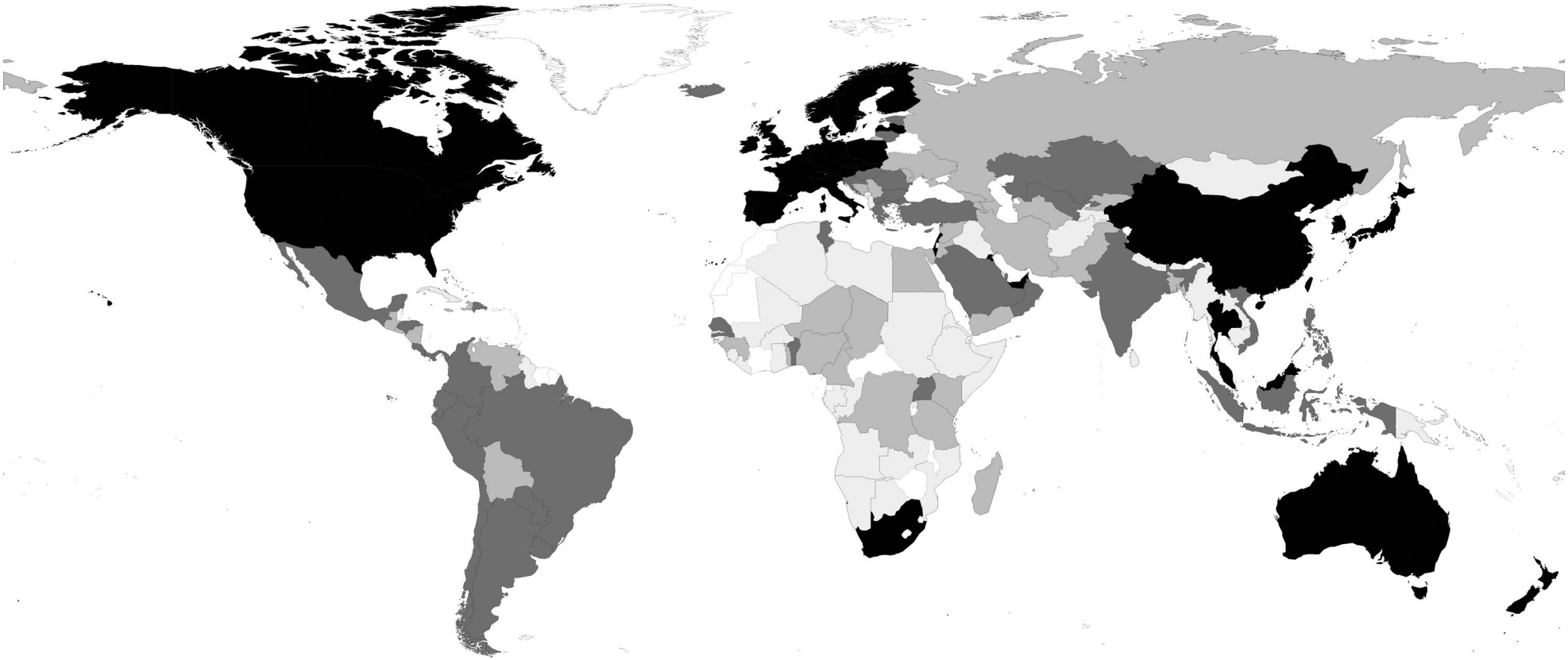
Connecting to Compete

2010

Trade Logistics in the Global Economy

The Logistics Performance Index and Its Indicators



LPI 1–2.48

LPI 2.48–2.75

LPI 2.75–3.23

LPI 3.23–5

No data

1 is the lowest score; 5 is the maximum score.

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The Logistics Performance Index and Its Indicators

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Foreword

This is the second edition of *Connecting to Compete: Trade Logistics in the Global Economy,* which was first published in November 2007. The Logistics Performance Index (LPI) and its indicators are a joint venture of the World Bank, logistics providers, and academic partners. The LPI is a comprehensive index created to help countries identify the challenges and opportunities they face in trade logistics performance. The World Bank conducts the LPI survey every two years.

