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Trade Costs in Africa:

Barriers and Opportunities for Reform

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Abstract

This paper reviews data and research on trade costs for Sub-Saharan African countries. It focuses on: border-related costs, transport costs, costs related to behind-the border issues, and the costs of compliance with rules of origin specific to preferential trade agreements. Trade costs are, on average, higher for African countries than for other developing countries. Using gravity-model estimates, the authors compute ad-valorem equivalents of improvements in trade indicators for a sample of African countries. The evidence suggests that the gains for African exporters from improving the trade logistics half-way to the level in South Africa is more important than a substantive cut in tariff barriers. As an example, improving logistics in Ethiopia half-way to the level in South Africa would be roughly equivalent to a 7.5 percent cut in tariffs faced by Ethiopian exporters.

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Barriers and Opportunities for Reform[1]

Alberto Portugal-Perez and John S. Wilson

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1. Introduction: African Trade Today and Challenges in Perspective

World trade and investment flows have expanded over the last years, but in contrast the trade performance of Sub-Saharan African countries has been disappointing. Africa's share of world exports has dropped by nearly two thirds in three decades: from 2.9 percent in 1976 to 0.9 percent in 2006[2]. This implies that if Africa's share of world exports would have been kept at the same level than at the mid-seventies, its exports revenue should be approximately 10 times bigger than its current value.

The high costs of trade —i.e. the cost of transporting goods and getting them across borders— are a major obstacle to African trade performance. A growing literature has gathered empirical evidence of the negative impact of trade costs on a country's trade performance. High trade costs have a negative effect on economies enduring them. They lower consumer welfare as they increase the price of imported goods, and make producers less competitive as imported inputs are relatively more expensive and final goods relatively more expensive. Although direct evidence on border costs shows that tariff barriers are relatively low across all countries, poor infrastructure and weak institutions contribute in a larger extent to high trade costs along the logistic chain in Sub-Saharan African countries (SSA) countries. Moreover, as it will be discussed in this paper, the data and evidence suggest that African countries are among those having the highest trading costs in the world, and that for several forms of costs.

Examining the role of trade costs in the economic development of African countries requires placing this topic in perspective. Many of the slowest-growing economies in Africa are either engaged in conflict or having recently emerged from conflict. Geography has also played a major role in shaping the economic fortune of African countries; fifteen African countries are landlocked[3] and about forty percent of Africans live in one of them. As these landlocked countries are dependent on the political stability, the infrastructure and the institutional quality of their neighboring transit countries to reach overseas markets, their remoteness from major world markets is amplified.

All these conditions, combined with corruption, underdeveloped institutions, constraints on business competition, and weak governance— make international trade and investment in Africa more costly. While reducing other trade barriers on African exports such as tariffs remains important, and must continue to be at the center of multilateral negotiations, we argue in this paper that many African countries will not be able to benefit from them unless other trade costs, which are among the highest in the world for these African countries, are reduced. In addition, recent research has corroborated that exports can be a vehicle for poverty alleviation, as farmers that are able to grow high-

[2] Figures computed from COMTRADE data available trough WITS.

[3] The landlocked African countries are: Botswana, Burkina Faso, Burundi, Central African Republic, Chad, Ethiopia, Lesotho, Malawi, Mali, Niger, Rwanda, Swaziland, Uganda, Zambia, and Zimbabwe.

yield export crops are, on average, less poor than those who engage in subsistence farming. High trade costs prevent the full realization of potential gains from trade and can wither the poverty reduction effect of export opportunities for African countries, such as high world prices for major export crops and commodities.

The aim of the paper is two-fold. First, we review the recent literature and indicators focusing on different sources of trade costs from the African perspective. We classify trade costs into four broad groups: border-related costs, transport costs, costs related to behind-the-border issues, and the costs of compliance with rules of origin that are specific to preferential trade that is key to African countries. Our review does not intend to be comprehensive; we primarily concentrate on recent research presenting evidence of the impact of trade costs on African countries and highlight new data and on-going general research addressing the sources of trade costs. We combine evidence from direct costs and indicators, which can be sparse and inaccurate especially for African countries, with indirect measures that are mainly inferred from case studies as well as from the trade gravity model.

Second, drawing on data and estimates by Hoekman and Nicita (2008)'s gravity model, we estimate illustrative ad-valorem equivalents of a counterfactual improvement in trade-costs indicators for several African countries. As data on African countries is generally sparse, the advantage of Hoekman and Nicita's specification is the incorporation trade costs variables having a good coverage of African countries, such as the Logistic Performance Index (LPI), and trade indicators constructed by Doing Business (DB). Moreover, they include the ad-valorem trade restrictiveness indices estimated by Kee, Olarreaga and Nicita (2008) that provide a summary measure on the restrictiveness of tariff and non-tariff barriers. Drawing on gravity estimates, we provide an illustrative assessment of the relative importance of trade costs captured by these estimators and proceed in three steps. First, we slightly modify HN's proposed gravity-specifications to analyze the sensitivity of the estimated coefficients to the inclusion of different indicators. Second, using gravity estimates, we compute the "ad-valorem" tariff cut that would leave exports for several African countries at the same level than an improvement in LPI, and DB variables halfway the value of the top performer African country along these indicators. Finally, we compare these illustrative ad-valorem equivalents across measures and African countries.

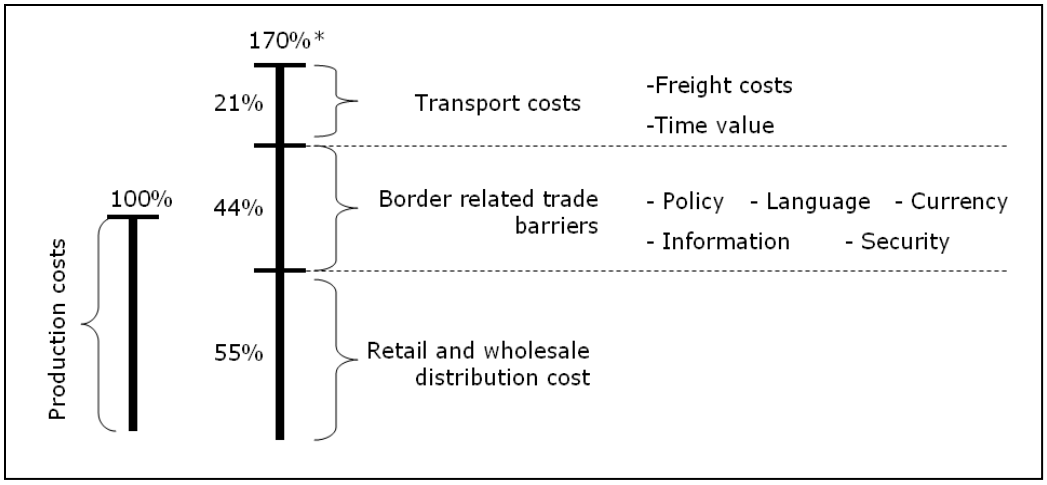
The rest of the paper is organized as follows. Section 2 presents the definition of trade costs and discusses some orders of magnitude. In section 3, we review recent research on four dimensions of trade cost: border-related costs, transport costs, costs related to behind-the-border issues, and the costs of compliance with rules of origin that are specific to preferential trade. In section 4, we use gravity estimates compute illustrative ad-valorem equivalents of improvements in some trade-cost related dimensions for African countries. Section 5 concludes briefly.

2. A definition of trade costs and some orders of magnitude

Trade costs can be broadly defined to encompass all costs incurred in getting a final good to a final user, other than the cost of producing the good itself. In general, an exporter or importer incurs trade costs at all stages of the export or import process, starting with obtaining information about market conditions in a foreign market and ending with the reception of the final payment. Frequently, firms serving the local market and willing to sell their product to a foreign market is subject to costs of compliance with standards and technical regulations from foreign markets. As these costs would not be incurred if the good remains exclusively sold domestically, they are considered as part of trade costs. An analog reasoning applies to preferential trade agreements as preferential access to partners' markets requires compliance with rules of origin, which may involve, for instance, adjustment in the intermediates mix or production process and could entail additional costs.

In an extensive review of the literature on different trade costs sources, Anderson and Van Wincoop (2004) provide a rough estimate of 170% (in terms of ad-valorem equivalent) of representative trade costs for industrialized countries. The authors breakdown this estimate into three components: a 21% ad-valorem equivalent for transportation costs, 44% for border-related trade barriers, and 55% percent for retail and wholesale distribution costs, as shown in Figure 1.[4] Evidently, trade costs have different sizes and patterns across countries and regions, as well as across goods and sectors. While approximate and subject to data limitations, the data suggest that for developed countries the costs of trading a good -including both international trade costs and domestic distribution costs- can even be larger than the cost of producing it.

Figure 1
Estimates of trade costs in industrialized countries.



