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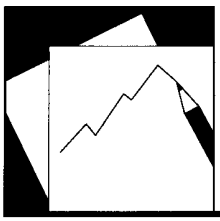

# IMF Working Paper

# Border and Behind-the-Border Trade Barriers and Country Exports

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**IMF Working Paper**

Policy Development and Review Department

# Border and Behind-the-Border Trade Barriers and Country Exports

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**Abstract**



How do signatures required for exporting and business registration procedures affect the volume and composition of country's exports? To answer this question, I develop a model where a country can export two types of products: differentiated and homogeneous. I show that export signatures and registration procedures reduce overall exports by increasing transaction costs. The impact, however, varies across goods according to the product's degree of differentiation—the lack of price data on differentiated products due to their heterogeneity makes them more sensitive to export signatures. Regressions show that each extra signature exporters have to collect before a shipment can take place reduces aggregate exports by 4.2 percent. The impact is large, equivalent to raising importer's tariff by 5 percentage points. Furthermore, each signature lowers exports of differentiated products by 4–5 percent more than exports of homogeneous goods. I find evidence that business registration procedures affect exports of differentiated products only.

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Contents Page

## I. INTRODUCTION

What explains diverse export performance among countries? The answer bears a highly relevant policy message, particularly when countries' economic fortunes have become increasingly reliant on their ability to compete in today's global economy. Over the past decades, many developing countries have improved admirably their trade performance, boosting considerably their exports while enhancing its content and quality. Still, exports of many others remain subdued and heavily dependent on few agricultural or mineral commodities. This calls for obvious questions: why some countries underexport? Why their exports remain limited to a narrow list of commodities?

A possible answer—among many others—lies in high transaction costs. Before a typical international transaction can take place, a trader must overcome many hurdles. He must incur expenses related to searching for international supplier or customer, signing a delivery contract, securing a payment, moving good from manufacturer to port, clearing the customs in country of origin, loading good to vessels and shipping it to destination country, clearing customs there, and, finally, delivering the shipment to a customer. In addition to direct monetary outlays, these steps involve costs associated with time delays and uncertainty (Hummels, 2001 and Anderson and Marcouiller, 2001). While transaction costs depend, to a certain degree, on exogenous factors like geographic location and distance between trading countries, appropriate policy measures—e.g. improvements in infrastructure or reduction in administrative barriers to trade—can significantly reduce them, boosting the potential for trade.

The focus here is to study the effect of country's trade-related administrative barriers, namely the number of signatures required for exporting and the number of procedures for registering business, on its exports. I choose these indicators because they—unlike many other factors of transaction costs—are in direct control of the regulatory authorities. The number of signatures variable, which counts all signatures that a representative exporter has to collect from the trade and/or customs officials starting from the moment she begins preparing documents required for exporting until the cargo sails from the originating port, serves as a proxy for the exporter's border barrier. The number of business registration procedures approximates country's behind-the-border barrier. Both indicators are taken from the World Bank's Doing Business database, with data on number of export signatures coming from a survey on trade facilitation and trade costs of 345 freight forwarders and port and customs officials in 126 countries.

The paper's contribution is twofold. First, I estimate the adverse effects of export signature requirement and business registration procedures on country's aggregate exports. Second, I show that the impact is stronger on exports of differentiated (complex) products than exports of homogeneous (simple) goods.

I develop a trade model where an exporter needs to secure signatures from officials before a shipment can take place. Securing signatures is costly and adds to the exporter's transaction costs, suppressing exports. Signature fees are assessed on the product's price, which, for homogeneous goods, is available from the commodity listings of organized exchanges or

specialized industry publications. In contrast, due to their heterogeneity, differentiated products are not traded in organized markets such as exchanges, limiting availability of reliable price information. This relative lack of price data on differentiated products translates into higher costs of securing export signatures than in the case of homogeneous goods.

Empirically, I regress bilateral exports on the number of signatures required for exporting and the number of procedures for registering business as well as other gravity controls. I find the effect of export signatures to be empirically robust and significant both economically and statistically. Each additional signature reduces country's aggregate exports by about 4.2 percent. In terms of impact on exports, this is equivalent to raising importer's tariff by 5 percentage points. Regressions point, however, to a mixed evidence regarding the impact of business registration procedures. Using Rauch's product classification (Rauch, 1999), which classifies commodities at the 4-digit product level into two product groups: differentiated and homogeneous, I find strong support for the model's conclusion that exports of differentiated products are more sensitive to changes in export signature and business registration requirements than those of homogeneous goods.[2] Estimates suggest that each signature reduces exports of differentiated products by 4–5 percent more than exports of homogenous goods. This result is robust to estimating regressions using difference-in-difference technique, which is less prone to the potential endogeneity of export signatures to export volumes.

As import tariffs came down, trade literature has increasingly recognized transaction costs among important remaining barriers to trade and labeled efforts to lower these costs a trade facilitation. Researchers and policy makers, however, have had a difficult time agreeing on its exact definition and elements. Initially, trade facilitation was considered to include efforts directed only at easing documentation burden and improving logistics of transporting goods across borders. This definition has now expanded to encompass the overall environment for international transactions, such as transparency and professionalism of customs, harmonization of standards, and conformance to international or regional regulations. In broad terms, trade facilitation is now thought to comprise all factors that contribute to country's capacity and effectiveness to create and maintain trade-friendly environment. These factors are further split into two broad categories: "border" barriers such as port efficiency and customs administration as well as "behind-the-border" barriers such as quality of infrastructure and regulatory environment (Wilson et al., 2004).

Early empirical work on trade facilitation was motivated by increased interest in explaining the missing trade phenomenon (Trefler, 1995), and, in the absence of detailed data on transaction costs or trade facilitation indicators, used broad measurements of trade barriers to

[2] Rauch's classification is a first systematic attempt to define homogeneous versus differentiated products. Rauch (1999) argues that it is economically inefficient to centralize transactions when products have multidimensional characteristics and consumers have preferences for a variety of products. Based on this approach, he defines commodities traded through international exchanges, such as wheat, and goods whose reference prices are published in trade publications, such as aluminum, as homogeneous; all other commodities are classified as differentiated goods.

estimate how they restrict trade. Anderson and Marcouiller (2001) attribute the lack of trade between low-income countries to hidden transaction costs associated with the insecurity of international exchange. These hidden costs in low-income countries arise from corrupt customs practices, unenforceable contracts, and organized crime—all potentially linked to trade facilitation. They show that a broad measure of exchange insecurity—compiled using indicators of government's impartiality and transparency and enforceability of commercial contracts—severely constrains international trade of low-income countries. Hummels (2001) argues that time is another important trade barrier, closely related to trade facilitation factors such as quality of ports and port services and customs procedures. Using the U.S. trade data, he shows that, for an average length ocean shipment of manufactured goods, one extra day in shipment reduces the probability of a country exporting to the United States by 1.5 percent—equivalent to the impact of a 16 percent increase in the tariff. Limao and Venables (2001) turn attention to infrastructure and show that its quality determines transport costs, which in turn affect trade volumes between countries. They find that a deterioration in infrastructure from that of the median country to the 75$^{th}$ percentile raises transport costs by an amount equivalent to 3,466 km of sea travel or 419 km of overland travel, reducing trade volume by 28 percent.

With richer data becoming available on individual elements of trade facilitation, research moved into the specific areas of trade facilitation effort. Fink et al. (2002a) show that anticompetitive practices in port services and other transport services increase unit shipping costs, hampering country's trade. They also study the role of telecommunication services (2002b) and find that a 10 percent decrease in the price of phone calls between two countries is associated with an 8 percent increase in bilateral trade. Using data for 1998–99, Freund and Weinhold (2000) find that a 10 percent increase in number of web hosts in country increases its trade by 10 percent. Moenius (2000) shows that comparability in standards promotes trade, while Otsuki et al. (2001) find that tightening the EU food standards by 10 percent reduces African exports of certain cereals, nuts, and dried foods by a range of 5 to 11 percent. Wilson et al. (2004)—building on Wilson et al. (2003), construct four measures of trade facilitation: port efficiency, customs environment, regulatory environment, and "e-business" development in each trading country and find that all measures have a significant trade impact, with improvements in port efficiency associated with the largest increase in trade. They estimate that bringing below-average countries in the group half-way to the average of the entire set of 75 countries in the sample in all four areas of trade facilitation would yield a US$377 billion gain in trade flows in manufacturing goods. Djankov et al. (2005)—most relevant to this paper—estimate the effect of time delay in exporting on trade using the World Bank data on trade costs. They measure time delay as the average number of days it takes for a typical 20-foot container sent from a factory in the most populous city to get on a ship in the most accessible port. They find that a delay of one day reduces trade by more than 1 percent, which, in terms of its trade impact, is equivalent to distancing trading countries apart by about 85 km.

These studies are complemented by a number of papers that look into the role of trade facilitation in trade across different products. Based on Rauch's product classification, Tang (2006) finds that a reduction in country's communications costs increases its exports to the United States, with a stronger impact in differentiated products. Similarly, Ranjay and Lee

(2003) show that trade in differentiated products is more responsive to improvements in contract enforcement.

The importance of trade facilitation in promoting exports and development has also attracted attention of policy-makers—both at national and international levels—resulting in a closer integration of trade into national development plans and creation of the Integrated Framework in 1997 by six multilateral institutions (IMF, ITC, UNCTAD, UNDP, World Bank and the WTO). The framework is a program that assists the least developed countries to enhance their economic growth and achieve poverty reduction goals by expanding their trade potential. Diagnostic Trade Integration Studies prepared within the Integrated Framework—to identify and assess specific domestic and international constraints to trade—frequently point to the critical role of trade facilitation in supporting country's exports.

The rest of the paper is organized as follows. In the next section, I develop a theoretical model to underpin the estimation strategy. Section 3 presents an estimation strategy and is followed by section 4 which discusses data issues. Section 5 presents estimation results with robustness checks. Section 6 concludes.

## II. MODELING TRADE FACILITATION AND COUNTRY EXPORTS

This section develops a two-country trade model where 1) the number of signatures required to complete export transaction and the number of procedures to register business reduce country's exports by increasing transaction costs; and 2) exports of differentiated products are more sensitive to changes in trade facilitation than exports of commodity goods.

