

**Transport Prices and Costs:**  
**The Need to Revisit Donors' Policies in Transport in Africa**

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## **Transport Prices and Costs:**

### **The Need to Revisit Donors' Policies in Transport in Africa**

**Gaël Raballand**

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#### **Abstract**

This study is the first comprehensive and empirical effort in the last fifteen years to measure and quantify the determinants of transport costs and prices in Africa. Based on trucking surveys for more than 400 companies in thirteen African countries, it demonstrates that contrary to what most literature has presented, transport costs (cost to transport service providers) are not excessively high in the Sub-Saharan region but transport prices (costs to shippers) are, especially in Central Africa. This is mainly a result of official and unofficial market regulation and structure in trucking services, notably in West and Central Africa.

In order to seriously tackle transport-related constraints on corridors in Africa, the donor community should support as a first priority transport market liberalization but also collection of data in the trucking industry and the use of country specific trucking data in the economic analysis and design of road maintenance strategies because, in most cases, investments in roads will probably not lead to decrease of transport costs for end-users of transport services.

**Keywords:** transport costs, Africa, landlocked, cartels.

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## I. Introduction

In Africa, high transport prices are rightly seen as a major obstacle to economic growth of the region. This has been documented in several studies. One of them (Amjadi and Yeats, 1995) even concluded that, in Africa, transport costs are a higher trade barrier than import tariffs and trade restrictions. In this paper<sup>1</sup>, it is analyzed, identified and quantified the factors behind Africa's high prices of road transport, with the purpose of helping policy-makers adopt appropriate actions to reduce transport prices to domestic and international trade.

Before the presentation of the results, a distinction has to be made between logistics costs, transport prices, transport costs and vehicle operating costs in order to avoid the usual confusion. This distinction is useful because prices may or may not reflect transport costs<sup>2</sup>:

- a) Transport prices are the rates charged by a transport company or a freight forwarder to the shipper or importer. Transport prices usually are the result of negotiated rates between the shipper and the transport service provider. Transport prices normally cover transport costs, the operator's overheads and profit margin.
- b) Transport costs are the costs the transport operator incurs when transporting a cargo. In addition to VOC, transport cost includes other indirect costs, such as license fee, roadblocks, etc.
- c) Vehicle operating costs (VOC) include the various direct costs the transport provider must pay to operate a given vehicle, notably labor, capital, fuel, tires, maintenance and depreciation cost of a vehicle.

A few empirical studies including trucking surveys carried out since the mid-1990s demonstrated that transport prices were high in Africa compared to other regions. One study (Rizet and Hine, 1993) estimated that prices of road transport in three Francophone African countries (Cameroon, Côte d'Ivoire and Mali) were up to six times higher than in Pakistan, and about 40 percent higher than in France where labor rates are much higher. Another study (Rizet and Gwet, 1998) comparing seven countries in three continents, Africa (Ghana, Cameroon, Burkina, Côte d'Ivoire), South-East Asia (Indonesia, Vietnam) and Latin America (Costa Rica), demonstrated that for distances up to 300 kilometers, the unit costs of road transport were 40-100 percent higher in Africa than in South-East Asia. Transport prices for most African landlocked countries range from 15 to 20 percent of imports costs (MacKellar et al., 2002), which is three to four times higher than in most developed countries.

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<sup>1</sup> The paper is based on a World Bank report. See Teravaninthorn and Raballand (2008) for a detailed description of the methodology and also see Annex 5.

<sup>2</sup> Logistics costs can be added. However, there is no agreement on a precise definition of logistics costs. Logistics is the process of planning, implementing, and controlling the efficient, cost effective flow and storage of raw materials, in-process inventory, finished goods and related information from point of origin to point of consumption for the purpose of meeting customer requirements. Logistics costs then encompass a much wider definition than transport costs including transaction costs (those related to transport and trade-processing of permits, customs, standards), financial costs (inventory, storage, security), and non-financial costs (insurance).

However, a number of studies that looked at the determinants of the high transport costs in Africa did not arrive at a wide consensus, but rather identified different factors as being the main contributors to the high prices. The factors included: low productivity of the trucking industry in Africa, notably due to infrastructure constraints (Pedersen, 2001), low levels of competition between service providers (Rizet and Hine, 1993), or weak infrastructure (Lima and Venables, 2001). This latter study also indicated the poor quality of infrastructure as accounting for most of Africa's poor trade performance. From a cross-country regression, the study concluded that trade was highly sensitive to transport costs – a 10 percent drop in transport costs increases trade by 25 percent, and transport costs are sensitive to the quality of infrastructure, as measured by such variables as the density of the road and rail network.

In the past, large investments in improving road infrastructure were predicated on the basis that transport prices would be reduced. The World Bank since the 1970s has actively supported the transport corridors in Africa and during many years such support focused almost exclusively on improving infrastructure. While the improvements were essential to facilitate road transport and resulted in lower costs for the trucks carrying cargo on the corridors, no clear impact on the transport prices was evident. Thus, the end-users of road transport services did not seem to fully benefit from the lower transport costs and better service quality that the improved infrastructure could possibly allow.

Since many research attempts in the past did not arrive at a conclusive result, the current study has made a deliberate attempt to expand both the breadth and depth of the research and can claim to be original in the following areas:

- a) It is the first comprehensive and practical effort in the last fifteen years to measure and quantify the high transport prices in Africa.
- b) It is the first attempt of this kind in Africa and elsewhere in the world to disaggregate and clearly define the various input factors into three tiers of cost and prices, i.e. vehicle operating costs, transport costs (incurred to commercial transport providers) and transport prices (incurred to end users), and try to understand how each of them effect the final transport prices.
- c) It is also the first study that clearly recognizes the diversification in transportation market across Africa continent with an attempt to measure with the same yard stick the costs, prices and performances of the transportation industry across the four sub-regions of Africa.

Contrary to what most literature has presented, transport costs are not excessively high in Africa but transport prices are, especially in Central Africa mainly due to official and unofficial market regulation and structure in trucking services.

Following the introductory section, the report in Section 2 compares transport prices and costs and trucking services productivity in Africa with other regions of the world and presents a typology of corridors in Sub-Saharan Africa (SSA). Section 3 disentangles the main determinants of transport costs and highlights the fact that road condition may not matter much on corridors, while Section 4 demonstrates the

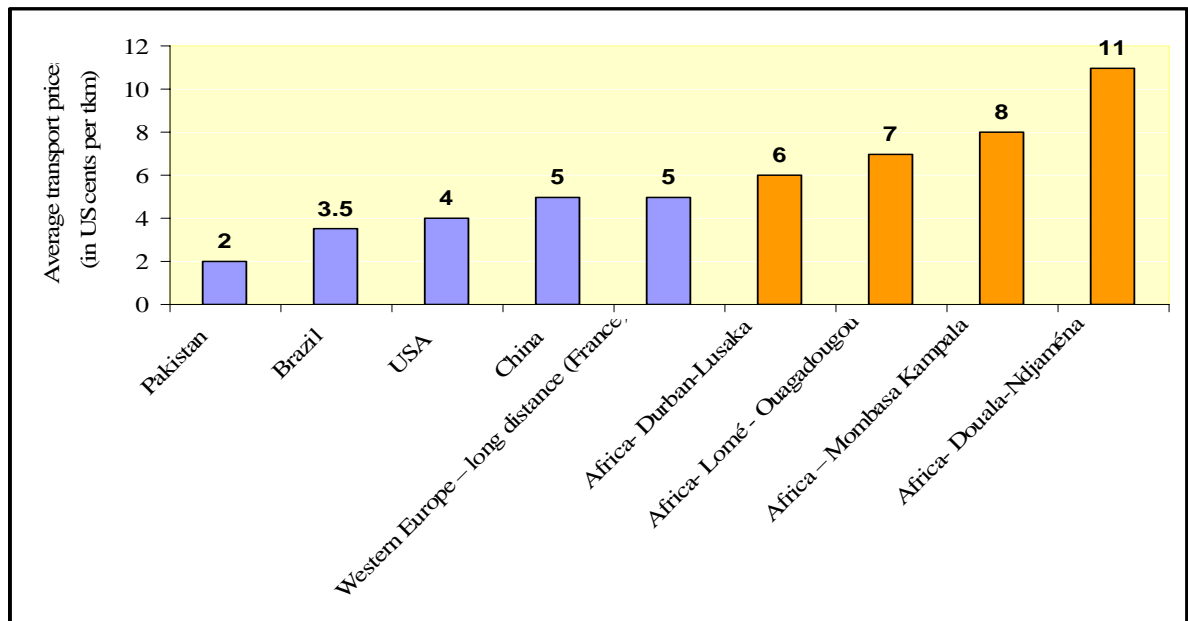
impact of cartels on transport prices and service quality. Section 5 assesses econometrically the main determinants of transport profitability and Section 6 concludes summarizing the main findings and the policies recommendations for Africa.

