an additional cost, the fastest legal procedure is chosen. It is assumed that neither the exporter nor the importer wastes time and that each commits to completing each remaining procedure without delay. Procedures that can be completed in parallel are measured as simultaneous. The waiting time between procedures, for example, during unloading of the cargo, is included in the measure.

Finally, the Internet variable comes from the World Development Indicators database available on the World Bank web site. This variable determines the number of Internet users per 1000 people being the best proxy for technological intensity and for the intensity of e-commerce.

The second database, Institutional Profiles (2001), that is used for robustness check, is a survey conducted by researchers based at the French Ministry of the Economy, Finance and Industry (MINEFI) and the French Development Agency (AFD) based on a survey conducted by MINEFI and AFD agencies in the countries covered (51 countries both developed and developing). Data were collected through a questionnaire describing the institutional characteristics of these countries and was split in 4 sections: section A was related to the institutional environment, section B to the market for goods and services, section C concerned the financial system and section D the labor market and social interactions. Out of the legion of indicators included in the database, only 14 were chosen based on their appropriateness to trade facilitation.

Appendix 2: Descriptive Statistics

Table 1: Descriptive Statistics of the Used Variables

Variable	Mean	Std. Dev.	Min	Max
Flow	34226.53	472471.7	0.0009	7.11E+07
Ln(Rel. Imp)	-7.87549	4.076451	-25.0902	7.146209
Ln(Production)	0.117676	4.138838	-16.4876	16.48759
Ln(Distance)	3.703952	1.390011	-4.00679	8.205046
Ln(Tariff)	1.887526	1.237213	0	6.908755
Continuity	0.026133	0.159532	0	1
Com. Lang	0.152688	0.359686	0	1
Colony	0.019127	0.136973	0	1
Com. Col.	0.081989	0.274348	0	1
PTA	0.022821	0.149333	0	1
Landlocked Exp.	0.17109	0.376588	0	1
Landlocked Imp.	0.181122	0.385119	0	1
Island Exp.	0.135962	0.342749	0	1
Island Imp.	0.146917	0.354023	0	1
Exporter Doc. For Export	7.020906	2.224858	3	14
Exporter Doc. For Import	8.841187	3.371443	1	19
Importer Doc for Export	7.012269	2.214629	3	14
Importer Doc for Import	8.800639	3.435382	1	19
Exporter Time for Export	26.14798	16.69472	5	102
Exporter Time for Import	30.8264	20.17957	3	104
Importer Time for Export	26.27936	16.88121	5	102
Importer Time for Import	30.87687	20.3216	3	104
Internet users per 1000 people (Imp)	1.912023	2.018309	0.007731	7.562283
Internet users per 1000 people (Exp)	1.932443	2.032466	0.007731	7.562283

Table 2: Correlation Matrix among the Used Variables from Doing Business Database

Variables	Doc. (exp.)	Time (exp.)	Doc. (imp.)	Time (imp.)
Doc. (exp.)	1			
Time (exp.)	0.6564	1		
Doc. (imp.)	0.706	0.6381	1	
Time (imp.)	0.6423	0.9387	0.671	1

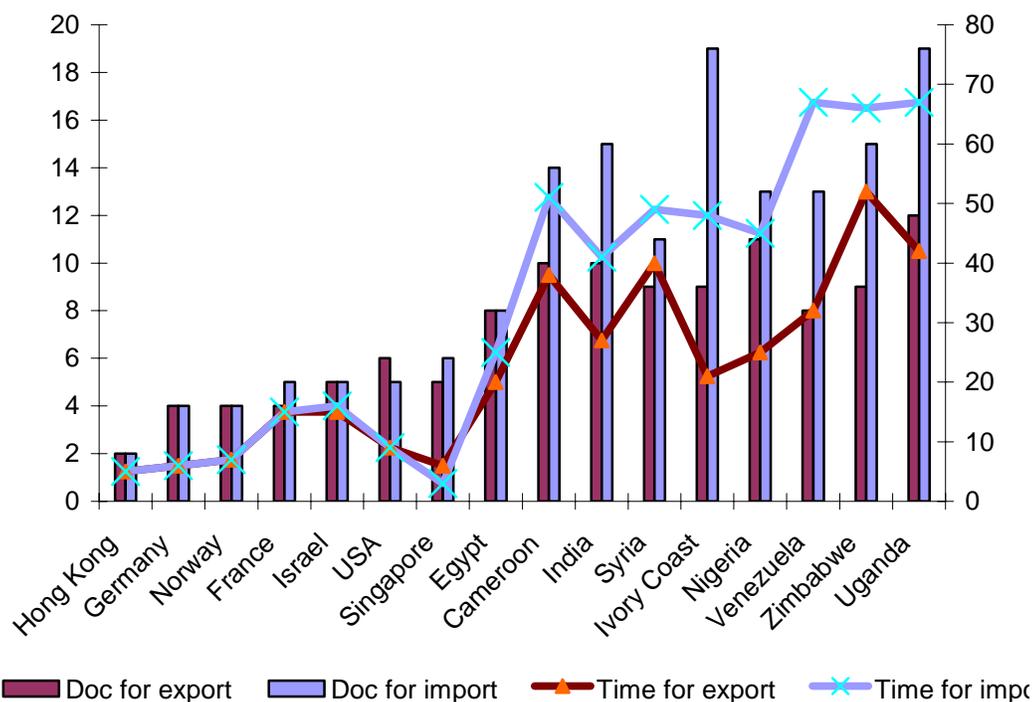
Source: Constructed by the author from ``Doing Business'', the World Bank, 2006.