*Transaction costs and exporter trade facilitation*

The model has two countries, with *i* and *j* used as non-specific references to country 1 and country 2. International exchange between them is costly. I assume that trade costs take an ad valorem form such that an importer in country *i* would face price

$$p_j\left(1+\tau_{ij}\right)$$

for a good shipped from country *j* at price $p_j$. Trade costs are not merely limited to shipping costs between trading countries. They include expenditures required to cover all transaction costs, including various border fees and customs tariffs. In exporter's country, for example, they include expenditures to transport a shipment from a factory to port, complete required documentation, and clear the customs.

To focus on the impact of the exporting country's trade facilitation on transaction costs and exports, I assume that trade costs for each bilateral country pair can be separated as:

$$1+\tau_{ij}=\left(1+\eta_j\right)\left(1+\eta_{ij}\left(g_{ij},t_{ij},f_i\right)\right), \qquad (1)$$

where the first term on the right side, $(1+\eta_j)$, represents trade costs specific to the exporting country. Clearly, these costs depend on its trade facilitation level. I assume that the exporter has to collect $s_j$ signatures, a proxy for the country's border trade facilitation, before its shipment is allowed to leave port. The second term on the right side of (1), $(1+\eta_{ij})$, is transaction costs that can be explained by bilateral-pair factors, such as standard gravity variables ($g_{ij}$), tariffs imposed by $i$ on imports from $j$ ($t_{ij}$), and importer country specific factors, including those determined by its trade facilitation, e.g. ($s_i$).[3]

*Product heterogeneity and transaction costs*

Securing export signatures is costly. In addition to costs related to preparing required documentation, exporter must pay fees to secure the official's signature.[4] I assume that these fees take an ad valorem form imposed on the price of the product as estimated by the official. I also assume that the official does not have a complete information on the price of the product, but she does not trust the invoice price, $p_j$, submitted by the exporter either. She knows that both exporter and importer have an incentive to understate the contract price to evade export charges and import tariffs or miscellaneous fees. Moreover, if the exporter is a subsidiary of the importer, understating the export price may be an effective window for profit transfer. In producing her estimate of the product's export price for calculating the signature fees, the official relies on information available from major commodity exchanges, specialized industry journals, and pricing lists put together by pre-shipment companies, adjusting it to the country circumstances by transportation and other transaction cost differentials. Given the wide variation in quality and price of products, information available from these sources, however, may not be completely reliable or perfectly applicable to the country or product circumstances. With these constraints, the official can only produce a range for the estimate of product's price:

$$\left[\overline{p}-\varepsilon, \overline{p}+\varepsilon\right], \tag{2}$$

where $\overline{p}$ is the official's point estimate of the country-adjusted export price, and $\varepsilon$ is her deviation factor which depends on availability of reliable and comparable information.

Signature fees, which determine the official's pay, are assessed on the basis of her price estimate within the range in (2). With the range in hand, the official always assesses the product's export price at $\overline{p}+\varepsilon$ and levies total fees to be paid by the exporter for $s_j$ signatures:

[3] Importer country's trade facilitation will undoubtedly have an impact of the volume of trade. The paper, however, concentrates on the impact of trade facilitation on country's exports only. In the empirical part, I control for the importer country specific variables, including those capturing its trade facilitation, using fixed effects.

[4] These payments do not necessarily need to be formal. In countries with a widespread corruption, such fees may be collected informally and accrue to the official signing required export documents.

$$(\overline{p}+\varepsilon)*\theta(s_j)$$

where *θ(s)* is the applied fee rate that increases with the number of required signatures, $\theta'(s)>0$. Converted to ad valorem form, the exporter country specific transaction costs are:

$$\eta_j = \frac{\overline{p}+\varepsilon}{p_j}\theta(s_j).$$

The official's deviation factor, $\varepsilon$, is not necessarily fixed across goods. For goods traded in organized commodity exchanges, relatively reliable latest prices are available from these markets. Similar factors, albeit to a lesser degree, apply to goods whose prices are printed in specialized industry journals. These two categories of goods were classified as homogeneous and price-referenced products, respectively, by Rauch(1999) at the 4-digit product level according to whether a product was traded in organized exchange or had its price quoted in industry publications. All other products were categorized as differentiated products. Rauch argued that differentiated products are generally more complex and heterogeneous in their attributes, which explains why limited reliable information on their quality and price is available from centralized sources than for homogeneous goods.

Scarcer and less reliable information available from international markets on the quality or price of differentiated products increases the variation of the official's price estimate for differentiated products relative to that for homogeneous goods. With this in mind, I write the official's deviation factor, ε, as an increasing function of the product's heterogeneity $\varepsilon(c)$, where *c* reflects the heterogeneity of the product and $\varepsilon'(c)>0$.

The equation for the exporter specific transaction costs becomes:

$$\eta_{jc} = \frac{\overline{p}+\varepsilon(c)}{p_j}\theta(s_j). \qquad (3)$$

Noting that $\partial\eta_j/\partial s_j > 0$, $\partial\eta_j/\partial c > 0$, and, therefore, $\partial^2\eta_j/\partial s_j\partial c > 0$, it follows that 1) transaction costs increase with the number of required signatures; 2) exports of differentiated products face higher transaction costs; and 3) an extra signature is costlier for differentiated products than for homogeneous goods.

Based on (3), the equation for all transaction costs can be written as:

$$1+\tau_{ijc} = \left(1+\frac{\overline{p}+\varepsilon(c)}{p_j}\theta(s_j)\right)\left(1+\eta_{ij}\left(g_{ij},t_{ij},f_i\right)\right) \qquad (4)$$

*The trade model*

Each country is endowed with a composite labor factor *L* and a specific factor *S*. A representative consumer in country *i* maximizes preferences over two composite goods: a differentiated (complex) good *D* and a homogeneous (simple) good *H*, expressed by:

$$U_i = D_i^{\beta} H_i^{1-\beta}, \qquad (5)$$

where $\beta$ is a share of her income spent on *D*. *D* can be thought as a sub-utility derived from the consumption of manufacturing goods, while $H$ is a similar measure for the consumption of commodity goods.

In each country, perfectly competitive firms produce an identical commodity using the composite factor *L*. The production takes a form of a constant returns to scale technology with marginal cost $c_{ih}$ in country *i*. Each country produces a unique commodity. For instance, country 1 might produce steel while country 2 produces wheat. Consumer preferences over the homogeneous aggregate are given by the standard CES utility function, with $\sigma_h > 1$ being elasticity of substitution between the two commodities:

$$H_i = \left( h_{ii}^{\frac{\sigma_h - 1}{\sigma_h}} + h_{ij}^{\frac{\sigma_h - 1}{\sigma_h}} \right)^{\frac{\sigma_h - 1}{\sigma_h}}, \tag{6}$$

where $h_{ii}$ and $h_{ij}$ denote the consumption by consumer in country *i* of a commodity produced in country *i* and *j*, respectively.

Manufacturing sector is more evolved. There, firms produce symmetric but imperfectly substitutable goods in the usual Dixit-Stiglitz fashion. Each firm produces a single variety using the increasing returns to scale technology with constant marginal cost. Establishing a firm and setting up production of a manufacturing variety requires fixed cost in form of *F* units of the specific factor *S* (call it a skilled labor). *S* can be used only to develop a manufacturing variety. Thus, if $S_i$ is the skilled labor endowment of country *i*, the number of manufacturing varieties it produces in equilibrium is:

$$N_i = \frac{S_i}{F}. \tag{7}$$

Once the product has been developed, production of manufacturing good requires the composite labor factor *L*, with marginal cost $c_{id}$ in *i*. Letting $d_{ij}$ represent the consumption in *i* of manufacturing good produced in *j*, a symmetric CES aggregate for the manufactures is given by:

$$D_i = \left( N_i d_{ii}^{\frac{\sigma_d - 1}{\sigma_d}} + N_j d_{ij}^{\frac{\sigma_d - 1}{\sigma_d}} \right)^{\frac{\sigma_d}{\sigma_d - 1}}, \tag{8}$$

where $\sigma_d \geq 1$ is the elasticity of substitution between manufacturing varieties. Under these assumptions, the manufacturing firms will generate mark-up profits in equilibrium, which accrue to the owners of the specific factor *S*.

Finally, both manufacturing and commodity goods can be traded according to the trade costs given by (4).

*Import Demand Equations*

In commodity markets, perfect competition implies that firms always price at marginal cost. The domestic price equals the marginal cost of production, while the import price is higher because of trade costs. Accordingly, the price of home and foreign commodities faced by a consumer in *i* is:

$$p_{iih} = c_{ih} \qquad \text{for the home commodity, and}$$
$$p_{ijh} = c_{jh}\left(1+\tau_{ijh}\right) \qquad \text{for the foreign commodity.}$$

Consumer in country *i* spends $(1-\beta)$ share of her total income, $Y$, on homogeneous good. Solving the consumer's maximization problem yields a commodity demand function; the import demand for commodity produced in *j* is:

$$h_{ij} = p_{ijh}^{-\sigma_h} e_{ih}^{(\sigma_h-1)}(1-\beta)Y ,$$

where $e_{ih} = \left(\sum_{j=1,2} p_{ijh}^{1-\sigma_h}\right)^{\frac{1}{1-\sigma_h}}$ is the ideal commodity price index in country *i.* The total value of commodity imports into country *i* from country *j* can be written as:

$$M_{ijh} = c_{jh}^{1-\sigma_h}\left(1+\tau_{ijh}\right)^{1-\sigma_h} e_{ih}^{\sigma_h-1}(1-\beta)Y_i . \qquad (9)$$

In manufacturing, each firm produces a single variety, and, as a result, faces a downward sloping (constant elasticity) demand. Firms maximize profit by pricing the product at a constant markup over the marginal cost. Under these conditions, the consumer price in country *i* is:

$$p_{iid} = \frac{\sigma_d}{\sigma_d - 1} c_{id} \qquad \text{for the domestic manufacturing good, and}$$
$$p_{ijd} = \frac{\sigma_d}{\sigma_d - 1} c_{jd}\left(1+\tau_{ijd}\right) \qquad \text{for the imported manufacturing good.}$$

Solving consumer problem (like it was done for the commodities) for the value of country *i*'s imports in each of $N_j$ manufacturing varieties produced in country *j,* the value of total manufacturing imports from *j* to *i* is given by:

$$M_{ijd} = N_j c_{jd}^{1-\sigma_d}\left(1+\tau_{ijd}\right)^{1-\sigma_d} e_{id}^{\sigma_d-1}\beta Y_i . \qquad (10)$$

*Behind-the-border barriers*

Unlike border barriers, behind-the-border barriers of trade facilitation impose costs and constraints on economic activity in a nondiscriminatory manner, regardless of the destination of the product. For example, high business registration costs or poor domestic infrastructure increase firms' production costs, which translates into higher domestic and export prices. To model the effect of behind-the-border barriers, I assume that improvements in behind-the-border barriers increase country's factor productivity. This can be achieved by introducing a country-specific efficiency parameter $a$ (with higher values denoting better behind-the-border trade facilitation). In commodities, where there are no fixed costs and production involves factor *L* only, an increase in productivity lowers marginal costs, while in manufacturing, where production requires two factors—*S* to set up the production process and *L* to produce good—improvements in behind-the-border trade facilitation would reduce both the fixed costs (of setting up a business) and the marginal cost of production. Thus, in the commodity sector the marginal cost takes $\frac{c_{jh}}{a_j}$ form. Similarly, in manufacturing, the marginal cost becomes $\frac{c_{jd}}{a_j}$, but a key difference with the commodities is that now $\frac{F}{a_j}$ units of factor *S* are needed to satisfy the fixed cost requirement to set up production of a single variety.

