Policy Brief

NUMBER 5, 2007

Overview

The success of Africa's exports, as well as its spatial development, depends on lowering transport costs. In this Policy Brief, we address a number of pertinent questions on transport costs in Africa, such as 'what are transport costs?', 'do transport costs matter for trade?', 'how important are transport costs in practice?', and 'why are Africa's transport costs so high?' We present a case study of the firm location decisions of exporters in South Africa to illustrate the significance in particular of domestic transport costs for manufactured exports. The message from this Policy Brief is that Africa's international transport costs are significantly higher than that of other regions, and its domestic transport costs could be just as significant. Moreover we show how domestic transport costs influence the location, the quantity, and the diversity of manufactured exports. Various policy options to reduce transport costs in Africa are discussed.

Written by Wim Naudé and Marianne Matthee

ISBN 978-92-808-3041-5
ISSN 1814-8026

UNITED NATIONS UNIVERSITY
UNU-WIDER
World Institute for Development Economics Research

The Significance of Transport Costs in Africa

HIGH TRANSPORT COSTS POSE A SIGNIFICANT BARRIER TO DEVELOPMENT IN AFRICA. Causing friction in the movement of labour and goods, transport costs effectively reduce the markets for labour and goods, and for the transmission of knowledge and technologies. Reducing transport costs in contemporary Africa has become even more of a priority, with many countries having reduced tariffs on their international trade, and as protectionism in developed countries are scaled down. The success of Africa's exports, as well as its rural and more generally its spatial development, now depend on lowering its transport costs.

This Policy Brief addresses a number of pertinent questions on transport costs in Africa, such as 'what are transport costs?', 'do transport costs matter for trade?', 'how important are transport costs in practice?', and 'why are Africa's transport costs so high?'. We present a case study of the firm location decisions of exporters in South Africa to illustrate the significance in particular of domestic transport costs for international trade. We conclude by discussing various policy options that can be taken to reduce transport costs in Africa.

What are Transport Costs?

Transport costs are, in a broad sense, the costs involved with the movement of people and goods. When this movement takes place within the borders of a particular country, the costs are often described as domestic transport costs, whereas when goods cross borders, there is an additional element of international transport costs. International transport costs comprise all the costs involved in the movement of goods from an exporter to an importer, typically including the cost of handling, of freight, and of insurance. All international traded goods incur both domestic as well as international transport costs, a fact that is often overlooked in international trade but which can be important for the ultimate cost competitiveness of a country's exports. It also affects the ability of a country to source inputs, such as raw materials and technology, from abroad.

About the Authors

Wim Naudé is a Senior Research Fellow at WIDER, Helsinki, Finland.

Marianne Matthee is a lecturer in economics at North-West University (Potchefstroom Campus), South Africa.

A recent survey concluded that transport costs are the most important component of trade costs and that the 'death of distance' has been exaggerated. The survey found that in industrial countries, total trade costs add 170 per cent to costs, of which 21 per cent are transport costs.[1] Steve Radelet and Jeffrey Sachs found empirical evidence that countries with lower transport costs have had faster manufactured export and overall economic growth during the last three decades than countries with higher transport costs.[2] They found that if transport costs double, annual growth would increase at a slower rate of about 1.5 per cent. Nuno Limão and Anthony Venables found that an increase in international transport costs of 10 per cent could reduce the volume of trade by as much as 20 per cent.[3] For countries in Africa, the reduction in trade volumes due to transport costs could be much more severe, as many countries in Africa are landlocked. In fact Africa is the continent with the largest number of landlocked countries in the world. Radelet and Sachs found that landlocked countries' transport costs are up to 50 per cent higher than those of coastal countries, while Limão and Venables estimate that their trade volumes are around 60 per cent lower. Landlocked countries may lose the equivalent of up to 40 per cent of the export on high transport costs. Remoteness from sources of supply is a major determinant of the price of capital goods—for example, due to remoteness, capital equipment in South Africa is twice as expensive as in the UK.[4]

All international traded goods incur both domestic as well as international transport costs

A study by the UNCTAD Secretariat in 2003[5] found that international transport costs faced by African countries are almost twice as high as the world average: 12.6 per cent compared to 6.1 per cent for the world average. In this sense it would be scant consolation to African countries if international transport costs had been declining in absolute terms since Africa's relative position remains a concern. Relatively high transport costs in Africa are one reason for the continent's relatively slow growth in exports compared to other developing regions.

