

The Cost of Being Landlocked

Logistics, Costs, and Supply Chain Reliability

Edited by

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CONFERENCE EDITION



CHAPTER 1

Introduction and Overview

About one out of five countries in the world is landlocked.¹ Twenty of 54 low-income economies are landlocked, the majority of them in sub-Saharan Africa, while only 3 of 35 high-income economies are landlocked (not counting European microstates and dependencies²). In view of current trends toward reduction in maritime transport costs and more advanced logistics to compensate for the limitations of intercontinental distance, lack of direct sea access presents growing challenges to the global integration and growth prospects of many landlocked developing countries (LLDCs).

Facilitating trade in landlocked countries is important because such geographical restrictions are the primary reason that developing countries are unable to benefit from trade preferences (Milner and Zgovu 2003; Hoekman and Nicita 2008). Moreover, as Hummels (2007) pointed out, “as tariffs become a less important barrier to trade, the contribution of transportation to total trade costs . . . is rising.”³

Variants of the new economic geography, new trade theory, and neo-classical and endogenous growth theories have been applied to highlight the nexus between geographic location, trade, and economic growth and to explain the cost of being landlocked. Some of the conclusions are: (1) landlocked countries trade less (on average 30 percent less) than

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coastal countries);⁴ (2) landlocked countries experience weaker growth than maritime countries⁵ (being landlocked reduces average growth by about 1.5 percent);⁶ and (3) on average landlocked countries have had recourse to IMF assistance longer than coastal countries have.⁷ MacKellar, Wörgötter, and Wörz (2002) highlight, for instance, that crossing a border entails very high transaction costs due to customs and handling charges. Therefore, being landlocked is associated with increased import prices and reduced export revenues. This is one reason Radelet and Sachs (1998) claimed that a reexport model is extremely difficult to achieve in landlocked developing countries due to the higher cost of intermediate products. Amjadi and Yeats (1995) pointed out that the incidence of transport costs heavily affects the landlocked African countries because they have to adjust their selling prices to world prices. Gallup, Sachs, and Mellinger (1999) proposed two reasons landlocked countries may be disadvantaged:

- Coastal countries may have political or economic incentives to impose costs on landlocked countries.
- Infrastructure development across national borders is more difficult to arrange than similar investment within a country.

Most authors have documented the transportation cost burden facing landlocked countries using macrodata.⁸ Using cost, insurance, and freight (CIF) or free on board (FOB) margin as a proxy for transport cost, Radelet and Sachs (1998) have found these costs to be about 50 percent higher for landlocked countries. Stone (2001), using freight payments as a percentage of total imports, shows that landlocked developing countries, especially in Africa, bear exorbitant transport costs: out of 15 landlocked African countries, 13 had a ratio higher than 10 percent, and for 7 the ratio was even higher—20 percent, compared with 4.7 percent for industrial countries and 2.2 percent for the United States.

The plight of LLDCs has naturally received special attention for decades, leading to a specific set of development priorities. For almost a century, the impact of being landlocked has focused on dependence on the transit state.⁹ Dependence on the transit¹⁰ state implies high transaction costs (notably transport costs). High transaction costs are perceived to be the result of “transit charges”¹¹ and also of the inability to benefit from adequate regional infrastructure.

Therefore, the standard approach used to tackle the cost of being landlocked has taken two directions: (1) facilitating the signing of regional/

multilateral conventions aiming at ensuring freedom of transit, and (2) developing regional transport infrastructure.

Early efforts involved legal measures. Many bilateral, regional, and multilateral treaties have been signed since World War II, following the recognition of the right to freedom of transit for landlocked countries by GATT Article V¹² and the 1958 Geneva Convention on High Seas (further developed in the 1982 Montego Bay Convention). Moreover, most existing action plans adopted at the international level stress as a top priority the need for new road construction to boost LLDC trade.