## II. Where does stand Africa in terms of transport prices, costs and quality?

### *Transport prices, costs and quality*

As shown in Figure 1 transport prices (per ton-kilometer) in Africa are, on average<sup>3</sup>, higher than in South Asia or Brazil; only the Durban-Lusaka Corridor in Southern Africa approaches the price level of other regions of the world.

**Figure 1: Average transport prices: a global comparison**



Source: Study team compilation of data from various sources.

However, Tables 1 and 2 demonstrate that transport costs, on the main international corridors, transport costs in Africa are not excessively higher than in Western Europe. Indeed, variable costs are

<sup>3</sup> Average transport prices are difficult to disaggregate because transport prices or freight rates are dependent on several factors including *Return cargo*: if backload is ensured, freight rates are lowered; *Cargo types*: tankers, oil products, machinery and containers are more expensive to transport than general cargo in bags; *Commercial practices/discounts*: there are often large discrepancies between published tariff schedules and what customers actually pay; *Seasonal demand*: prices are seasonal and are highly sensitive to supply/demand, especially for certain export commodities and some imported finished goods.

However, although there are some possible biases and problems concerning data reliability, transport prices are rather homogeneous along the studied routes in the trucking surveys. Along a corridor, prices obviously vary: for instance, in USD prices per tkm, from Mombasa, average prices are set at 4 USD cents for Kenya, 8.5 for Uganda, 9 for Rwanda, 11 for Burundi and 12 for DRC (Goma) (Oyer 2007).

higher in Africa because of: (i) high costs of fuel; (ii) old age of truck fleets, which lead to a higher fuel consumption; and (iii) probably worst roads condition. However, lower fixed costs in Africa offsets this. Fixed costs are much lower in Africa than in Europe due to much lower wages and lower capital cost associated with the use of aged truck fleets.

**Table 1: Comparative transport costs between Africa and Europe (Eastern and Western) (in USD)**

	<b>Central Africa</b>	<b>East Africa</b>	<b>France</b>	<b>Germany</b>	<b>Spain</b>	<b>Poland</b>
Total transport costs (USD per veh-km)	1.87	1.33	1.59	1.71	1.52	2.18

Source: Trucking surveys for Chad and Kenya, CNR for Europe. Monthly wages include bonus for France and Germany.

**Table 2: Transport costs comparison between Central, East Africa and France**

	<b>Central Africa<sup>4</sup></b>	<b>East Africa</b>	<b>France</b>
Variable costs (in USD per km)	1.31	0.98	0.72
Fixed costs (in USD per km)	0.57	0.35	0.87 <sup>5</sup>
Total transport costs (in USD per km)	1.88	1.02	1.59
Average fleet age (in years)	11 years	7 years	7 years
Fuel consumption (in liters per 100 kilometers)	65 liters	60 liters	34 liters
Yearly mileage (in kms)	65,000	100,000 <sup>6</sup>	121,000
Average daily speed (in kms per hour) <sup>7</sup>	30	43	69
Payload utilization <sup>8</sup> (in percentage)	75%	76%	87%
Immobilization time before loading <sup>9</sup>	13 hours	6 hours	1.6 hours
Articulated trucks (in USD)	n/a	169,200	138,000

Note: East Africa truck price (in USD) corresponds to a heavy truck. Source: CNR for France. Trucking surveys for Central and East Africa.

<sup>4</sup> For Central Africa: Corridor Douala-N'Djaména. For East Africa: Corridor Mombasa-Kampala.

<sup>5</sup> Data for 2006.

<sup>6</sup> Based on interviews.

<sup>7</sup> Data from HDM-4 (Highway Development Management) for African corridors.

<sup>8</sup> Ratio of the number of kilometers with payload over the total number of kilometers of a truck. Data are based on rather similar truck capacity; African companies usually importing trucks from Europe after several years of use.

<sup>9</sup> Calculations for immobilization time before loading for African routes comes from the trucking surveys when loading at ports. It derives from the following question: what was the average amount of time you waited to pick up freight once inside the port?

The paradox lies in the fact that despite such low wages level, transport costs and prices are not much lower, while they are potentially the lowest in the world. Trucking industry is an activity intensive in labor. As such, the lower wages in Africa help to maintain at a relatively low level transport costs (see Table 3 for the wages comparison).

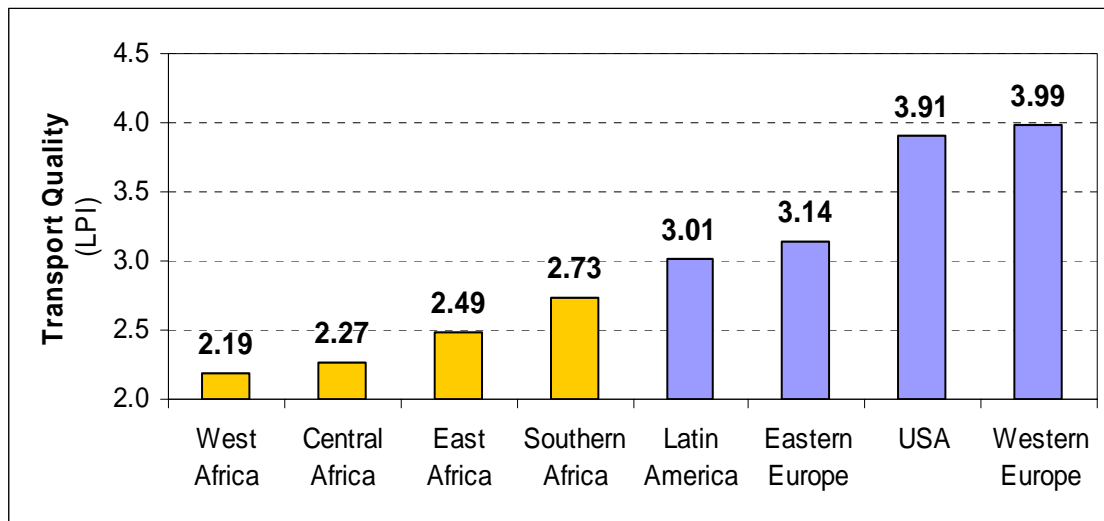
**Table 2: Median monthly wages for truckers (in USD)**

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

Source: CNR for France and Germany. Trucking surveys for Chad and Kenya. Monthly wages include bonus for France and Germany.

As shown in Figure 2, the four African sub-regions are on average below other regions in the world with respect to transport quality, West Africa being the worst and Southern Africa being the best within Africa. A yearly survey of international freight forwarders allows to determine the Logistics Performance Index (LPI)<sup>10</sup>.