Logistics encompasses an array of essential activities—from transport, warehousing, cargo consolidation, and border clearance to in-country distribution and payment systems—involving a variety of public and private agents. A competitive network of global logistics is the backbone of international trade. Unfortunately, many developing countries have not yet benefited from the productivity gains of logistics modernization and internationalization implemented over the last 20 years by advanced economies.

Improving logistics performance has become an important development policy objective in recent years because logistics have a major impact on economic activity. Evidence from the 2007 and 2010 LPIs indicates that, for countries at the same level of per capita income, those with the best logistics performance experience additional growth: 1 percent in gross domestic product and 2 percent in trade. These findings are especially relevant today, as developing countries need to invest in better trade logistics to boost recovery from the current economic crisis and emerge in a stronger and more competitive position.

On a hopeful note, the 2010 LPI points to modest but positive trends in key areas such as customs, use of information technologies for trade, and investment in private services. It also shows that logistics overperformers—countries with a higher LPI score than income would predict—are countries that have consistently invested in reforms and improvements. The 2010 LPI highlights new areas that need further attention, such as the coordination of agencies involved in border clearance and the quality of domestic trucking and customs brokerage services.

Connecting to Compete 2007 helped spark dialogue in several countries among various stakeholders in the government and between policymakers and the private sector about measures to address logistics bottlenecks and facilitate international trade and transportation. The optimistic messages from *Connecting to Compete 2010* should encourage countries to do even more, particularly important for countries whose trade logistics performance continues to be low.

With the LPI, the World Bank aims to focus attention on an issue of global importance and provide a platform for dialogue among government, business, and civil society. By showing how countries compare to others in the area of trade logistics and illuminating the costs of poor logistics performance, we hope the LPI will continue to serve as a catalyst, helping policymakers and the private sector build the case for domestic policy reform, for investment in trade-related infrastructure, and for the regional and multilateral cooperation that is needed for countries to break out of the vicious circle of "logistics unfriendliness."

Otaviano Canuto
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Acknowledgments

This is the second report presenting a new dataset for the Logistics Performance Index (LPI) and indicators. The survey is conducted every two years to improve the reliability of the indicators and to build a dataset comparable across countries and over time.

The LPI survey would not have been possible without the support and participation of the International Federation of Freight Forwarders Associations (www.fiata.com), the Global Express Association (www.global-express.org), the Global Facilitation Partnership for Transportation and Trade (www.gfptt.org), ten major international logistics companies, and a large group of medium-size logistics companies worldwide. The survey was designed and implemented with Finland's Turku School of Economics (www.tse.fi), which has worked with the World Bank to develop the concept since 2000.

The authors express their gratitude to the hundreds of employees of freight forwarding and express carrier companies around the world who took the time to respond to the survey. Their participation was central to the quality and credibility of the project, and their continuing involvement and feedback will be essential as we develop and refine the survey and the LPI in future years.

Authors

This report was prepared by the World Bank's International Trade Department (PRMTR), under the guidance of Bernard Hoekman (director) and Mona Haddad (sector manager). The project leaders and main authors were Jean-François Arvis and Monica Alina Mustra. Authors also included Professor Lauri Ojala (Turku School of Economics), Ben Shepherd, and Daniel Saslavsky (consultants).[1]

Gerard McLinden, Marc Juhel, Louis-Paul Tardif (Transport Canada), Aart Kraay, Andreas Dietrich Kopp, Lilya Repa, Charles Kunaka, Robin Carruthers, and Giuseppe Iarossi provided major inputs to the survey concept and the review of the results. The authors are also grateful to Tapio Naula (USAID Regional Trade Liberalization and Customs Project) for providing material on Central Asia and to Yann Duval (UNESCAP Trade and Investment Division) for providing material on East Asia. The LPI survey website[2] was designed and developed by Patrick Tse and Steffen Soulejman Janus of the World Bank Institute. The 2010 LPI website is produced and supported by Arseny Malov and Adarsh Desai from the World Bank Institute under close guidance of the core team. Scott Johnson from the World Bank Information Solutions Group assisted the team with monitoring survey responses.