*Export equations*

With the perfect competition in the commodity sector and monopolistic competition with constant mark-ups in manufacturing, lower marginal costs reduce prices in both product markets. In manufacturing, improvements in behind-the-border barriers also enhance the productivity of factor *S,* which allows the country to produce more manufacturing varieties. Expressions for *i*'s imports from country *j* (presented here as exports of *j* to *i*, for convenience) take the following form for homogeneous and differentiated products respectively:

$$E_{ijh} = \left(\frac{c_{jh}}{a_j}\right)^{1-\sigma_h} \left(1+\tau_{ijh}\right)^{1-\sigma_h} e_{ih}^{\sigma_h-1}\left(1-\beta\right)Y_i \qquad (11a)$$

$$E_{ijd} = \left(N_j a_j\right)\left(\frac{c_{jd}}{a_j}\right)^{1-\sigma_d} \left(1+\tau_{ijd}\right)^{1-\sigma_d} e_{id}^{\sigma_d-1}\beta Y_i . \qquad (11b)$$

Abstracting for a moment from differences in the elasticities of substitution, $\sigma_h$ and $\sigma_d$, it follows from 3, 4, and 11 that exports of differentiated products are more sensitive to changes in the number of required signatures for exporting, $\left|\partial E_{ijd}/\partial s_j\right| > \left|\partial E_{ijh}/\partial s_j\right|$.

Equations 11a and 11b also show that improvements in the behind-the-border elements of trade facilitation, $a_j$, will have more pronounced impact on exports in differentiated products,

$\partial E_{ijd} / \partial a_j > E_{ijh} / \partial a_j$ . Taking into account that differentiated products are typically more easily substitutable than homogeneous goods, i.e. $\sigma_d > \sigma_h$, reinforces these results.

## III. ESTIMATION APPROACH

The model developed in the previous section shows that the export signature requirement and business registration procedures reduce country's exports. Moreover, exports of differentiated products are more strongly affected by changes in trade facilitation than exports of homogeneous goods. For empirical estimation, I use a standard gravity equation that has become one of the most successful models in economics, explaining consistently a large share of variations in the volume of international trade. The sample is limited to 2005 as the trading across border variables of the Doing Business Dataset are available only for that year. This constraint, unfortunately, does not allow me to exploit potential time variations in data.[5]

I start the empirical analysis with regressions on aggregate exports. The empirical equation takes the following form:

$$LnE_{ij} = \alpha\, sign_j + \beta\, start_j + \gamma_1\, lnY_j + \gamma_2\, lnYpc_j + \\ + \gamma_3\, tariff_{ij} + \gamma_4\, remote_j + Z_{ij}\Gamma + D'\zeta + \varepsilon_{ij}, \qquad (12)$$

where $E_{ij}$ denotes the volume of exports shipped to country $i$ from country $j$, $Y_j$ and $Ypc_j$ are the exporter's GDP and GDP per capita. $Z_{ij}$ contains a set of standard bilateral gravity variables, including the great circle distance between countries, dummies to reflect whether or not they share common border, language, have colonial ties, and are landlocked. Variable $tariff_{ij}$ is a weighted-average of applied tariffs imposed by importer $i$ on goods coming from country $j$. In addition to controlling for additional variations in the volume of trade induced by the differences in bilateral tariff rates, the inclusion of tariff rates will allow me to calculate the tariff-equivalent of changes in the trade facilitation in terms of their effect on exports. Finally, $D$ is a vector of importer fixed effects, which is meant to capture the importer's "remoteness" term in Wei (1996) or the importer's "multilateral resistance" term in Anderson and van Wincoop (2003).

The variables of interest, $sign_j$ and $start_j$ are proxies for the exporter's border and behind-the-border trade facilitation. The first is the number of signatures required before a shipment is allowed to leave the exporter's port, while the second is a number of procedures necessary to register a business in the exporting country. Because $sign_j$ and $start_j$ are exporter specific, I am not able to include exporter fixed effects as that would preclude the identification of these

[5] Data for 2006 became available at the late drafting stage of the paper. A close look reveals that, for most countries, trade facilitation indicators remained unchanged, limiting variation gains from forming panel data by including the 2006 data. Furthermore, it stands to reason that some time needs to pass before changes in indicators could affect exports.

variables. Given this limitation, instead of exporter dummies, I use a measure of the exporter's remoteness as defined by Head (2003):

$$remote_j = \frac{1}{\sum_{k \in I} Y_k / d_{jk}},$$

where $I$ is a set of all importers, $Y_k$ is a GDP of $k$-$th$ importer, and $d_{jk}$ is a distance between $j$ and $k$. Controlling for the importer's and exporter's remoteness—using dummy variables for the former and a remoteness for the latter—allows me to capture the theoretical foundations of the gravity equation which state that two countries tend to trade more with each other the more remote they are from all their trading partners.

To capture the differential effect of trade facilitation on two categories of products: differentiated and homogeneous, I estimate equation (12) separately on the sample of differentiated and homogeneous exports. Higher coefficient estimates on $sign_j$ and $start_j$ when (12) is estimated using differentiated exports than using homogeneous exports would support the paper's hypothesis. I can also estimate (12) on the pooled data using a dummy variable to discriminate between the two categories of goods.

Equation (12) may suffer from endogeneity. In countries with significant contribution of exports to national income, it is likely that policy makers will recognize its importance and attempt to promote it. Moreover, exporters may use their influential role in the economy to lobby the government to improve trade facilitation. Such countries are more likely to have export-friendly regime, including having lower export signature burden. To overcome this reverse causality, I assume that while trade in all products may equally affect the number of signatures, the number of signatures affects export of differentiated products more than it affects exports of commodities. Differencing exports of the two product groups for each importer-exporter combination yields a ratio of exports of differentiated products relative to exports of homogeneous goods, $Ln\ (E_{ij,d}/E_{ij,h})$, where $d$ denotes differentiated and $h$ denotes homogeneous products. This reduces the bias generated by the reverse causality as the ratio of exports is less likely to affect variables on the right of (14) than the volume of total exports can in (12):

$$Ln\ (E_{ij,d}/E_{ij,h}) = \alpha\ sign_j + \beta\ start_j + \gamma_1 Y_j + \gamma_2 Ypc_j + \gamma_3\ tariff_{ij} + \gamma_4\ remote_j + Z_{ij}\,\Gamma + \varepsilon_{ij}. \quad (14)$$

Further, to reduce the omitted variables bias, I eliminate importer specific factors by picking an anchor country and first-differencing equation (14). The difference-in-difference equation becomes:

$$Ln\ (E_{ij,d}/E_{ij,h}) - Ln\ (E_{iB,d}/E_{iB,h}) = \alpha\ (sign_j - sign_B) + \beta\ (start_j - start_B) + \gamma_1\ (Y_j - Y_B) + \gamma_2\ (Ypc_j - Ypc_B) + \gamma_3\ (tariff_{ij} - tariff_{iB}) + \gamma_4\ (remote_j - remote_B) + (Z_{ij} - Z_{iB})\,\Gamma + \varepsilon_{ij}. \quad (15)$$

where $B$ denotes the anchor country, Belgium.

## IV. DATA

The data comes from several sources. Bilateral import data at 4-digit product level are from COMTRADE database of the UN/World Bank WTIS system. I use import data because it is likely to be more reliable than export data since government revenues depend on the accurate tracking of country's imports. The paper presents results based on the 2004 data; using the average for 2002-2004 does not change the results. Bilateral imports between any pair of countries is the sum of the bilateral imports across all 4-digit products. For regressions estimating the differential effect of trade barriers on exports of differentiated and homogeneous products, I use Rauch's goods classification. As mentioned earlier, Rauch (1999) categorized each 4-digit product into one of the following groups: commodity, price-referenced, and differentiated.[6] Products traded on organized exchange were treated as commodity goods, while products not sold on exchanges but whose benchmark prices were available from industry publications were classified as price-referenced. All other goods were deemed differentiated products. I treat both the commodity and price-referenced goods as one homogeneous category because it is the lack of a reference price that distinguishes them from differentiated products. I sum bilateral imports of each country pair by the two product categories: homogeneous and differentiated. Thus for each country pair in the dataset, there are two bilateral import flows. I also present regressions using import data at 4-digit product level (without summing into the two subgroups) where I use dummy variables to control for the products' classification.

Applied bilateral import tariff rates specific to a trading partner (who would face preferential tariffs if the trading countries belonged to the same free trade area) at the 6-digit product level are available from the TRAINS database of the WITS. Tariff rates at a more aggregated level—at overall trade and 4-digit product trade levels—are the weighted-averages of applied rates calculated using the 6-digit product bilateral imports. The use of an ad valorem equivalent for products facing a specific import tariff is among the key advantages of TRAINS.