**Figure 2: Transport quality in the world based on the Logistics Performance Index**



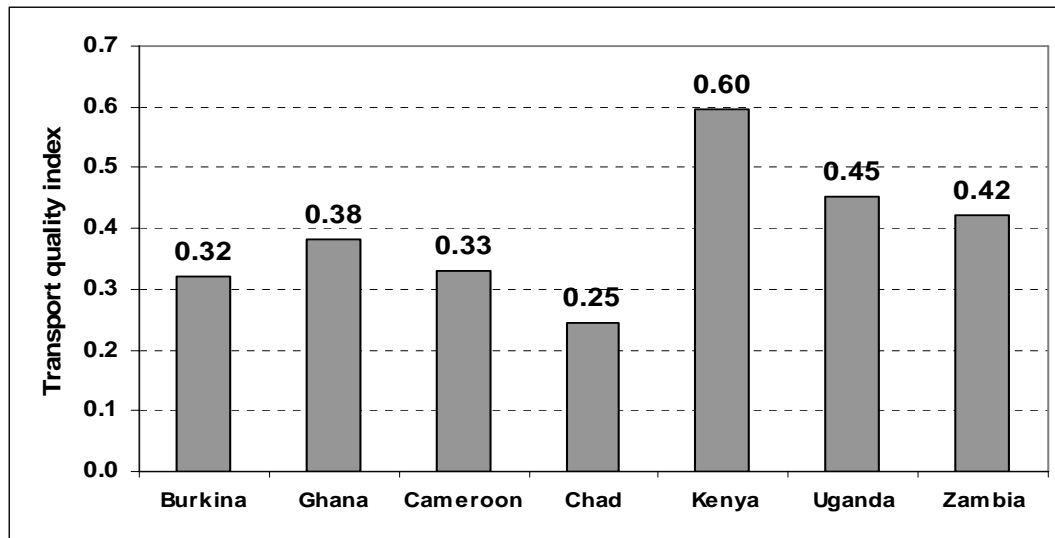
Source: World Bank, LPI (2007).

<sup>10</sup> The LPI is a set of indicators that measure perceptions of the logistics environment of 140 countries on several logistics dimensions. The survey uses an anonymous, web-based questionnaire which asks respondents to evaluate their country of residence, as well as eight countries they are dealing with, on several logistics dimensions: international transportation costs; domestic transportation costs; timeliness of shipments; tracking of shipments; transport and IT infrastructure; customs and other border procedures; and logistics competence.

Comparing transport prices and the quality of service as measured by the LPI with other countries shows that transport service in Africa is both more expensive and lower quality than in developed countries such as France and USA<sup>11</sup>: the greater the LPI (i.e., the better the transport quality), the lower the average transport price. USA has an LPI of 3.84 while West Africa's is 2.54. The LPI in Africa ranges between 2.54 and 3.11, the Central African region being an extreme case of high prices associated with low quality.

In order to assess transport quality in this environment, a proxy of country transport quality was developed based on trucking survey results<sup>12</sup> (see Figure 3). Based on this index, transport quality seems to be highest in Kenya and Uganda and lowest in Chad and Burkina Faso.

**Figure 3: A transport quality index based on the trucking surveys results**



Source: Trucking surveys and own calculations.

### ***Prices differ between African sub-regions***

Transport prices differ widely in Africa. On average, transport prices in Southern Africa are between two and three times lower than in Central Africa. The findings signal that the transport industry has

<sup>11</sup> Transport quality and predictability induce increase in non-logistics costs and then on development (see Arvis et al. 2007).

<sup>12</sup> It would have been obviously better to assess transport quality from end users but it is rather difficult to get reliable data on transport quality from firm surveys, such as investment climate assessments.

The index is calculated as a weighted average of indexes using the following weights :

- |   |   |
|---|---|
| ▪ Education level of the head of the company              | 2 |
| ▪ Experience in the industry of the head of the company   | 1 |
| ▪ Perception of the importance of domestic competition    | 2 |
| ▪ Importance of freight load obtained through contracting | 2 |
| ▪ Use of tracking system                                  | 1 |
| ▪ Fleet size  | 1 |
| ▪ Fleet age   | 3 |
| ▪ Number of employees                                     | 1 |



distinctive features along different routes. Transport practices, prices and costs are mainly route-specific (see Table 4) <sup>13</sup>.

**Table 4: International transport prices, costs and profit margins (from gateway to destination)<sup>14</sup>**

<b>Corridor</b>	<b>Route Gateway - Destination</b>	<b>Price<sup>15</sup> (USD per km)</b>	<b>Variable cost (USD per km)</b>	<b>Fixed cost (USD per km)</b>	<b>Profit margin<sup>16</sup> (percent)</b>
West Africa (Burkina and Ghana)	Tema/Accra - Ouagadougou (Ghana)	3.53 <sup>17</sup> (2.01)	1.54 (0.59)	0.66 (0.64)	80%
	Tema/Accra - Bamako (Mali)	3.93 (1.53)	1.67 (0.23)	0.62 (0.36)	80%
Central Africa (Cameroon and Chad)	Douala - N'Djaména (Chad)	3.19 (1.10)	1.31 (0.32)	0.57 (0.30)	73%
	Douala - Bangui (CAR)	3.78 (1.30)	1.21 (0.35)	1.08 (0.81)	83%
	Ngaoundéré - N'Djaména (Chad)	5.37 (1.44)	1.83 (0.25)	0.73 (0.44)	118%
	Ngaoundéré - Moundou (Chad)	9.71 (2.58)	2.49 (0.64)	1.55 (0.43)	163%
East Africa (Kenya and Uganda)	Mombasa - Kampala (Uganda)	2.22 (1.08)	0.98 <sup>18</sup> (0.47)	0.35 (0.14)	86%
	Mombasa-Nairobi (Kenya)	2.26 (1.36)	0.83 (0.17)	0.53 (0.19)	66%

<sup>13</sup> Fixed costs are the sum of staff costs, license costs, overhead costs, insurance costs, communication costs, security costs, losses, financial costs and depreciation costs. All fixed costs are calculated as an average for a truck owned by the company (i.e., total costs divided by fleet) and per year. Variable costs are the sum of fuel, tire, maintenance costs and bribes. Variable costs are route specific and are calculated per kilometer. Survey data however does not relate variable costs to routes traveled (except for bribes) and we assume that fuel and tire consumption and maintenance costs are uniform within the company fleet. All the original values are in local currency and were converted into current US dollars using IMF exchange rates.

<sup>14</sup> Prices are in USD per kilometer because most companies have the same truck capacity and similar (over)loading practices on a corridor. Moreover, due to questions in reporting overloading, prices in USD per kilometer are probably much more reliable than prices in ton kilometer. Prices and costs obtained from reported truckload (approximately 30 tons).

<sup>15</sup> Some indicative prices are set by some ministries of transportation in Africa but are not used. Prices set by freight allocation bureaus in Central Africa may be more respected.

<sup>16</sup> Data should be taken cautiously since some companies may omit some costs or, on the contrary, double count some costs.

<sup>17</sup> Prices from the trucking surveys are similar to the ones given by the Conseil Burkinabe des Chargeurs. Depending on the tonnage (official or real), prices in on per kilometer may be more or less higher.

<b>Unit</b>	<b>Official data from Burkina Faso shippers' council</b>		<b>Survey</b>
	<b>CFA</b>	<b>USD</b>	<b>USD</b>
Ton	26,000-30,000	52-60	59
Container	1,300,000 - 1,400,000	2,600-2,800	2,000

Note: Exchange rate USD/FCA = 0.002.

<sup>18</sup> Data are consistent with Oyer (2007), who found 1.1 USD per kilometer for Kenyan routes, without including overheads and management costs as well as no border-crossing and bribes costs.

