What constrains Africa's exports?
Preliminary and incomplete

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Abstract What is the binding constraint to Africa's exports: transit, paperwork, or ports and customs costs? We use detailed data on the breakdown of trade times to answer this question. We find that transit costs are the most constraining. A one percent reduction in inland travel times leads to a 1-2 percent increase in exports. Put another way, a one day reduction in inland travel times translates into nearly a three percentage point reduction in all importing country tariffs. In contrast, higher times in the other areas are not robustly significant in reducing exports. We control for the possibility that greater trade leads to improvements in transit in a three ways. First, we examine the effect of trade costs in a transit country on the exports of landlocked countries. Second, we use a sample of food products, ranging from perishable goods where time is most critical to preserved goods, and show that transit costs reduce exports by relatively more for goods with a shorter lifespan. Third, we show that transit times have a greater effect on existing exports, while other costs also affect new exports. One explanation for the domination of transit is that it is associated with more uncertainty than other costs. Our results imply that improvements in moving goods inland must be included in trade facilitation programs in Africa.

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I. Introduction

It takes 36 days to process export documents in countries such as Angola, Zambia and Niger. In Denmark or Singapore it takes only one day to produce all necessary export documents. It takes 37 for the goods to be shipped from Bujumbura (Burundi) to Dar Es Salaam port (Tanzania). While customs and ports procedures take 17 days in Angola and Eritrea, they take 2 days in Switzerland or in Belgium. We use detailed data from the World Bank's 'Doing Business' report to estimate whether and how diverse trade costs affect export volumes in Sub-Saharan Africa[1].

This paper follows from Djankov, Freund and Pham (2006) in which authors analyze the effects of export times on trade. We extend the previous study by disaggregating total export times into four main components: documentation activities, inland carriage, terminal (port) handling and customs and technical control. Identifying which of the previous components has a significant impact on trade is fundamental to the design of suitable trade facilitation policies for developing countries seeking to expand exports.

A contribution of our paper is to understand why different types of export costs might affect trade differently. First, we investigate if the uncertainty related with each component of export times can explain why, for exporters, inland transit delays are more important than waiting times in customs and ports. In addition, we test if certain procedures such as documentation activities can be done in advance by exporters and are learning by doing processes.

The standard tool of our analysis is the gravity equation[2]. We control for remoteness since more remote countries are likely to trade more with their actual trading partners because they have fewer alternatives. A concern deriving from our

[1] Djankov, Freund and Pham (2006) analyze the effects of export times on trade. The authors have a unique variable identifying time delays which makes it difficult to understand which components of export times significantly affect trade values.

[2] Wilson et. al. (2004) and Nordas and Piermartini (2004) use a standard gravity equation to estimate how trade facilitation costs and infrastructure affect trade flows using a gravity model. They use data on port efficiency from the Global Competitiveness Report. These data are based on perception surveys and may not be comparable across countries.

approach is that the volume of trade may directly affect trade costs. The marginal value of investment in trade facilitation is higher when the trade volume is large since cost savings are passed on to a larger quantity of goods. In addition, many time-saving techniques, such as computerized container scanning, are only available in high-volume ports. Alternatively, increased trade volumes could increase congestion and lessen the efficiency of trade infrastructure. Thus, while more efficient trade facilitation stimulates trade, trade also generates improved trade facilitation.

To deal with the potential effect of export volumes on export times, we first estimate the effects of time uncertainty on trade values. This specification partially reduces the endogeneity problem coming from reverse causality since higher volumes of export might not necessarily decrease the uncertainty about delivery times.

We also investigate the effect that each key export time component has on the extensive and intensive margins of trade. In this case, the effect that time delays have on new products exports is less likely to be endogenous if we assume that trade in new products does not have a significant impact on trade facilitation. Furthermore, analyzing new products export volumes allow us to examine if documentation procedures are a learning-by-doing process.

As an alternative way to eliminate the potential endogeneity problem, we examine the effect that documentation, inland transit, customs and port delays in transit countries respectively have on landlocked countries exports. We perform a linear regression by simply substituting the export time variables of each landlocked country by the ones of the coastal neighboring country(ies). We also report the results using an instrumental variables approach.

Finally, we estimate a “difference-in-difference” equation. The technique we use evaluates the interactive effect of time sensitivity and time delays on trade flows, controlling for exporter and industry fixed effects. The intuition is that long delays present an even greater hurdle to exporters of time sensitive products. This follows the methodology of Romalis (2004), Levchenko (2007) and Cunat and Melitz (2007) who examine the effect of endowments, institutions, and labour flexibility, respectively, on trade. The advantage of this specification is that we can see whether lower trade costs stimulate relatively more exports in time-sensitive categories. The identification problem may still be present if enhanced trade in time-sensitive

industries leads to better trade facilitation, though this is less likely since these products make up a small share of total trade.

All the different techniques used to analyze the effect of export times key components on trade values lead to the same conclusion. Inland transit delays have a robust negative effect on export values. Our estimates imply that a one percent increase of inland transit times decreases export values of one percent on average. Furthermore, this effect is higher for time sensitive goods with respect to time insensitive goods. Finally, delays in documentation processes have a negative impact on new products exports.