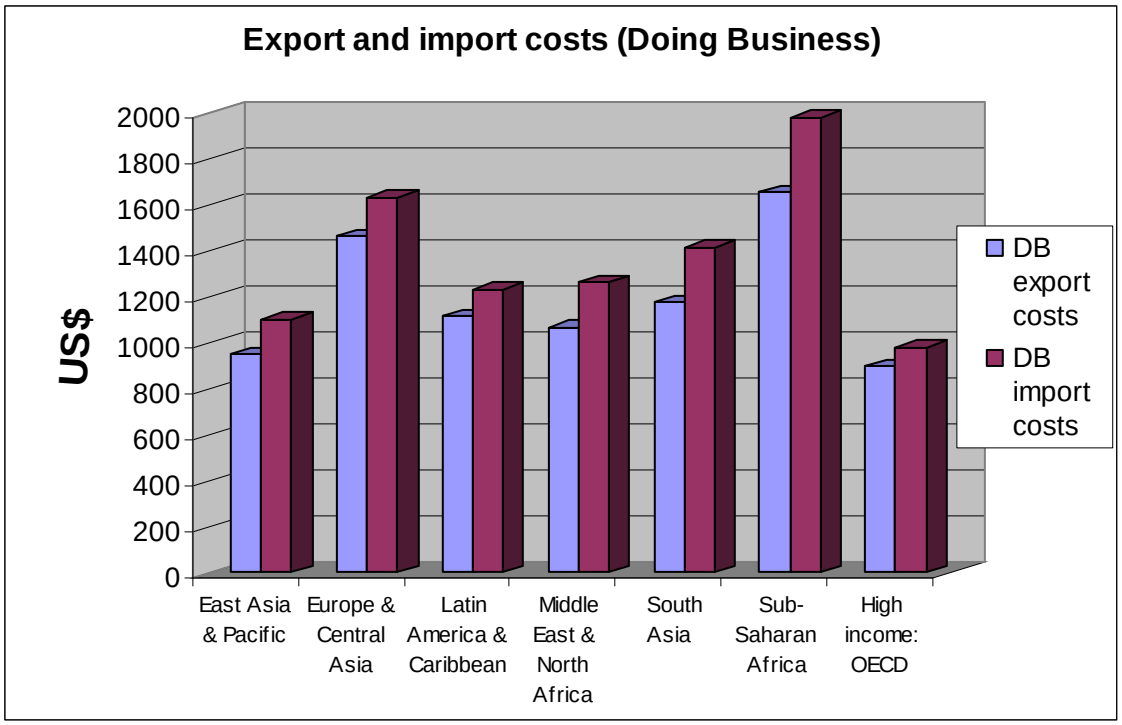
Notes:
Estimates drawn from Anderson and Van Wincoop (2004)
* Breakdown of costs is expressed in ad-valorem equivalent terms: 1.7=1.21*1.44*1.55-1.

[4] The costs components are expressed in ad-valorem equivalent terms: 1.7=1.21*1.44*1.55-1. The first two components amount for total international trade costs that are about 74% (0.74=1.21*1.44-1).

The ratio of trade costs to production costs ratio appears to be larger for developing countries than for developed ones, especially African ones, as they face considerably higher transport costs than developed countries. In that sense, Anderson and Van Wincoop estimates can be thought of as an illustrative benchmark for similar trade costs figures that could be estimated for African countries.

To provide some figures on the variability of trading costs across regional groups, figure 2 shows the average costs of export and import procedures by group of countries as collected by the World Bank (2008) Doing Business.[5] Among developing countries, SSA countries have the highest costs in average for both economic activities. The cost of import and export procedures in African countries are about twice as higher as in high income OECD countries.

Figure 2
Costs of Export and import procedures in USD.



Source: Doing Business (2008)

3. Trade costs and their impact: a review

In this section, we review briefly recent research on selected dimensions of trade costs with a focus on Africa. A classification of the different types and sources of trade costs can be performed in several ways. In this review, we group trade costs in four categories.

[5] To ensure comparability, these figures are the official fees levied on a 20-foot container in US dollars associated with completing the procedures to export or import the goods, which include the costs for documents, administrative fees for customs clearance and technical control, terminal handling charges, inland transport, and excluding tariffs and trade taxes.

We start our review with border-related costs, which include tariffs and non-tariff measures. The restrictiveness indices developed by Kee, Nicita, and Olarreaga (2008) provide a summary measure of both types of measures of policy allowing comparison across countries. Second, we review the evidence and the literature on transport costs. Next, we focus on trade costs related to behind-the-border issues, such as governance transparency, and the business environment. Fourth, we provide a short summary on the costs of compliance with rules of origin that are specific to preferential trade agreements, which are central to African countries. At the end of the section, we briefly discuss the contrast between "hard" infrastructure (highways, railroads, ports, etc) and "soft" infrastructure (standards, administrative procedures, transparency, etc.).

3.1. Border-related costs

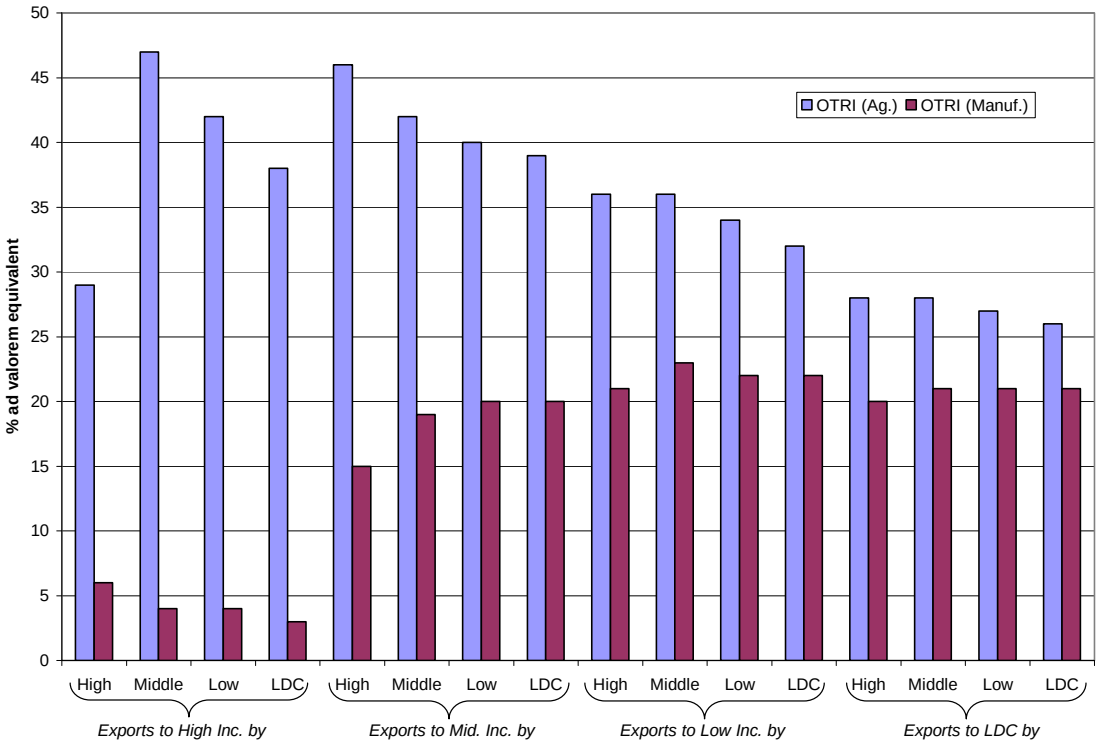
Trade Policy and Border Barriers

As goods enter a country, they are subject to a variety of trade policy-related barriers that raise the costs of trading. Traditional trade policy barriers include tariffs (ad-valorem and specific), quotas, and a combination of both: tariff-rate quotas (TRQ). Other less "traditional" trade policy instruments include antidumping duties, countervailing duties, and safeguard measures. Since trade policy can take different forms, it is difficult to find a single measure of trade restrictiveness. Even when the impact of these measures can be estimated as an ad valorem equivalent, it can be useful to aggregate a large number of tariffs and other trade policy measures into a single figure that summarizes the overall level of restrictiveness in each country.

Contributing to address these issues, Kee, Olarreaga and Nicita (2006) developed theoretically grounded indexes based on research by Anderson and Neary (1994). The Overall Trade Restrictiveness Index (OTRI) and the Tariff Trade Restrictiveness Index (TTRI) provide a summary measure of existing trade policies and allow comparison across 104 countries (counting the EU as a single country). Both indexes represent the ad valorem tariff which, if applied by an importing country to all imports, would result in a total import level equivalent to that prevailing under current policy settings..The OTRI captures all policies on which information is reported by the international organizations collecting this data (ITC, UNCTAD, and WTO). These comprise ad valorem tariffs, specific duties, and non-tariff measures (NTMs) such as price control measures, quantitative restrictions, monopolistic measures, and technical regulations. In contrast, the TTRI is narrower in scope; it considers only ad-valorem and specific tariffs. As many NTMs are not necessarily protectionist in intent the OTRI reflects net overall restrictiveness; it is not a measure of the level of protection that a government seeks to provide domestic industry. Some NTMs comprise border restrictions, such as quotas or bans, and are motivated by protectionist objectives. Others, such as standards for mercury content or fecal matter, are aimed at safeguarding human, animal, or plant health. Unfortunately, the measures do not allow distinction between objectives. Thus, protection is arguably better measured by the TTRI, even if this index is best thought of as a lower-bound estimate of the extent of protection prevailing in a market due to its limited coverage of trade policy instruments,

Figure 3

OTRI for agriculture and manufactures.



(Source: Kee et al., 2006.)

Four important points about OTRI figures and the pattern of trade policy restrictiveness are worth mentioning. First, low and middle income countries are the ones that both impose and face the highest levels of protection, as shown in figure 3. Second, the bulk of restrictive trade policies are concentrated on agricultural products, a key export for African countries. The value of OTRI for agricultural products is on average roughly twice OTRI for manufactured goods.

Third, it may be misleading to focus only on tariffs: non-tariff barriers contribute to a large extent to the total restrictiveness of trade policy. For East Asia & Pacific, Europe & Central Asia, and Latin America & the Caribbean, the non-tariff component (measured by the difference between OTRI and TTRI) is more important than the tariff component (measured by the TTRI), as seen in table 1a. The same applies to the US, the EU, Japan, three out of the four largest world traders (see table 1b). Finally, the non-tariff component of trade protection is larger for agricultural products than for manufactures, as can be seen from tables 1a and 1b. Among the four major traders, Japan and the EU are the markets with the most restrictive overall trade policies for agriculture. Among them, the EU is the market with the largest non-tariff share of trade restrictiveness, as non-tariff restrictiveness account for 90% of overall restrictiveness.