Southern Africa (Zambia)	Lusaka-Johannesburg (South Africa)	2.32 (1.59)	1.54 (0.41)	0.34 (0.40)	18%
	Lusaka-Dar-es-Salaam (Tanzania)	2.55 (0.08)	1.34 (0.52)	0.44 (0.51)	62%

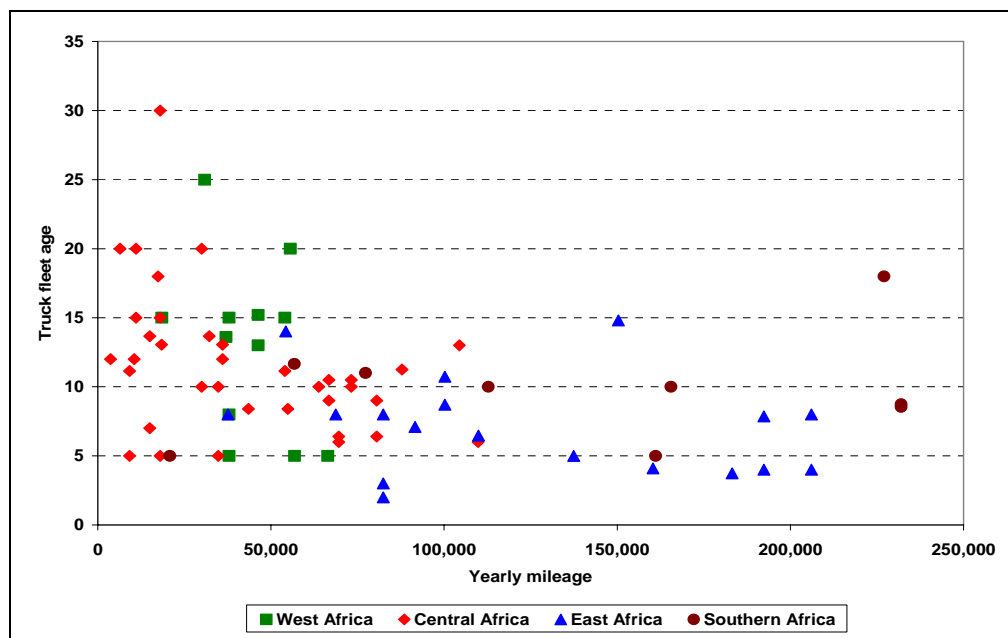
Notes:

1. These values include trucking services (three or more trucks) and truckers (one or two trucks). We are reporting the destination city and country in parenthesis
2. Standard deviation in parenthesis.

Source: Trucking surveys data and own calculations. Exchange rates come from IMF-IFS.

The large difference in transport prices (and costs) is clearly correlated with the level of truck utilization and the oversupply level, which mainly depends on the existence of cartels. While trucking companies in Southern Africa are able to utilize their vehicles at levels similar to the European transporters (10,000-12,000 kilometers per month), operators in Central and West Africa utilize their vehicles at lower rates (sometimes as low as 2,000 kilometers per month).

**Figure 4: The relationship between fleet age and yearly mileage by sub-region**



Source: Trucking surveys and own calculations.

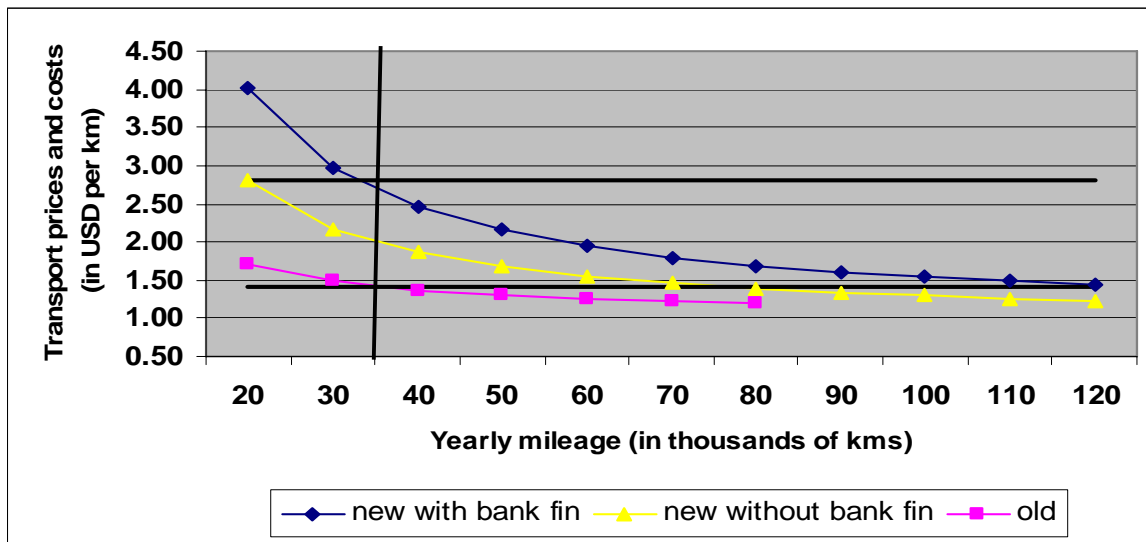
Standard deviation measures are especially high for prices. This, can be explained by the strategy of some large trucking companies, especially in a cartelized environment, to subcontract freight to truckers at a lower price<sup>19</sup>. Consequently, some truckers charge a low price and can be hardly profitable whereas some well-known trucking companies benefit from the cartel price and consequently reap large profits. It also

<sup>19</sup> This dualism is common to many industries and based on a product differentiation strategy. This standard deviation is probably due to the fact that trucking companies and truckers were interviewed and both have a different pricing strategy.

explains why old and new trucks can travel along the same corridor. Most probably, the new fleet benefits abnormally high mark-ups whereas the old truck is the subcontractor of a well-known trucking company.

Even though prices are relatively low in West Africa on the main international corridors compared to Central Africa, this does not prevent the trucking business from being profitable. Truckers keep production costs low through the combination of low capital costs (purchase of second-hand trucks) and minimal maintenance expenditures while they maximize revenues through high truck (over) loads. Old trucks then become the economic optimal when mileage is limited to 30-40,000 kilometers per year and margins derives from cartel prices (see Figure 5).