International transport costs are however, only one component of the costs of trading goods: the other is domestic transport costs. There are good reasons to think that domestic transport costs may be just as important an obstacle to trade, especially trade in manufactured goods, than international transport costs in Africa. Rail freight in Africa is on average about 200 per cent higher than in Southeast Asia, and Africa has fewer roads than a country such as Poland.[6]

Why are Africa's Transport Costs so High?

There are at least five reasons why African countries face high transport costs on their international trade: (1) distance, (2) being landlocked, (3) insufficient economies of scale in production, (4) lack of sufficient investment in transport infrastructure, and (5) trade and transport policies.

Consider distance. Studies have found that a 1 per cent increase in distance increases transport costs by approximately 0.25 per cent.[7] It is therefore no surprise that trade volumes decline over distance. In fact, around half of the world's trade takes place between countries located within only 3,000 km of each other.[8] African countries' traditional export markets are in the EU and USA, which are in most cases, especially for southern and eastern Africa, in excess of 3,000 km.

A second reason for high transport costs is due to many countries being landlocked. Being landlocked has a significant effect in raising transport costs, through rising costs of transiting various borders, as well as in the time lost due to border delays.

The inability to reap sufficient economies of scale often hampers Africa's international trade, and prevents per unit transport costs from coming down. This is largely due to the absence of the so-called 'home-market effect' (internal market) due to the relative low levels of urbanization and per capita incomes in Africa. It is also because most businesses in Africa are small and micro-enterprises, with relatively fewer medium and large-sized firms in Africa. There are various reasons for this predominance of small and micro-sized firms in Africa, including low levels of financial development, lack of skilled entrepreneurs, high levels of risk and transaction costs, and high taxation of medium-sized firms. Lack of adequate transport infrastructure makes it difficult for firms to distribute their products and so obtain economies of scale. The type of goods produced also affects a country's ability to reap economies of scale and achieve reductions in per unit transport costs. This is because different goods have different logistical requirements. Intermediate goods (which Africa imports in significant quantities) and goods such as fertilizer tend to have higher freight rates than other manufactured goods.[9]

High transport costs are also due to domestic transport infrastructure, such as roads, railways, airports, harbours, as well as transport and logistics services, being insufficient—not only in moving people effectively between places and markets—but also in moving goods overland. In part this reflects the colonial legacy, which resulted in the construction of roads and railways from the interior to the coast, for the extraction and export of raw materials. Not only does this infrastructure remain in the wrong place today, it was designed to service industries where countries now face declining terms of trade. But more than the colonial legacy is to blame for the continent's inadequate stocks of transport infrastructure. Investment in transport infrastructure since independence has been woefully inadequate. Civil war in many countries resulted in the destruction of much transport infrastructure that fulfilled a vital role in linking rural areas with cities and ports. In Mozambique, more than a decade after the civil war ended, rural development is still hamstrung by the destruction of roads and bridges during the conflict. Many opportunities, such as the production of high-valued fruit crops and nuts, are unexploited due to the inability of farmers to bring these goods to market. As a result of colonial patterns of transport infrastructure and subsequent neglect of transport investments, trade volumes between

Transport costs faced by African countries are almost twice as high as the world average

This Policy Brief is published in the UNU-WIDER research project 'New Directions in Economic Development' directed by Augustin Kwasi Fosu. More detailed findings are set out in a series of three WIDER Research Papers (available to download free at www.wider.unu.edu):

RP2007/09 Wim Naudé and Marianne Matthee: *The Geographical Location of Manufacturing Exporters in South Africa*

RP2007/10 Marianne Matthee and Wim Naudé: *The Determinants of Regional Manufactured Exports from a Developing Country*

RP2007/11 Marianne Matthee and Wim Naudé: *Export Diversity and Regional Growth: Empirical Evidence from South Africa*