Table 1a
OTRI and TTRI (percent), by developing country region, 2006

	Total trade	Agriculture	Manufacturing
Middle East & North Africa	**21.6**	**32.3**	**19.4**
	11.9	12.1	11.8
South Asia	**19.5**	**46.4**	**18.2**
	14.0	31.4	13.2
Latin America & the Caribbean	**15.0**	**28.1**	**13.8**
	5.4	6.6	5.3
Sub-Sahara Africa	**14.4**	**24.9**	**12.9**
	8.4	13.8	7.6
East Asia & Pacific	**11.3**	**26.6**	**10.4**
	5.0	8.7	4.8
Europe & Central Asia	**10.1**	**25.9**	**9.0**
	4.5	10.3	4.0

Source: Global Monitorig Report (2008)

Table 1b
OTRI and TTRI (percent), for the four largest traders, 2006

	All trade	Agriculture	Manufacturing
United States	**6.4**	**18.4**	**5.7**
	1.6	3.8	1.5
European Union	**6.6**	**48.7**	**2.9**
	1.4	5.9	1.1
Japan	**11.4**	**55.8**	**5.7**
	4.5	31.1	1.1
China	**9.9**	**17.1**	**9.5**
	5.1	8.8	4.9

Source: Global Monitoring Report (2008)

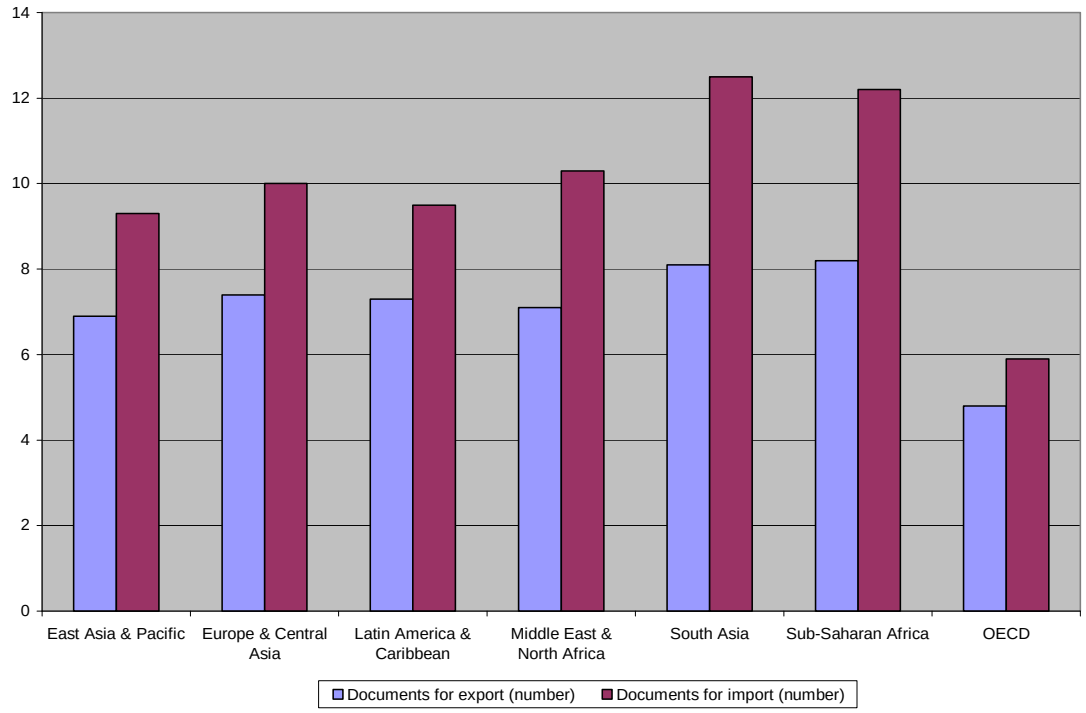
Customs Procedures

In a broad context, national customs administrations are in charge of implementing a country's trade policy at the border. This implies levying tariff duties, verifying conformity of imported goods with the relevant non-tariff barriers, preventing the importation of prohibited or unsafe imports (e.g. illegal weapons or out-of-date medicines).

Delays in customs procedures increase trading costs not only in terms of opportunity costs, but also represent additional expenditures such as storage and wage charges.

Djankov, Freund and Pham (2006) find that each day of delay at customs is equivalent to a country distancing itself from its trading partners by additional 85 km. Keeping customs procedures as simple and transparent as possible contributes to reduce the time needed to clear customs, and thereby to reduce this dimension of trade costs.

Figure 4
Number of export and import procedures.



Source: Doing Business

The World Bank (2008) Doing Business dataset reports procedural requirements for exporting and importing a standardized cargo of goods by ocean transport. Figure 4 shows the average number of export and import procedures across regions. South Asia is is the region with the highest number of export and import procedures, closely followed by SSA.

Product Standards and Technical Regulations

Product standards and technical regulations can have a dual impact on trade costs. On the one hand, they can impose additional variable or fixed costs on exporters to the extent that it is necessary to alter production processes to adapt products to such standards and regulations in the importing country. Moreover, certification aiming to demonstrate compliance with this set of rules can generate additional costs for the exporter. On the other hand, product standards and technical regulations in the importing country can potentially reduce exporter's information costs if they convey valuable information as to consumer tastes or industry needs in the importing country. In absence of standards, such

information would be costly for the exporting firm to collect. Accordingly, standardization in sectors where information costs are important could help reduce trade costs and promote trade.

The net impact of product standards on trade will depend on the relative magnitude of these effects. The empirical evidence is scant, primarily due to the impediment of collecting reliable data[6] and constructing comprehensive indicators on standards in different sectors across countries. Among the papers having found evidence on the negative effect of standards on trade from African countries, Otsuki et al. (2001) examine the impact of European aflatoxin standards on African groundnut exports. They find that a 10% increase in restrictiveness is associated with a fall in trade volumes of about 11%.

Disdier et al. (2007) use data on WTO notifications of mandatory sanitary and phyto-sanitary measures, as well as technical regulations, to measure the impact of standards across a large number of different sectors. They generally find that standards are associated with negative trade impacts, in particular for exports from developing countries to OECD countries.

On the positive net impact of standards on trade, Moenius (2004) observes that country-specific standards tend to promote trade in the manufacturing sector. However, the opposite result holds for relatively homogeneous goods, such as agricultural products. Such an outcome could be consistent with the interpretation that higher information costs in manufactures can be surmounted by standards.

One way to reduce the costs associated with standards is through international harmonization, as the need for exporters to pay multiple product adoption costs related to manifold national standards is limited. In that regard, Czubala, Shepherd and Wilson (2007) study the impact of EU standards on African textiles and clothing exports. By identifying standards that are aligned with ISO standards (as a proxy for de facto international norms), the authors find evidence that non-harmonized standards reduce African exports of these products, whereas EU standards harmonized to ISO standards are less trade restricting. Their results suggest that efforts to promote African exports of manufactures may need to be complemented by measures to reduce the cost impacts of product standards, including international harmonization. In addition, efforts to harmonize national standards with international norms, including through the World Trade Organization Technical Barriers to Trade Agreement, promise concrete benefits for African exporters. Efforts should be directed at designing standards that minimize costs,

[6] Although it is difficult to directly observe the possible trade benefits of standards, we do know something more about their direct cost impacts. The World Bank Technical Barriers to Trade database (Wilson and Otsuki, 2004) provides some informative data. In Sub-Saharan Africa, firms invest on average 7.65% of sales in order to comply with foreign standards. These data also show, however, that experiences differ greatly from one firm to another: the range of investment costs reported by firms runs from 0.01% of annual sales to 124%. Part of this apparent variation is due to the metric used: for constant costs, bigger companies with higher levels of sales will tend to report lower costs as a percentage of sales. It also suggests that firms may have some leeway in terms of how they react commercially to changes in foreign standards.

while still promoting the important public policy objectives they pursue, such as consumer protection or public health and safety.

3.2. Transport Costs.

Transports costs rise in distance, as each kilometer traveled requires fuel, manning and capital expense. Regression analysis shows that the trade-distance relationship is robust to the inclusion of a wide variety of partial correlates. Hummels (1999) estimates the elasticity of shipping and costs with respect to distance, and see its evolution over time for air and ocean shipping over the period 1974-1998. He finds that comparing a long (9000 km) route to a short (1000 km) route for comparable ocean/shipped commodities, the longer route was 59 % more expensive in 1974, but only 32% more expensive in 1998. In other words, the effect of distance on costs seems to decline on time. Over the years technological improvements, such as the introduction of containerization in maritime transport in the 50s, seem to have contributed to the reduction of transport costs.