The paper proceeds as follows. The next section discusses the data. Section III presents the estimation strategy. Section IV presents the results. Section V evaluates time sensitive products and Section VI concludes.

II. Data

We use data on trade times based on answers to a comprehensive World Bank questionnaire completed by trade facilitators at freight-forwarding companies in 146 countries in 2007 and collected as part of Doing Business, a World Bank project that investigates the scope and manner of business regulations[3].

The data provides detailed information on the different kinds of costs an exporter faces when moving his goods from the principal city to the port of exit. More precisely, the survey ask respondents the average and the maximum times in calendar days it takes for completing a series of export procedures. Each procedure can be classified into one of four main categories: documentation, inland transportation, customs and ports.

The first category represents the time it takes for an exporter to complete all documentation activities such as securing a letter of credit, assembling and processing export and international shipping certificates and realizing all pre-shipment inspections and clearance.

Inland transportation includes not only the time it takes for the merchandise to be moved from the principal city to the port of exit but also the time spent arranging the

[3] For a detailed description of the data see Djankov, Freund and Pham (2006).

transport and waiting for the merchandise's pick up and loading into a carriage. For landlocked countries, total transport times also include waiting times at the crossing border.

The customs category includes the time necessary to realize the technical controls of the merchandise. In addition, for landlocked countries this category comprises the total time it takes from the submission of request of clearance until the completion of the inspection and clearance procedure in the transit country.

Finally, the ports category represents terminal handling times, including storage if a certain storage period is required, the waiting times for loading the containers into the vessel and customs inspection and clearance times.

It is important to take into account that for many countries, especially in Africa and the Middle East, the port of exit may not be the nearest one. Indeed freight-forwarders avoid some ports due to high port fees, inadequate inland infrastructure, or problems at border crossings. One example is Cotonou, Benin's main port, which is seldom used due to perception of corruption and high terminal handling fees.

Two examples illustrate the data. In Denmark, an exporter takes on average 5 days to have his goods moved from the factory to the ship: 2 days preparing documents, 1 day on land transportation and 2 days going through customs and getting the merchandise loaded onto ships. In contrast, for an exporter in Rwanda it takes 43 days on average to complete all requirements for shipping its merchandise abroad: 17 days represent both the delays resulting from documentation and inland transit, while port and custom procedures take respectively 6 and 3 days on average (see Figure1).

Table 1 presents the summary statistics for each of the components representing the total time[4] necessary to fulfil all the requirements for exporting by region and regional arrangement. Several patterns are seen in the data. Getting a product from the factory to the ship is relatively quick in developed countries. In contrast, for Sub-Saharan Africa, all time costs categories are on average higher compared to all the other regions. Across regions, paperwork procedure times are usually the ones taking more time, followed by inland transit.

[4] The time delays reported in the survey are probably at the lower end of the time it takes to move the average product from factory to ship. This is because the products are chosen so that they do not require cooling or any technical inspections based on use of hazardous materials.

In Sub-Saharan Africa, trade facilitation is not only about administrative hurdles but also about inland transit. Indeed three quarters of the time delays are represented by delays from documentation and inland transit. The problems are magnified for landlocked African countries, whose exporters need to comply with different requirements and delays at each border (see Table 2).

The trade data are both from the UN Comtrade database and the IMF Direction of Trade database. GDP and Population are from the World Bank's World Development Indicators. Gravity variables such as country pair distances, language and colony are taken from Mayer and Zignago dataset. Country's Capital abundance information is available for 2005 and comes from GTAP 7 database. Simple average Tariffs at 6 digit level are taken from the TRAINS dataset.

III. Estimation

We study the effects that each of the components of time to export (documentation, inland transit, ports and customs) has on trade values in isolation. Longer time delays act as a tax on exports, especially on high- value goods, since they are effectively depreciating during the delay. In addition, the exporter must expend capital on the exporting process and storage/transport of the goods during the delay.

We begin by estimating an augmented gravity equation:

$$\begin{aligned} LnExports_{ij} = {} & \mu_j + \beta_1 Ln(GDP_i) + \beta_2 Ln(POP_i) + \beta_3 Ln(Dist_{ij}) + \beta_4 Ln(Docstime_i) + \\ & + \beta_5 Ln(inlandtransittime)_i + \beta_6 Ln(Cust\&Portstime_i) + \beta_7 Ln(\mathrm{Remote}_i) + X_{ij} + \varepsilon_{ij} \end{aligned} \quad (1)$$

where i and j represent the exporter and the importer countries respectively. The dependent variable is represented by total exports, and μ_j are importer fixed effects; GDP_i and POP_i are respectively the Gross Domestic Product and the total population of country i; $Dist_{ij}$ is the distance between country i and country j. X_{ij} is a vector of dummy variables associated with the exporter and the importer such as sharing the same official language or border or having a having been a colony.