**Figure 5: Costs comparison between old and new trucks in Central Africa**

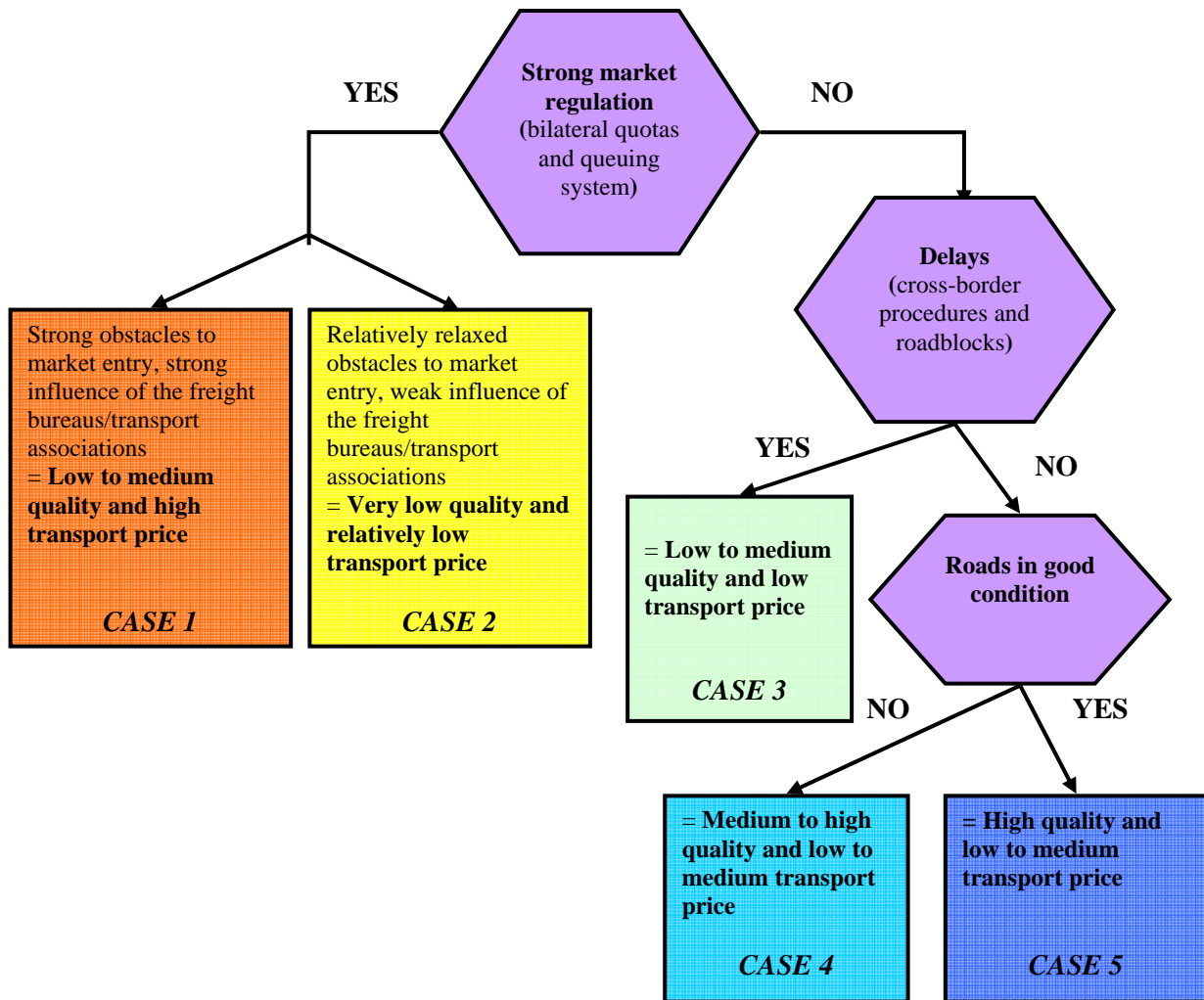


Source: Trucking surveys and own calculations.

### *A typology of corridors*

Of special importance with regard to transport prices is the fact that each of the corridors in the four Sub-Saharan corridors has its own market structure and regulation. Figure 6 defines a typology of corridors with market access at the core of the distinction. The trucking environment and market structure in Central and West Africa are characterized by cartels offering low transport quality (Cases 1 and 2, respectively), while in East Africa the trucking environment is more competitive and more mature (Cases 3 and 4). Major corridors in Southern Africa are the most advanced in terms of competitive and efficient services (Cases 4 and 5).

**Figure 6: A typology of transport corridors in Africa based on market access**



### III. Main determinants of transport costs: road condition does not matter so much

Different typologies of transport companies coexist on the same corridors. However, in general, the cost structure in SSA, even in the more modern and better organized companies, is different from developed countries: in Africa, trucking companies' costs are mostly variable cost while fixed costs are generally low. Central and West Africa are the extreme cases with ratios of 70/30 and above between variable and fixed costs, while in East Africa the ratio is 60/40. In all African corridors, the cost of fuel and lubricants is the main variable cost accounting for at least 40 percent of total vehicle operating costs. Tires cost is another important cost factor, whereas bribes do not seem to play a major role as has been generally perceived on most African corridors (see Annex 3).

In SSA, poor roads are perceived as being the main cause of high variable operating costs. Results from the study reveal that costs linked to road condition along the selected SSA international corridors do not seem to be that detrimental to the operating cost of trucks.

There is a wide range in the condition of roads over the study corridors, from corridor routes having only 45 percent of the road in good condition (Douala-N'Djaména) to others having the whole route in good condition (one in Central Africa and the two routes in South Africa).

**Table 5: Infrastructure condition and load control**

Region	Origin	Destination	Percentage of section in good and fair condition
West Africa	Tema / Accra	Ouagadougou	82%
	Tema / Accra	Bamako	61%
Central Africa	Douala	N'Djaména	45%
	Douala	Bangui	53%
	Ngaoundéré	Moundou	100%
	Ngaoundéré	N'Djaména	61%
East Africa	Mombasa	Kampala	86%
	Kampala	Kigali	75%
Southern Africa	Lusaka	Johannesburg	100%
	Lusaka	Dar-es-Salaam	no data

Note: Taken into account the percentage of the section that would be practicable at 50km/h in every season.

Travel time is much better than it is used to be, in large part because much road improvement has been carried out in Africa over the last decade with the support of donors (mostly the EU and the World Bank). Accessing the capital cities has become easier and faster. However, there are still a few road sections that require major improvements as well as some missing links to be built, notably in Central Africa. Travel time between cities is not much dependent on the average speed that a truck operates. More important than restricted speeds is the time a truck is idling while waiting for administrative procedures to be performed (at borders or at the terminals during loading or unloading). For instance, along the Northern Corridor in East Africa, truckers usually lose up to four hours in reduced speed because of road condition along some segments but spend, on average, more than one day at the border-crossing between Kenya and Uganda.

The results of surveys and HDM-4 simulations show a mixed result: in West and Central Africa, where traffic is low and the truck fleets are old, as long as international corridor routes are paved in a fair condition, road condition does not emerge as a major hindrance to transport efficiency. On the contrary, in Eastern Africa, on the main trade corridors, improving road condition would have a significant impact in reducing transport costs, even if the roads are in fair condition. But these cases are limited to a few corridor

routes. Table 6 presents indicative results of the cost/benefit analysis of partial road rehabilitation on a given corridor of 1,000 kilometers, depending on changes in road condition.

**Table 6: Indicative internal rate of return of infrastructure rehabilitation in three African sub-regions<sup>20</sup>**

		West Africa		Central Africa		East Africa	
		50 km project	100 km project	50 km project	100 km project	50 km project	100 km project
Fair to Good	Min. traffic	<0%	<0%	<0%	<0%	7%	0%
	Max. traffic	<0%	<0%	<0%	<0%	30%	15%
Poor to Good	Min. traffic	<0%	<0%	<0%	<0%	38%	20%
	Max. traffic	8%	1%	12%	3%	127%	65%

Source: Trucking surveys data and HDM-4 own calculations.

In West and Central Africa, due to low traffic, low truck utilization and old fleet, even if rehabilitation is limited to 50 kilometers of a road section in poor condition, the internal rate of return of the project is not positive (taking into account only the vehicle operating costs savings induced by road rehabilitation). On the contrary, in East Africa, in almost all the cases, road rehabilitation is justified mainly due to the fact that the minimal traffic along the Northern corridor (up to Kampala) is at least equal to 200 trucks per day. These tables therefore demonstrate that due the high cost of road improvement and the relatively old fleets, roads rehabilitation on hundred of kilometers requires probably than 200 trucks per day to be economically justified. Below such traffic, rehabilitation should probably take place when the road is only in poor or very poor condition (and only if a large proportion of the reduction in VOCs is passed on to the final user of transport services).

#### **IV. Impact of cartels on transport prices and service quality**

Much of the transport price burden in Africa has to do with the overall political economy of freight logistics which exacerbates the problems in trade and transport facilitation found in the rest of the world<sup>21</sup>. Competition in the trucking industry is a prerequisite for lower transport prices. For decades, trucking

<sup>20</sup> Assumptions are the following: savings are constant for 20 years for a 1,000 kilometer corridor, yearly traffic growth of 3 percent, rehabilitation costs are estimated to 0.5 million USD per kilometer, road maintenance costs are excluded and savings are discounted. We only take into account trucks traffic.

<sup>21</sup> In Africa, due to the thinness of some markets, the existence of cartels is easier than in Asia or Europe. However, market thinness does not necessarily induce the existence of cartels, like it is demonstrated in the case of Rwanda.

operators from landlocked countries, especially in West and Central Africa, have benefited from strong formal and informal protection (see Annex 1). The result was to be expected: high transport prices and low quality. The low level of truck utilization in some SSA sub-regions is due to oversupply of transport capacity resulting from the freight allocation and queuing systems. The two main strategies that operators undertake to mitigate the low truck utilization in the SSA regulated environment are the use of second-hand trucks and overloading the trucks.

Trade logistics is a fertile ground for rent-seeking activities: corruption and protected inefficient trucking services which in turn become a barrier to entry of modern operators. All these factors increase fragmentation and inhibit the emergence of a seamless supply chains needed by importers and exporters. Countries become trapped in vicious circles where inefficient regimes sustain low quality services (e.g. transport, customs broking) and high transport prices.