Africa and major world markets have been reduced. And not only is Africa trading less with the rest of the world, intra-continental trade is also less, partly due to high transport costs. Trade volumes between west and east is conspicuously low. The Africa Commission Report noted that it costs more to transport a vehicle from Abidjan to Addis Ababa than shipping the same vehicle from Abidjan to Japan. The World Bank estimates that upgrading road linkages between the Central African Republic and the Democratic Republic of the Congo could increase intra-Africa trade between US$ 10 and 30 billion per year.[10]

Finally, Africa incurs high transport costs due to inappropriate trade and transport policies. Policies regulating the domestic freight transport industry often protect inefficient monopolies, and fail to provide for intermodal transport facilities and maritime transport development. Policy 'failures' are reflected in the dominance and expensiveness of road freight in many African countries despite the fact that rail transport can—and should—be cheaper. It is also reflected in port inefficiencies and high dwell costs (these include the costs of loading and unloading a ship and the cost of queuing outside a port). Regarding the latter, delays in African ports add significantly to international transport costs with the cost of an additional day in transit for manufactured goods adding on average 0.8 per cent to the value of the goods each day.[11]

In many African countries domestic transport costs may be just as much of an obstacle as high international transport costs. This is because export production must take place somewhere within the space of a country. In making its decision on where to locate within a country, a firm typically takes into consideration aspects such as proximity to domestic markets, labour pools, and inputs required in production. These determinants may not necessarily be consistent with ideal export levels, because the locations chosen might be at a distance from local ports. For example, in South Africa substantial firm location during much of twentieth century took place in the interior where a gold mining industry developed, mainly to service the growing agglomeration of people and mining firms. Today, many firms face high domestic transport costs to get their products to the ports, which are more than 500 km away.

It costs more to transport a vehicle from Abidjan to Addis Ababa than shipping the same vehicle from Abidjan to Japan

A Case Study from South Africa

The case of South Africa shows that transport costs (distance) matter for exports, since cost-minimizing firms aiming to export prefer to locate closer to a port. South Africa is a good example of an African economy where the potential importance of domestic transport costs on international trade can be investigated. It has a fairly good transport infrastructure compared to many other African countries. Consequently, the distance of location of manufacturing exporters from a port may be a good indicator of the effect of domestic transport costs on exports. In contrast, in many other African countries distance from a port may not adequately reflect transport costs due to a lack of transport infrastructure.

Therefore, by considering how far manufacturing exporters tend to locate from South Africa's ports, we are able to get an indirect measure of the potential importance of domestic transport costs, something which would be less straightforward in other African settings.

The case of South Africa allows us to answer a further two questions: how significant is domestic distance from the port as a determinant of (manufactured) exports? And does distance (transport costs) affect the diversity of exports?

exports generally experienced higher economic growth rates and contributed more to overall exports from South Africa. For instance, in terms of the Herfindahl Index, magisterial districts with an index value of higher than 0.9 (high specialization) experienced below average annual growth in GDP per capita between 1996 and 2004, whilst those with an index value below 0.20 (diversified exports) achieved an above average growth rate in GDP per capita over the period. Magisterial districts with an index value below 0.20 contributed 33 per cent of South Africa's total exports in 2004.

The success of Africa's exports, as well as its rural and more generally its spatial development, depends on lowering its transport costs

Is Distance from a Port Important?

The answer is yes. Given that transport costs increase with distance, domestic transport costs will negatively affect manufacturing exports.

Based on data for 354 magisterial districts across South Africa we found that the largest volumes of exports are generated within 100 km of a port (including dry ports). In particular, between 70 per cent and 98 per cent of manufactured exports are produced within 100 km of the nearest port. For certain goods, such as electronics, about 98 per cent of manufacturing takes place within 100 km of a port. Further away from a port (in excess of 100 km) one finds furniture, textiles, and metal products. These goods tend to be produced largely for the domestic market, which is relatively more intensive in natural resources.

Do Transport Costs Affect Export Diversity?