I take the number of signatures required to complete an export transaction from the World Bank's Doing Business in 2005 dataset, which provides measures in ten areas of business regulations and their enforcement that are comparable across countries. The Doing Business reports, for example, a number of indicators on starting and closing a business, dealing with licenses, hiring and firing workers, enforcing contracts, paying taxes, and trading across borders.

To measure border-related barriers to export, I use Trading Across Borders indicators that document the degree of easiness to conduct international trade across countries. These are obtained from the extensive survey of trade facilitators at freight-forwarding companies in 146 countries conducted by the World Bank in 2005. The survey asks the respondents to

[6] Given ambiguities for certain products, Rauch developed two classification schemes: a "conservative" and a "liberal". The paper uses the "liberal" classification.

provide detailed information on documents, signatures, and time to complete each exporting procedure required for the cargo to sail from the exporter's port starting from the moment the exporter begins preparing documents required to complete the transaction. To ensure that results are comparable across countries and avoid potential idiosyncrasies among exporters, the survey assumes that the exporter, traded product, and cargo meet certain criteria. In particular, the exporter is a local business with at least 200 employees located in the most populous city and trades a good that is not hazardous, does not require refrigeration and any phytosanitary or environmental safety standards, and can be shipped in a dry-cargo, 20-foot, full container. Only three 4-digit products meet these requirements: textile yarn and fabrics (SITC 65), articles of apparel and clothing accessories (SITC 84), and coffee, tea cocoa, spice and manufactures thereof (SITC 07).[7] Thus, for each of the 146 countries, I have data on the number of signatures and documents as well as the time required to complete an export transaction; all three indicators are highly correlated. I use the number of signatures as a proxy for the country's export facilitation.

The indicators of behind-the-border business barriers, such as those measuring the burden of registering a business or obtaining a license as well as enforceability of contracts are similarly highly correlated. I approximate behind-the-border barriers by using the number of procedures required to start a business in the country. The 2004 GDP and GDP per capita come from the World Bank's World Development Indicators. Other standard time-invariant gravity regressors—geographic data and dummies for common border, same language, and colonial links—are taken from Andrew Rose's website (http://faculty.haas.berkeley.edu/arose/).

Tables 1–4 present summary statistics for 140 exporters for which complete data on trade facilitation and commodity-level bilateral exports are available. The countries are split into four broad groupings according to their per capita income using the World Bank's country classification.[8] It takes on average four procedures to complete an export transaction in high income country, while a typical exporter located in low income country has to complete 18 procedures. Similarly, it takes only 14 and 23 days respectively for a shipment leaving the production site to sail from the port in high income and upper middle income country compared to 49 days spent in low income country. The last two columns in the tables show that countries with higher income (and better trade facilitation indicators) tend to have more diversified exports structure with higher share of differentiated products than low income countries.

[7] Check Djankov et al.(2006) for a more detailed description of the survey's data and methodology.

[8] Based on the 2005 GNI (Atlas method) per capita, the groups are: low-income, $875 or less; lower middle income, $876-3,465; upper middle income, $3,466-$10,725; and high income, $10,726 or more.

## V. RESULTS

*Aggregate exports*

I now turn attention to regression results based on equation (12) using aggregate bilateral trade data. They are shown in Table 5, which reports regressions for three alternative measures of aggregate exports—the dependent variable in all specifications—as robustness checks (columns 1–3). The first measure of aggregate exports includes all products reported in COMTRADE. The second excludes exports of goods exporting which may require passing particularly stringent phytosanitary or environmental safety standards, such as unprocessed food or animal products, medicaments, weapons and explosives. In addition, it excludes exports of petroleum and natural gas. I exclude these two products to account for the special export regime frequently afforded to these—regarded in many countries as strategic—sectors. In addition, their exclusion should improve results of regressions based on exports grouped according to Rauch's classification since both oil and gas are homogenous products amounting to a major part of exports in a number of countries. The third specification covers only those products that met all requirements of the Trading Across Borders questionnaire as discussed in the data section. The list includes SITC 07 (coffee, tea, spices), SITC 65 (textile yarns, fabrics), and SITC 84 (articles of apparel and clothing) goods. This alternative measure would address concerns as to whether trading across the border indicators obtained from the survey based on a narrow set of goods may be applicable to a broader set of traded products.

The point estimate for $\alpha$, a coefficient for the number of signatures, in the first column is -0.047 and highly significant, while the coefficient for business registration is -0.033, but statistically not different from zero. The estimate implies that one additional signature required for exporting reduces country's exports by about 4½ percent. The importer's tariff is statistically significant too, its impact on trade—increasing average tariff by 1 percentage point is associated with about 0.8 percent reduction in exports—is consistent with the recent findings of Wei and Zhang (2006). Other coefficient are intuitive and statistically significant, with signs and magnitude broadly in line with the existing literature. Finally, the estimate for remoteness variable is positive, as expected, meaning that more remote countries tend to trade more with a given trading partner. As discussed in the section on estimation, all regressions include importer dummies; standard errors are clustered by exporters.

Running regressions on exports that exclude oil/gas products and goods typically subject to strict clearance procedures does not change the results, except for the business registration variable, which become significant at 6 percent significance (column 2). One extra export signature is associated with 6 percent lower exports, while each additional business registration procedure would cost 5 percent of exports. The third column shows even a stronger impact of signatures on country's exports which is expected given that the dependent variable is limited to only the three products covered by the World Bank's survey.

The results for the business registration variable in the first three specifications point to a mixed picture. The variable is highly correlated with a number of country characteristics that form its general business environment. Omission of such characteristics may cause a bias in the estimate of the business registration variable. I address this problem by adding a broad

measure of exporter's governance in the next three regressions (columns 4–6). The measure is an average of regulatory quality, rule of law, and control of corruption indicators for 2004 taken from the Aggregate Governance Indicators database of the World Bank. As expected, the exporter's governance indicator has statistically significant positive impact on exports. Interestingly, its inclusion in the regression renders the business registration insignificant in all three specifications, although the estimate remains negative. Nevertheless, the coefficient for the number of signatures remains significant with only slight changes in its size, -0.042 and -0.054 for the first two alternative export specifications (columns 4 and 5). Treating the latter as the central result of regressions on aggregate exports, I calculate a tariff equivalent of an export signature. Since one percentage point increase in the importer's tariff reduces exports by 0.8 percent, an extra signature (which is associated with 4.2 percent lower exports) would have the same negative effect on exports as increasing importer's tariff by about 5 percentage points.

*Homogeneous vs. Differentiated exports*

I next move to testing the main hypothesis of the paper which posits that trade facilitation has a more pronounced effect on exports of differentiated products compared to those of homogeneous goods. Exports between any pair of countries are aggregated into two product types: homogeneous and differentiated. I start with a simple estimation based on the pooled data (Table 6). Coefficients on variables *exporter signature* and *exporter registration* capture their impact on exports of homogeneous products, while coefficients for the interaction term of these variables with a differentiated exports dummy reflect the additional effect on exports of differentiated products. Results in column 1 imply that the number of signatures do not affect exports of homogeneous products (the coefficient -0.016 is statistically not different from 0), but have a strong and large impact on exports of differentiated products—each signature reduces exports of differentiated products by 8.4 percent.[9] Similarly, additional business registration procedure appears to be associated with about 10 percent lower export of differentiated products, but has no impact on homogeneous goods' exports.[10] The estimates remain broadly consistent across the alternative measures of exports (columns 2 and 3) as well as specifications that include exporter's governance (columns 4–6).

While the pooled regressions reported in Table 6 benefit from larger sample size, their specification restricts coefficients of all independent variables except for the two trade facilitation variables to be identical across the two categories of products. I relax this restriction by running separate regressions on exports of homogeneous and differentiated products (table 7). The results support estimations based on the pooled data. Exports of differentiated products are considerably more sensitive to the number of signatures than exports of homogeneous products with or without exporter's governance variable in the regression.

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[9] (-0.016)+(-0.068)=-0.084 (where -0.016 captures the impact of signature variable on exports of homogeneous goods and -0.068 captures its additional impact on exports of differentiated goods).

[10] 0.023+(-0.121)=-0.098.

*Product level regressions*

Instead of aggregating exports into the two product categories, I run regressions on individual 4-digit product exports (table 8), using a dummy variable to control whether the product is homogeneous or differentiated. Along with the large sample gains, using individual product exports allows to control for the importer-product specific tariff rates. I also include a set of importer-product pair fixed dummies, which are more general than importer and product fixed effects. Unlike in the regressions using aggregate exports, the export signature has a significant effect both on homogeneous and differentiated products' exports, but the impact remains stronger in differentiated products. One extra signature reduces exports of homogeneous and differentiated products by 1.3 and 6.5 percent respectively (column 1). These results would probably produce a more accurate tariff-equivalent estimate of the export signature because the detailed specification account more fully for the product-importer specific import tariff rates. Controlling for the exporter's governance (column 4), an extra signature would reduce exports of homogeneous products equally as a 1.3 percentage increase in the import tariff would. In terms of impact on exports of differentiated products, each additional signature is equivalent to 7.1 percentage point increase in the import tariff.

*Difference-in-difference regressions*

Finally, I present regression using the difference-in-difference specification (equation 15). It estimates only for the differential impact of trade facilitation (and other variables) across the two product types. The main advantage of this approach, as discussed earlier, is the lower likelihood of endogeneity stemming from the reverse causality between the trade volume and trade facilitation. All alternative specifications in Table 9 provide a strong support for the paper's hypothesis and confirm regression results based on the levels, with coefficients that are consistent in magnitude and statistically significant. In particular, the specification controlling for the exporter's governance (column 4) implies that an additional export signature reduces exports of differentiated products by 4.6 percentage points more than exports of homogeneous goods. The differential impact of business registration is even greater at 6.8 percentage points. Interestingly, an increase in the trading partner's import tariff is associated with higher ratio of exports of differentiated products relative to exports of homogeneous goods.