The current policy framework, summarized in the Almaty Programme of Action of 2003 (Box 1.1), is consistent with previous attempts to tackle the costs of being landlocked in its targeting of three priorities: (1) ensuring the recognition of freedom of transit in international agreements, (2) developing transport infrastructure, and (3) encouraging transnational cooperation. The midterm review of the program confirmed these priorities

Box 1.1

The Almaty Programme of Action (2003)¹³

The “Almaty Conference” (2003) highlighted five priority areas for landlocked countries.

- **Transit policy and regulatory frameworks.** Both landlocked and transit countries should review their transport regulatory frameworks and establish regional transport corridors.
- **Infrastructure development.** Landlocked countries need to develop multi-modal networks (rail, road, air, and pipeline infrastructure projects).
- **Trade and transport facilitation.** Landlocked countries need to implement the international conventions and instruments designed to facilitate transit trade (including the WTO).
- **Development assistance.** The international community needs to assist by (1) providing technical support, (2) encouraging foreign direct investment, and (3) increasing official development assistance.
- **Implementation and review.** Procedures for monitoring the implementation of transit instruments and conducting a comprehensive review of their implementation must be established in due course.

(continued)

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Box 1.1 (continued)

The 2008 midterm review confirmed these priorities but recognized a substantial change in the environment, stressing the need “to look at new approaches . . . directly linked to transit” and to consider “developments in the transport sector.” Among these are port developments, intermodal transport operators, and increased use of information and communication technologies (ICTs) to program and manage operations and check traffic at border control points.”

Source: Almaty Programme of Action: Addressing the Special Needs of Landlocked Developing Countries within a New Global Framework for Transit Transport Cooperation for Landlocked and Transit Developing Countries (2003); and key issues for the preparatory meeting of the midterm review (UNCTAD 2008).

but also acknowledged the need to take better account of operational and technological development of services and administrations.

What has been the impact of such measures? On the legal side, the Sub-Saharan Africa Transport Policy Program (SSATP)—World Bank review of legal instruments for transit trade in Africa found that the main problem today is not the inadequacy or lack of agreements and frameworks (Table 1.1) but their poor implementation, stemming from a lack of capacity or political will. Some basic provisions of agreements signed in the 1970s have, for instance, never been implemented.

On the infrastructure side, progress has indeed been made: almost all the capital cities of landlocked countries are now linked to ports with paved infrastructure in fair or good condition.¹⁴ However, transport prices remain extremely high for most operators based in landlocked countries. Recent surveys demonstrate that the costs and time penalties borne by landlocked countries’ international trade operations are indeed high and problematic. Table 1.2 provides a comparison of landlocked and coastal countries for two regions, using the Logistics Performance Index (LPI) developed by the World Bank.¹⁵

The transport infrastructure of landlocked countries in sub-Saharan Africa represents a significant penalty—7 percent worse than for coastal countries—but it is not the worst component among the dimensions of the LPI.

Why do massive investments in infrastructure seem to have had a rather limited impact?¹⁶ Although there may be an infrastructure gap for landlocked countries (which is increasingly questionable), *logistics/trade services efficiency is more important for limiting the cost of being landlocked*

Table 1.1 The Number of Multilateral Legal Instruments with Relevance for Transit Trade in Africa

Global instruments	28
Regional instruments	8
Subregional instrument	90
Central Africa	16
Eastern Africa	12
Southern Africa	18
Western Africa	44

Source: Matons (2004).

Table 1.2 Regions with Poorly Performing Landlocked Countries Based on LPI

<i>Background data</i>	<i>Sub-Saharan Africa</i>		<i>South Asia</i>	
	<i>Landlocked</i>	<i>Coastal</i>	<i>Landlocked</i>	<i>Coastal</i>
Overall LPI	2.22	2.43	1.84	2.64
Selected LPI components				
Logistics competence	2.21	2.45	1.84	2.69
Infrastructure	1.97	2.11	1.61	2.41
Customs and trade processes	2.10	2.30	1.69	2.34
LPI input data				
Customs clearance (days)	3.2	4.7	2.6	2.2
Physical inspection (percent) (higher is worse)	62	42	56	27
Possibility of review (percent) (higher is better)	52	19	33	30
Lead time (days) to:				
Export (median) shipper → port	11.8	6.2	6.5	2.5
Import (median) port → consignee	18.4	9.3	14.7	3.3
Import (best 10 percent) port → consignee	9.1	5.0	11.0	2.5