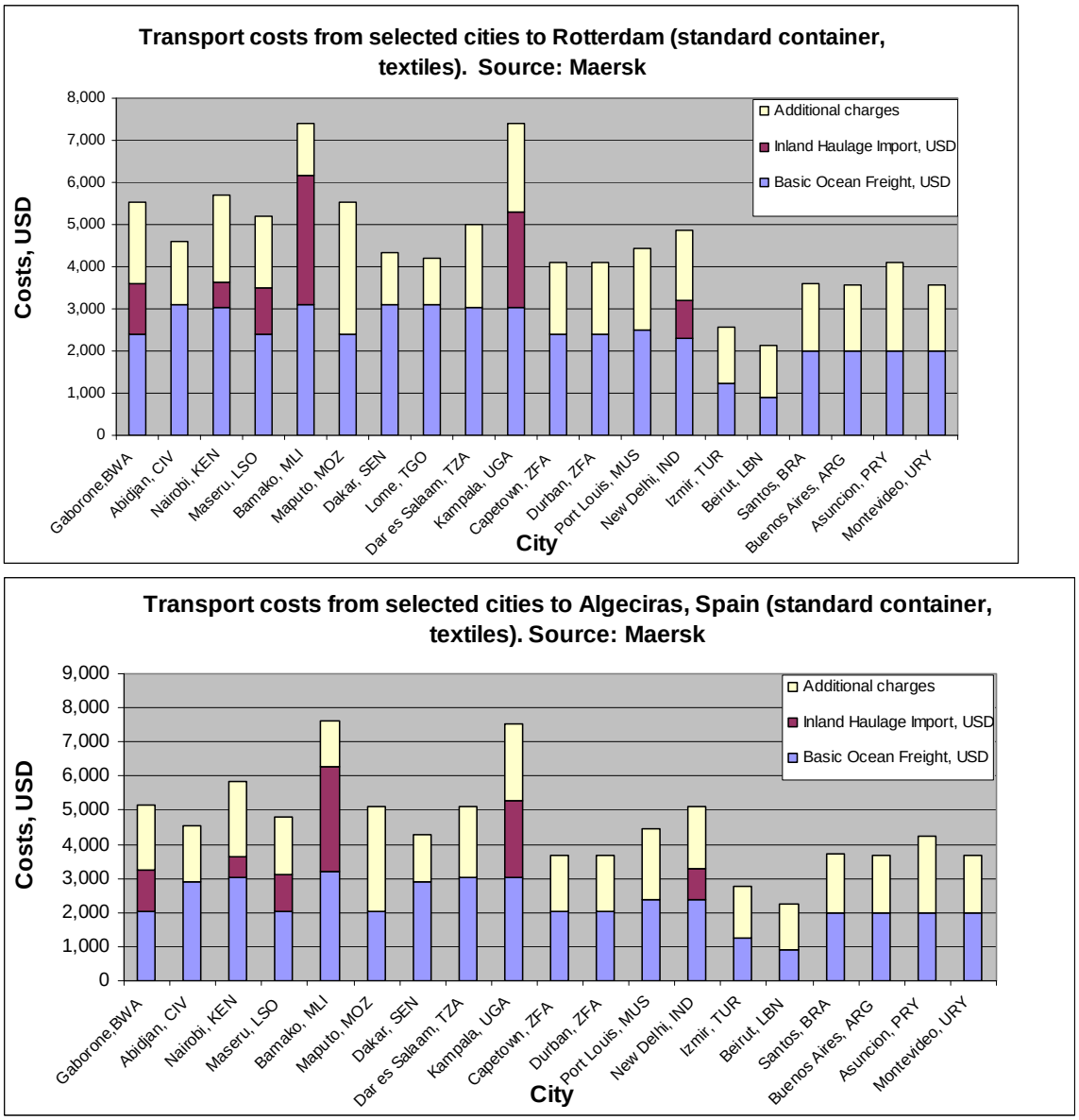
Despite the contribution of technical improvements lowering trade costs, shipping costs from African countries to main world markets can be considerably higher compared to other regions. Figure 5a and 5b show shipping costs from several cities towards two of the largest European ports, Rotterdam and Algeciras, reported by Maersk, a major liner shipping company. Indeed, Maersk makes available in its website shipping costs for itineraries having several combinations of cities in the world as origin and destination points.[7] To ensure comparability among figures, we collected the freight costs for a standard 40-foot container transporting textiles. Despite the distance between both European ports, freight costs from each city in the sample to Algeciras and to Rotterdam are similar. Consider Santos and Dakar, the closest South American and African cities in the sample to Algeciras. Despite the fact that distance to Santos is about twice the distance to Dakar, the ocean freight is lower from the Brazilian city. Moreover, the presumably low -value exports from developing countries, especially in Africa, inflates transport costs of a container when expressed in ad-valorem terms, i.e. as a proportion of the value of exports.

Indeed, maritime transport exhibits important economies of scale. Larger trade flows are conducive to scale economies in shipping, whereby lowering transport costs. To further illustrate the relationship of freight costs for large versus small exporters, Hummels (2006) consider the case of Japan and the Ivory Coast that are equidistant to the US West and East Coasts, respectively. Shipping costs from the Ivory Coast are twice as high as shipping costs from Japan, even after adjusting for differences in the commodity composition of trade. More systematically, Hummels and Skiba (2004) use data from many importer-exporter pairs to estimate that doubling trade quantities leads to a 12 % reduction in shipping costs. Arvis et al (2007) illustrate the tendency of shipping lines

[7] Maersk data allows to breakdown costs into three components: the basic ocean freight associated with ocean transport, an inland haulage fare for non-coastal cities that groups charges associated with arranging intermodal transportation, and additional charges. As this latter component is the same for Capetown and Durban in South Africa, it appears to be country specific.

setting higher tariffs in smaller ports with less traffic by considering the case of exporters of fruits and vegetables from South Mauritania. They argue that because of the maritime transport price differential exports are processed in the Dakar port, in Senegal, rather than in Nouakchott, despite border crossing costs and a longer distance.

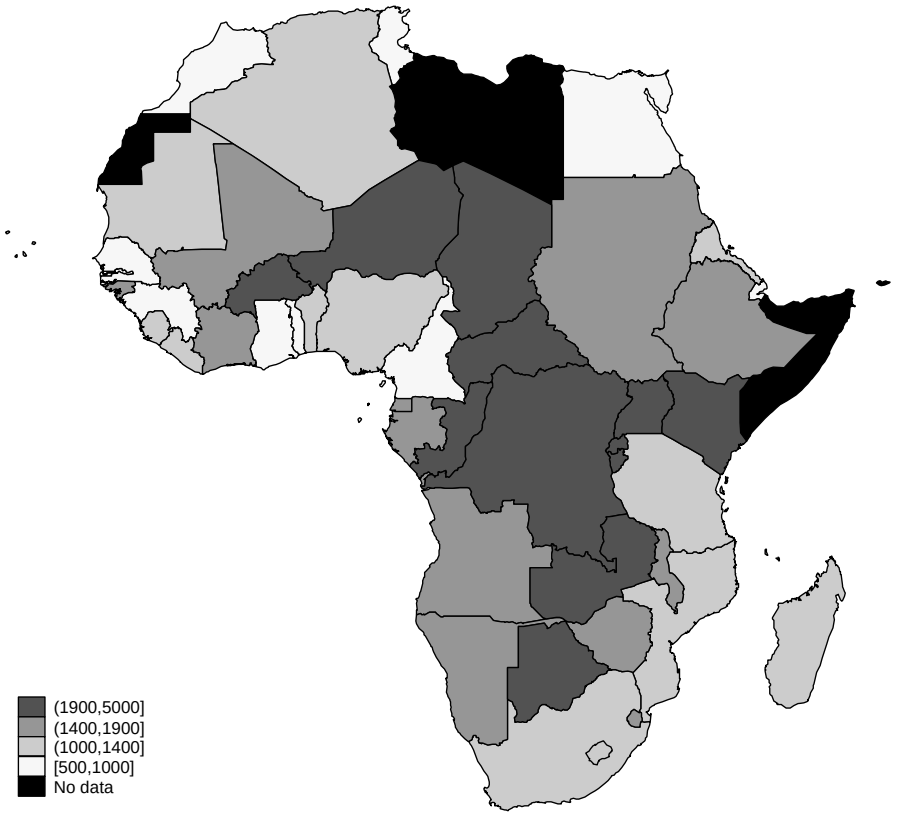
Figure 5a and 5b
Tranport cost from selected cities to a European port



Recent research also identify poor infrastructure as a significant deterrents to trade expansion (e.g. Limao and Venables, 2001). Buys, Deichmann, and Wheeler (2006) investigate the potential trade benefits of investing in upgrading and maintaining a trans-African highway network. The proposed network links 83 major cities at a length of

about 100,000 km, and the estimated benefits are found to be significant. Buys, Deichmann, and Wheeler find that intra-African trade as a whole can be expected to increase from 10 billion to about 30 billion USD per year, while initial investments and annual maintenance costs would be relatively moderate over the course of the investment cycle. For instance, an upgrade of the road from Bangui in the Central African Republic to Kisangani in Congo DR is expected to increase the volume of trade by 7.93 percent.

Figure 6
Costs associated with completing export procedures in USD.



Source: Graph constructed with data from Doing Business (2008).

Landlocked countries in Africa are particularly in disadvantage. To access overseas markets, landlocked countries rely not only on the physical infrastructure and logistic capacity of transit countries, but also on their administrative practices and political stability. As for African landlocked countries, dependence on a transit country implies higher transaction costs. Figure 6 shows the costs associated with completing export procedures for a comparable container as reported by Doing Business in 2008 for several African countries. The associated fees include the costs for documents, administrative fees for customs clearance and technical control, terminal handling charges and inland transport and exclude tariffs or trade taxes. Not surprisingly, export costs are ranked among the highest for most landlocked countries.

Limao and Venables (2001) estimate that the median landlocked country transport costs are 46% higher than the median coastal economy. They also find that distance explains only 10% of the change in the transport costs. Poor road infrastructures represent 40% of the transport costs predicted for coastal countries and 60% for landlocked countries, which is especially relevant for African countries where transport costs seem to be particularly high, even for a given distance, because of location and poor infrastructure[8].

International transport in SSA suffers from low competition, reflecting the regulations of African governments intended to promote national shipping companies and airlines. For instance, as described by Collier and Gunning (1999), many African governments (especially West African countries) have adopted "cargo reservation schemes" which allow privileged liner operators to set inflated freight rates considerably above those that would prevail in a competitive environment and to extend inferior-quality services.

Studying main international corridors in Africa[9], Teravaninthorn and Raballand (2008) argue that the costs backed by transport-service providers are not excessively high in Africa. Nevertheless, the transport prices charged to end-users in Africa are relatively high compared to prices in developed countries and most developing countries. This assertion is paradoxical given the low level of truckers wages in Africa compared to wages elsewhere, as illustrated in table 2. Perhaps, inland transport costs and prices should be much lower and potentially the lowest in the world because trucking industry is an activity intensive in labor.