*Oil exporters*

Regressions up to now point to a strong differential impact of export signatures on differentiated products as compared to homogeneous products. These results, however, may be driven by country-specific characteristics, not differences between the product types. This could happen if, for example, resource-rich countries—which export primarily homogeneous products—have higher number of signatures required for exporting than resource-poor countries. To check, I re-run key regressions over two different groups of exporters: a) countries where oil products make up less than 1 percent of total exports, and

b) countries where that share exceeds 12.87 percent.[11] The results can be found in Table 10. Regressions using aggregate trade (which do not allow for a differential impact of signatures across the two product types) show little difference between the two samples. While the robustness of coefficients is lower in the oil-exporter sample, their magnitude remains little changed compared to those from the nonoil-exporter sample. The regression allowing for a differential impact across the product types (columns 3–4) shows that signatures have a more pronounced adverse impact on differentiated products in both samples, but the magnitude of the differential is considerably stronger in the nonoil-exporter sample. This finding implies that while the differential impact of export signatures results from differences between the two types of goods, the country characteristics also play a role.

## VI. CONCLUDING REMARKS

I estimate how the number of signatures required for exporting and the number of business registration procedures—proxies for border and behind-the-border barriers respectively—affect country's exports. I argue that their impact depends on the product's characteristics, in particular its degree of differentiation. I develop a model where the export signatures and the business registration procedures impose additional transaction costs on exporting. The lack of reliable comparator for the price of differentiated products, which unlike homogeneous goods are not traded in organized exchanges, translates into higher fees assessed on exports of differentiated products.

I estimate gravity equations for bilateral exports between country-pairs exploiting Trading Across Borders survey of the World Bank and Rauch's division of products into homogeneous and differentiated categories. I find strong support of the model's conclusions. Estimations (controlling for the exporter's governance) show that each additional export signature is associated with 4.2 percent lower overall exports, but there is a little evidence of the strong impact of business registration. I show that each extra signature on exports is equivalent to raising importer's tariff by 5 percentage points. I perform sensitivity analysis by excluding petroleum and natural gas products from exports as well as limiting exports to the three products covered by the survey and find the results to be robust with even stronger impact of the signature variable.

Moving to the regressions that allow for a differential impact of trade facilitation on the two product types, I find a strong evidence that signatures have more adverse impact on exports of differentiated products compared to homogeneous goods' exports. In particular, regressions on the panel data using imports grouped into the two types of products suggest that the impact of signatures on aggregate trade stems mainly from their effect on exports of differentiated products. This is supported by regressions run separately on the two product types as well as regressions using the 4–digit product exports. I conclude that each signature lowers exports in differentiated products by 4–5 percent more than it does in homogeneous goods. Finally, difference-in-difference regressions, which are less prone to the potential

[11] The number corresponds to the mean of oil products' share in exports across all countries of the sample.

endogeneity of trade facilitation variables to trade, strongly support the conclusions drawn from the level regressions. In addition, they suggest that business registration variable too has a stronger impact in differentiated products, contrary to the mixed evidence from the regressions using levels.

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Table 1. Descriptive statistics: High-income countries.

| Country | GDP per capita | Number of Signatures | Time to export | Number of procedures to start business | Exports/GDP (in percent) | Petroleum& Gas/Exports (in percent) | Diff. products / Exports (in percent) | Herfindahl Index |
|---|---|---|---|---|---|---|---|---|
| Australia | 31690 | 2 | 12 | 2 | 13.6 | 8.4 | 17.4 | 0.04 |
| Austria | 35766 | 2 | 8 | 9 | 31.8 | 0.4 | 69.8 | 0.01 |
| Belgium | 33807 | 2 | 7 | 4 | 57.8 | 2.8 | 55.5 | 0.02 |
| Canada | 30586 | 2 | 12 | 2 | 31.5 | 13.5 | 54.7 | 0.03 |
| Denmark | 44673 | 2 | 5 | 3 | 26.5 | 6.5 | 59.7 | 0.01 |
| Finland | 35562 | 3 | 7 | 3 | 28.9 | 0.2 | 57.7 | 0.02 |
| France | 33896 | 3 | 22 | 7 | 19.3 | 0.5 | 64.8 | 0.02 |
| Germany | 33212 | 1 | 6 | 9 | 29.8 | 0.6 | 74.9 | 0.02 |
| Greece | 18560 | 6 | 29 | 15 | 6.8 | 1.0 | 50.1 | 0.01 |
| Hong Kong, China | 23684 | 4 | 13 | 5 | 37.9 | 0.0 | 73.0 | 0.02 |
| Iceland | 41893 | 3 | 15 | 5 | 23.8 | 0.3 | 26.1 | 0.09 |
| Ireland | 44644 | 5 | 14 | 4 | 70.9 | 0.0 | 61.0 | 0.08 |
| Israel | 17194 | 2 | 10 | 5 | 30.7 | 0.1 | 46.2 | 0.11 |
| Italy | 29143 | 5 | 28 | 9 | 18.3 | 0.3 | 75.1 | 0.01 |
| Japan | 36182 | 3 | 11 | 11 | 13.2 | 0.2 | 78.9 | 0.03 |
| Korea, Rep. | 14136 | 3 | 12 | 12 | 36.0 | 0.4 | 73.7 | 0.04 |
| Kuwait | 22654 | 10 | 30 | 13 | 35.2 | 90.8 | 2.4 | 0.64 |
| Netherlands | 35560 | 3 | 7 | 7 | 43.9 | 5.1 | 57.0 | 0.01 |
| New Zealand | 24364 | 2 | 8 | 2 | 20.0 | 1.0 | 30.1 | 0.02 |
| Norway | 54465 | 3 | 7 | 4 | 30.1 | 61.1 | 16.5 | 0.27 |
| Portugal | 15970 | 4 | 18 | 11 | 20.9 | 0.4 | 70.5 | 0.02 |
| Saudi Arabia | 10462 | 12 | 36 | 13 | 41.6 | 87.0 | 2.2 | 0.67 |
| Singapore | 25191 | 2 | 6 | 6 | 102.8 | 3.6 | 67.9 | 0.06 |
| Slovenia | 16115 | 7 | 20 | 9 | 42.0 | 0.0 | 72.3 | 0.02 |
| Spain | 24360 | 3 | 9 | 10 | 15.8 | 0.8 | 67.4 | 0.03 |
| Sweden | 38525 | 1 | 6 | 3 | 32.1 | 0.5 | 69.2 | 0.02 |
| Switzerland | 48385 | 5 | 21 | 6 | 35.3 | 0.1 | 64.4 | 0.03 |
| United Arab Emirates | 24121 | 3 | 18 | 12 | 48.9 | 62.4 | 14.2 | 0.31 |
| United Kingdom | 35485 | 5 | 16 | 6 | 14.5 | 6.7 | 62.4 | 0.02 |
| United States | 39883 | 5 | 9 | 5 | 6.9 | 1.3 | 64.6 | 0.01 |
| **Average** | **30672** | **4** | **14** | **7** | **32** | **12** | **53** | **0.09** |

Table 2. Descriptive statistics: Upper-middle-income countries.

| Country | GDP per capita | Number of Signatures | Time to export | Number of procedures to start business | Exports/GDP (in percent) | Petroleum& Gas/Exports (in percent) | Diff. products / Exports (in percent) | Herfindahl Index |
|---|---|---|---|---|---|---|---|---|
| Argentina | 3988 | 6 | 23 | 15 | 22.6 | 11.4 | 22.6 | 0.04 |
| Botswana | 5073 | 7 | 37 | 11 | 31.7 | 0.0 | 2.8 | 0.73 |
| Chile | 5836 | 7 | 23 | 9 | 34.7 | 0.3 | 11.3 | 0.12 |
| Costa Rica | 4349 | 8 | 36 | 11 | 62.3 | 0.0 | 66.1 | 0.20 |
| Croatia | 7724 | 10 | 35 | 12 | 15.3 | 1.6 | 63.3 | 0.02 |
| Czech Republic | 10475 | 3 | 20 | 10 | 52.1 | 0.4 | 73.6 | 0.02 |
| Estonia | 8331 | 2 | 12 | 6 | 52.6 | 2.8 | 64.8 | 0.02 |
| Hungary | 9962 | 4 | 23 | 6 | 48.9 | 0.3 | 79.8 | 0.04 |
| Latvia | 5868 | 6 | 18 | 7 | 28.4 | 1.2 | 58.0 | 0.03 |
| Lebanon | 6149 | 15 | 22 | 6 | 5.2 | 0.7 | 38.9 | 0.03 |
| Lithuania | 6480 | 5 | 6 | 8 | 28.1 | 4.1 | 59.5 | 0.01 |
| Malaysia | 4753 | 3 | 20 | 9 | 126.0 | 7.4 | 67.8 | 0.06 |
| Mauritius | 4889 | 4 | 16 | 6 | 30.7 | 0.0 | 65.0 | 0.10 |
| Mexico | 6518 | 4 | 18 | 9 | 27.9 | 11.1 | 72.5 | 0.03 |
| Oman | 9584 | 7 | 23 | 9 | 49.3 | 93.7 | 3.7 | 0.64 |
| Panama | 4325 | 3 | 30 | 7 | 22.6 | 3.5 | 61.3 | 0.07 |
| Poland | 6346 | 5 | 19 | 10 | 26.5 | 0.3 | 68.2 | 0.01 |
| Romania | 3374 | 6 | 27 | 5 | 31.2 | 0.2 | 68.4 | 0.02 |
| Russian Federation | 4042 | 8 | 29 | 8 | 27.9 | 45.9 | 11.8 | 0.16 |
| Slovak Republic | 7635 | 8 | 20 | 9 | 61.1 | 0.2 | 68.3 | 0.06 |
| South Africa | 4675 | 7 | 31 | 9 | 22.5 | 0.4 | 24.7 | 0.04 |
| Turkey | 4221 | 10 | 20 | 8 | 18.8 | 0.3 | 71.6 | 0.02 |
| Uruguay | 3842 | 10 | 22 | 11 | 24.0 | 0.0 | 34.0 | 0.05 |
| Venezuela | 4214 | 6 | 34 | 13 | 27.7 | 73.6 | 5.9 | 0.50 |
| **Average** | **5944** | **6** | **24** | **9** | **37** | **11** | **48** | **0.12** |

Table 3. Descriptive statistics: Lower-middle-income countries.