Table 3: Time and Document for Developed and Developing Countries

Variable	Developing	Developed
Exporter Doc for Exp.	6.96	7.16
Exporter Doc for Imp.	8.79	8.97
Importer Doc for Exp.	7.82	4.96
Importer Doc for Imp.	9.89	6.04
Exporter Time for Exp.	25.65	27.42
Exporter Time for Imp.	30.23	32.34
Importer Time for Exp.	32.00	11.80
Importer Time for Imp.	37.96	12.93

Source: Constructed by the author from ``Doing Business'', World Bank, 2006.

Figure 1: Document and Time for Export and Import



Notes: (i.) Documents are defined as all documents required to export and import the goods. It is assumed that the contract has already been agreed upon and signed by both parties. Documents include all official documents exchanged between the concerned parties. For more details, see appendix 1.

(ii.) Time is recorded in calendar days. The time calculation for a procedure starts from the moment it is initiated and runs until it is completed. It is assumed that neither the exporter nor the importer wastes time and that each commits to completing each remaining procedure without delay. For more details, see appendix 1.

Source: Doing Business, The World Bank.

Table 4: Time and Document for Landlocked and Not Landlocked Countries

Variable	Landlocked			Not Landlocked		
	Mean	Min	Max	Mean	Min	Max
Doc. for exp.	7.474	4	14	6.658	3	14
Time for exp.	36.366	6	89	21.829	5	102
Doc. for imp.	9.354	4	19	8.468	1	18
Time for imp.	43.548	6	104	26.095	3	101

Source: Constructed by the author from “Doing Business”, World Bank, 2006.

Appendix 3: List of countries and sectors in the sample**Table 5: List of Countries by Code ISO-3**

Country	ISO 3	Country	ISO 3	Country	ISO 3	Country	ISO 3
Afghanistan	AFG	East Timor	TMP	Latvia	LVA	Sao Tome Princip.	STP
Albania	ALB	Ecuador	ECU	Lebanon	LBN	Saudi Arabia	SAU
Algeria	DZA	Egypt	EGY	Lesotho	LSO	Senegal	SEN
Angola	AGO	El Salvador	SLV	Lithuania	LTU	Serbia & Mont.	YUG
Anti. & Barb	ATG	Luxembourg	LUX	Macedonia	MKD	Seychelles	SYC
Argentina	ARG	Eritrea	ERI	Madagascar	MDG	Sierra Leone	SLE
Armenia	ARM	Estonia	EST	Malawi	MWI	Singapore	SGP
Australia	AUS	Ethiopia	ETH	Malaysia	MYS	Slovakia	SVK
Austria	AUT	Fiji	FJI	Maldives	MDV	Slovenia	SVN
Azerbaijan	AZE	Finland	FIN	Mali	MLI	Solomon Islds	SLB
Bangladesh	BGD	France	FRA	Marshall Islds	MHL	South Africa	ZAF
Belarus	BLR	Gabon	GAB	Mauritania	MRT	Spain	ESP
Belgium	BEL	Gambia	GMB	Mauritius	MUS	Sri Lanka	LKA
Belize	BLZ	Georgia	GEO	Mexico	MEX	St. Kitts & Nevis	KNA
Benin	BEN	Germany	DEU	Micronesia	FSM	St. Lucia	LCA
Bhutan	BTN	Ghana	GHA	Moldova,	MDA	St Vinc. & Grena.	VCT
Bolivia	BOL	Greece	GRC	Mongolia	MNG	Sudan	SDN
Bosnia & Herz.	BIH	Grenada	GRD	Montenegro	MNT	Suriname	SUR
Botswana	BWA	Guatemala	GTM	Morocco	MAR	Swaziland	SWZ
Brazil	BRA	Guinea	GIN	Mozambique	MOZ	Sweden	SWE
Bulgaria	BGR	Guinea-Bissau	GNB	Namibia	NAM	Switzerland	CHE
Burkina Faso	BFA	Guyana	GUY	Nepal	NPL	Syria	SYR
Burundi	BDI	Haiti	HTI	Netherlands	NLD	Taiwan	TWN
Cambodia	KHM	Honduras	HND	New Zealand	NZL	Tajikistan	TJK
Cameroon	CMR	Hong Kong	HKG	Nicaragua	NIC	Tanzania	TZA
Canada	CAN	Hungary	HUN	Niger	NER	Thailand	THA
Cape Verde	CPV	Iceland	ISL	Nigeria	NGA	Togo	TGO
Cent. Afri. Rep.	CAF	India	IND	Norway	NOR	Tonga	TON
Chad	TCD	Indonesia	IDN	Oman	OMN	Trinidad & Tob.	TTO
Chile	CHL	Iran	IRN	Pakistan	PAK	Tunisia	TUN
China	CHN	Iraq	IRQ	Palau	PLW	Turkey	TUR
Colombia	COL	Ireland	IRL	Palestine	PAL	Uganda	UGA
Comoros	COM	Israel	ISR	Panama	PAN	Ukraine	UKR
Congo (Dem.)	ZAR	Italy	ITA	Pap. New Guin	PNG	Emirates	ARE
Congo, Rep.	COG	Jamaica	JAM	Paraguay	PRY	United Kingdom	GBR
Costa Rica	CRI	Japan	JPN	Peru	PER	Uni. States Amer.	USA
Cote d'Ivoire	CIV	Jordan	JOR	Philippines	PHL	Uruguay	URY
Croatia	HRV	Kazakhstan	KAZ	Poland	POL	Uzbekistan	UZB
Czech Rep.	CZE	Kenya	KEN	Portugal	PRT	Vanuatu	VUT