$\mathrm{Re}\,mote_i$ is a measure for the exporter's remoteness and is calculated following Head (2003)

$$\mathrm{Re}\,mote_i = \frac{1}{\sum_j GDP_j / Dist_{ij}}$$

It is important to control for remoteness in our regressions for two reasons. First, there is evidence that a country's trade with any given partner is dependent on its average remoteness to the rest of the world (Anderson and Van Wincoop 2003). Furthermore, remoteness is correlated with factory-to-port time delays hence not including it into the regression would produce biased estimates of the impact of trade facilitation on trade.

$Docs\ time_i$, $Inland\ transit\ time_i$ and $Cust\ Port\ time_i$ are the explanatory variables of our interest. The times representing terminal port handling and customs and technical control were aggregated due to their very high correlation. The time it takes for an exporter to complete all requirements to ship its merchandise abroad has been decomposed into its main components to better understand which procedures are the ones representing a direct obstacle on exports. From a policy perspective, exploring which exports time components have a significant negative impact on trade values is important to design suitable trade facilitation programs.

There is a reverse causality problem in our regressions since time to export variables are likely to be correlated with country exports. An improvement of infrastructure and administrative time costs has positive effects on exports. However, countries that export more may have higher returns to enhance local trade facilitation and invest more in time efficient means. Furthermore, some types of exports processing are only available in high volume ports. In fact, Hummels and Skiba (2004) provide evidence that trade volumes affect the timing of adopting containerized shipping and reduce shipping costs. Alternatively, congestion effects imply underestimation of the coefficient on time costs.

We use different strategies to control for the potential effect of export volumes on export times. First, we estimate the effects of time uncertainty on trade values. We define time uncertainty as the difference between the maximum time and the average

time it takes to conclude each of the different phases representing the total time to export. This specification partially reduces the endogeneity problem coming from reverse causality since higher volumes of export might not necessarily decrease the uncertainty about delivery times.

As a second strategy we investigate the effects that documentation, inland transport, customs and ports times respectively have on the intensive and extensive margins of trade. More precisely, we regress equation (1) considering both new[5] and old products aggregate exports as dependent variables. We can assume that new products, since not exported in the past, do not have a significant impact on infrastructure and administrative times to export. In addition, this approach allows us to test if aactivities such as securing a letter of credit or assembling documentation activities can either be learned on time or done in advance. If so, we would expect a negative and significant effect of documentation times on export values of new products.

Finally, we examine the effect that each of the key components of time trade costs in transit countries has on landlocked countries exports. First we perform a linear regression by simply substituting the export time variables of each landlocked country by the ones of the coastal neighboring country. We also report the results using instrumental variables. Even in this case the instruments for each time export variable are represented by the export times components of their neighboring transit country(ies) as the container travels to the port.

IV. Results

We now estimate the augmented gravity regression from Equation (1). The linear regression results including all Sub-Saharan countries are reported in Table 4. The results from the first two columns imply that all export time components have a negative effect on exports and this negative effect is statistically higher in the case of

[5] We define new products as those that were not exported in the years 2002 2003 and 2004 and that entered into the export market in the time interval 2005-2007. New products exports include exports of new products to old markets, exports of new products to new markets and exports of old products to new markets.

documentation procedures when average tariffs[6] are not included. The coefficients on other variables are typical in the literature and are stable with the inclusion of the different categories of export times.

In columns (3) and (4) of the table we control for domestic geography by including the distance in km from the principal city to the port. In column (3) the variable inland transit time still has a negative and significant effect. However, the distance variable shows a positive and significant coefficient which might be explained by its collinearity with the inland transit time variable. In fact, when this last variable is dropped from the regression (see column 4) the distance in km coefficient becomes negative and non significant. These results imply that there are other factors different from pure geography such as road quality, road blocks or border waiting times having a direct negative effect on trade values.

In columns (5) and (6) we repeat the same exercise but this time including the distance in time from the principal city to the port. This variable is calculated as the travel time it takes to get from the principal city to the port by assuming a speed of 40 km per hour for unpaved roads and 80 km per hour for paved surfaces[7]. Even in this case the travel time variable is negative and non significant once the inland transit time is dropped form the regression. This outcome confirms the fact that geography is not responsible for the long time it takes in Sub-Saharan Africa to get the goods from the city to the port. Furthermore, this variable shows that roads quality (paved versus unpaved roads) is not as important as other factors influencing road conditions.

Next, we deal with the potential endogeneity of the export time variables. In Table 5 the results that both inland transit time uncertainty and customs and ports time uncertainty have on trade values are presented. The results show a negative and significant impact of inland transit time uncertainty on trade values with a one percent increase in this last variable leading to a reduction of export of 0.2 percentage points.

The fact that delays in customs procedures and ports handling do not show a significant negative impact on trade values might derive from the presence of higher uncertainty in inland transport times with respect to uncertainty in port and customs

[6] Bilateral average tariffs where constructed as the simple average of MFN tariffs across all six-digit industries.