Table 2

Median monthly wages for truckers (in USD)

Country	Median monthly wages
France	3,129
Germany	3,937
Chad	189
Kenya	269
Zambia	160

Source: Teravaninthorn and Raballand (2008)

Teravaninthorn and Raballand point out that the trucking market structure and environment in West and Central Africa are characterized by strict market regulation leading to low transport quality, while in East Africa the trucking environment is more competitive and the market more mature. Trucking operators from landlocked countries,

[8] Faze, McArthur, Sachs and Snow (2004) present a detailed appendix with regional overviews outlining key challenges facing the landlocked countries in each region of Africa

[9] The study focuses on four corridors covering all four Africa's sub-regions and including 13 countries. These corridors carry over 70 percent of the international trade of the selected landlocked countries. The thirteen countries served by the corridors are:

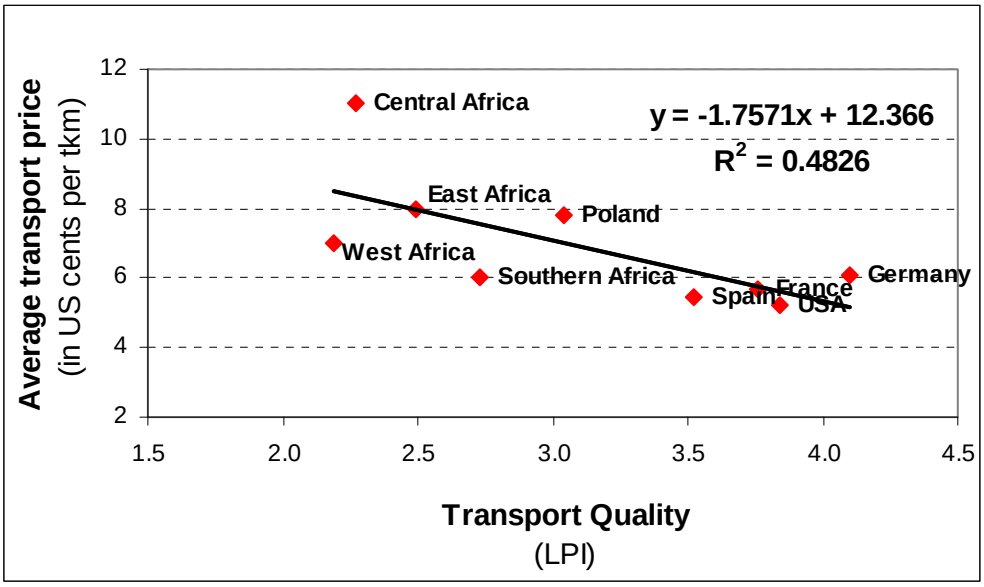
West Africa:	Ghana, Niger, Burkina Faso, Togo.
Central Africa:	Cameroon, Chad, CAR.
East Africa:	Kenya, Uganda, Rwanda.
Southern Africa:	South Africa, Zimbabwe, Zambia.

especially in West and Central Africa, have benefited from strong formal and informal protection for decades. The result was to be expected: high transport prices and lower quality of services. Trucking surveys also indicate that a large mark-up or profit margin by transport providers, made possible by the current regulatory regime leading to high transport prices along some international corridors, such as those in West and Central Africa. In contrast, Teravaninthorn and Raballand also find that major corridors in Southern Africa are the most advanced of all corridors included in their study in terms of prices and efficiency of services; mainly because of an unregulated transport market.

Figure 7 confronts transport prices with the Logistics Perception Index (LPI) [10] for some countries as well as African regions. Compared to other countries, such as France and the USA, transport prices in Africa are more expensive and provided at a lower quality, as measured by the LPI. Moreover, an inverse relationship between transport quality and transport price as the greater the LPI, the better the transport quality. The Central African region is an extreme case of high prices associated with low quality.

Figure 7

Transport services in Africa: quality and cost



Source: Teravaninthorn and Raballand (2008)

[10] The LPI is a measure of perceptions of the logistics environment of 140 countries along seven areas of performance: i) Efficiency of the clearance process by customs and other border agencies, ii) Quality of transport and information technology infrastructure for logistics, iii) Ease and affordability of arranging international shipments, iv) Competence of the local logistics industry, v) Ability to track and trace international shipments, vi) Domestic logistics costs, and vii) Timeliness of shipments in reaching destination. Itd allows comparison across countries and regions. It is based on a yearly survey of international freight forwarders. The survey uses an anonymous, web-based questionnaire which asks professionals in several logistics service companies worldwide to evaluate their country of residence, as well as eight countries they are dealing with, on seven logistics dimensions. Country performance in these areas was evaluated using a 5-point scale (1 for the lowest score, 5 for the highest). The Logistic Performance index is a weighted average of these measures constructed using the Principal Component Analysis technique in order to improve the confidence intervals.

Building on Wilson et al (2003)'s methodology, Njinkeu, Wilson, and Powo-Fosso (2008) analyze the impact of reform along four categories of trade facilitation efforts: port efficiency, customs environment, regulatory environment, services infrastructure. Using a gravity model, they find that the ports and services infrastructures are the main trade facilitation indicators that affect positively intra-African trade.

3.3. Behind the Border issues and other sources of costs

Corruption, governance, transparency and the business environment

Recent research has focused on the different channels institutions can play a role on trade. Anderson and Marcouiller (2002) find that weak institutions act as significant barriers to international trade: import/export transactions are inherently risky due to, for example, imperfect contract enforceability, and such factors are in effect given free rein under weak institutional regimes. They use World Economic Forum data to construct an index of the strength of institutions that support trade, focusing on contract enforcement and the existence of impartial and transparent government policies.

Weak institutions can manifest themselves through widespread corruption at various points in the supply chain, which can increase the trade costs faced by exporters and importers. The empirical evidence largely supports the view that trade costs are an important determinant of extortion and evasion behaviors. Gatti (1999) uses data on corruption perceptions and trade policy to show that higher trade costs—in this case, tariff rates—are indeed associated with a higher level of corruption. Focusing on the evasion mechanism, Fisman and Wei (2004) measure the difference between declared export and import values on bilateral trade between Hong Kong and the Chinese mainland. They find that higher tariff rates are associated with larger differences in declared values, which is highly suggestive of an important evasion effect.

A recent working paper by Dutt and Traca (2007) provides some preliminary evidence on the empirical importance of extortion and evasion in terms of their ultimate impact on bilateral trade flows. Using a gravity model, they first show that the trade inhibiting effect of corruption depends on the level of trade costs: the negative impact is relatively stronger in low tariff environments. Thus, the extortion effect dominates when tariffs are low, but becomes less important as they increase. Second, the data also appear to support the proposition that the trade impeding effects of tariffs are lower in more corrupt countries. This finding is consistent with the existence of an evasion mechanism: as tariff rates increase, firms in corrupt countries manage to limit their impact by making side payments to customs officials.

Francois and Manchin (2007) measure institutional quality through the lens of economic freedom, focusing on aspects such as the size of government, freedom of trade, protection of property rights, and business regulation. They find that strong institutions in this sense are associated with increased trade at both the intensive and extensive margins.

Helble, Shepherd and Wilson (2007) conduct empirical investigations of the role of transparency in trade, focusing on the Asia-Pacific region. They use a combination of "objective" and perceptions-based indicators to produce composite measures of importer and exporter transparency. Their measures cover two fundamental dimensions of transparency: predictability and simplification. To capture the former, they consider data such as administrative favoritism, dispersion of tariff rates, extent of tariff bindings, and uncertainty surrounding import times. Simplification of a country's trade regime is analyzed using variables including the time taken to import, the number of agencies an importer must deal with, the extent of trade barriers other than published tariffs, and the prevalence of trade-related corruption. It turns out that transparency, particularly as it relates to the import regime, can be a significant factor in promoting bilateral trade. Indeed, Helble et al. (2007) find that improving import transparency in APEC member economies to the regional average could have a larger impact than reducing tariffs or NTBs to the same level. As expected, the gains from reform accrue primarily to the reformers themselves. Two main touchstones for trade facilitation and transparency reform in Asia Pacific Economic Cooperation's Bogor Goals can be stressed: predictability and simplification. Making trade policy more predictable reduces uncertainty, and therefore costs, for business. Possible reforms include: (1) Binding tariff rates through the WTO; (2) Moving towards "flatter" tariff structures; (3) Making import and export delays less variable; (4) Lowering uncertainty surrounding unofficial payments; and (5) Reducing favoritism in administrative decision making.

Using data from World Bank's investment climate surveys, Balchin and Edwards (2008) examine the relationship between the business climate, manufacturing productivity and export performance in eight African countries: Egypt, Kenya, Madagascar, Mauritius, Morocco, South Africa, Tanzania and Zambia. Based on principal components analysis, they construct several indices summarizing different aspects of the business climate, and find that indices representing micro-level supply constraints, macroeconomic conditions and the legal environment are all significant determinants of the probability of exporting. At the country level, the quality of the business climate is found to matter most for export participation in Mauritius and Zambia. The study also finds that individual firm characteristics — such as size, age, ownership, use of information technology and managerial education levels — are important determinants of the decision to enter foreign markets. Indeed, larger and younger firms are more likely to export, as well as firms with a larger share of foreign-owned firms. Moreover, a higher propensity to export is found for firms whose top manager has some form of tertiary education, and for those having access to internet.

Information and Communication Costs

Border costs associated with information barriers are potentially important. Recent empirical work reflects this fact, in assigning importance to modern information and communications technologies as determinants of international trade costs. Limao and Venables (2001), for instance, include a measure of telecommunications development (the number of mainlines) in their indices of infrastructure quality. Francois and Manchin (2007) take a broader approach, including in addition data on mobile telephone usage. Consistent with the view that communications costs are an important component of trade

costs, both papers find an overall positive impact of infrastructure quality, including communications infrastructure quality, on bilateral trade.

In line with these arguments, it seems plausible that the internet could have lowered the costs of trading internationally. It is now much easier—and cheaper—than ever before to obtain information on foreign market conditions, product standards, and consumer preferences. This should lower the costs of entering foreign markets, and promote trade at the margin. Freund and Weinhold (2004) provide the first empirical evidence in support of this sort of dynamic. They find that a 10% increase in the number of a country's web hosts is associated with an export gain of around 0.2%. Although this effect is statistically significant, it is relatively small in economic terms—perhaps surprisingly so. Moreover, they find that development of the internet does not seem to have brought about any significant changes in the impact of distance on trade. This outcome could be consistent with a scenario in which the internet significantly reduces the fixed costs of market entry, such as obtaining information on product requirements or preferences, but does not significantly alter the variable costs of international trade as captured by distance.