Table 5: Continued

Country	ISO 3	Country	ISO 3	Country	ISO 3	Country	ISO 3
Denmark	DNK	Kiribati	KIR	Puerto Rico	PRI	Venezuela	VEN
Djibouti	DJI	Korea	KOR	Romania	ROM	Viet Nam	VNM
Dominica	DMA	Kuwait	KWT	Russian Fed.	RUS	Yemen	YEM
Dominican Rep.	DOM	Kyrgyzstan	KGZ	Rwanda	RWA	Zambia	ZMB
		Lao Peop. Rep.	LAO	Samoa	WSM	Zimbabwe	ZWE

Source: Constructed by the author from Trade and Production database.

Table 6: Distribution of Countries Used in the Sample by Income Level

Income level	Frequency	Percent in the sample	Cumulative percent
High income: OECD	25	14.29	14.29
High income: non-OECD	12	6.86	21.14
Low income	50	28.57	49.71
Lower middle income	54	30.86	80.57
Upper middle income	34	19.43	100
Total	175	100	

Note: In this table, the adopted classification is the World Bank's one.

Source: Constructed by the author from the World Bank database.

Table 7: List of Manufacturing Sectors by Code

Code	Sector
300	Total manufacturing
311	Food products
313	Beverages
314	Tobacco
321	Textiles
322	Wearing apparel
323	Leather products
324	Footwear
331	Wood products except furniture
332	Furniture except metal
341	Paper and products
342	Printing and publishing
351	Industrial chemicals
352	Other chemicals
353	Petroleum refineries
354	Misc. petrol./coal prod.
355	Rubber products
356	Plastic products
361	Pottery China earthenware
362	Glass and products
369	Other non-metal min. prod.
371	Iron and steel
372	Non-ferrous metals
381	Fabricated metal products
382	Machinery except electrical
383	Machinery electric
384	Transport equipment
385	Prof. and sci. equipment
390	Other manufactured products

Source: Constructed by the author from Trade and Production database.

Appendix 4: Regressions Results

Table 8: Impact of Trade Facilitation variables on Trade

	Ln(Rel. Imp)	Ln(Rel. Imp)	Ln(Rel. Imp)
Ln(Production)	0.781*** (0.017)	0.776*** (0.016)	0.727*** (0.020)
Ln(Distance)	-0.735*** (0.044)	-0.700*** (0.045)	-0.655*** (0.050)
Ln(Tariff+1)	-0.201*** (0.043)	-0.209*** (0.042)	-0.330*** (0.049)
PTA	0.636*** (0.13)	0.965*** (0.12)	0.943*** (0.14)
Contiguity	1.864*** (0.21)	1.919*** (0.21)	2.068*** (0.26)
Common Lang.	1.276*** (0.24)	1.238*** (0.24)	1.088*** (0.27)
Colony	0.463** (0.22)	0.532** (0.21)	0.750*** (0.24)
Com Col.	1.821*** (0.16)	1.514*** (0.15)	1.208*** (0.36)
Landlocked Exp.	-0.0858 (0.11)	-0.374*** (0.11)	-0.356** (0.15)
Landlocked Imp.	-0.0825 (0.12)	-0.340*** (0.11)	-0.301** (0.13)
Island Exp.	-0.0354 (0.17)	-0.291* (0.17)	-0.387** (0.18)
Island Imp.	0.813*** (0.20)	0.683*** (0.20)	1.131*** (0.23)
Exporter's Time for Exp.	0.0286*** (0.0099)		
Exporter's Time for Imp.	-0.0690*** (0.011)		
Importer's Time for Exp.	0.0207*** (0.0079)		
Importer's Time for Imp.	-0.0505*** (0.0090)		
Exporter's Doc for Exp.	0.0943* (0.049)		
Exporter's Doc for Imp.	0.0842*** (0.022)		
Importer's Doc for Exp.	0.0451 (0.041)		
Importer's Doc for Imp	0.0144 (0.024)		
Internet Users (Exporter)	0.0682* (0.035)	0.143*** (0.031)	
Internet Users (Importer)	0.168*** (0.035)	0.246*** (0.031)	
Export Time		0.000806*** (0.00023)	
Import Time		-0.000611*** (0.00023)	
Import Doc.		0.0318 (0.033)	