Source: Logistics Performance Index, 2010.

than investing massively in infrastructure and neglecting the functioning of logistics services. Table 1.2 indicates that the incompetence of services or trade processes represents a larger penalty—on average about 10 percent worse than for coastal countries. Corridors with infrastructure in average condition can sometimes be as slow as corridors with an infrastructure in bad condition. Logistics has become increasingly complex and critical to firms' competitiveness (Memedovic et al. 2008).

Based on extensive data collection in several regions of the world, this book argues that (1) exporters/importers in landlocked developing

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countries do face high logistics costs, which are highly detrimental to their competitiveness in world markets; (2) contrary to the most prevalent ideas, high logistics costs usually do not result from poor road infrastructure since transport prices depend mainly on trucking market structure and organization; (3) high logistics costs depend on low logistics reliability and predictability; (4) and low logistics reliability and predictability stem mostly from rent seeking and governance issues (which are prone to proliferate in low-volume trading environments), which increase uncertainty along logistics chains (see Figure 1.1).

Hence, this book proposes a new analytical framework to model the constraints faced by logistics chains, one that can be easily applied to landlocked countries.¹⁷ It is rooted in World Bank operational activities such as country audits and trade and transport facilitation projects. It converges with a growing literature that uses a microeconomic approach to assess trade and macroeconomic impacts of logistics issues.¹⁸ It also takes into account recent findings on the importance of uncertainty and inventory control to firms' performance.¹⁹

It is based on observation of logistics from the shippers' perspective, and service delivery is therefore central to the model (see Figure 1.2). Using a service delivery approach, we find only an indirect relationship between costs and infrastructure or facilitation measures. Infrastructure provision is considered as an input to the production function of service providers. Along with infrastructure, this analysis emphasizes the impact

Figure 1.1 The Vicious Circle of Logistics for Landlocked Countries

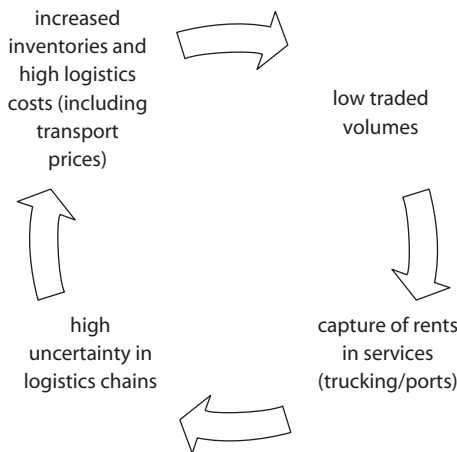
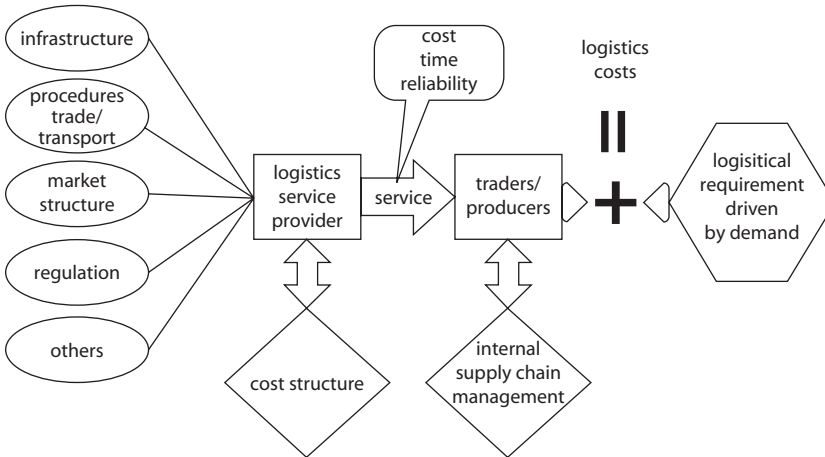