| Country | GDP per capita | Number of Signatures | Time to export | Number of procedures to start business | Exports/GDP (in percent) | Petroleum& Gas/Exports (in percent) | Diff. products / Exports (in percent) | Herfindahl Index |
|---|---|---|---|---|---|---|---|---|
| Albania | 2439 | 13 | 37 | 11 | 7.3 | 0.3 | 57.1 | 0.06 |
| Algeria | 2616 | 8 | 29 | 14 | 31.0 | 96.9 | 0.4 | 0.54 |
| Armenia | 1017 | 12 | 34 | 10 | 16.2 | 0.0 | 12.4 | 0.18 |
| Azerbaijan | 1026 | 40 | 69 | 14 | 23.3 | 82.1 | 4.0 | 0.66 |
| Belarus | 2330 | 9 | 33 | 16 | 41.3 | 1.3 | 79.5 | 0.40 |
| Bolivia | 974 | 15 | 43 | 15 | 25.2 | 42.9 | 8.5 | 0.16 |
| Bosnia and Herzegovina | 2183 | 15 | 32 | 12 | 22.9 | 0.1 | 55.6 | 0.04 |
| Brazil | 3284 | 8 | 39 | 17 | 16.5 | 2.5 | 37.1 | 0.02 |
| Bulgaria | 3109 | 5 | 26 | 11 | 37.3 | 0.1 | 49.5 | 0.01 |
| Cameroon | 897 | 11 | 39 | 12 | 21.5 | 48.8 | 16.2 | 0.27 |
| China | 1490 | 7 | 20 | 13 | 40.3 | 0.3 | 80.0 | 0.02 |
| Colombia | 2176 | 7 | 34 | 12 | 17.7 | 17.6 | 30.3 | 0.07 |
| Congo, Rep. | 1118 | 42 | 50 | 8 | 90.5 | 84.5 | 2.4 | 0.69 |
| Dominican Republic | 2130 | 3 | 17 | 10 | 30.5 | 0.0 | 66.1 | 0.04 |
| Ecuador | 2322 | 4 | 20 | 14 | 31.2 | 46.1 | 11.1 | 0.27 |
| Egypt, Arab Rep. | 1085 | 11 | 27 | 10 | 10.9 | 19.6 | 35.7 | 0.04 |
| El Salvador | 2340 | 10 | 43 | 12 | 19.5 | 0.2 | 77.6 | 0.07 |
| Fiji | 3125 | 5 | 22 | 8 | 24.2 | 0.1 | 42.8 | 0.08 |
| Georgia | 1151 | 35 | 54 | 8 | 18.5 | 19.0 | 14.5 | 0.09 |
| Guatemala | 2233 | 6 | 20 | 15 | 19.0 | 4.1 | 55.0 | 0.05 |
| Guyana | 1047 | 10 | 42 | 8 | 73.7 | 0.0 | 8.3 | 0.15 |
| Honduras | 1046 | 17 | 34 | 13 | 65.5 | 0.0 | 72.3 | 0.08 |
| Indonesia | 1184 | 3 | 25 | 12 | 31.1 | 18.6 | 36.7 | 0.03 |
| Iran, Islamic Rep. | 2439 | 30 | 45 | 8 | 20.8 | 87.8 | 3.5 | 0.74 |
| Jamaica | 3352 | 7 | 20 | 6 | 19.3 | 0.0 | 15.8 | 0.40 |
| Jordan | 2117 | 6 | 28 | 11 | 22.0 | 0.0 | 54.7 | 0.06 |
| Kazakhstan | 2717 | 15 | 93 | 7 | 40.9 | 54.1 | 3.9 | 0.26 |
| Kiribati | 633 | 5 | 31 | 6 | 20.0 | 0.0 | 63.0 | 0.28 |
| Macedonia, FYR | 2637 | 8 | 32 | 13 | 28.9 | 0.1 | 46.1 | 0.03 |
| Maldives | 2345 | 4 | 24 | 6 | 28.2 | 0.0 | 64.2 | 0.17 |
| Moldova | 615 | 12 | 33 | 10 | 53.9 | 0.1 | 32.0 | 0.07 |
| Morocco | 1678 | 13 | 31 | 5 | 22.3 | 0.0 | 59.9 | 0.03 |
| Namibia | 2843 | 7 | 32 | 10 | 24.6 | 0.0 | 30.3 | 0.14 |
| Nicaragua | 847 | 4 | 38 | 8 | 32.3 | 0.0 | 54.5 | 0.05 |
| Paraguay | 1220 | 7 | 34 | 17 | 25.7 | 0.0 | 14.3 | 0.15 |
| Peru | 2490 | 10 | 24 | 10 | 16.7 | 1.9 | 16.5 | 0.05 |
| Philippines | 1036 | 5 | 19 | 11 | 67.6 | 0.5 | 82.1 | 0.17 |
| Sri Lanka | 1033 | 10 | 25 | 8 | 29.1 | 0.0 | 71.2 | 0.03 |
| Syrian Arab Republic | 1293 | 19 | 49 | 12 | 18.8 | 65.2 | 12.6 | 0.43 |
| Thailand | 2539 | 10 | 23 | 8 | 62.5 | 1.4 | 65.0 | 0.02 |
| Tonga | 2084 | 4 | 11 | 4 | 13.4 | 0.0 | 25.7 | 0.20 |
| Tunisia | 2838 | 8 | 25 | 9 | 33.9 | 7.0 | 68.0 | 0.04 |
| Ukraine | 1366 | 9 | 34 | 15 | 44.4 | 2.2 | 20.9 | 0.03 |
| Vanuatu | 1526 | 6 | 7 | 8 | 66.9 | 0.0 | 85.0 | 0.38 |
| **Average** | **1863** | **11** | **33** | **11** | **32** | **16** | **40** | **0.18** |

Table 4. Descriptive statistics: Low-income countries.

| Country | GDP per capita | Number of Signatures | Time to export | Number of procedures to start business | Exports/GDP (in percent) | Petroleum& Gas/Exports (in percent) | Diff. products / Exports (in percent) | Herfindahl Index |
|---|---|---|---|---|---|---|---|---|
| Bangladesh | 406 | 15 | 35 | 8 | 17.1 | 0.0 | 92.6 | 0.10 |
| Benin | 498 | 10 | 36 | 8 | 7.6 | 0.3 | 10.4 | 0.36 |
| Bhutan | 751 | 12 | 39 | 11 | 12.2 | 0.0 | 15.4 | 0.10 |
| Burkina Faso | 376 | 19 | 71 | 12 | 6.9 | 0.0 | 9.1 | 0.46 |
| Burundi | 90 | 29 | 67 | 11 | 5.1 | 0.0 | 5.9 | 0.43 |
| Cambodia | 354 | 10 | 43 | 10 | 57.6 | 0.1 | 96.0 | 0.11 |
| Central African Republic | 328 | 38 | 116 | 10 | 10.2 | 0.0 | 7.7 | 0.33 |
| Chad | 447 | 32 | 87 | 19 | 30.6 | 89.2 | 1.6 | 0.80 |
| Cote d'Ivoire | 866 | 11 | 21 | 11 | 32.4 | 7.2 | 9.2 | 0.18 |
| Eritrea | 219 | 20 | 69 | 13 | 1.4 | 0.2 | 59.5 | 0.08 |
| Ethiopia(excludes Eritrea) | 114 | 33 | 46 | 7 | 6.2 | 0.6 | 25.5 | 0.23 |
| Ghana | 409 | 11 | 47 | 12 | 22.7 | 1.6 | 13.0 | 0.23 |
| Guinea | 421 | 11 | 43 | 13 | 26.2 | 7.3 | 3.1 | 0.43 |
| Haiti | 420 | 20 | 58 | 12 | 12.1 | 0.0 | 93.2 | 0.17 |
| India | 640 | 22 | 36 | 11 | 10.6 | 0.2 | 42.3 | 0.03 |
| Kenya | 481 | 15 | 45 | 13 | 14.4 | 0.2 | 43.6 | 0.06 |
| Lao PDR | 423 | 17 | 66 | 9 | 14.3 | 0.0 | 82.8 | 0.08 |
| Madagascar | 241 | 15 | 50 | 11 | 30.6 | 0.0 | 50.5 | 0.10 |
| Malawi | 149 | 12 | 41 | 10 | 26.5 | 0.0 | 12.8 | 0.27 |
| Mali | 371 | 33 | 67 | 13 | 6.8 | 0.2 | 6.1 | 0.80 |
| Mauritania | 515 | 13 | 42 | 11 | 51.1 | 0.0 | 17.3 | 0.29 |
| Mongolia | 641 | 21 | 66 | 8 | 53.2 | 0.8 | 40.4 | 0.18 |
| Mozambique | 313 | 12 | 41 | 14 | 24.7 | 0.1 | 2.3 | 0.53 |
| Nepal | 252 | 12 | 44 | 7 | 10.2 | 0.0 | 62.9 | 0.04 |
| Nigeria | 560 | 39 | 41 | 9 | 44.1 | 96.3 | 1.2 | 0.83 |
| Pakistan | 632 | 10 | 33 | 11 | 11.5 | 0.1 | 64.8 | 0.05 |
| Papua New Guinea | 677 | 5 | 30 | 8 | 67.2 | 19.0 | 2.6 | 0.16 |
| Rwanda | 208 | 27 | 63 | 9 | 18.9 | 78.0 | 1.3 | 0.54 |
| Sao Tome and Principe | 407 | 8 | 31 | 9 | 19.8 | 0.0 | 27.7 | 0.19 |
| Senegal | 683 | 8 | 6 | 9 | 8.7 | 0.8 | 13.7 | 0.10 |
| Sierra Leone | 202 | 8 | 36 | 9 | 19.8 | 0.0 | 24.4 | 0.35 |
| Sudan | 594 | 35 | 82 | 10 | 17.3 | 85.9 | 3.7 | 0.74 |
| Tanzania | 288 | 10 | 30 | 13 | 9.4 | 9.1 | 11.6 | 0.04 |
| Togo | 344 | 8 | 34 | 13 | 14.5 | 0.1 | 7.2 | 0.17 |
| Uganda | 245 | 18 | 58 | 17 | 7.0 | 0.0 | 15.2 | 0.14 |
| Vietnam | 550 | 12 | 35 | 11 | 61.6 | 19.4 | 57.5 | 0.07 |
| Zambia | 471 | 25 | 60 | 6 | 23.3 | 0.1 | 5.0 | 0.26 |
| Zimbabwe | 363 | 18 | 52 | 10 | 38.5 | 0.1 | 16.8 | 0.08 |
| **Average** | **420** | **18** | **49** | **11** | **22** | **11** | **28** | **0.27** |