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LPI ranking and scores 2010

Economy	2010 LPI Rank	Score	% of highest performer	Economy	2010 LPI Rank	Score	% of highest performer	Economy	2010 LPI Rank	Score	% of highest performer
Germany	1	4.11	100.0	Vietnam	53	2.96	63.1	Cameroon	105	2.55	49.7
Singapore	2	4.09	99.2	Greece	54	2.96	62.8	Niger	106	2.54	49.4
Sweden	3	4.08	98.8	Qatar	55	2.95	62.6	Nicaragua	107	2.54	49.3
Netherlands	4	4.07	98.5	Costa Rica	56	2.91	61.3	Jamaica	108	2.53	49.2
Luxembourg	5	3.98	95.7	Slovenia	57	2.87	60.2	Côte d'Ivoire	109	2.53	49.2
Switzerland	6	3.97	95.5	Senegal	58	2.86	59.8	Pakistan	110	2.53	49.1
Japan	7	3.97	95.2	Romania	59	2.84	59.1	Armenia	111	2.52	48.9
United Kingdom	8	3.95	94.9	Oman	60	2.84	59.1	Bolivia	112	2.51	48.5
Belgium	9	3.94	94.5	Tunisia	61	2.84	58.9	Gambia, The	113	2.49	48.0
Norway	10	3.93	94.2	Kazakhstan	62	2.83	58.9	Turkmenistan	114	2.49	47.9
Ireland	11	3.89	92.9	Bulgaria	63	2.83	58.8	Chad	115	2.49	47.9
Finland	12	3.89	92.6	Malta	64	2.82	58.6	Congo, Rep.	116	2.48	47.4
Hong Kong SAR, China	13	3.88	92.4	Dominican Republic	65	2.82	58.5	Ghana	117	2.47	47.3
Canada	14	3.87	92.3	Uganda	66	2.82	58.4	Lao PDR	118	2.46	47.0
United States	15	3.86	91.7	Peru	67	2.80	57.9	Albania	119	2.46	46.8
Denmark	16	3.85	91.4	Uzbekistan	68	2.79	57.5	Comoros	120	2.45	46.5
France	17	3.84	91.3	Benin	69	2.79	57.4	Montenegro	121	2.43	45.9
Australia	18	3.84	91.2	Honduras	70	2.78	57.1	Gabon	122	2.41	45.4
Austria	19	3.76	88.7	Ecuador	71	2.77	57.0	Ethiopia	123	2.41	45.4
Taiwan, China	20	3.71	86.9	Colombia	72	2.77	57.0	Papua New Guinea	124	2.41	45.3
New Zealand	21	3.65	85.0	Macedonia, FYR	73	2.77	56.9	Maldives	125	2.40	45.1
Italy	22	3.64	84.9	Croatia	74	2.77	56.8	Djibouti	126	2.39	44.8
Korea, Rep.	23	3.64	84.7	Indonesia	75	2.76	56.5	Liberia	127	2.38	44.4
United Arab Emirates	24	3.63	84.5	Paraguay	76	2.75	56.3	Bhutan	128	2.38	44.3
Spain	25	3.63	84.3	Uruguay	77	2.75	56.3	Cambodia	129	2.37	44.0
Czech Republic	26	3.51	80.5	Bahamas, The	78	2.75	56.1	Algeria	130	2.36	43.7
China	27	3.49	79.9	Bangladesh	79	2.74	56.0	Tajikistan	131	2.35	43.2
South Africa	28	3.46	78.9	Syrian Arab Republic	80	2.74	55.9	Libya	132	2.33	42.8
Malaysia	29	3.44	78.4	Jordan	81	2.74	55.8	Myanmar	133	2.33	42.7
Poland	30	3.44	78.2	Mauritius	82	2.72	55.3	Botswana	134	2.32	42.3
Israel	31	3.41	77.5	Serbia	83	2.69	54.1	Solomon Islands	135	2.31	42.0
Bahrain	32	3.37	76.2	Venezuela, RB	84	2.68	53.9	Mozambique	136	2.29	41.5
Lebanon	33	3.34	75.1	Congo, Dem. Rep.	85	2.68	53.8	Sri Lanka	137	2.29	41.4
Portugal	34	3.34	75.0	El Salvador	86	2.67	53.7	Zambia	138	2.28	41.2
Thailand	35	3.29	73.6	Bosnia and Herzegovina	87	2.66	53.4	Mali	139	2.27	40.7
Kuwait	36	3.28	73.2	Madagascar	88	2.66	53.2	Guyana	140	2.27	40.7
Latvia	37	3.25	72.2	Azerbaijan	89	2.64	52.6	Mongolia	141	2.25	40.2
Slovak Republic	38	3.24	71.9	Guatemala	90	2.63	52.4	Angola	142	2.25	40.1
Turkey	39	3.22	71.4	Kyrgyz Republic	91	2.62	52.0	Afghanistan	143	2.24	39.9
Saudi Arabia	40	3.22	71.3	Egypt, Arab Rep.	92	2.61	51.8	Fiji	144	2.24	39.7
Brazil	41	3.20	70.6	Georgia	93	2.61	51.8	Burkina Faso	145	2.23	39.4
Iceland	42	3.20	70.5	Russian Federation	94	2.61	51.6	Sudan	146	2.21	38.7
Estonia	43	3.16	69.3	Tanzania	95	2.60	51.4	Nepal	147	2.20	38.6
Philippines	44	3.14	68.8	Togo	96	2.60	51.4	Iraq	148	2.11	35.5
Lithuania	45	3.13	68.5	Guinea	97	2.60	51.2	Guinea-Bissau	149	2.10	35.4
Cyprus	46	3.13	68.4	Haiti	98	2.59	51.1	Cuba	150	2.07	34.3
India	47	3.12	67.9	Kenya	99	2.59	51.0	Rwanda	151	2.04	33.4
Argentina	48	3.10	67.4	Nigeria	100	2.59	51.0	Namibia	152	2.02	32.8
Chile	49	3.09	67.3	Yemen, Rep.	101	2.58	50.8	Sierra Leone	153	1.97	31.2
Mexico	50	3.05	65.7	Ukraine	102	2.57	50.6	Eritrea	154	1.70	22.4
Panama	51	3.02	65.0	Iran, Islamic Rep.	103	2.57	50.5	Somalia	155	1.34	10.9
Hungary	52	2.99	63.8	Moldova	104	2.57	50.5				