Table 8: Continued

	Ln(Rel. Imp)	Ln(Rel. Imp)	Ln(Rel. Imp)
Export Doc.		-0.208*** (0.061)	
Time			-0.000752*** (0.00023)
Document			-0.0812 (0.058)
Internet			0.147*** (0.040)
Constant	-4.423*** (0.45)	-4.138*** (0.47)	-6.307*** (0.54)
Sector Dummies	YES	YES	YES
Observations	28512	28512	24480
R-squared	0.63	0.62	0.58

Notes: (i.) Robust standard errors in parentheses.

(ii.) ***, ** and * represent respectively statistical significance at the 1%, 5% and 10% levels.

Table 9: Impact of Trade Facilitation Variables on Bilateral Trade: Controlling for Income Level

COEFFICIENT	Low+Low Ln(Rel. Imp)	Low+High Ln(Rel. Imp)	High+Low Ln(Rel. Imp)	High+High Ln(Rel. Imp)
Ln(Production)	0.885*** (0.028)	0.844*** (0.033)	0.688*** (0.028)	0.649*** (0.038)
Ln(Distance)	-0.925*** (0.096)	-0.676*** (0.085)	-1.032*** (0.065)	-0.461*** (0.085)
Ln(Tariff+1)	-0.391*** (0.067)	-0.157** (0.079)	-0.198*** (0.075)	-0.158 (0.11)
PTA	1.704*** (0.35)	1.226*** (0.33)	0.753*** (0.24)	0.965*** (0.25)
Contiguity	1.616*** (0.23)	1.782** (0.71)	1.365** (0.63)	1.376** (0.60)
Common Lang.	0.861*** (0.28)	0.764 (0.80)	1.269** (0.51)	1.242*** (0.25)
Colony	0.613* (0.32)	0.473 (0.75)	0.505 (0.44)	0.152 (0.23)
Com Col.	1.355*** (0.19)	1.172** (0.46)	1.173*** (0.32)	2.127*** (0.46)
Landlocked Exp.	-0.199 (0.21)	-0.600** (0.23)	-0.215 (0.19)	0.626** (0.25)
Landlocked Imp.	-0.274 (0.23)	-0.0698 (0.20)	-0.497*** (0.17)	0.367 (0.38)
Island Exp.	0 (0)	0 (0)	-0.0835 (0.18)	-0.395 (0.25)
Island Imp.	0 (0)	0.888*** (0.28)	0 (0)	0.453* (0.25)
Export Time	0.000587** (0.00026)	0.00277*** (0.00064)	0.000149 (0.00059)	-0.00391 (0.0044)
Import Time	-0.000718** (0.00028)	-0.00310*** (0.00066)	-0.000275 (0.00056)	-0.00160 (0.0041)
Import Doc.	-0.0719 (0.061)	0.119* (0.064)	0.0536 (0.047)	-0.400*** (0.11)
Export Doc.	0.0659 (0.11)	-0.301** (0.13)	-0.0232 (0.090)	1.952*** (0.36)
Internet Users (Exporter)	-0.272** (0.11)	-0.111 (0.12)	0.134** (0.060)	0.439*** (0.11)
Internet Users (Importer)	0.263** (0.10)	-0.0382 (0.087)	0.613*** (0.090)	0.450*** (0.10)
Constant	-5.986*** (0.90)	-5.496*** (0.96)	-4.955*** (0.76)	-13.34*** (2.01)
Sector Dummies	YES	YES	YES	YES
Observations	5561	7484	9701	5766
R-squared	0.61	0.57	0.60	0.58

Notes: (i.) Robust standard errors in parentheses.

(ii.) ***, ** and * represent respectively statistical significance at the 1%, 5% and 10% levels.