Table 5. Regressions. Aggregate Bilateral Exports.

| *Dependent variable: Log Aggregate Bilateral Imports* | | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) /1 | (3) /2 | (1) | (2) /1 | (3) /2 |
| Exporter Signature | -0.047 | -0.061 | -0.091 | -0.042 | -0.054 | -0.08 |
| | (-3.55) | (-3.82) | (-6.5) | (-3.17) | (-3.44) | (-5.53) |
| Exporter Registration | -0.033 | -0.052 | -0.047 | -0.014 | -0.025 | -0.001 |
| | (-1.29) | (-1.87) | (-1.4) | (-0.55) | (-0.93) | (-0.04) |
| Exporter Governance | | | | 0.296 | 0.429 | 0.727 |
| | | | | (1.86) | (2.49) | (2.85) |
| Import tariff | -0.008 | -0.007 | 0.002 | -0.008 | -0.006 | 0.002 |
| | (-3.46) | (-3.46) | (0.84) | (-3.44) | (-3.42) | (0.91) |
| Log Exporter GDP | 1.264 | 1.318 | 1.195 | 1.27 | 1.329 | 1.209 |
| | (24.99) | (25.48) | (15.67) | (25.05) | (25.93) | (16.99) |
| Log Exporter GDP per capita | -0.044 | -0.191 | -0.846 | -0.179 | -0.388 | -1.184 |
| | (-0.47) | (-1.9) | (-6.35) | (-1.48) | (-3.02) | (-7.15) |
| Log Distance | -1.408 | -1.402 | -1.376 | -1.411 | -1.407 | -1.398 |
| | (-18.42) | (-18.6) | (-12.89) | (-18.62) | (-19.07) | (-13.49) |
| Border Dummy | 0.98 | 0.98 | 0.63 | 0.99 | 0.994 | 0.641 |
| | (5.6) | (5.67) | (2.87) | (5.57) | (5.66) | (2.95) |
| Common Language | 0.683 | 0.67 | 0.568 | 0.675 | 0.661 | 0.534 |
| | (5.82) | (5.29) | (2.7) | (5.74) | (5.21) | (2.59) |
| Colony | 0.478 | 0.496 | 0.817 | 0.394 | 0.376 | 0.734 |
| | (2.4) | (2.43) | (2.82) | (1.85) | (1.71) | (2.33) |
| Landlocked | 0.155 | 0.393 | -0.313 | 0.097 | 0.312 | -0.444 |
| | (0.86) | (2.06) | (-1.26) | (0.53) | (1.59) | (-1.87) |
| Exporter remoteness | 8.833 | 5.554 | 0.079 | 8.566 | 5.112 | -0.395 |
| | (3.67) | (2.19) | (0.03) | (3.44) | (1.93) | (-0.12) |
| No of Obs. | 7501 | 7453 | 5792 | 7482 | 7434 | 5787 |
| $R^2$ | 0.729 | 0.73 | 0.58 | 0.73 | 0.73 | 0.59 |

Notes:

t-statistics are reported in parenthesis. Robust standard errors are clustered by exporters.

All regressions include importer fixed effects.

1/ Exports exclude products in SITC 00, 01, 02, 05, 08, 33, 34, 35, 54, 57, 94, 95, 96, 97 categories. The list covers unprocessed food or animal products, medicaments, petroleum, natural gas, electricity, explosives, live animals, weapons, and gold.

2/ Exports include SITC 07 (coffee, tea, spices), 65 (textile yarns, fabrics), 84 (articles of apparel and clothing).

Table 6. Regressions. Differentiated vs. Homogeneous Products: Pooled Data

*Dependent variable: Log Bilateral Imports by Product Group*

| | (1) | (2) /1 | (3) /2 | (1) | (2) /1 | (3) /2 |
|---|---|---|---|---|---|---|
| Exporter Signature | -0.016 | -0.030 | -0.051 | -0.010 | -0.022 | -0.041 |
| | (-1.29) | (-1.64) | (-2.95) | (-0.76) | (-1.24) | (-2.49) |
| *Differentiated | -0.068 | -0.059 | -0.056 | -0.068 | -0.059 | -0.055 |
| | (-6.92) | (-5.06) | (-3.43) | (-6.88) | (-5.05) | (-3.41) |
| Exporter Registration | 0.023 | 0.017 | 0.051 | 0.048 | 0.047 | 0.095 |
| | (0.88) | (0.59) | (1.31) | (1.76) | (1.66) | (2.46) |
| *Differentiated | -0.121 | -0.126 | -0.125 | -0.121 | -0.125 | -0.123 |
| | (-4.08) | (-4.64) | (-4.23) | (-4.05) | (-4.61) | (-4.2) |
| Exporter Governance | | | | 0.388 | 0.477 | 0.713 |
| | | | | (2.49) | (2.88) | (2.98) |
| Import tariff | -0.005 | -0.005 | 0.001 | -0.005 | -0.005 | 0.001 |
| | (-3.67) | (-3.89) | (0.27) | (-3.59) | (-3.85) | (0.32) |
| Log Exporter GDP | 1.236 | 1.281 | 1.114 | 1.247 | 1.295 | 1.127 |
| | (24.75) | (25.26) | (14.49) | (25.56) | (26.4) | (15.93) |
| Log Exporter GDP per capita | -0.065 | -0.174 | -0.727 | -0.245 | -0.396 | -1.064 |
| | (-0.69) | (-1.78) | (-5.47) | (-2.02) | (-3.15) | (-6.74) |
| Log Distance | -1.49 | -1.482 | -1.328 | -1.496 | -1.49 | -1.347 |
| | (-21.9) | (-21.24) | (-13.35) | (-22.1) | (-21.64) | (-14.02) |
| Border Dummy | 0.909 | 0.9 | 0.523 | 0.916 | 0.908 | 0.54 |
| | (5.49) | (5.45) | (2.69) | (5.39) | (5.36) | (2.81) |
| Common Language | 0.578 | 0.584 | 0.451 | 0.571 | 0.576 | 0.422 |
| | (4.93) | (4.62) | (2.17) | (4.9) | (4.59) | (2.07) |
| Colony | 0.565 | 0.597 | 0.93 | 0.464 | 0.471 | 0.843 |
| | (3.02) | (3.09) | (3.46) | (2.28) | (2.25) | (2.92) |
| Landlocked | 0.128 | 0.333 | -0.179 | 0.057 | 0.247 | -0.302 |
| | (0.74) | (1.87) | (-0.76) | (0.33) | (1.35) | (-1.34) |
| Exporter remoteness | 8.285 | 5.996 | 1.418 | 7.895 | 5.505 | 0.895 |
| | (3.56) | (2.46) | (0.46) | (3.29) | (2.16) | (0.29) |
| No of Obs. | 13970 | 13701 | 9749 | 13943 | 13676 | 9743 |
| $R^2$ | 0.69 | 0.68 | 0.51 | 0.69 | 0.69 | 0.52 |

Notes:

t-statistics are reported in parenthesis. Robust standard errors are clustered by exporters.

All regressions include importer fixed effects.

1/ Exports exclude products in SITC 00, 01, 02, 05, 08, 33, 34, 35, 54, 57, 94, 95, 96, 97 categories. The list covers unprocessed food or animal products, medicaments, petroleum, natural gas, electricity, explosives, live animals, weapons, and gold.

2/ Exports include SITC 07 (coffee, tea, spices), 65 (textile yarns, fabrics), 84 (articles of apparel and clothing).

Table 7. Regressions. Differentiated vs. Homogeneous Products:
Individual Regressions.

*Dependent variable: Log Bilateral Imports by Product Group*

| | All products | | | |
|---|---|---|---|---|
| | HOM | DIF | HOM | DIF |
| Exporter Signature | -0.027 | -0.075 | -0.024 | -0.064 |
| | (-2.35) | (-4.46) | (-2.09) | (-3.78) |
| Exporter Registration | 0.011 | -0.088 | 0.021 | -0.048 |
| | (0.44) | (-2.68) | (0.77) | (-1.48) |
| Exporter Governance | | | 0.163 | 0.609 |
| | | | (0.94) | (2.96) |
| Import tariff | -0.008 | -0.001 | -0.008 | -0.001 |
| | (-3.57) | (-0.72) | (-3.55) | (-0.56) |
| Log Exporter GDP | 1.181 | 1.29 | 1.182 | 1.311 |
| | (26.04) | (18.36) | (26.06) | (19.47) |
| Log Exporter GDP per capita | -0.013 | -0.111 | -0.086 | -0.396 |
| | (-0.14) | (-0.91) | (-0.71) | (-2.5) |
| Log Distance | -1.509 | -1.480 | -1.513 | -1.488 |
| | (-21.13) | (-17.74) | (-20.74) | (-18.36) |
| Border Dummy | 0.839 | 0.974 | 0.842 | 0.987 |
| | (4.36) | (5.34) | (4.32) | (5.36) |
| Common Language | 0.541 | 0.619 | 0.531 | 0.619 |
| | (4.7) | (4.29) | (4.61) | (4.38) |
| Colony | 0.656 | 0.482 | 0.611 | 0.322 |
| | (3.71) | (2.02) | (3.3) | (1.22) |
| Landlocked | 0.112 | 0.134 | 0.079 | 0.028 |
| | (0.57) | (0.62) | (0.39) | (0.13) |
| Exporter remoteness | 15.277 | 1.674 | 15.23 | 0.888 |
| | (6.79) | (0.59) | (6.63) | (0.3) |
| No of Obs. | 6812 | 7158 | 6801 | 7142 |
| $R^2$ | 0.65 | 0.74 | 0.65 | 0.74 |

Notes:
t-statistics are reported in paranthesis. Robust standard errors are clustered by exporters.
All regressions include importer fixed effects.

Table 8. Regressions. Differentiated vs. Homogeneous Products:
Commodity-Level Regressions Using Pooled Data.