Summary and key findings

This report presents the findings of the second edition of *Connecting to Compete,* a report on the new dataset for the 2010 Logistics Performance Index (LPI) and its component indicators. The LPI is a multidimensional assessment of logistics performance, rated on a scale from one (worst) to five (best). It uses more than 5,000 individual country assessments made by nearly 1,000 international freight forwarders to compare the trade logistics profiles of 155 countries.

The 2010 LPI also provides a snapshot of selected performance indicators in nearly 130 countries, including expanded information on the time, cost, and reliability of import and export supply chains, infrastructure quality, performance of core services, and the friendliness of trade clearance procedures. The 2010 LPI and its indicators encapsulate the firsthand knowledge of movers of international trade, collected amid the economic turmoil of 2009.

The importance of efficient logistics for trade and growth is now widely acknowledged. Analysis based on the 2007 LPI or similar information has shown that better logistics performance is strongly associated with trade expansion, export diversification, ability to attract foreign direct investments, and economic growth. In other words, trade logistics matter.

World trade is moved between countries by a network of increasingly global logistics operators. But the ease with which traders can use this network to connect with international markets depends in large part on country-specific factors such as trade procedures, transport and telecommunications infrastructure, and the domestic market for support services. The LPI and its component indicators provide a unique global point of reference to better understand these key dimensions of logistics performance.

Germany and Singapore receive the highest ratings in the 2010 LPI with scores over 4.08, while Somalia ranks last with a score of 1.34. As observed in *Connecting to Compete 2007,* there is a large logistics gap between high- and low-income countries. The LPI scores of advanced economies and some emerging and transition economies are relatively high due to their well-developed trade facilitation programs. But most countries are still in the process of addressing their performance bottlenecks. Although small differences in scores and rankings of individual countries should be interpreted with caution, especially for countries in the intermediate group of performers, the countries that have the worst performance—mostly least developed countries—are hampered by severe capacity constraints that make sustained progress difficult.

Income is not the only determinant of a country's logistics environment. Even in low-income countries, policymakers can do much to boost performance. Liberalizing logistics services markets, for example, can encourage local service providers to increase quality and price competitively. This is particularly important in sectors such as trucking and customs brokerage that are essential to efficient service delivery by international forwarders.