Figure 1.2 A Logical Framework with Service Provider as the Core of the System

of market structure, overheads, and rent seeking activities on the performance of service delivery of logistics/transport (cost, time, and reliability). For instance, infrastructure improvement mostly impacts direct transport costs, which are only a portion of the total transport costs faced by exporters or importers in LLDCs; and its impact may be further diluted if one takes a broader view of logistics costs, incorporating overheads and supply chain efficiency.

Analysis of service delivery constraints has been seriously neglected and could explain the disappointing implementation of regional transit agreements and the massive investments in corridors for exports diversification (see Box 1.2 for the differences and commonalities between exports and imports). While our research confirmed the cost of being landlocked, it does not explain it in terms of an infrastructure gap but mainly in relation to governance, rent seeking, and political economy issues.

Moreover, taking the shippers' view of logistics allows us to analyze the impact of their efficiency not only in terms of direct financial costs, but also by choosing the most appropriate definition of the value of time and reliability depending on the context.

The book confirms that the specific conditions of landlocked countries impact their logistics costs: transport costs are higher due to a combination of inadequate market structure, which prevents the passing on of cost benefits to prices (Chapter 2), and small markets (Chapter 5). Moreover,

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Box 1.2

Are Exports from Landlocked Countries Constrained Like Imports?

There are obvious differences between imports and exports facilitation, since they represent the two ends of the supply chain, with different operational constraints and requirements. It is usual that no fiscal revenues are attached to exports, and in the case of developing countries, merchandise imported for consumption or investments are generally different from exports (which are still, to a large extent, commodities). Therefore, on average, the import process is more cumbersome than the export process. Export transport costs and timing are not homogeneous and depend on several factors—for example, local (national) versus international transport, number of stages (and locations) in the production chain, perishability of goods, and storage strategy (for some commodities) among others.²⁰

It is worth noting that detailed data demonstrate a wide dispersion of results among corridors in the world. Landlocked countries face a cost penalty, compared with their coastal neighbors, ranging from 8 percent to as much as 250 percent, and a time penalty also ranging widely, from 9 percent to 130 percent. The average cost of transporting an export container to a European or U.S. destination in early 2008 was about US\$3,900 for a significant sample of landlocked countries, and US\$2,550 for their coastal neighbors. This amounts to a cost penalty for the landlocked countries of about 53 percent. Transit times, which give an indication of the relative scope of logistic costs for each shipment, averaged about 47 days for the landlocked countries compared to about 35 days for the coastal countries, implying a penalty of about 33 percent or 12 days.

Hence, even though perhaps less problematic than imports, exports from landlocked countries still face major constraints.²¹

Source: Arvis, Carruthers, and Smith (2010).

firms' administrative costs and overheads suffer from numerous rent seeking activities that are often transit specific and derive from market size (Chapters 4 and 5).

The book's content is divided as follows. In Chapter 2 we question the notion that costs to operate trucks in developing countries are intrinsically higher than in developed countries. Neither the distance covered nor the unit cost of transportation services is necessarily much higher in landlocked developing countries than in developed countries. However,

we also demonstrate that because of a lack of competition or anticompetitive behaviors in the trucking industry, transport prices can be much higher in central or western Africa compared to southern or eastern Asia.

Chapter 3 presents a transit framework and introduces a supply chain model to assess impacts of various constraints along the chain. Research on the cost of being landlocked has been essentially based on macromodeling, which is inadequate to identify the relative importance of possible sources of costs for landlocked countries. In order to fill this gap, we suggest following a supply chain model initially proposed by Baumol (1970). We use microlevel, disaggregated data to identify the three components of transit costs: (1) transport costs, (2) non-transport costs, and (3) hedging costs incurred by shippers to cope with unpredictable delivery schedules. The model demonstrates that transit logistics is complex, involves many public and private participants, and requires adequate procedures and responsibilities. Its performance is determined by a wide range of policies, implementation mechanisms, or organizations of services, which are usually prone to rent seeking and capture, especially in an environment where traded volumes are low.