[7] No information on road condition was used in the calculation of travel time. Furthermore, delays at the border (or otherwise) were not included.

delays. Once exporters might use different ways to reduce ports and customs uncertainty they cannot directly affect the uncertainty related with inland transit times.

Table 6 presents the linear regression results for new and old products respectively. The outcomes show a significant effect of inland transport delays on exports of new and old products. In addition, the fact that the time it takes to secure a letter of credit or to process export documents has a significant negative impact only on the volume of exports of new products is in line with the learning by doing hypothesis of documentation activities.

In Table 7 we control for the potential effect that old products export volumes might have on export time efficiency by running a linear regression on a sub-sample of landlocked countries an substituting the export time variables of each of them by the ones of their coastal neighboring country(ies). For a sake of comparison, results from a regression of landlocked countries' new products export values are also included in the table.

Even in this case the results show a negative and significant effect of inland transport delays on aggregate trade. This effect is higher in the case of old products exports compared to new products exports. In fact, a one percent increase in inland transit times decreases exports in new and old products by 1,5 and almost 2 percent respectively. The outcomes further confirm the learning by doing hypothesis for documentation activities.

In Table 8 we present the outcomes obtained by running a restricted sample regression for landlocked countries and substituting their time to export variables with the ones of their neighbor country(ies). The first two columns report the results for the basic regression excluding and including average tariffs. Once we control for reverse causality the only component of export time that has a negative and statistical significant effect on exports is inland transit time. A one percent increase in inland transit times reduces trade by about one percent.

In the remaining columns of Table 8 we control for geography using three different variables, distance in km and travel time from the principal city of each landlocked country to the port they use and distance in km from the border (between the landlocked and the coastal country) to the export port. We repeat the regressions

also including average tariffs. The results show that after having controlled in different ways for geography, the effect of inland transit time is still negative and significant, with a coefficient very similar to the one of the basic regression.

The outcomes of the instrumental variables regressions are presented in Table 9. Even using this specification the only time to export component that has a significant negative effect on trade values is inland transit times. An increase of one percent in the delays of inland transit decreases trade on average by 1.6 percent. This result still holds after controlling for geography and including average tariffs. Putting the results in context we can say that a one day reduction in inland travel times translates into nearly a three percentage point reduction in all importing country tariffs.

It is important to notice that the results obtained in the regressions using a sub-sample of landlocked countries are not only driven by the fact these countries are more isolated and hence transit matters more for them. In fact, even if delays in inland transport can be higher with respect to coastal countries, the documentation procedures are still those taking more time for exporters (see Table 2).

From the previous results we can conclude that while reducing inland transit times significantly increases export values, higher times in other areas such as documentation, customs and ports are not robustly significant in reducing Africa's exports. These outcomes have important policy implications since they highlight that trade facilitation policies should prioritize those programs directly affecting the conditions and the security of Sub-Saharan Africa roads.

As a robustness check we perform all regressions excluding trade in oils and minerals from the dependent variable. This to control for the surge in commodities exports that took place in some African countries during the 2007. Results still confirm the presence of a negative and significant effect of inland transit times on exports.

To account for the presence of zero trade values across country pairs, we use Tobit and Poisson specifications[8]. In most of the cases results still hold. The reasons why we prefer to show and comment the truncated OLS results are twofold. First, we are interested on time to export effects on trade volumes, rather than on whether trade facilitation will have an impact on export decisions. In addition, Martin and Pham

[8] Results are available upon request.

(2008) show that amongst different gravity equation estimation techniques, those that produce unbiased estimators after dealing with the pervasiveness of zero trade values and of heteroskedasticity issues yield to estimators very similar to the ones of a truncated OLS specification.

V. Time-Sensitive Exports

Time delays should have a greater effect on of time-sensitive goods'[9] exports. To examine the extent to which they are hampered, we follow the methodology first introduced by Levchenko (2007) and Cuñat and Melitz (2007) and estimate a difference-in-difference gravity equation using trade data of agricultural products for which time matters the most and the least. This methodology reduces the endogeneity problem coming form reverse causality because we control for country and industry fixed effects. In addition, the products we consider account for only a small fraction of trade in agricultural goods on average (less than 10 percent) so it is unlikely that they have a large impact on establishing trade facilitation processes.

We base our definition of time-sensitive agricultural products on the information of their storage life (Gast 1991) which includes a range of products going from a minimum storage life of 2 weeks or less, such as apricots, beans, currants, and mushrooms to 4 weeks or longer, for example apples, cranberries and potatoes and canned products. We also include goods with very long storage life such as dry fruits with a maximum storage life between 6 months and one year and canned products with a storage life ranging from 1 to 5 years, depending on the good's acidity. To measure time sensitivity we use the inverse of the median storage life of each product.