Other Sources of Costs

Other non-market institutions, such as exporters' clubs, can have an impact on trade costs. For instance, Negri and Porto (2008) assess the benefits of Burley tobacco clubs in Malawi. Tobacco clubs are formed by about 10 to 30 farmers that grow tobacco collectively and are designed to promote smallholder tobacco production. One of the major services provided by these tobacco clubs is the access to selling floors, where tobacco is commercialized in Malawi. In addition, club members jointly acquire inputs under group lending (that is, under a common loan that is repaid at the time of sales in the auction floors) and perform collective actions in monitoring debt repayment and input use (preventing side selling of fertilizer, for instance) and in procuring higher input quality as well as lower input prices (via bulk purchases). Moreover, tobacco clubs contribute to the realization of economies of scale, particularly in transportation services to the selling floors. Finally, the clubs are instrumental in the development of supporting networks by encouraging the interchange of farming advice and the provision of labor assistance. Negri and Porto find that the burley clubs are indeed an active local institution for exports. Tobacco club members are much more productive than non-members: the tobacco club premium in yields (per acre) ranges from 40-74 percent. Members also earn between 45 and 89 percent more (per acre) than non-members via sales. This implies average income gains from burley membership of between 20 to 37 percent. The authors affirm that these gains would be equivalent to increases in tobacco prices, for instance due to improved market access abroad, lower transportation costs, or better infrastructure, of between 37 to 54 percent.

In another paper exploring the role of export costs in poverty reduction in rural Africa, Balat, Brambilla and Porto (2008) claim that the marketing costs emerging when the commercialization of export crops requires intermediaries can lead to lower participation into export cropping and, thus, to higher poverty. The study use data from the Uganda National Household Survey and have three major results: i) farmers living in villages

with fewer outlets for sales of agricultural exports are likely to be poorer than farmers residing in market-endowed villages; ii) market availability leads to increased household participation in export cropping (coffee, tea, cotton, fruits); iii) households engaged in export cropping are less likely to be poor than subsistence-based households. The authors conclude that the availability of markets for agricultural export crops help realize the gains from trade. This result uncovers the role of complementary factors that provide market access and reduce marketing costs as key building blocks in the link between the gains from export opportunities and the poor.

3.4. Costs Related to Preferential Trade: Rules of Origin

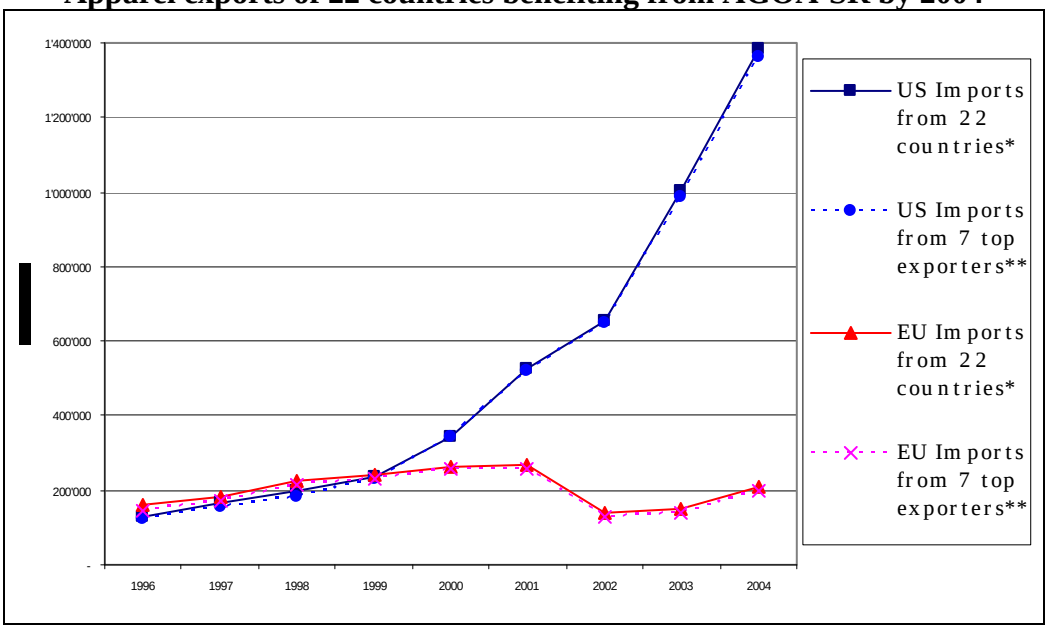
An important proportion of African exports to developed countries is shipped on a preferential basis. In order to benefit from enhanced market through a lower preferential tariff, producers must comply with rules of origin, which are the set of rules a product must undergo to get originating status. The primary role of rules of origin in such preferential agreements is to prevent trade deflection, which may happen if a beneficiary country with an MFN tariff lower than the one of a country providing the preferences imports a certain product and re-exports it at a profit. Nevertheless, well organized-interest groups in any of the partner countries can influence origin so that they raise costs and restrict trade beyond what is necessary to prevent trade deflection in a way similar to tariffs. Cadot, de Melo, and Portugal-Perez (2007) applied revealed-preference arguments to estimate upper and lower bounds of compliance costs of RoO. Applying a non-parametric method they obtain trade-weighted ad valorem estimates of compliances costs of rules of origin of 4.7- 8.2 percent for PANEURO preferences that include Sub-Saharan African countries.

Among African goods eligible for trade preferences to the US and to the EU, the textile sector is a key one as from all stages in the production of clothing, apparel assembly is the one that is the most intensive in low-skilled labor. A group of low-income African countries benefit simultaneously of preferential market access for their apparel to the US and to the EU. Although the extent of preferential access for apparel to the US market provided by AGOA is similar o the one provided by EU's preferential regimes, these agreements differ in their RoO. While the EU under the Everything But Arms initiative and the Cotonou agreement require yarn to be woven into fabric and then made-up into apparel in the same country or in a country qualifying for cumulation, AGOA grants a "Special Rule" (SR) to "lesser developed countries" allowing them the use of fabric from any origin and still meet the criteria for preferences.

Figure 8 shows a substantial increase in the value of apparel exports with AGOA's entry into force in 2000. Thus, unlike AGOA's special regime (SR) neither Cotonou nor Everything But Arms appeared to have offered a preference mix (tariff preferences and rules of origin) conducive to export growth. Comparing African apparel exports to the European Union and the United States provides a quasi-experimental situation to analyze the effects of rules of origin on the uptake of trade preferences. By taking advantage of this natural experiment, Portugal-Perez (2007) finds econometric evidence that relaxing

RoO by allowing the use of fabric from any origin increased significantly exports of apparel by about 300% for the top seven beneficiaries of AGOA's SR, while broadening the varieties of apparel exported by these countries.

Figure 8
Apparel exports of 22 countries benefiting from AGOA-SR by 2004



Source: Portugal-Perez (2007)

Notes:
*The 22 Sub Saharan countries benefiting from AGOA-SR by 2004 as well as ACP are: Benin, Botswana, Cameroon, Cape Verde, Ethiopia, Ghana, Kenya, Lesotho, Madagascar, Malawi, Mali, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Swaziland, Tanzania, Uganda, and Zambia.
**The top 7 exporters are : Botswana, Cameroon, Ghana, Kenya, Lesotho, Madagascar, Namibia, Nigeria, and Swaziland.

As for the policy debate, strict RoO have often been justified as a means to support more processing in developing countries by encouraging integrated production within a country, or within groups of countries through cumulation schemes. However, at least in the case of T &A, RoO have a perverse effect as they discourage developing exports at the intensive margin as well as at the extensive margin through product diversification which contributes to reducing volatility. In sum, development-friendly policies would benefit from relaxing the stringency of RoO requirements.

Recent research provides evidence that the current system of trade preferences granted by developed countries to African countries is undermined by the current RoO. (see Cadot and de Melo 2007 for a review). Although RoO have a legitimate justification in preventing trade deflection by insuring sufficient processing, the accumulated evidence indicates that they have largely been captured by protectionist interest groups and that they hinder the integration of preference-receiving developing countries in the world economy. RoO matters and a first step in any reform should aim to simplify them and unify them to reduce compliance costs. Several policy reforms avenues could be considered. For instance, all the different combinations of RoO that can exist for a single

good in certain PTAs could be abandoned for a single value content, which could also be uniformed across goods, as in the case of AFTA RoO regime. The WTO organization could play a role of forum in which harmonization of RoO across preferential trade agreements could take place.

3.5. "Soft" vs. "Hard" Infrastructure.

Trade facilitation measures can be thought along two dimensions: "*hard"* infrastructure, (highways, railroads, ports, etc) and "*soft"* infrastructure (transparency, institutional reforms, etc). A particular interest of this distinction resides on comparing the benefits and costs of investment or policy reform along both dimensions. Francois and Manchin (2006) provide some empirical evidence on the benefits of these two dimensions. They estimate a gravity model of international trade that includes two aggregate indices of institutional performance, and two indices of infrastructure quality. Their results provide confirmation for the view that both hard and soft infrastructure matter for trade performance—indeed; they appear to explain more of the observed variation in North-South trade flows than do tariffs. For low income exporting countries, the authors find that in terms of upgrading hard infrastructure, it is transport that is the most important area. However, as income increases, communications infrastructure becomes more and more important. For low income countries, openness and protection of property rights are relatively more important than in higher income countries, while the negative impact of larger government and regulatory density is more strongly felt in high income countries than in low income ones.