We found that regions with less specialization and more diversified

We also found that transport costs may matter for export diversity. To be specific, export diversity declines as the distance from a port (export hub) increases. Most magisterial districts with high export diversity values are located within 100 km of the nearest port. Furthermore, comparing export locations in 2004 with that of 1996 indicated that the distance–export diversity relationship had changed over time (the period in question was characterized by significant trade liberalization). It suggests that transport costs have become more important since 1996 (under greater openness), with magisterial districts located further than 100 km from the ports being less diverse in 2004 than in 1996. One possible explanation for this changing pattern of export diversity may be the impact of increased foreign direct investment since 1994, following the opening up of the economy and the transition to democracy. Transport infrastructure is a significant determinant of the location decisions of 'footloose' multinational firms. These firms tend to locate in particularly high value-added sectors in that are in close proximity to a port. In South Africa, tentative indications that may support this hypothesis were found in the fact that it is horizontal diversification and not vertical diversification *per se*, that is associated with higher economic growth. High-skill intensive sectors with integrated global markets (such as electronics) tend to be almost exclusively located within a small distance of ports.

policies to increase port efficiency can also make an important contribution towards reducing transport costs. A recent study[13] found that international transport costs can be reduced by 12 per cent if a seaport's operating efficiency increases from the 25th percentile to the 75th percentile—and could stimulate trade by up to 25 per cent. It is encouraging to note that a number of ports in Africa are currently being identified for upgrading, such as Walvis Bay (Namibia) and Maputo (Mozambique). In promoting the efficiency of ports, it is important to give attention not only to the costs of

The promotion of regional integration schemes is necessary to reduce transport costs

So What Can be Done?

Africa's transport costs are significantly higher than that of other regions. In particular, domestic transport costs could be as important as international transport costs. We found from a case study of South Africa that domestic transport costs influence the location, the quantity, and the diversity of manufacturing exports. The implication is that the success of Africa's exports, as well as its rural and more generally its spatial development, now depends on lowering its transport costs.

First, Africa needs to invest more in transport infrastructure—including roads, railways, pipelines, port infrastructure and handling equipment. Studies have found that an improvement of 1 per cent in the infrastructure could lower transport costs by 0.14 per cent. Limão and Venables have established that poor infrastructure accounts for 40 per cent of transport costs for coastal economies and 60 per cent for landlocked countries. Port infrastructure and handling freight, but also in turnaround times, and in providing support services such as break-bulk and cold-storage facilities.

Second, more attention needs to be paid to the physical location of firms relatively to ports. One way is for ports to be brought closer to firms. In this regard the creation of more 'dry' (inland) ports in Africa should be promoted as it could bring ports and depots closer to importers and exporters. Currently there are only few such inland ports in Africa (e.g. Johannesburg, Nairobi, Kampala, Harare, and Kumasi). Development of inland ports adjacent to international airports may be important to stimulate exports of perishable goods from Africa by integrating road, rail and air transport. Examples are the production of cut flowers (e.g. Kenya) and freshwater fish (e.g. Burundi, Malawi) for European markets. However, for firms to benefit from close location to a port/airport would require improvements in air transport in Africa.

Currently safety is a concern, with only few African countries meeting ICAO standards. Another way to improve location relative to a port is for careful planning of business parks and business premises in the proximity of ports. Examples where this are currently being done is the development of the Coega Industrial Development Zone next to the harbour in East London, South Africa and the Walvis Bay Port Export Processing Zone in Namibia. Furthermore, the need for creating additional ports—as is currently being planned for the Niger Delta Zone—should not be ignored, as it would alleviate the capacity problems that currently constrain major ports in Africa and would also open up a greater range of options for landlocked countries.[14]

Third, the promotion of regional integration schemes is necessary to reduce transport costs, including transit times, for landlocked countries. These integration schemes should specifically address the vexing issue of time consuming and frustrating border/customs controls. Where integration coincides with investments in transport infrastructure, additional benefits can be reaped. An example is of Botswana, Mozambique, Namibia, and South Africa, who as members of the SADC, have recently completed the Trans-Kalahari Corridor, which in effects link the ports of Maputo and Durban on the east coast with Walvis Bay on the west coast, forming the first cross-continent transport corridor on the African continent. It is however important that regional integration schemes integrate different national transport development plans into co-ordinated regional transport development plans, and place much higher emphasis on ensuring the safety and security of transported goods and operators.