To study the joint effect of industry time-sensitivity and country time delays on exports we estimate the following difference in difference gravity regression

[9] Evans and Harrigan (2005) show that time-sensitive apparel products are more sensitive to distance than time-insensitive products.

$$LnExports_{ik} = \alpha_i + \alpha_k + \beta_1 Ln(Time\ Sensit_k) \times Ln(Docs\ time_i) + \beta_2 Ln(Time\ Sensit_k) \times Ln(Customs\&Ports\ time_i) + \beta_3 Ln(Time\ Sensit_k) \times Ln(Inland\ transit\ time_i) + \beta_4 Ln(K\ abundance_i) \times (canned\ product_k) + \varepsilon_{ik}$$

where α_i and α_k represent country and industry fixed effects. The coefficients β_1, β_2 and β_3 capture the joint effect of time sensitive products and respectively time delays in documentation, customs and ports and inland transit on export values. We introduce the term $(K\ abundance_i) \times (canned\ product_k)$ to control for the fact that more capital abundant countries are more likely to produce canned products.

With this specification we test whether exports of time-sensitive goods are more responsive to time delays in each of the key components of time to export than exports of time-insensitive products.

Tables 10 and 11 present the results for time-sensitive agricultural products controlling for the interaction of capital abundance and the fact that the good is a canned product. In the first table results are reported for countries exporting at least one product while in the second table, countries exporting 70% or more of the products are considered. In both cases the first column shows that the coefficient of the interaction term of inland transit times with time sensitivity is always negative and significant, implying that an increase in inland transit times reduces export of time-sensitive goods relatively more than time insensitive goods.

After controlling for the interaction between product time sensitiveness and distance in km and travel time respectively, an increase in inland transit still has a negative and significant effect on export of time-sensitive goods relatively to time insensitive goods. Neither of the new interaction terms is significant. This suggests that the effects on transit time delays on export of time sensitive goods is really about delay and not about features such as geography.

Poor road conditions affects the composition of trade, preventing countries from exporting time-sensitive agricultural goods. Time-sensitive goods also tend to have higher value, implying that some of the effect of inland transit delays on aggregate exports results from countries with poor and not well targeted trade facilitation programs concentrating on low-value time insensitive goods.

VII. Conclusion

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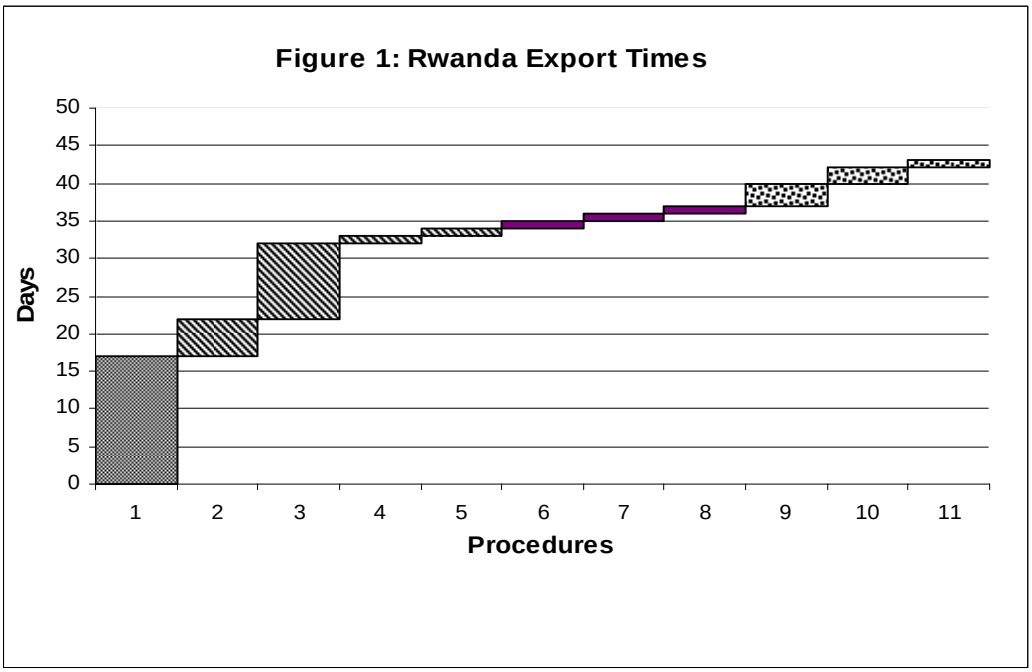
Figure 1: Export Procedures by Category



List of procedures:

-Documentation:
1. Obtain bank related documents and reassemble all other export documents

- Inland transit
2. Pack and arrange transportation
3. Inland transportation
4. Additional clearance
5. Waiting time at border