*Market entry through the licensing process is relatively easy.* Indeed, trucking companies/truckers do not identify the licensing process as one of the main constraints of the sector. Moreover, except in Kenya/Uganda, licenses to operate internationally remain marginal expenses in total VOCs. The existence of oversupply in many landlocked countries (see below) tends to demonstrate that market entry and credit access to finance trucks are not a major constraint to market entry.

*But the main regulatory issue concerns operational rules and market access restrictions mainly through freight sharing schemes.* The regulatory environment of inland countries in West and Central Africa is centered on two main intertwined regulations/rules:

- A transit bilateral treaty, which establishes quotas for the fleets of the coastal and inland countries.
- A formal/informal practice of a queuing system (the “*tour de rôle*”<sup>22</sup>) to allocate freight to transporters, requiring the operator to be affiliated with a transporter association.

Even though the “*tour de rôle*” is perceived negative by most stakeholders in landlocked countries, the bilateral quotas are backed in order to protect truckers from landlocked countries. In fact, in many countries in West and Central Africa, authorities have tried to tackle the “*tour de rôle*” and to declare this system unlawful. However, these attempts have never been really successful mainly due to the fact that the legal basis for restrictive practices remains through the quotas (see Annex 2). This system and rule lead to poor quality of service and to low productivity, with no incentives to improve efficiency<sup>23</sup>.

While bilateral freight allocation protects the trucking industry of landlocked countries, it “*de facto*” creates cartels and slows down market and regional integration. Furthermore, the operators so protected often do not meet regulatory requirements, such as having enough transport capacity. For

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<sup>22</sup> Contrary to bilateral quotas, the “*tour de rôle*” has no legal basis whatsoever.

<sup>23</sup> A landlocked country limiting access to its freight market for foreign companies self imposes higher transport prices on its trade because transport cannot be optimized due to a lack of backloads and transport operators charge at a higher price one way assuming no backload.

instance, Nigerien fleet is not appropriate to handle freight peaks and for various reasons, Nigerien fleet is less competitive than coastal countries' fleet.

In practice, authorities and trucking companies acknowledge that bilateral quotas are not enforced as in the case of Niger. Adoléhoumé (2007) gives the figure of 36 percent for the market share of the Nigerien fleet on the Togolese corridor for the first six months in 2007 whereas it should be in theory 2/3 and the same figures are given for CAR and Cameroon. On the ground, landlocked countries' fleets do not carry more than 50 percent of total traffic because of inadequate and uncompetitive fleet. Adoléhoumé estimated that the Nigerien fleet of articulated trucks is, on average, 29 years old and its operating costs per vehicle-kilometer are some 30 percent higher than the Beninese and Togolese fleets. By forcing shippers to use local fleet, they have to pay a surcharge (due to higher prices, lower quality or increased bribes if they want to use their transporters), which is detrimental, rather than beneficial, to the interests of the landlocked economy. The bilateral quota system is prone to strengthen bribes because the trucking association in charge of enforcing quotas "sells" market shares/freight to truckers/trucking companies ready to pay the highest bribe. This helps explain why bilateral quotas are not enforced. Further, in the case of Niger, the trucking association frequently sells freight to non-Nigerien companies<sup>24</sup>. The trucking industry in SSA faces various regulations such as market entry barriers, market access restrictions, technical regulations, and customs regulations. However, market access restrictions through freight sharing schemes are probably the most critical on the performance of the trucking industry. The current system favors the use of large fleets with majority of aged trucks in poor condition. Further, it fosters corruption because the only way for a transport operator to increase its volume of cargo is to bribe the *freight bureaux* (i.e., the government entities charged with allocating freight among the various transport operators).

Direct contracting, that is, a medium or long-term contract between a shipper and a trucking company, is one of the best signs of good logistics. However, direct contracting is almost inexistent in Central Africa and limited in West Africa to some institutional shippers, which bypass the queuing system (see Table 7). Stakeholders and representatives of transport associations usually agree that such contracts are the only way to develop an efficient transport industry. That is why the importance of direct contracting is an excellent proxy to assess the modernization, or the lack of it, of the trucking industry.

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<sup>24</sup> International own account transport is usually allocated to Beninese companies and due to the age of the fleet, shippers willing to overload prefer to use Beninese or Togolese fleet, which are younger.



**Table 7: Main methods used by the trucking industry to get freight (percentage by sub-region)<sup>25</sup>**

	Through independent freight agents	Through public-private institutions in charge of freight allocations	By phone/fax and through contracts from customers	By trucks waiting at lorry parks and finding their own loads	Others
West Africa	42.7	21.0	16.2	1.9	18.2
Central Africa	35.7	11.4	2.1	24.1 <sup>26</sup>	26.7
East Africa	12.7	20.7	27.3	5.1	34.2
Southern Africa	12.5	1.1	16.4	0.8	69.2

Source: Trucking survey and own calculations. Data for Zambian fleet for Southern Africa.

Central and West Africa are clear examples of the negative effects of freight sharing schemes on transport prices and quality. However, the freight allocation system is entrenched in these sub-regions and it would not be easy to abolish it. In Niger, there has been a recent attempt to abolish the queuing system. A recent government decree<sup>27</sup> states that (i) the 2/3 and 1/3 rule to distribute traffic between local transport companies and the maritime transport companies is still in effect, BUT (ii) all trucking operations within the Nigerien 2/3 are open to total competition. Yet, a workshop organized by the government on the Nigerien transport industry with all stakeholders to discuss the decree was boycotted by the trucking association<sup>28</sup>.

Up to now, the decree is nothing more than a signal. Indeed, the “*tour de rôle*” never had any legal ground and was designed by the Nigerien truckers to be imposed on themselves. Hence, its implementation requires willingness from Nigerien trucker association representatives. But, the queuing system can continue to be in place as long as transport associations have leverage thanks to the bilateral transit agreement, which gives them the power to avoid direct contracting between the shipper and the transporter.

## V. An econometric analysis

Table 8 presents the results of regressions in order to strive to explain the margins of transport companies and truckers along the main international corridors in Africa. We selected several exogenous variables and excluded to explain transport costs due because of endogenous problems between many

<sup>25</sup> To note that it is difficult to capture in trucking surveys the exact role of freight bureaus, which appears from interviews to be more important than from surveys due to the fact that truckers with old fleets benefit from the current system.

<sup>26</sup> This figure as well as through independent agents can be added to the figure through freight allocation bureaus. Indeed, agents “negotiate” with freight bureaus and truckers waiting at lorry parks depend on paperwork issued by the freight bureau.

<sup>27</sup> Ministerial decree number. 09/MT/DTT-MF of February 2007.

<sup>28</sup> Some companies attempt to enter the market without being part of a trucking association and of the queuing system but usually on very limited niches.

variables such as fixed costs, variable costs and even mileage and the possible dependant variable. The econometric is especially relevant to demonstrate how can be the impact of good road condition on the profitability of the industry. Using previous tables (such as Table 4), trucking along international corridors seems to be a rather profitable industry for most companies in Africa<sup>29</sup>.