Table 10: Impact of Trade Facilitation Variables on the Sectoral Level (1)

	Food	Beverages	Tobacco	Textiles	Wearing	Leather prod.	Furniture	Paper prod	Chemicals	Petro. Ref.
	311	313	314	321	322	323	332	341	352	353
	Ln(Rel. Imp)	Ln(Rel. Imp)	Ln(Rel. Imp)	Ln(Rel. Imp)	Ln(Rel. Imp)	Ln(Rel. Imp)	Ln(Rel. Imp)	Ln(Rel. Imp)	Ln(Rel. Imp)	Ln(Rel. Imp)
Ln(Production)	0.692*** (0.031)	0.948*** (0.043)	0.800*** (0.098)	0.757*** (0.039)	0.734*** (0.041)	0.550*** (0.066)	0.468*** (0.057)	0.859*** (0.030)	0.869*** (0.030)	0.762*** (0.075)
Ln(Distance)	-0.506*** (0.089)	-0.947*** (0.13)	-1.043*** (0.39)	-0.889*** (0.13)	-1.089*** (0.16)	-0.623*** (0.14)	-0.132 (0.13)	-0.975*** (0.10)	-0.756*** (0.062)	-0.579*** (0.18)
Ln(Tariff+1)	-0.427*** (0.095)	-0.312*** (0.11)	-0.545*** (0.17)	-0.263** (0.12)	0.0840 (0.13)	-0.104 (0.13)	-0.547*** (0.15)	-0.128 (0.090)	-0.197** (0.097)	-0.428* (0.26)
PTA	1.157*** (0.35)	0.802 (0.52)	0 (0)	1.213*** (0.44)	1.352** (0.63)	1.109 (0.80)	0.0725 (0.33)	1.516*** (0.30)	1.021*** (0.22)	-0.266 (0.70)
Contiguity	2.144*** (0.26)	0.945* (0.50)	-0.172 (0.93)	2.324*** (0.46)	2.379*** (0.63)	1.895*** (0.48)	1.727*** (0.38)	1.790*** (0.30)	2.576*** (0.35)	3.608*** (0.71)
Common Lang.	1.581*** (0.24)	0.465 (0.60)	-1.859** (0.89)	1.135** (0.53)	1.103* (0.59)	0.981*** (0.36)	1.881*** (0.41)	0.715** (0.28)	2.204*** (0.76)	1.448* (0.88)
Colony	0.295 (0.31)	0.896* (0.48)	1.285* (0.67)	0.267 (0.53)	-0.642 (0.51)	0.646* (0.35)	-0.242 (0.42)	0.834*** (0.30)	0.178 (0.57)	-0.447 (0.84)
Com Col.	1.540*** (0.25)	1.947*** (0.37)	1.012 (1.34)	1.082** (0.45)	-0.581 (0.61)	0.793 (0.49)	0.452 (0.45)	1.783*** (0.36)	2.467*** (0.30)	2.755*** (0.58)
Landlocked Exp.	-0.837*** (0.25)	0.0643 (0.42)	0.0305 (0.75)	-1.382*** (0.46)	-0.923** (0.38)	-1.581*** (0.39)	-1.134*** (0.25)	-0.141 (0.21)	-0.280 (0.23)	-0.729 (0.48)
Landlocked Imp.	-0.823*** (0.20)	-1.139*** (0.37)	-0.541 (0.77)	-1.070*** (0.33)	0.870** (0.38)	-0.619 (0.38)	-0.153 (0.41)	-0.252 (0.18)	-0.294 (0.22)	-1.089** (0.46)
Island Exp.	-1.363*** (0.32)	-0.472 (0.51)	-1.357** (0.67)	1.198** (0.56)	-0.103 (0.51)	-1.527*** (0.37)	-0.861** (0.35)	-0.387 (0.30)	-0.477* (0.26)	-1.219 (0.98)
Island Imp.	0.657** (0.29)	0.729 (0.44)	-0.0509 (0.73)	0.573 (0.45)	-0.0744 (0.35)	-0.0292 (0.44)	0.0989 (0.43)	2.548*** (0.66)	0.337 (0.32)	2.212** (0.94)
Export Time	0.00117*** (0.00034)	0.00111 (0.00077)	0.000521 (0.0010)	0.000596 (0.00056)	-0.000872 (0.00068)	0.000683 (0.00073)	0.000621 (0.00068)	0.00106** (0.00053)	0.00106** (0.00051)	0.00195* (0.00099)
Import Time	-0.00110*** (0.00038)	-0.00123* (0.00071)	0.000279 (0.0012)	-0.000747 (0.00054)	0.000511 (0.00072)	-0.000377 (0.00080)	-0.00121** (0.00060)	-0.000985* (0.00055)	-0.000795* (0.00048)	-0.00255** (0.0010)
Import Doc.	0.000449 (0.057)	0.0971 (0.087)	-0.00334 (0.15)	-0.0826 (0.082)	-0.486*** (0.12)	-0.234** (0.095)	0.140* (0.073)	0.00322 (0.066)	-0.128** (0.056)	0.221* (0.12)
Export Doc.	-0.103 (0.098)	0.338 (0.23)	-0.0274 (0.35)	-0.227 (0.15)	0.409** (0.16)	0.00802 (0.21)	-0.0418 (0.13)	-0.196 (0.13)	0.0441 (0.12)	0.223 (0.22)
Internet (Exporter)	Users 0.152**	0.104	0.258*	-0.0570	-0.0662	0.224**	0.0552	0.150**	0.310***	-0.0366