-Customs
6. Customs clearance
7. Health/technical control
8. Pre-shipment

-Ports
9. Port and terminal handling
10. Waiting time
11. Loading onto vessel

Table 1. Descriptive statistics by Geographic Region

Region	Statistics	Documents	Customs	Ports	Inland Transit
East Asia & Pacific (19)	mean	**13.26**	2.58	4.58	4.05
	median	12	2	3	3
	s.d.	10.13	1.54	3.67	3.34
Europe & Central Asia (23)	mean	**13.09**	3.78	4	6.48
	median	10	2	3	4
	s.d.	8.97	4.71	2.35	8.34
Latin America & Caribbean (28)	mean	**11.64**	3.29	3.79	4.04
	median	11	2.5	3	3.5
	s.d.	6.70	2.26	2.41	3.11
Middle East & Nord Africa (16)	mean	**13.38**	3.44	3.25	4.75
	median	11	2	3	3.5
	s.d.	12.88	3.12	1.39	4.92
OECD (24)	mean	**5**	1.25	1.88	2.04
	median	4	1	2	2
	s.d.	3.20	0.53	0.80	0.95
South Asia (8)	mean	**16.25**	4.13	4.50	7.63
	median	13	3.5	4	5
	s.d.	11.51	1.96	1.31	6.89
Sub-Saharan Africa (44)	mean	**18.84**	**4.34**	**5**	**7.20**
	median	17	4	4	4
	s.d.	8.67	2.09	3.21	7.07

Note: 1. The unit of measure is number of days. 2. Number of countries for each region in parenthesis.

Table 2. Descriptive statistics Landlocked and Coastal Sub-Saharan Countries

Sub-Saharan Countries	Statistics	Documents	Customs	Ports	Inland Transit
Landlocked countries (13)	mean	23.85	4.62	4.54	15.46
	s.d.	9.35	1.89	1.45	7.57
	min	9	3	3	8
	max	41	10	7	31
	median	25	4	4	11
Coastal countries (31)	mean	16.74	4.23	5.19	3.74
	s.d.	7.57	2.19	3.72	2.61
	min	5	1	1	1
	max	38	10	20	13
	median	15	4	4	3

Note: 1. The unit of measure is number of days. 2. Number of countries for each region in parenthesis.

Table 3: Correlation of explanatory variables

	GDP	POP	Docs	Customs	Ports	Inland transit	Docs (Transit country)	Customs (transit country)	Ports (Transit Country)	Inland tranp (Transit country)	Remote	Dist. city to port (km)	Dist. city to port (time)	Lang	Colony	Border
GDP	1															
POP	0.593	1														
Documents	-0.110	-0.064	1													
Customs	-0.006	0.108	0.175	1												
Ports	0.265	0.094	0.175	0.388	1											
Inland transsort	-0.146	-0.073	0.312	0.066	-0.023	1										
Docs (Transit Coutnry)	-0.046	-0.037	0.710	0.287	0.299	-0.078	1									
Customs (transit country)	0.008	-0.101	0.229	0.789	0.356	-0.013	0.436	1								
Ports (Transit Coutnry)	0.225	-0.012	0.202	0.281	0.899	-0.016	0.297	0.356	1							
Inland transp. (Transit country)	0.003	0.055	0.218	0.208	0.249	0.329	0.296	0.187	0.150	1						
Remote	0.011	-0.146	-0.166	-0.210	-0.157	-0.211	-0.174	-0.101	-0.159	-0.007	1					
Dist. city to port (km)	-0.072	-0.035	0.432	0.075	-0.073	0.702	-0.043	-0.015	0.022	-0.057	-0.362	1				
Dist. city to port (time)	-0.081	-0.048	0.417	0.045	-0.081	0.791	-0.074	-0.048	-0.024	-0.024	-0.325	0.976	1			
Lang	0.046	0.013	-0.014	0.012	-0.005	-0.044	-0.027	0.067	0.027	-0.087	-0.029	0.005	-0.008	1		
Colony	0.067	0.040	-0.018	0.001	0.018	-0.066	-0.023	0.013	0.061	-0.090	-0.067	0.002	-0.016	0.561	1	
Border	0.017	0.026	0.029	0.001	0.001	0.009	0.019	-0.001	-0.006	0.010	0.004	0.022	0.022	0.135	0.119	1

Table 4: The Effect of export time components on Aggregate Exports
OLS regression overall sample

Dep. var: Aggregate Exports	(1)	(2)	(3)	(4)	(5)	(6)
Docs time	-0.844***	-0.646***	-0.897***	-1.036***	-1.127***	-1.191***
	[0.129]	[0.211]	[0.133]	[0.129]	[0.140]	[0.140]
Inland transit time	-0.436***	-0.342***	-0.535***		-0.710***	
	[0.074]	[0.124]	[0.087]		[0.100]	
Customs and ports time	-0.500***	-0.602***	-0.550***	-0.559***	-0.447***	-0.474***
	[0.134]	[0.204]	[0.140]	[0.140]	[0.140]	[0.140]
GDP	1.099***	1.315***	1.079***	1.185***	1.108***	1.237***
	[0.054]	[0.084]	[0.056]	[0.050]	[0.056]	[0.051]
POP	0.066	-0.171**	0.085	-0.026	-0.001	-0.131***
	[0.051]	[0.077]	[0.052]	[0.049]	[0.053]	[0.050]
Distance	-1.534***	-1.674***	-1.547***	-1.516***	-1.624***	-1.587***
	[0.105]	[0.144]	[0.105]	[0.106]	[0.106]	[0.107]
Dist. princip. city to port (km)			0.049**	-0.023		
			[0.022]	[0.019]		
Dist. princip. city to port (time)					0.331***	0.025
					[0.067]	[0.052]
Tariff (simple av.)		-0.029**				
		[0.013]				
Observations	3778	1871	3778	3778	3630	3630
R-squared	0.506	0.490	0.507	0.501	0.513	0.505

Notes: 1. Robust standard errors in brackets.*** p<0.01, ** p<0.05, * p<0.1. 2. Importer fixed effects, reporter remoteness and country pair specific variables (common language and common colony) are included in all regressions.