Large investments in hard infrastructure projects aiming to improve infrastructure quality, per se, are not necessarily conducive to lower transport prices; other measures in the "soft" part should accompany them. The lack of competition along the different segments in the trade logistics chain can result in high markups favoring cartels among logistic services firms while keeping high transport prices for end-users, as trade-logistics is a fertile ground for rent-seeking activities. Interest groups lobbying and potential corruption can lead to inadequate regulation (such as market access restrictions, technical regulations, and customs regulations) aiming to protect inefficient logistics operators, and discouraging the entry of more modern logistics operators with lower operational costs. Regulation reform aiming to dismantle cartels and enhance competition along different segments of the logistic chain is crucial to lower trade costs. In a more competitive environment, measures to improve physical infrastructure are likely to yield more significant results

4. Using gravity estimates to compare domestic trade-costs indicators.

The gravity model predicts that the volume of trade between two countries is proportional to their income and inversely related to the distance between them. In addition to these core variables, gravity-equations can contain other variables influencing trade that economists wish to explore, such as institutional characteristics or trade policy

variables.[11] Gravity models have been used in a wide variety of applications as inference on the effect of a change in an explanatory variable on trade is straightforward. Some of the research reviewed in last section adopts this approach.

Table 3
Trade-costs indicators

Indicators	Units	Source	Coverage
OTRI and TTRI	ad-valorem equivalent	Kee at al (2008) and WB Global Monitoring Report 2008	104 countries , including 22 SSA countries
Number of days to export/import	days	Doing Business (2008)	188 countries, including 47 SSA countries
Costs associated with export/import procedures	US$ per 20-foot standard container	Doing Business (2008)	Idem
Documents necessary to export/import	# of documents	Doing Business (2008)	Idem
Logistic Performance Index.	Aggregate index (range: 5-1)	LPI (2007)	150 countries, including 39 SSA countries

Yet, some of the variables related to trade-cost that are likely to enter into a gravity-model have a reduced coverage in terms of African countries; leading to the exclusion of many African countries from estimates. Nevertheless, among indicators surveyed in the last section, three sets of indicators have a reasonably good coverage of SSA countries and are ready to be incorporated in a gravity model: the restrictiveness indices estimated by Kee et al (2008), the trading-across-the-border indicators reported by Doing Business, and the LPI. Table 3 summarizes some of their main attributes. Comparability across countries for each of these trade-cost indicators is possible, but as their units differ it is difficult to compare their relative importance in each country. To fill this gap and provide orders of magnitude of their relative importance for each country in the sample, estimates from a gravity model can be used by comparing the effect of a change in these indicators in a country's trade.

Hoekman and Nicita (henceforth HN) (2008) estimate a gravity equation that not only include several variables that previous research has shown to be significant in explaining trade flows, but also indicators from these three categories. We build on their database and estimates to compute some illustrative figures to compare the effect of trade-cost

[11] Several studies have provided theoretical foundations to the gravity model and contributed to its popularity as they showed it can be derived from different models, such as the Ricardian, Heckscher-Ohlin, increasing returns to scale (IRS) models, and more recently the firm-heterogeneity model as in Helpman-Melitz and Rubinstein (2008).

related indicators. Their data set covers 104 importers and 115 exporters, 22 of which are African countries. Data correspond to 2006. Only for the few cases where 2006 data was not available, 2005 or 2004 data was used.

As their gravity equation include ad-valorem restrictiveness measures of tariff barriers (TTRI) and non-tariff barriers (NTB-RI), the estimated coefficients can be used to compute, for instance, the ad-valorem TTRI change leading to a change in trade that would otherwise be induced by a change in another explanatory variable, such as the LPI or the trade costs reported by Doing Business (DB). To illustrate this, suppose that a one percentage change in DB Export Costs leads to a change in trade flows of about $\hat{\beta}_{DB\_Export\_Cost}$ percent[12] according to gravity estimates. The same change in trade flows could be brought about by a relative change in the value of the TTRI equal to the ratio $\hat{\beta}_{DB\_Export\_Cost} / \hat{\beta}_{TTRIt}$, which is the "tariff-cut equivalent" or the "ad-valorem equivalent" of a percent change in the cost of export procedures.

Drawing on the database and estimates by HN (2008), we compute for each African exporter in the sample, the "ad-valorem equivalents" of both, an improvement in LPI and a reduction in the costs of export procedures, halfway the level of the top performing African country in the sample.[13] In the data base, trade flows are positive for about 90 percent of observations in the sample. The Poisson pseudo maximum likelihood (PPML) estimator is employed to estimate the gravity equation. Zero bilateral trade flows are also included in the sample as the PPML estimator produces consistent estimates in the presence of heteroskedasticity and is robust to truncation (Santos-Silva and Tenreyro, 2006).

Table 3 reports estimates of a set of specifications aiming to check the robustness of $\hat{\beta}_{TTRI}$, $\hat{\beta}_{NTB-TRI}$, $\hat{\beta}_{DB\_Export\_Cost}$, and $\hat{\beta}_{LPI\_Exporter}$ that are used to compute the illustrative "ad-valorem equivalents" on an improvement in terms of LPI and a reduction in export costs. Estimates are typical for gravity-equation models, where nearly all coefficients have the expected signs and are significant. Column 1 reports estimates for a slightly modified version of specification 5 in HN (table 5), where TTRI and NTB-RI are expressed in levels rather than in logarithms, a convenient choice to compute "ad-valorem equivalents".[14] Contrary to typical results, the coefficients of dummies identifying landlocked countries are not significant. A possible explanation resides on the inclusion of the LPI or the costs of exports for landlocked countries that remove explanation power to the dummies, as landlocked countries generally have lower scores along these dimensions (see for instance figure 6). Common language is another variable

[12] For notation, let $\hat{\beta}_X$ be the estimated elasticity of imports with respect to the variable X entering in their gravity equation.

[13] Appendix 1 contains a table with the values of LPI and DB costs of export procedures for the African countries considered in the gravity estimates.

[14] In addition, TTRI and NTB-RI are expressed in percentages, meaning that a figure of 5% is equal to 0.05 in decimals.

having a non-significant coefficient. Although these dummies with non-significant coefficients are removed from specification 2, coefficients do not vary greatly.[15]

In specification 3, TTRI and NTB-RI are replaced by OTRI, which is a sum of the two former. Unsurprisingly, the value of the OTRI coefficient looks like an average of the two former, but the pseudo R-square -a measure of fitness of the regression- falls slightly. When the LPIs are excluded (specification 4), the export and import-costs coefficients become larger, as also shown by HL (2008). Analogously, LPI coefficients become larger when DB variables are excluded in specification 5. Finally, specification 6 incorporates the other Doing Business variables related to trade: the time and the number of documents required to export and import. Among them, only the coefficient of the time to import is both, significant and has an appropriate sign. This is likely due to the inclusion of several independent variables that are highly correlated. But in general, the estimates of $\hat{\beta}_{DB\_Export\_Cost}$ and $\hat{\beta}_{LPI\_Export}$ remain stable and significant across specifications.

Making use of gravity estimates, we compute for each African exporter the ad-valorem-equivalent of an improvement in the exporter's LPI, and independently, a reduction in the costs of export procedures halfway the level of the most performing countries, which are South Africa in the case of the LPI, and Mauritius in the case of export costs. We use the estimated TTRI coefficient rather than the NTB-RI coefficient to compute the "ad-valorem equivalents" for three reasons. First, the TTRI is a more reliable measure of protection than the NTB-RI, as the raw data used to construct the NTB-RI is less reliable than the tariff data used to construct the TTRI. Second, unlike the NTB-RI coefficient, the TTRI remains significant at the 1% level in all estimates. Finally, retaining TTRI coefficients, which are bigger than NTB-RI coefficients in absolute value, leads to more conservative estimates of "ad-valorem equivalent" estimates of a given change in export costs. [16]

For our exercise, we retain estimated coefficients in specification 1 as it has the highest pseudo-R squared and the estimates of $\hat{\beta}_{DB\_Export\_Cost}$ and $\hat{\beta}_{LPI\_Export}$ are among the smallest in absolute value, leading again to more conservative estimates.

[15] Removing these coefficients from subsequent regressions do not alter significantly coefficients of other variables.

[16] Indeed, the ratio $\hat{\beta}_{DB\_Export\_Cost} / \hat{\beta}_{TTRIt}$ is smaller than the ratio $\hat{\beta}_{DB\_Export\_Cost} / \hat{\beta}_{NTB-TRIt}$.

Table 3. Gravity-estimates.

	1	2	3	4	5	6
Distance (log)	-0.765	-0.765	-0.772	-0.808	-0.744	-0.767
	[0.043]***	[0.043]***	[0.043]***	[0.043]***	[0.046]***	[0.043]***
GDP Importer (log)	0.754	0.751	0.773	0.798	0.663	0.689
	[0.070]***	[0.067]***	[0.066]***	[0.035]***	[0.069]***	[0.062]***
GDP Exporter (log)	0.565	0.568	0.567	0.71	0.486	0.604
	[0.063]***	[0.064]***	[0.063]***	[0.029]***	[0.078]***	[0.053]***
Population Importer (log)	0.07	0.071	0.054	0.035	0.17	0.133
	[0.047]	[0.046]	[0.043]	[0.036]	[0.043]***	[0.044]***
Population Exporter (log)	0.248	0.248	0.245	0.126	0.329	0.209
	[0.063]***	[0.063]***	[0.062]***	[0.042]***	[0.086]***	[0.052]***
Remoteness Importer (log)	0.944	0.935	0.981	1.008	1.028	0.94
	[0.130]***	[0.133]***	[0.135]***	[0.132]***	[0.138]***	[0.131]***
Remoteness Exporter (log)	1	1.007	1	1.157	1.087	0.962
	[0.135]***	[0.136]***	[0.133]***	[0.128]***	[0.138]***	[0.147]***
Landlocked Importer	0.047		0.053	0.07	-0.038	0.048
	[0.130]		[0.131]	[0.126]	[0.134]	[0.129]
Landlocked Exporter	-0.04		-0.04	-0.013	-0.112	-0.094
	[0.098]		[0.098]	[0.095]	[0.096]	[0.100]
Common border	0.701	0.701	0.706	0.587	0.725	0.701
	[0.159]***	[0.159]***	[0.159]***	[0.162]***	[0.169]***	[0.155]***
Common language	-0.108	-0.108	-0.117	-0.055	-0.09	-0.097
	[0.134]	[0.134]	[0.134]	[0.143]	[0.132]	[0.129]
TTRI	-3.182	-3.187		-3.013	-3.975	-3.396
	[0.883]***	[0.880]***		[0.824]***	[0.896]***	[0.931]***
NTB-RI	-1.53	-1.524		-1.564	-1.921	-1.297
	[0.887]*	[0.886]*		[0.842]*	[0.996]*	[0.831]
OTRI			-2.255			
			[0.538]***			
LPI Importer	0.149	0.153	0.153		0.479	0.062
	[0.149]	[0.145]	[0.148]		[0.145]***	[0.163]
LPI Exporter	0.396	0.393	0.388		0.663	0.507
	[0.140]***	[0.141]***	[0.140]***		[0.173]***	[0.153]***
DB Import Costs (log)	-0.431	-0.428	-0.435	-0.532		-0.37
	[0.103]***	[0.100]***	[0.103]***	[0.100]***		[0.111]***
DB Export Costs (log)	-0.355	-0.356	-0.359	-0.474		-0.39
	[0.114]***	[0.111]***	[0.111]***	[0.120]***		[0.111]***
# docum to export						0.016
						[0.029]
Days to export						0.014
						[0.004]***
# docum to importndimp						0.021
						[0.027]
Days to import						-0.02
						[0.005]***
Observations	10508	10508	10508	10725	10508	10508
Pseudo-R^3	0.8971	0.8971	0.8969	0.8932	0.8921	0.8998

Robust standard errors in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Figure 8
Average TTRI and estimated "ad-valorem equivalents" of an improvement in LPI and DB export.