*Dependent variable: Log 4-digit Product-Level Bilateral Imports*

| | (1) | (2) /1 | (3) /2 | (1) | (2) /1 | (3) /2 |
|---|---|---|---|---|---|---|
| Exporter Signature | -0.013 | -0.017 | -0.021 | -0.012 | -0.016 | -0.021 |
| | (-11.68) | (-13.59) | (-6.65) | (-10.01) | (-12.35) | (-6.6) |
| *Differentiated | -0.052 | -0.049 | -0.033 | -0.052 | -0.049 | -0.033 |
| | (-42.04) | (-36.92) | (-10) | (-42.06) | (-36.74) | (-9.98) |
| Exporter Registration | 0.002 | 0.006 | 0.04 | 0.021 | 0.026 | 0.051 |
| | (1.48) | (3.73) | (7.4) | (13) | (14.54) | (9.38) |
| *Differentiated | -0.015 | -0.019 | -0.056 | -0.014 | -0.019 | -0.055 |
| | (-8.51) | (-10.54) | (-9.95) | (-8.13) | (-10.27) | (-9.88) |
| Exporter Governance | | | | 0.324 | 0.331 | 0.201 |
| | | | | (41.86) | (41.26) | (9.91) |
| Import tariff | -0.01 | -0.011 | -0.014 | -0.009 | -0.01 | -0.014 |
| | (-12.41) | (-16.4) | (-10.77) | (-12.16) | (-16.09) | (-10.62) |
| Log Exporter GDP | 0.734 | 0.762 | 0.676 | 0.741 | 0.77 | 0.679 |
| | (361.56) | (363.09) | (133.44) | (364.33) | (366) | (134.05) |
| Log Exporter GDP per capita | -0.237 | -0.264 | -0.545 | -0.407 | -0.439 | -0.65 |
| | (-60.31) | (-64.93) | (-57.34) | (-71.74) | (-74.45) | (-44.76) |
| Log Distance | -0.884 | -0.907 | -0.815 | -0.888 | -0.912 | -0.82 |
| | (-211.07) | (-211.28) | (-77.05) | (-212.5) | (-212.78) | (-77.65) |
| Border Dummy | 0.46 | 0.452 | 0.329 | 0.479 | 0.471 | 0.339 |
| | (38.67) | (36.57) | (10.59) | (40.27) | (38.09) | (10.94) |
| Common Language | 0.22 | 0.227 | 0.183 | 0.212 | 0.22 | 0.175 |
| | (29.42) | (29.43) | (9.26) | (28.47) | (28.54) | (8.87) |
| Colony | 0.322 | 0.328 | 0.497 | 0.29 | 0.295 | 0.48 |
| | (24.16) | (23.88) | (14.48) | (21.67) | (21.44) | (13.92) |
| Landlocked | 0.048 | 0.048 | -0.325 | 0.006 | 0.004 | -0.35 |
| | (5.42) | (5.2) | (-14.57) | (0.63) | (0.47) | (-15.64) |
| Exporter remoteness | 0.342 | -0.532 | -1.968 | 0.141 | -0.736 | -2.085 |
| | (3.94) | (-5.93) | (-8.33) | (1.62) | (-8.18) | (-8.79) |
| No of Obs. | 8.09E+05 | 7.48E+05 | 1.09E+05 | 8.09E+05 | 7.48E+05 | 1.09E+05 |
| $R^2$ | 0.43 | 0.44 | 0.41 | 0.43 | 0.44 | 0.42 |

Notes:

t-statistics are reported in paranthesis. Robust standard errors are clustered by exporters.

All regressions include importer*product pair fixed effects.

1/ Exports exclude products in SITC 00, 01, 02, 05, 08, 33, 34, 35, 54, 57, 94, 95, 96, 97 categories. The list covers unprocessed food or animal products, medicaments, petroleum, natural gas, electricity, explosives, live animals, weapons, and gold.

2/ Exports include SITC 07 (coffee, tea, spices), 65 (textile yarns, fabrics), 84 (articles of apparel and clothing).

Table 9. Regressions. Differentiated vs. Homogeneous Products:
Difference-in-Difference Regressions.

*Dependent variable: Log Ratio of Differentiated Imports to Homogenous Imports.*

| | (1) | (2) /1 | (3) /2 | (1) | (2) /1 | (3) /2 |
|---|---|---|---|---|---|---|
| Exporter Signature | -0.054 | -0.035 | -0.032 | -0.046 | -0.029 | -0.035 |
| | (-4.85) | (-2.64) | (-1.49) | (-4.06) | (-2.13) | (-1.65) |
| Exporter Registration | -0.097 | -0.088 | -0.094 | -0.068 | -0.068 | -0.108 |
| | (-3.34) | (-2.98) | (-2.53) | (-2.16) | (-1.96) | (-2.63) |
| Exporter Governance | | | | 0.426 | 0.3 | -0.222 |
| | | | | (1.97) | (1.26) | (-0.85) |
| Import tariff | 0.009 | 0.009 | 0.015 | 0.009 | 0.009 | 0.015 |
| | (2.76) | (2.8) | (2.05) | (2.76) | (2.8) | (2.05) |
| Log Exporter GDP | 0.1 | 0.076 | 0.066 | 0.118 | 0.094 | 0.062 |
| | (1.57) | (1.16) | (0.99) | (1.92) | (1.47) | (0.91) |
| Log Exporter GDP per capita | -0.14 | -0.024 | 0.064 | -0.345 | -0.172 | 0.171 |
| | (-1.25) | (-0.2) | (0.45) | (-2.31) | (-1.09) | (0.9) |
| Log Distance | -0.14 | -0.106 | -0.384 | -0.14 | -0.105 | -0.382 |
| | (-2.01) | (-1.58) | (-3.94) | (-2.05) | (-1.58) | (-3.91) |
| Border Dummy | -0.424 | -0.402 | -0.161 | -0.407 | -0.386 | -0.169 |
| | (-2.5) | (-2.48) | (-0.85) | (-2.51) | (-2.46) | (-0.89) |
| Common Language | 0.005 | 0.019 | -0.06 | 0.013 | 0.025 | -0.058 |
| | (0.07) | (0.23) | (-0.51) | (0.17) | (0.31) | (-0.49) |
| Colony | -0.187 | -0.289 | -0.564 | -0.281 | -0.36 | -0.528 |
| | (-0.96) | (-1.5) | (-2.05) | (-1.5) | (-1.93) | (-1.9) |
| Landlocked | 0.05 | -0.199 | 0.164 | -0.015 | -0.238 | 0.2 |
| | (0.21) | (-0.78) | (0.57) | (-0.06) | (-0.92) | (0.7) |
| Exporter remoteness | -14.145 | -11.473 | -7.744 | -14.789 | -12.072 | -7.522 |
| | (-6.78) | (-4.76) | (-3) | (-6.83) | (-4.99) | (-2.85) |
| No of Obs. | 6417 | 6204 | 3717 | 6408 | 6197 | 3716 |
| $R^2$ | 0.14 | 0.12 | 0.10 | 0.15 | 0.13 | 0.10 |

Notes:

t-statistics are reported in paranthesis. Robust standard errors are clustered by exporters.

The regressand is a difference in difference variable. The first difference is taken between exports in differentiated products and homogeneous products for the same exporter (j)-importer (i) combination. The second difference is taken between the first difference for (j-i) and the first difference for Belgium-(i) combination, i.e. Ln (Eij,d /Eij,h) - Ln (EiB,d /EiB,h).

1/ Exports exclude products in SITC 00, 01, 02, 05, 08, 33, 34, 35, 54, 57, 94, 95, 96, 97 categories. The list covers unprocessed food or animal products, medicaments, petroleum, natural gas, electricity, explosives, live animals, weapons, and gold.

2/ Exports include SITC 07 (coffee, tea, spices), 65 (textile yarns, fabrics), 84 (articles of apparel and clothing).

Table 10. Regressions. Oil and Nonoil Exporters.

| | Aggregate Imports | | Imports by Product Category | |
|---|---|---|---|---|
| | Oil exporters | Nonoilexporters | Oil exporters | Nonoilexporters |
| Exporter Signature | -0.036 | -0.040 | -0.026 | 0.011 |
| | (-1.78) | (-2.61) | (-1.3) | (0.7) |
| *Differentiated | | | -0.031 | -0.091 |
| | | | (-3.13) | (-5.02) |
| Exporter Registration | -0.07 | -0.019 | -0.016 | 0.014 |
| | (-1.32) | (-0.57) | (-0.3) | (0.39) |
| *Differentiated | | | -0.132 | -0.058 |
| | | | (-3.13) | (-1.35) |
| Exporter Governance | 1.95 | 0.316 | 0.456 | 0.328 |
| | (0.5) | (1.47) | (1.31) | (1.61) |
| Import tariff | -0.008 | -0.008 | -0.002 | -0.007 |
| | (-1.43) | (-3.11) | (-0.64) | (-4.19) |
| Log Exporter GDP | 1.287 | 1.295 | 1.207 | 1.273 |
| | (7.3) | (24.15) | (6.59) | (24.21) |
| Log Exporter GDP per capita | -0.229 | -0.176 | -0.41 | -0.168 |
| | (-0.73) | (-1.01) | (-1.49) | (-1.04) |
| Log Distance | -1.632 | -1.307 | -1.706 | -1.396 |
| | (-7.23) | (-16.16) | (-8.77) | (-18.94) |
| Border Dummy | 1.316 | 0.826 | 1.255 | 0.776 |
| | (3.36) | (3.76) | (3.06) | (3.78) |
| Common Language | 0.583 | 0.937 | 0.309 | 0.744 |
| | (2.28) | (6.38) | (1.24) | (6.09) |
| Colony | 2.388 | 0.511 | 0.895 | 0.562 |
| | (1.24) | (2.17) | (0.54) | (2.32) |
| Landlocked | -0.175 | 0.231 | -0.268 | 0.161 |
| | (-0.39) | (1.03) | (0.62) | (0.8) |
| Exporter remoteness | 20.001 | 8.141 | 20.507 | 8.311 |
| | (1.85) | (2.82) | (1.81) | (3.21) |
| No of Obs. | 1491 | 4327 | 2752 | 8004 |
| $R^2$ | 0.65 | 0.76 | 0.60 | 0.72 |

Notes:
t-statistics are reported in paranthesis. Robust standard errors are clustered by exporters.
All regressions include importer fixed effects.