In Chapter 4, we demonstrate that more than costs, delays and—even more important—a low degree of reliability and predictability of services creates massive disincentives to invest and higher total logistics costs through increased inventories.

In Chapter 5, we describe the importance of rents and how they affect logistics quality and reliability in landlocked countries. Shippers usually suffer from massive overheads resulting from corruption, overregulation, and private inefficiencies. Much of the cost supported by LLDCs may not be exogenous, as primary sources of cost are associated with poor performance of transit logistics resulting from a combination of (1) poor design or implementation of transit regimes and (2) unfavorable political economy of transit resulting in poor services.

Chapter 6 gives recommendations and argues for a paradigm shift in determining the cost of being landlocked. Many activities often promoted with trade facilitation projects (including border-crossing infrastructure and IT improvements) may either have less impact than expected or prove too difficult to implement.²² The three areas associated with the greatest potential gains in total logistics costs are the following: (1) any measure that enhances supply chain predictability and thereby reduces hedging costs; (2) measures, some of which may be parts of broader governance reforms, reducing rent seeking activities and therefore overhead logistics costs; and (3) reforming market structure by

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moving from a cartel/syndicate freight organization to an efficient market structure, to induce reductions in the fixed cost of transportation (see Table 1.3 for a summary).

The various links in a given transit supply chain indicate that the main sources of improvement in predictability and performance are:

1. *Improved initiation of transit at the gateway (typically the main source of delay and unpredictability)*, through a streamlined transit regime (preferably IT-based and including differentiation of treatment based on quality and treatment based on a professional risk assessment system).²³
2. *Improved clearance at destination*, which is already typically faster than the initiation of transit, but is a potential source of complication, especially for nonrecurring shipments, due to the lack of customs capacity in small countries and many self-imposed clearance processes and

Table 1.3 Potential Impact of Trade Facilitation Measures on Various Costs

<i>Type of logistics costs</i>	<i>Environment specificities</i>	<i>Potential impact</i>
Fixed cost of transportation	Three cases: 1. Efficient market 2. Cartel/syndicate 3. Transition from a cartel syndicate to an efficient market (decreased turnaround time)	Only two or three days can be gained on a typical trip Limited possible gains Substantial reduction through better use of trucks (30% or more)
Variable cost of transportation		Limited without major change in infrastructure condition or tax policy
Overhead costs		Reduction of non-transportation cost can be obtained in most cases by addressing overregulation or increasing competition
Administrative costs		To be assessed (especially for small shipments)
Inventory/hedging costs	1. Improvement in transit time 2. Improvement in predictability	Can be significant, but less than the improvement in predictability Very important

overheads. Customs reform in landlocked countries can be very challenging also because of the higher importance of customs in the public finance management system (as governments in these countries often have very few sources of income). However, there is ample available evidence that streamlined clearance coupled with effective risk assessment methods can lead only to an increase in customs revenue, never to a decrease.

3. *More reliable service quality through improved market competition.* Facilitation measures should be designed to give an advantage to services that help the economy integrate—for instance, dismantling anticompetitive practices in the trucking industry and upgrading entry requirements based on compliance and quality standards.
4. *Improved efficiency of multimodal nodes.* Beyond the obvious case of ports, in terms of reliable service delivery, road transport is usually more reliable than rail transport, and shippers are willing to pay a premium for more reliable road services if railroad interfaces are not optimized. However, the key impact here is often the improvement of rail service itself, which can be very challenging from a financial as well as an institutional standpoint, if it includes concessioning, privatization, or reform.

In this context, LLDCs' governments can often claim that they do not have many tools to bring to such an overwhelmingly challenging situation: their bargaining power is often weak even vis-à-vis their own operators, and many measures fall outside of their prerogatives.