Table 10: Continued

	Food	Beverages	Tobacco	Textiles	Wearing Leather prod.	Furniture	Paper prod	Chemicals	Petro. Ref.	
Internet Users (Importer)	(0.062) 0.179***	(0.068) 0.450***	(0.13) 0.158	(0.074) 0.216***	(0.11) 0.458***	(0.092) 0.254***	(0.10) -0.0358	(0.069) 0.145**	(0.054) 0.347***	(0.11) 0.473***
Constant	(0.067) -5.286***	(0.12) -9.067***	(0.16) -5.946***	(0.065) -1.258	(0.067) -2.879*	(0.069) -3.319**	(0.097) -8.097***	(0.070) -4.145***	(0.070) -5.420***	(0.12) -9.641***
Observations	(0.84) 1512	(1.90) 1102	(2.20) 357	(0.98) 1192	(1.51) 634	(1.34) 954	(1.02) 1005	(1.05) 1709	(0.92) 1225	(1.67) 643
R-squared	0.50	0.52	0.55	0.63	0.54	0.45	0.39	0.66	0.78	0.38

Notes: (i.) Robust standard errors in parentheses.

(ii.) ***, ** and * represent respectively statistical significance at the 1%, 5% and 10% levels.

Table 11: Impact of Trade Facilitation Variables on the Sectoral Level (2)

	Rubber prod	Plastic	Iron steel	Non-fer Met	Fab. Metal	Machinery	Elect mach	Transport	Prof sci equi	Other
	355	356	371	372	381	382	383	384	385	390
	Ln(Rel. Imp)	Ln(Rel. Imp)	Ln(Rel. Imp)	Ln(Rel. Imp)	Ln(Rel. Imp)	Ln(Rel. Imp)	Ln(Rel. Imp)	Ln(Rel. Imp)	Ln(Rel. Imp)	Ln(Rel. Imp)
Ln(Production)	0.909*** (0.051)	0.813*** (0.028)	0.781*** (0.042)	0.658*** (0.060)	0.835*** (0.036)	0.736*** (0.029)	0.806*** (0.056)	0.738*** (0.026)	0.713*** (0.036)	0.880*** (0.036)
Ln(Distance)	-0.869*** (0.084)	-0.824*** (0.080)	-0.986*** (0.16)	-0.901*** (0.20)	-0.860*** (0.078)	-0.795*** (0.069)	-0.440* (0.23)	-0.543*** (0.079)	-0.215** (0.10)	-0.697*** (0.12)
Ln(Tariff+1)	-0.336*** (0.11)	0.0288 (0.11)	0.0530 (0.19)	0.129 (0.22)	-0.165 (0.14)	-0.203** (0.096)	-0.651*** (0.14)	0.00842 (0.13)	-0.0834 (0.11)	-0.256* (0.13)
PTA	1.090*** (0.30)	1.226*** (0.25)	0.460 (0.80)	1.229 (0.76)	1.554*** (0.36)	0.749*** (0.24)	1.312** (0.61)	1.515*** (0.39)	0.626*** (0.22)	0.457 (0.38)
Contiguity	1.025** (0.47)	2.919*** (0.35)	1.201** (0.49)	1.928*** (0.58)	1.968*** (0.30)	1.163*** (0.26)	0.823* (0.45)	2.297*** (0.40)	1.649*** (0.30)	0.781 (0.48)
Common Lang.	-0.250 (0.44)	2.983*** (0.50)	-0.181 (0.48)	2.042*** (0.60)	0.840*** (0.31)	1.181*** (0.35)	1.126** (0.49)	1.380*** (0.29)	1.552*** (0.46)	0.685 (0.51)
Colony	1.141*** (0.37)	-0.262 (0.47)	0.309 (0.43)	-0.551 (0.64)	0.794*** (0.26)	0.779*** (0.26)	0.857** (0.38)	0.967*** (0.29)	0.199 (0.32)	1.412*** (0.53)
Com Col.	2.511*** (0.47)	1.036*** (0.28)	2.614*** (0.61)	-0.322 (0.85)	1.569*** (0.39)	1.735*** (0.24)	1.751*** (0.38)	1.842*** (0.48)	0.814** (0.38)	1.782*** (0.48)
Landlocked Exp.	-0.748*** (0.22)	-0.347 (0.22)	0.998** (0.42)	-0.803 (0.49)	-0.184 (0.24)	0.126 (0.20)	0.0356 (0.65)	-0.431 (0.38)	-0.106 (0.21)	0.230 (0.30)
Landlocked Imp.	0.0110 (0.24)	-0.162 (0.19)	-0.332 (0.38)	0.0678 (0.44)	0.432* (0.23)	1.085*** (0.26)	-1.694*** (0.52)	-0.289 (0.35)	-0.156 (0.23)	-0.257 (0.25)
Island Exp.	0.549**	0.197	0.630	0.165	0.351	0.132	-0.454	-0.0740	-0.190	-0.222