Notes

1 Anderson, J.E. and E. Wincoop (2004) 'Trade Costs', *Journal of Economic Literature*, 42(3): 691–751.

2 Radelet, S. and J. Sachs (1998) 'Shipping Costs, Manufactured Exports and Economic Growth'. http://www.earthinstitute.columbia.edu/about/director/pubs/shipcost.pdf

3 Limão, N. and A.J. Venables (2001) 'Infrastructure, Geographical Distance, Transport Costs and Trade', *World Bank Economic Review*. 15(3): 451–79.

4 Venables, A. (2005) 'Geographical Economics: Notes on Africa', *Journal of Development Perspectives*, 1(1): 63–84.

5 UNCTAD Secretariat (2003) 'Efficient Transport and Trade Facilitation to Improve Participation by Developing Countries in International Trade'. http://www.unctad.org/en/docs/c3d53_en.pdf

6 Mwase, N. (2003) 'The Liberalization, De-Regulation and Privatization of the Transport Sector in Sub-Saharan Africa: Experiences, Challenges and Opportunities', *Journal of African Economies*, 12 (AERC supplement 2): 691–751.

7 Martínez-Zarzoso, I., L. Gracía-Menéndez, and C. Suárez-Burguet (2003) 'Impact of Transport Costs on International Trade: The Case of Spanish Ceramic Exports', *Maritime Economics & Logistics*, 5(2): 179–198.

8 The Round Table (2004) 'Transport and International Trade'. European Conference of Ministers of Transport: Conclusions of Round Table 131. http://www.cemt.org/online/conclus/rt131e.pdf

9 Hummels, D. (1999) 'Have International Transportation Costs Declined?' http://www.nber.org/~confer/99/itisi99/hummels.pdf

10 Buys, P., U. Deichmann, and D. Wheeler (2006) *Road Network Upgrading and Overland Trade Expansion in Sub-Sahara Africa*. Washington, DC: World Bank.

11 Hummels, D. (2001) 'Time as a Trade Barrier'. https://www.gtap.agecon.purdue.edu/resources/download/2009.pdf

12 Bougheas, S., P.O. Demetriades, and E.L.W. Morgenroth (1999) 'Infrastructure, Transport Costs and Trade', *Journal of International Economics* 47(1): 169–189.

13 Micco, A. and T. Serebrisky (2004) 'Infrastructure, Competition Regimes and Air Transport Costs: Cross Country Evidence'. *Econometric Society* (Econometric Society 2004 Latin American Meetings No. 117).

14 Pedersen, P.O. (2001) 'Freight Transport under Globalisation and its Impact on Africa', *Journal of Transport Geography*, 9: 85–99.

www.wider.unu.edu

UNITED NATIONS UNIVERSITY

UNU-WIDER

World Institute for Development Economics Research

The World Institute for Development Economics Research (WIDER) was established by the United Nations University (UNU) as its first research and training centre and started work in Helsinki, Finland in 1985. The Institute undertakes applied research and policy analysis on structural changes affecting the developing and transitional economies, provides a forum for the advocacy of policies leading to robust, equitable, and environmentally sustainable growth, and promotes capacity strengthening and training in the field of economic and social policy making. Work is carried out by staff researchers and visiting scholars in Helsinki and through networks of collaborating scholars and institutions around the world.

INSIDE:

Policy Brief

"The Significance of Transport Costs in Africa"

This Policy Brief addresses a number of pertinent questions on transport costs in Africa, such as 'what are transport costs?', 'do transport costs matter for trade?', and 'how important are transport costs in practice?'

UNITED NATIONS UNIVERSITY
UNU-WIDER
World Institute for Development Economics Research

World Institute for Development
Economics Research
of the United Nations University
Katajanokanlaituri 6 B
FIN-00160 Helsinki
Finland
Tel. +358-9-615911
info1@wider.unu.edu
www.wider.unu.edu