The following equation was first tested for the whole sample and then for the observations of the three sub-regions: West, Central and East Africa:

$$\pi_i = \alpha VC_i + \beta FC_i + \chi Contracts_i + \delta Quality_i + \phi Roadcond_i + \lambda Nat_i + \varepsilon$$

*II: margins, VC = variable costs, FC= fixed costs, Contracts= percentage of freight obtained by contracts, Quality = road transport quality, Roadcond= road condition, Nat = dummy variable for national corridors.*

**Table 8: Results of simple regressions to identify the main determinants of transporters' margins**

	All (1)		Central Africa (2)		West Africa (3)		East Africa (4)
<i>Dependent variable: margin</i>							
Variable costs	0.18 <i>0.15</i>		-0.39 <i>0.21</i>	*	0.54 <i>0.52</i>		-0.82 <i>0.42</i>
Fixed costs	-0.25 <i>0.10</i>	**	-0.29 <i>0.09</i>	**	-0.51 <i>0.28</i>	*	1.49 <i>0.92</i>
Contracts	0.01 <i>0.00</i>		0.02 <i>0.01</i>		-0.04 <i>0.02</i>	**	0.01 <i>0.01</i>
Quality	-0.77 <i>0.61</i>		-2.20 <i>1.24</i>	*	6.75 <i>3.50</i>	*	-0.23 <i>0.84</i>
Road condition	1.23 <i>0.48</i>	**	2.76 <i>0.67</i>	**	3.80 <i>3.81</i>		-11.51 <i>5.42</i>
National	-0.06 <i>0.18</i>		-0.72 <i>0.25</i>	**	-0.37 <i>1.05</i>		-1.65 <i>0.61</i>
Constant	0.31 <i>0.42</i>		0.91 <i>0.56</i>		-4.46 <i>3.98</i>		10.85 <i>4.74</i>
Mean of dep. variable	0.97		0.92		1.09		0.94
R <sup>2</sup>	0.07		0.26		0.14		0.30
Observations	249		120		73		56
Routes	13		6		4		3

Note: (\*\*) implies significance at the 5 percent level and (\*) at the 10 percent level. Standard error is reported in italics. Data comes from trucking surveys.

The first column, which is an aggregation of all the sub-regions, shows diversity between sub-regions, with a very low R<sup>2</sup> and variables insignificant (except for road condition and fixed costs). The table

<sup>29</sup> In a competitive environment, like in Southern Africa, the margins on international corridors are set at 10-15 percent, which means that any savings in transport costs can have a positive impact on trucking profitability and/or transport prices.

confirms that there is disconnect between costs and prices<sup>30</sup> since costs never explain margins, except fixed costs for Central Africa. We can then demonstrate that since prices settings are more or less exogenous, the most profitable companies in Africa are the ones able to operate on routes with abnormal prices or the ones with a certain degree of costs efficiency. That is why, in East Africa, trucks operating on roads in good condition are able to increase substantially their profits (probably due to the fact that companies charge similar rates despite lower costs). It is even more pronounced for international corridors. In Central Africa, higher fixed costs induce lower margins.

In Central Africa, higher profits are reported for roads in better condition. Once again, it is most probably due to informal market sharing agreements. Central Africa seems to be the sub-region where informal regulation is the strongest and where incentives to invest are the lowest. Indeed, higher transport quality (which depends in investment in human resources, equipment) induces lower margins.

Results for West Africa demonstrate that strategies of companies seem probably to differ more than in Central Africa because no variables seem really to explain margins, except the share of contracts (marginally). It is worth noting that companies, which operate with direct contracting, have lower margins.

East African companies demonstrate what donors expect when they support road rehabilitation. Indeed, better road condition implies much lower transport margins, probably due to the fact that competition operates in East Africa when road is rehabilitated and we also pointed out that bilateral transit treaties with quotas do not exist in this sub-region. Even though the situation may not completely be adequate since international routes remain more profitable than national routes<sup>31</sup>, nevertheless, it does confirm that investment in roads is economically viable in East Africa.

## **VI. Conclusions**

In general, the key findings are:

- a) There are substantial disconnect between transport costs and prices in numerous African countries, e.g. transport costs in Africa are not abnormally high, but transport prices are high along some corridors, indicating a strong seller's market.
- b) Despite many poor efficiency factors (low yearly vehicle utilization rates, aging vehicle fleet, unbalanced trade, etc.), trucking companies in Africa can still charge high price, and have relatively large profit margin along some corridors.

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<sup>30</sup> Prices are inflated through the whole logistics chain. In a regulated environment, even though profits from freight forwarders may be lower, this activity remains largely profitable. Any overhead or abnormal payment is automatically included in the price for the final user. Moreover, integrated services, which includes shipping lines activities, port operations, logistics platforms operations, freight forwarding and sometimes rail concession usually give a better quality of services but considerably inflate prices on several segments of transport, such as port operations or logistics platforms and these global operators frequently prevent other operators to increase their market share and use their market power to keep prices at very high level.

<sup>31</sup> It is explained by the importance of delays on the road on the Northern Corridor (see Teravaninthorn and Raballand 2008).

- c) Market regulation is an eminent price determinant hindering the efficiency improvement of the trucking industry, lacking competitiveness and thus high transport price in Africa.
- d) Poor condition of road infrastructure might not necessarily be the most critical factor for high transport costs.

The formulation of policy recommendations needs to distinguish between regulated and more mature market environment. In a competitive environment with high traffic volumes, measures to improve road condition and limit fuel prices are likely to yield significant results. In such environment, measures aimed at reducing delays at the border or at weighbridges would also be useful as they would help increase truck utilization.

In a regulated environment, like in West and Central Africa, regulatory constraints (formal and informal) must be dismantled because they are the root cause of limited competition, poor service and high transport prices<sup>32</sup>.

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<sup>32</sup> See Annex 4 for the worldwide experience of trucking services liberalization.

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### Annex 1: Main regulatory barriers in SSA

	West Africa	Central Africa	East Africa	Southern Africa
<b>Market entry</b>				
Licenses	Not restrictive (especially for nationals)	Not restrictive (especially for nationals)	Not restrictive (especially for nationals)	Not restrictive
<b>Market access</b>				
Bilateral agreement	Yes	Yes	No	Yes
Quotas/freight allocation	Yes	Yes	No	No
Queuing system	Yes	Yes	No	No
Third country rule <sup>33</sup>	Prohibited	Prohibited	Prohibited	Allowed in some countries <sup>34</sup>
Technical regulation (road user charges, axle-load, vehicle standard, import restriction)	Problem of harmonization of axle-load regulation	Problem of harmonization of axle-load <i>enforcement</i>	Problem of harmonization of axle-load regulation, delays at weighbridges	Prohibition of second-hand imports in South Africa
Customs regulation	Cumbersome transit procedures inducing border-crossing delays	Cumbersome transit procedures inducing border-crossing delays	1. Prohibition for trailers in transit to pick-up backloads in Kenya 2. Cumbersome transit procedures inducing border-crossing delays	Cumbersome transit procedures inducing border-crossing delays

Source: Study team compilation of data from various sources.

<sup>33</sup> The third country rule allows operation of trucks registered in a third party country to transport goods between two other countries.

<sup>34</sup> South Africa, Zimbabwe (on a reciprocal basis) and Malawi (during a defined period of time).

## **Annex 2: The queuing system or “tour de rôle”**

The queuing system finds its origins in the inland water shipping in France. Established in 1936, it was codified by the law of March 22, 1941. It became applied to the road transport sector after the establishment of the regional freight bureaus (BRF) in 1961. Freight bureaus receive transportation requests made by shippers. After having centralized them regionally, a list of vessels is assigned chronologically to the various transportation demands mainly depending on the arrival time of availability registration in the office of the freight bureau.

The queuing system was set up by a decree of July 28, 1965 to “ensure the proper functioning of the freight transportation market and allow transport coordination”. The BRF replaced cafes, which had been used to “coordinate” supply/demand of in transport. The role of BRF<sup>35</sup> was to organize the adequacy between supply and demand of the transport market. Each carrier had to be registered on arrival at the BRF. He then received a priority order that will be used to decide if more carriers would claim the same freight.

When BRF received a demand for transportation, which had always to come from transport broker, it was displayed on a blackboard with key information (tonnage, destination, type of goods, etc.). If a carrier was interested in fulfilling this demand, an announcement was made in the office. If no one claimed the same freight, the batch had to be assigned to the carrier that had expressed the willingness to carry the goods. But, if claimed by another carrier, the first registered to the freight will get the load and two vehicles from the same carrier could not be loaded without leaving a minimum delay. This was established in order to avoid large companies to capture the BRF.