Table 11: Continued

	Rubber prod	Plastic	Iron steel	Non-fer Met	Fab. Metal	Machinery	Elect mach	Transport	Prof sci equi	Other
Island Imp.	(0.27) -0.781**	(0.24) 0.123	(0.39) -0.127	(0.52) 1.650***	(0.31) 1.097	(0.21) 0.607	(0.71) -0.560	(0.28) 0.275	(0.23) 1.216**	(0.33) -0.970*
Export Time	(0.39) 0.00165**	(0.50) 0.00160***	(0.44) 0.000754	(0.36) 0.00246***	(0.68) 0.000566	(0.37) 0.000948**	(0.62) 0.000795*	(0.34) 0.00410***	(0.59) 0.000840	(0.50) -0.00111**
Import Time	(0.00070) -0.00100	(0.00051) -0.000994*	(0.00083) -0.000584	(0.00080) -0.00132	(0.00043) -0.000729*	(0.00043) -0.000614	(0.00045) -0.0000339	(0.00073) -0.00292***	(0.00062) 0.0000670	(0.00054) 0.00155***
Import Doc.	(0.00064) -0.152	(0.00052) -0.0840	(0.00083) 0.00408	(0.00080) 0.193**	(0.00044) 0.118	(0.00051) 0.0548	(0.00053) 0.311**	(0.00068) -0.211***	(0.00055) 0.235***	(0.00057) 0.120
Export Doc.	(0.12) 0.0628	(0.072) -0.320***	(0.096) -0.218	(0.087) -0.671***	(0.11) -0.331***	(0.084) -0.369***	(0.13) -0.917***	(0.067) -0.319**	(0.063) -0.885***	(0.090) -0.425***
Internet Users (Exporter)	(0.22) 0.151**	(0.11) 0.171***	(0.16) 0.0509	(0.21) -0.0122	(0.11) -0.00206	(0.11) 0.321***	(0.20) 0.178	(0.14) 0.211***	(0.15) 0.290***	(0.15) 0.217***
Internet Users (Importer)	(0.063) 0.372***	(0.052) 0.237***	(0.078) 0.194*	(0.098) 0.486***	(0.073) 0.310***	(0.065) 0.0159	(0.18) 0.159	(0.051) 0.0840	(0.066) 0.108	(0.079) 0.858***
Constant	(0.095) -4.410***	(0.053) -3.961***	(0.11) -3.201**	(0.10) -3.155**	(0.061) -3.935***	(0.061) -2.451***	(0.13) -0.918	(0.064) -2.305**	(0.075) -2.392***	(0.12) -4.791***
Observations	(1.00) 1290	(0.64) 1425	(1.57) 919	(1.36) 612	(0.84) 1416	(0.66) 1079	(1.60) 990	(0.91) 1030	(0.79) 857	(1.15) 670
R-squared	0.73	0.73	0.57	0.54	0.67	0.80	0.68	0.77	0.82	0.62

Notes: (i.) Robust standard errors in parentheses.

(ii.) ***, ** and * represent respectively statistical significance at the 1%, 5% and 10% levels.

Table 12: Calculating Consistent Values for Trade Facilitation Coefficients

	OLSmi	OLSagg
Distance coeff.	0.7	0.655
Tariff coeff.	0.209	0.33
Time	-	0.000752
Document	-	0.0812
Time imp.	0.00081	-
Doc exp.	0.208	-
Internet exp.	0.143	-
Internet imp.	0.246	-
Internet	-	0.147
σ	1.209	1.33
δ	3.3492823	1.98484848
μ_{time}	-	0.00227879
μ_{doc}		0.24606061
$\mu_{time,imp.}$	0.0038756	-
$\mu_{doc,exp.}$	0.99521531	-
$\mu_{internet,exp}$	0.68421053	-
$\mu_{internet,imp}$	1.17703349	-
$\mu_{internet}$	-	0.445454545

Notes: Constructed by the author from the regressions results.