However, several measures can help improve their situation, such as genuine customs reform or the dismantling of freight allocation bodies. None of these is easy to implement in a context in which a coalition of interests committed to bring measures to fruition is hard to implement (especially in the public sector, but also, more surprisingly, within shippers). Measures or policies aiming at improving quality of service are also very difficult to put in place from a public standpoint, as they usually emerge slowly from the service industry once the environment is favorable.

Notes

1. The true ratio is 43 out of 193 internationally recognized sovereign states.
2. Four landlocked countries are microstates in Europe: Andorra, San Marino, Vatican, and Lichtenstein.

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3. As of 2004, aggregate expenditures on shipping for total imports were three times higher than aggregate tariff duties paid (Hummels 2007).
4. Irwin and Terviö (2002); Limao and Venables (2001).
5. Bloom and Williamson (1998).
6. MacKellar, Wörgötter, and Wörz (2002).
7. Joyce (2001).
8. The presentation in Chapters 2 and 3 will demonstrate that (1) transportation costs are different from transport prices and, from a development perspective, the latter is more important; and (2) macrodata are inadequate to convey a sense of the extent of the transport constraint.
9. See, for instance, Faye, Sachs, and Snow (2004) for a discussion on the various types of dependence.
10. Transit procedure is per se a customs procedure. Transit processes seek to implement freedom of transit (Article V of the GATT) while safeguarding the transit country from potential fiscal loss by ascertaining that goods in transit actually exit the country. It is a delayed customs clearance. For an effective transit regime, the physical movement of goods must be backed by relevant financial and documentary flows. Any transit operation involves three core principles:
 1. The consignee or the designated agent (the principal) provides a guarantee through a financial institution to the transit country's customs (bond), based on the value of applicable duties on transit goods, to cover the risk of cargo disappearance within the customs transit territory.
 2. Transport has to be done in secured vessels and customs must affix seals on the vessel (i.e., container) that is checked at the entry port.
 3. Customs will implement documentary and information systems at borders to reconcile inflows and outflows.
11. UNCTAD (2002) gives the examples of port charges, road tolls, forwarding fees, customs bonds, or transport quota restrictions.
12. Article V of GATT (1947) states that "there shall be freedom of transit through the territory of each contracting party, via the routes most convenient for international transit, for traffic in transit to or from the territory of other contracting parties."
13. The International Ministerial Meeting of Landlocked and Transit Developing Countries and International Financial and Development Institutions on Transit Transport Cooperation.
14. Central African Republic is one of the few exceptions in the world.
15. It is worth noting that operators going to and from landlocked countries must often endure the poor logistics of both coastal and landlocked countries.

16. This assertion must be nuanced in the sense that outcomes may have been even worse without investments. However, the expected impact has not materialized yet.
17. Detailed data (at shipment level) were obtained from World Bank projects that used this methodology for appraisal in East and Central Africa.
18. Christ and Ferrantino (2009) demonstrate empirically that road quality and road uncertainty are close substitutes for each other, in the sense that improving either yields rewards to the exporter's payoff of comparable magnitude.
19. Azevedo and Ferreira (2007) demonstrate that the logistics area that seems to have the highest impact on firms' performance is inventory control.
20. Information accuracy may be questionable for some value chains because the cost of local transport (i.e., the cost of shipping the good from one location to another to continue the processing inside the chain) is sometimes included in other production costs.
21. The link between imports and exports is developed in Chapters 4 and 5.
22. Border-crossing improvements involve multicountry discussions and agreements, which can take a very long time to secure and sometimes do not lead to significant reduction in transit time if transit time is small compared to other links. In addition, their cost impact is limited.
23. If this is linked to improvement of the clearance process in the gateway country (through customs reform and improvement of a single window concept, for example), this can lead to major economic benefits region-wide. The importance of a quality private clearing and forwarding agent is also a key element in this equation.

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