Table 5: The Effect of time uncertainty on Aggregate Exports
Overall sample OLS regression

	(1)	(2)
Infrastructure time uncertainty	**-0.290*** **	**-0.211** **
	[0.076]	**[0.107]**
Ports and customs time uncertainty	0.011	-0.049
	[0.113]	[0.158]
Docs time	-0.289	0.313
	[0.220]	[0.315]
GDP	1.339***	1.561***
	[0.080]	[0.108]
POP	-0.331***	-0.447***
	[0.105]	[0.151]
log distance	-1.453***	-1.767***
	[0.158]	[0.208]
imp exp tariff (simple av.)		-0.037*
		[0.020]
Observations	1895	973
R-squared	0.566	0.592

Notes: 1. Robust standard errors in brackets.*** p<0.01, ** p<0.05, * p<0.1 2. Importer fixed effects, reporter remoteness and country pair specific variables (common language and common colony) are included in all regressions.

Table 6: The Effect of Documentation Times on New products Export Values OLS regression overall sample

	New products exports	New products Exports	Old products exports	Old products exports
Docs time	-0.379***	-0.511***	-0.598***	-0.349
	[0.107]	[0.141]	[0.156]	[0.221]
Inland transit time	-0.482***	-0.465***	-0.434***	-0.478***
	[0.064]	[0.086]	[0.090]	[0.132]
Customs and ports time	-0.153	-0.041	-0.726***	-0.666***
	[0.109]	[0.141]	[0.163]	[0.229]
GDP	0.914***	0.954***	1.221***	1.254***
	[0.049]	[0.065]	[0.068]	[0.096]
Population	-0.159***	-0.256***	-0.127*	-0.199**
	[0.049]	[0.065]	[0.066]	[0.094]
Distance	-1.375***	-1.505***	-1.578***	-1.813***
	[0.109]	[0.126]	[0.180]	[0.221]
Tariffs (simple av.)		-0.053***		-0.045*
		[0.014]		[0.023]
Observations	3363	1994	2159	1196
R-squared	0.439	0.448	0.480	0.450

Notes: 1. Robust standard errors in brackets.*** p<0.01, ** p<0.05, * p<0.1 2. Importer fixed effects, reporter remoteness and country pair specific variables (common language and common colony) are included in all regressions. 3. Regressions where repeated including distances in time and km from city to port and the results did not change.

Table 7: The Effect of Documentation Times on New products Export Values OLS restricted sample regression

	New products exports	Old products Exports
Docs time	-0.644***	-0.768
	[0.208]	[0.740]
Inland transit time	-1.596***	-1.983***
	[0.226]	[0.376]
Customs and ports time	-0.309	-0.493
	[0.438]	[0.508]
GDP	0.370***	1.090***
	[0.134]	[0.190]
Population	-0.003	-0.415**
	[0.138]	[0.165]
Distance	-2.053***	-2.015***
	[0.179]	[0.392]
Observations	944	617
R-squared	0.452	0.431

Notes: 1. Robust standard errors in brackets.*** p<0.01, ** p<0.05, * p<0.1 2. Importer fixed effects, reporter remoteness and country pair specific variables (common language and common colony) are included in all regressions.

Table 8: The Effect of export time components on Aggregate Exports
OLS regression restricted sample

Dep. Var: Aggregate Exp	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Docs time	-0.757*	-0.027	-0.726	-0.018	-0.916**	-0.233	-0.459	0.236
	[0.449]	[0.608]	[0.450]	[0.608]	[0.457]	[0.620]	[0.453]	[0.611]
Inland transit time	**-1.103*** **	**-1.042** **	**-1.288*** **	**-1.264*** **	**-1.267*** **	**-1.263*** **	**-1.206*** **	**-1.217*** **
	[0.297]	**[0.441]**	**[0.311]**	**[0.475]**	**[0.302]**	**[0.456]**	**[0.294]**	**[0.436]**
Customs and ports time	0.203	-0.150	0.079	-0.255	-0.042	-0.386	0.508	0.278
	[0.411]	[0.601]	[0.415]	[0.609]	[0.421]	[0.617]	[0.422]	[0.620]
GDP	0.755***	1.149***	0.692***	1.079***	0.616***	0.988***	0.546***	0.883***
	[0.141]	[0.222]	[0.150]	[0.236]	[0.160]	[0.251]	[0.149]	[0.232]
POP	-0.112	-0.382**	0.001	-0.266	0.033	-0.222	0.058	-0.181
	[0.121]	[0.181]	[0.131]	[0.200]	[0.130]	[0.199]	[0.118]	[0.178]
Distance	-1.565***	-1.840***	-1.571***	-1.807***	-1.578***	-1.796***	-1.614***	-1.764***
	[0.263]	[0.317]	[0.262]	[0.316]	[0.262]	[0.316]	[0.259]	[0.311]
Tariffs (simple av.)		-0.042		-0.047		-0.050*		-0.060**
		[0.030]		[0.030]		[0.029]		[0.029]
Dist. city to port (km)			-0.411*	-0.420				
			[0.242]	[0.355]				
Dist. city to port (time)					-0.502**	-0.544*		
					[0.222]	[0.328]		
Dist. border to port							-0.840***	-0.969***
							[0.168]	[0.255]
Observations	1024	502	1024	502	1024	502	1024	502
R-squared	0.507	0.508	0.509	0.510	0.511	0.511	0.522	0.526