Table 13: Robustness Check (1): Comparing Poisson and IV Results

	IV 1	IV 2	IV 3	PPML 1	PPML 2	PPML 3
	Ln (Rel. Imp.)	Ln (Rel. Imp.)	Ln (Rel. Imp.)	Rel. Imp.	Rel. Imp.	Rel. Imp.
Ln(Production)	0.795*** (0.0061)	0.792*** (0.0065)	0.777*** (0.012)	0.646*** (0.0068)	0.712*** (0.0071)	0.743*** (0.0077)
Ln(Distance)	-0.584*** (0.017)	-0.559*** (0.021)	-0.373*** (0.042)	-0.717*** (0.022)	-0.821*** (0.021)	-0.839*** (0.022)
Ln(Tariff+1)	-0.212*** (0.020)	-0.250*** (0.026)	-0.221*** (0.029)	-0.290*** (0.018)	-0.273*** (0.018)	-0.317*** (0.019)
Contiguity	2.332*** (0.13)	2.051*** (0.12)	2.467*** (0.17)	1.094*** (0.044)	0.895*** (0.044)	0.907*** (0.046)
Common Lang.	1.443*** (0.073)	1.476*** (0.082)	1.309*** (0.086)	-1.046*** (0.071)	-0.928*** (0.069)	-0.679*** (0.071)
Colony	0.367*** (0.087)	0.253*** (0.087)	0.620*** (0.12)	1.015*** (0.049)	0.931*** (0.049)	0.822*** (0.056)
Com Col.	0.514*** (0.16)	0.366** (0.16)	0.231 (0.20)	1.428*** (0.067)	1.146*** (0.062)	1.308*** (0.066)
PTA	0.367*** (0.13)	0.681*** (0.11)	0.943*** (0.16)	0.0925 (0.12)	-0.242** (0.12)	-0.418*** (0.12)
Landlocked Exp.	-0.194*** (0.070)	-0.350*** (0.064)	-1.441*** (0.17)	-0.687*** (0.076)	-0.822*** (0.072)	-0.606*** (0.070)
Landlocked Imp.	-0.799*** (0.090)	-0.235*** (0.072)	-0.220** (0.10)	-0.0554 (0.039)	0.194*** (0.040)	0.629*** (0.045)
Island Exp.	-0.179*** (0.068)	-0.0947* (0.056)	-1.133*** (0.16)	-0.299*** (0.055)	-0.232*** (0.053)	-0.277*** (0.056)
Island imp.	0.470*** (0.079)	0.731*** (0.054)	0.967*** (0.085)	1.350*** (0.13)	0.737*** (0.13)	1.374*** (0.14)
Internet (Exp)	0.0832*** (0.022)	0.188*** (0.016)	0.0112 (0.022)		-0.0849*** (0.011)	-0.0497*** (0.015)
Internet (Imp)	-0.0471* (0.026)	0.119*** (0.015)	0.00476 (0.017)		0.285*** (0.015)	0.205*** (0.017)
Time	- 0.00248*** (0.00028)			0.000599*** (0.000046)		
Document	-0.261*** (0.068)			-0.321*** (0.016)		
Import Time		-0.00179*** (0.00050)			0.000686*** (0.000069)	
Export Doc.		-0.214*** (0.072)			-0.314*** (0.025)	
Export Time		0.00171*** (0.00052)			0.00000425 (0.000067)	
Import Doc.		0.0952*** (0.017)			-0.0653*** (0.011)	
Exporter's Doc for Imp.			-0.165*** (0.035)			-0.0751*** (0.0096)
Importer's Time for Imp.			-0.0572*** (0.015)			-0.00780** (0.0039)
Importer's Time for Exp.			-0.0288*** (0.010)			-0.0208*** (0.0029)
Exporter's Doc for Exp.			-1.313*** (0.19)			-0.0282 (0.030)
Importer's Doc for Exp.			0.0600 (0.056)			-0.00767 (0.016)

Table 13: Continued

	IV 1	IV 2	IV 3	PPML 1	PPML 2	PPML 3
Importer's Doc for Imp			0.0914*** (0.011)			0.0660*** (0.0075)
Exporter's Time for Exp.			0.0648*** (0.0065)			-0.0169*** (0.0045)
Exporter's Time for Imp.			0.0688*** (0.019)			0.0486*** (0.0048)
Internet				-0.104*** (0.012)		
Constant	-4.435*** (0.57)	-7.287*** (0.36)	-0.258 (0.90)	-0.956** (0.37)	0.212 (0.24)	-3.169*** (0.39)
Sector dummies	YES	YES	YES	YES	YES	YES
Observations	21712	22099	21712	24480	28512	28512
R-squared	0.58	0.62	0.45	.	.	.

Notes: (i.) Standard errors in parentheses.

(ii.) ***, ** and * represent respectively statistical significance at the 1%, 5% and 10% levels.

Table 14: Robustness Check (2): Using Institutional Profiles Database

	Ln(Rel. Imp.)
Ln(Production)	0.822*** (0.012)
Ln(Distance)	-0.788*** (0.031)
Ln(Tariff+1)	-0.214*** (0.032)
PTA	0.400* (0.21)
Contiguity	2.000*** (0.14)
Common Lang.	2.559*** (0.11)
Colony	-0.221** (0.1)
Com Col.	0.197 (0.22)
Landlocked Exp.	-0.733*** (0.16)
Landlocked Imp.	0.0338 (0.17)
Island Exp.	0.0478 (0.11)
Island imp.	1.535*** (0.15)
Harmoni	0.0214 (0.022)
Info	0.128*** (0.012)
Cust. Effi.	0.0551*** (0.018)
Trans. Secu.	-0.104*** (0.0088)
Fraud	-0.0749*** (0.017)
Internet	0.00000830*** (6.2E-07)
Constant	-4.826*** (0.17)
Observations	7746
R-squared	0.47

Notes: (i.) Robust standard errors in parentheses.

(ii.) ***, ** and * represent respectively statistical significance at the 1%, 5% and 10% levels.