But, what was the impact of such system? The BRF became increasingly responsible for delays and poor transport quality. Indeed, carriers tended to become complacent to look for freight demand and competition became inexistent, which at the end undermined transportation service quality. It did not lead to an optimal distribution of traffic, does not give an incentive to provide a better service and enable oversupply of trucks in a context of freight shortage. Indeed, any truck was guaranteed to transport some freight even though it was not competitive. If oversupply was locally very high, a trucker was obliged to stop his truck for a month or even more. That is also why he did not have any incentive to invest in a new truck, which would have increased fixed costs with a high risk for future revenues. This system then gave more power to large fleet in poor condition and fostered corruption because the only way to increase transported volumes was to bribe the freight bureau.

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<sup>35</sup> France was divided into 19 regions. A national center, CNBRF, coordinated the work of the regional BRF.

### Annex 3: Truck operating costs - a comparison of the four corridors

Corridor	Route Gateway-Destination	Variable cost (USD / km)	Fixed cost (USD / day)	Yearly ratio FC/VC	Average truck fleet age
West Africa (Burkina and Ghana)	Tema/Accra - Ouagadougou (Burkina Faso)	1.51 (0.59)	30 (16)	10% - 89%	13
	Tema/Accra - Bamako (Mali)	1.67 (0.23)	36 (23)	10% - 89%	9
Central Africa (Cameroon and Chad)	Douala - N'Djaména (Chad)	1.31 (0.34)	49 (30)	17% - 82%	11
	Douala - Bangui (CAR)	1.22 (0.34)	73 (43)	25% - 74%	9
	Ngaoundéré -N'Djaména (Chad)	1.83 (0.27)	22 (8)	7% - 92%	15
	Ngaoundéré - Moundou (Chad)	2.49 (0.64)	21 (6)	5% - 94%	19
East Africa (Uganda and Kenya)	Mombasa - Kampala (Uganda)	0.98 (0.46)	61 (30)	68% - 31%	7
	Kampala - Kigali (Rwanda)	1.47 (0.84)	40 (30)	56% - 43%	10
Southern Africa (Zambia)	Lusaka - Johannesburg (South Africa)	1.54 (0.41)	55 (39)	61%-38%	9
	Lusaka - Dar-es-Salaam (Tanzania)	1.34 (0.52)	71 (54)	75%-24%	10

Notes:

1. These values include trucking services (three or more trucks) and truckers (one or two trucks). We are reporting the destination city and country in parenthesis.
2. Average yearly mileage (in thousands) is calculated distance time number of turnaround per year.
3. Standard deviation in parenthesis.

Sources: Trucking surveys data and own calculations. Exchange rates come from IMF-IFS.



#### Annex 4: International experiences in transport services liberalization

Country	Main achievements	Background
Czech Republic, Hungary, Poland	<ul style="list-style-type: none"> <li>- entry of many new operators</li> <li>- prices determined by market</li> <li>- innovative logistics services</li> </ul>	Major reform in 1998-90. Road freight transport was one of the first sectors to be privatized and liberalized in Central and Eastern European Countries
France	<ul style="list-style-type: none"> <li>- dramatic reduction in transport prices</li> </ul>	Major reform in 1986. Some 10 years after deregulation, overall prices increased by ha 40 percent, transport prices fell by over 10 percent
Indonesia	<ul style="list-style-type: none"> <li>- entry of many new operators</li> <li>- prices set by the market</li> <li>- most trucking companies are small</li> </ul>	Major reform in 1985. Vehicles required to obtain licenses to cross provincial boundaries, but no major impact
Mexico	<ul style="list-style-type: none"> <li>- entry of many new operators</li> <li>- trucking prices dropped by 23 percent in real terms within five years</li> <li>- trucking services improved in frequency, access and speed of delivery</li> </ul>	Major reform happened in 1989. The deregulation process was gradual over a period of two years
Morocco	<ul style="list-style-type: none"> <li>- transport prices dropped dramatically</li> <li>- abolition of government monopoly of freight allocation</li> </ul>	Freight allocation abolished in 2003. Large initial large oversupply was not reduced and led to atomized and low quality of service but prices were reduced
Rwanda	<ul style="list-style-type: none"> <li>- transport prices fell by 75% in real terms</li> <li>- rapid recovery of locally-owned fleet</li> </ul>	Major reform in 1994, after the genocide, when the public trucking fleet had practically vanished

Source: Task team compilation.

## Annex 5: Methodology

The study focuses on the main international corridors, representing all African sub-regions. The thirteen countries served by the corridors<sup>36</sup> cover all four Africa's sub-regions and include thirteen countries. They carry over 70 percent of the international trade of the selected landlocked countries<sup>37</sup>. 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.

The analysis was carried out in three phases:

- Phase I comprised the conduct of a large trucking survey covering the four corridors selected for the study, aimed at understanding the operations of truck services. The trucking survey covered seven countries, with approximately 20 trucking companies and 60 owner-operators being interviewed for the survey (see Teravaninthorn and Raballand (2008)<sup>38</sup> for a detailed description of the methodology).
- Phase II comprised a series of field visits to the countries in the selected corridors, intended to qualify and validate the preliminary findings and analysis derived from the trucking survey. It had also made an attempt to identify policies that could help lower the cost and price of transport services. Due to the fact that survey responses could not provide a full picture of country-specific constraints affecting the provision of road transport services, field visits were carried out<sup>39</sup> to supplement preliminary findings and collect qualitative information.
- Phase III comprised the quantitative analysis of the trucking surveys, the discussion of the results in the sub-regions, and the design of feasible policy recommendations.

**Table 1: Survey participation by country**

Country	Companies	Approached	Closed	Refused	Unavailable	Surveyed	Actual
Burkina Faso	Trucking companies	-	-	-	-	18	16
	Truckers	-	-	-	-	45	45

<sup>36</sup> **West Africa:** Cotonou-Ouagadougou, Cotonou-Niamey, Tema-Ouagadougou, Lomé-Ouagadougou, Lomé –Niamey; **Central Africa:** Douala-Bangui, Douala-N'Djaména; **East Africa:** Mombasa-Kampala-Kigali; **Southern Africa:** Durban-Lusaka-Ndola.

<sup>37</sup> Burkina Faso, Niger, CAR, Chad, Uganda, Rwanda, Zambia.

<sup>38</sup> Teravaninthorn, S. and Raballand, G. (2008), Transport prices and cost in Africa: A review of the Main International Corridors, World Bank: Washington D.C.

<sup>39</sup> The following field visits have been carried out so far: Burkina Faso/Niger/Benin (June 2007), Cameroon/CAR (June 2007), Zambia/South Africa (June 2007), Kenya/Rwanda (June 2007).

Ghana	Trucking companies	35	4	6	7	18	15
	Truckers	110	0	30	25	55	54
Cameroon	Trucking companies	52	10	12	8	22	17
	Truckers	120	0	40	23	57	57
Chad	Trucking companies	34	0	8	8	18	14
	Truckers	135	0	50	28	57	57
Kenya	Trucking companies	64	1	2	1	22	21
	Truckers	-	-	-	-	-	55
Uganda	Trucking companies	47	4	8	14	21	17
	Truckers	100	0	20	23	57	57
Zambia	Trucking companies	50	4	20	1	1	19
	Truckers	-	-	-	-	-	45

Note: No available data for Burkina Faso. Source: Trucking survey.

**Table 2: Number of vehicles survey by country**

Country	Companies	Light Weight (<5tons)	Medium Weight (>=5-7tons)	Heavy Weight (>7tons)	TOTAL
Burkina Faso	Trucking companies	4	22	216	242
	Truckers	3	17	117	137
Ghana	Trucking companies	0	1	298	299
	Truckers	2	12	77	101
Cameroon	Trucking companies	15	10	389	414
	Truckers	14	32	42	88
Chad	Trucking companies	0	0	290	290
	Truckers	0	1	66	67
Kenya	Trucking companies	20	67	1,096	1,183
	Truckers	0	15	122	137
Uganda	Trucking companies	104	66	240	410
	Truckers	2	16	72	90
Zambia	Trucking companies	66	109	495	670
	Truckers	32	32	29	93

Note: Each weight category includes trucks, trailers and semi trailers. Tractors and towing vehicles are not included.

Source: Trucking survey.