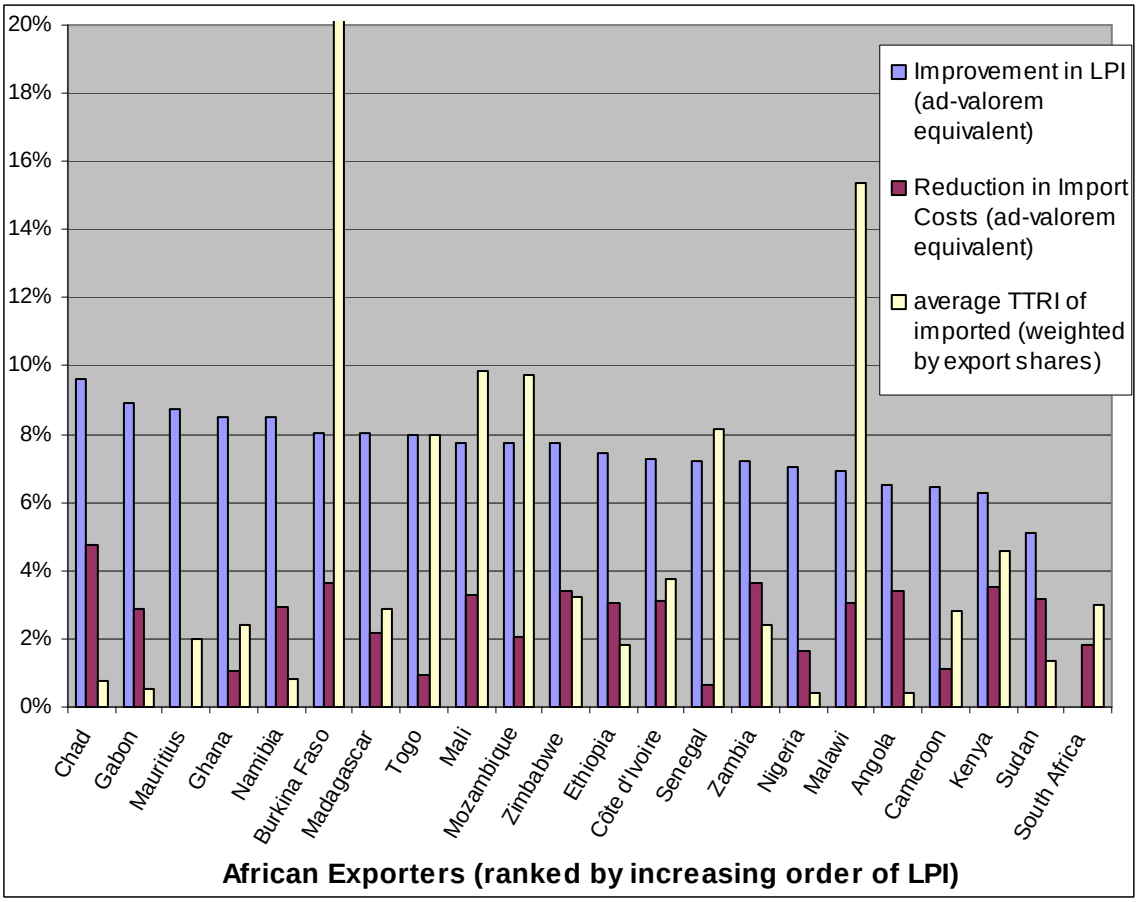


Figure 8 summarizes for each African exporter the "ad valorem equivalent" of an improvement in LPI halfway the value of South Africa for the LPI and Mauritius in the case of export costs. For each African exporter, we also report the average value of TTRI of each of the markets the African exporter serves weighted by its export share, which is a rough measure of the restrictiveness of tariff barriers across destinations. Evidently, the figure is dependent on the composition of exports across destinations.

Take the example of Ethiopia; if its logistic system -as measured by the LPI- were to improve halfway the level of South-Africa the subsequent rise in exports would be equivalent to the one triggered by an average cut in the TTRI it faces of about 7.5 %, assuming the composition of its exports across partners does not change. Similarly, if costs of export procedures in Ethiopia were cut halfway to the level of Mauritius, the subsequent change in exports would be bring about by a tariff cut of 3.1 percent. Compared to the weighted average of TTRI that Ethiopian exporters face is less than 2 percent, the gains of Ethiopian exporters in terms of an improvement in trade costs seem to be higher, especially for an improvement along the dimensions measured by the LPI.

For all African countries in the sample, an LPI improvement is more significant than a comparable reduction in DB Export costs. Evidently, LPI and DB indicators are closely linked and a decline in DB export costs for a country is likely to lead to an improvement in the value of the LPI for this country. As illustrated in figure 8, this improvement is more important for most of the countries than completely cancelling tariff barriers they face, as measured by the TTRI of importers.

It is also worth noting that such exercise produce illustrative estimates. The standard caveats to gravity estimates hold, such as the appropriateness of the constant elasticity functional form, the dependence of the value of estimates on the choice of independent variables, and so on. However, the constant elasticity gravity models are standard in the literature, and the estimated coefficients used to compute the "ad-valorem equivalents" seem stable across specifications and the specification leading to the most "conservative" estimates is retained.

5. Conclusion: Looking ahead.

Trade costs prevent the full realization of the gains from trade and can weaken the poverty alleviation role of export opportunities for African countries. In addition, some of the costs associated with exports, and thus the impacts of trade on incomes and poverty, depend to a large extent on complementary domestic factors like improved infrastructure, adequate competition policies and, especially in Africa, enhanced access to credit, better education and health, and low marketing or intermediation costs. Recent research focusing on case studies of several export crops in Africa shows that exports are crucial for poverty reduction.

Farmers that are able to adopt high-yield export crops are on average less poor than farmers more oriented towards subsistence activities, as shown by Porto (2008). Moreover, high trade costs prevent farmers from adopting major export crops. Policies aiming to reduce trade costs and encourage marketing activities in rural areas may be useful to facilitate exports and reduce poverty. Examples include roads, marketing information, and measures that promote the development of market arrangements such as FDI or growers schemes. To boost these potential benefits, these measures should be accompanied by enhanced access to international markets. These findings support the recent emphasis on the "aid for trade" approach to development policy.

Ongoing research suggests that important gains can be achieved in Africa through trade facilitation. Although illustrative, estimates in this paper suggest that an improvement in the logistics for the less advanced African countries up to a level comparable to more advanced countries in the region could be more important barriers in terms of trade expansion than a reduction of tariff.

Most economists agree that a successful completion of the Doha Round achieving cuts in agricultural barriers would boost benefits, particularly to African countries. Unhappily, at the time this paper is written, the Doha Round lies in a cryogenic state and it seems to

remain so for a while. Trade facilitation, which is about lowering trading costs by making more efficient the administrative and physical procedures to transport goods across borders, is an alternative policy option to be pursued in order to promote export opportunities and growth in Africa.

Despite unfavorable circumstances in the African region, there are some good prospects for growth. Apart the oil producing nations, some countries are experiencing strong growth, in part, with global price increases in other primary export commodities. This worldwide rise of commodity prices has been engendered in large part by the rapid growth of Asian developing countries, especially China and India. Their demand for these commodities is likely to grow, or at least not change from current levels, over the short to medium term. A number of countries in Africa are diversifying their exports, no longer relying solely on exports of a few raw commodities. Exports are increasingly composed of light manufactured goods, processed foods, and services such as tourism, and call centers. Some countries -such as Nigeria and South Africa- have been increasing their shares of exports in technology-based products, as noticed by Broadman (2007). Lowering trading costs to take advantage of future opportunities is part of the context in which African trade and development prospects can strengthen.

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Appendix
Logistic Performance Index (LPI) score and Doing Business (DB) export procedures cost for African countries in the sample.

African country	Cost of Export procedures	LPI score
Angola	1850	2.48
Burkina Faso	2096	2.24
Cameroon	907	2.49
Chad	4867	1.98
Côte d'Ivoire	1653	2.36
Ethiopia	1617	2.33
Gabon	1510	2.1
Ghana	895	2.16
Kenya	1955	2.52
Madagascar	1182	2.24
Malawi	1623	2.42
Mali	1752	2.29
Mauritius	728	2.13
Mozambique	1155	2.29
Nigeria	1026	2.4
Senegal	828	2.37
South Africa	1087	3.53
Sudan	1700	2.71
Tanzania	1212	2.08
Uganda	2940	2.49
Zambia	2098	2.37

Source: World Bank LPI (2007) and Doing Business (2008)