Notes: 1. Robust standard errors in brackets.*** p<0.01, ** p<0.05, * p<0.1. 2. Importer fixed effects, reporter remoteness and country pair specific variables (common language and common colony) are included in all regressions.

Table 9: The Effect of export time components on Aggregate Exports
Instrumental Variables Restricted Sample Regression

Dep. var.: Aggr. Exp	(1)	(2)	(3)
Docs time	0.258	0.103	0.300
	[1.065]	[0.395]	[0.545]
Inland transit time	**-1.655****	**-1.625*****	**-1.605*****
	[0.645]	**[0.316]**	**[0.443]**
Customs and ports time	0.643	1.170	0.656
	[1.810]	[0.881]	[1.316]
GDP	0.626***	0.324**	0.632***
	[0.229]	[0.130]	[0.188]
POP	-0.256	-0.070	-0.270
	[0.552]	[0.215]	[0.328]
Distance	-1.825***	-1.632***	-1.818***
	[0.312]	[0.252]	[0.317]
Tariffs (simple av.)	-0.061**		-0.060**
	[0.028]		[0.028]
Dist. from border to port		0.276	-0.036
		[0.220]	[0.316]
Observations	502	1024	502
R-squared	0.536	0.522	0.535
Sargan statistic	0.0576	0.499	0.0469
p-value of Sargan statistic	0.810	0.480	0.829

Notes: 1. Robust standard errors in brackets.*** p<0.01, ** p<0.05, * p<0.1
2. Importer fixed effects, reporter remoteness and country pair specific variables (common language and common colony) are included in all regressions.

Table 10: The Effects of Export Time Components on Time Sensitive Products
OLS Regression Including Countries Export at Least One Product

Dep. Var: Aggregate Exports by industry	(1)	(2)	(3)	(4)	(5)
Docs time*Time sensitivity	0.252	0.182	0.098	0.126	0.139
	[0.182]	[0.191]	[0.188]	[0.207]	[0.207]
Inland transit time*Time sensitivity	**-0.174***	**-0.248****		**-0.289****	
	[0.096]	**[0.113]**		**[0.130]**	
Customs and ports time*Time sensitivity	0.002	-0.142	-0.025	-0.157	0.008
	[0.200]	[0.233]	[0.227]	[0.235]	[0.223]
K abundance*Canned product	0.539**	0.547**	0.492**	0.548**	0.496**
	[0.216]	[0.216]	[0.216]	[0.217]	[0.216]
Distance in km*Time sensitivity		0.041	0.002		
		[0.033]	[0.028]		
Distance in time*Time sensitivity				0.131	-0.021
				[0.101]	[0.074]
Observations	637	637	637	635	635
R-squared	0.523	0.524	0.520	0.524	0.520

Notes: Standard errors in brackets *** p<0.01, ** p<0.05, * p<0.1

Table 11: The Effects of Export Time Components on Time Sensitive Products
OLS Regression Including Countries Exp 70% or more Products

Dep. Var: Aggregate Exports by industry	(1)	(2)	(3)	(4)	(5)
Docs time*Time sensitivity	0.226	0.096	0.020	0.048	0.119
	[0.202]	[0.225]	[0.224]	[0.251]	[0.251]
Inland transit time*Time sensitivity	**-0.229****	**-0.314****		**-0.346****	
	[0.109]	**[0.127]**		**[0.147]**	
Customs and ports time*Time sensitivity	0.037	-0.183	-0.027	-0.174	0.061
	[0.228]	[0.281]	[0.276]	[0.288]	[0.272]
K abundance*Canned product	0.710***	0.769***	0.636**	0.765***	0.629**
	[0.259]	[0.263]	[0.259]	[0.263]	[0.258]
Distance in km*Time sensitivity		0.055	0.003		
		[0.041]	[0.036]		
Distance in time*Time sensitivity				0.150	-0.047
				[0.126]	[0.094]
Observations	526	526	526	526	526
R-squared	0.545	0.547	0.540	0.546	0.540

Notes: Standard errors in brackets *** p<0.01, ** p<0.05, * p<0.1