Countries with low LPI scores tend to have higher average times to import or export. But it is important to keep these delays in perspective. Lead times reported by international forwarders are much shorter than shipping times. Landlocked developing countries are at a disadvantage because they cannot control shipping conditions outside their borders. Importing into a landlocked developing country typically takes a week longer than for its coastal neighbors, but times can vary widely, especially in Africa.

Even more than time and cost, logistics performance depends on the reliability and predictability of the supply chain. The level of logistics service available in the best performing countries is about double that in the lowest performing countries. In the lowest performing countries, importers and exporters incur extra costs as a result of the need to mitigate the effects of unreliable supply chains, for example, by increasing inventory to hedge against failed deliveries. The costs of poor performance ultimately fall

on end users or consumers. The relative—and often even absolute—burden of such costs is highest in the least developed countries.

Unreliability of logistics can come in many forms in low performance countries. Excessive physical inspection or inappropriate reliance on inspector discretion causes large variations in clearance times, and multiple inspections are frequent. Increasingly strict safety and security measures impair service provision in all but the top ranking countries.

The information obtained from logistics professionals reflected in the 2010 LPI is very relevant for helping to identify priorities for government agencies planning to implement reform agendas in cooperation with private stakeholders:

- Except in high-income countries, the availability and quality of trade-related infrastructure is a major constraint to performance—but the specific priorities tend to vary across countries. Information technology infrastructure is widely available and widely used for trade processing, even in low-income countries. Countries in the intermediate range of logistics performance tend to be relatively more impacted by the quality and availability of physical infrastructure (ports or roads). Rail services receive very low scores almost everywhere.
- Efficient border management and coordination of the various agencies involved in border clearance is increasingly important. The performance of agencies responsible for enforcement of sanitary and phytosanitary regulation —and to a lesser extent other types of product standards—appears to lag well behind customs in many countries. LPI survey respondents rate the activities of such agencies as a major factor leading to additional, sometimes redundant, paperwork and inspection processes in the lowest performing countries.
- A major challenge for the international community is how to help the lowest performing countries benefit from an increasingly open global trading system. These countries need to make substantial improvements in logistics competence, processes, and business practices, which may be difficult to attain given numerous other priorities. The challenge is compounded by the fact that many of these countries are landlocked and often depend on transit countries that have low logistics performance themselves. To escape the resulting multiplicative effects on trade costs, enhancing regional cooperation and implementing efficient transit systems on trade corridors is critical.

While *Connecting to Compete 2010* highlights priority areas for increased policy attention, the report offers an optimistic message. Logistics professionals assess the trends in logistics and trade facilitation in their country of work to be generally positive. The use of increasingly standardized information technology solutions in logistics is widespread worldwide, and customs reform has progressed in most countries, irrespective of their level of performance.

In fact, the logistics performance of a significant number of countries is gradually converging toward the level attained in the top performing countries. Part of this convergence is driven by a global trend toward consolidation and homogenization of service provision, especially in container, air freight, express cargo, and contract logistics. The current economic situation will further encourage this trend. But the increased awareness and proactive policies of a growing number of countries also play a major role in driving better performance, underpinning some of the most encouraging increases in LPI scores compared with the 2007 LPI report.

SECTION 1

The 2010 Logistics Performance Index

Trade logistics performance is directly linked with important economic outcomes, such as trade expansion, diversification of exports, and growth

From awareness to implementation

International trade is moved by a network of increasingly global logistics operators who deal with a number of functions in the international supply chains: ocean shipping, air freight, land transport, warehousing, and third party logistics. Globalization has made the demand for logistics services more sophisticated, pushing for integration and diversification of services to help operate uninterrupted supply chains. Key segments of the logistics industry[3] are dominated by 25 large corporations, especially in the maritime, port, and air freight segments.[4] But the industry remains much less concentrated in traditional subsectors that are more local in nature and have low costs of entry, such as trucking or "traditional" freight forwarding and customs brokerage. In global logistics the physical movement of goods is supported by a chain of service providers who should work together seamlessly.

The ease with which exporters can connect to this logistics network[5] depends on domestic factors such as infrastructure, trade procedures, and the market for trade-related support services. International companies trying to implement consistent standards worldwide find that the level of service they can achieve depends on local operating conditions in each country. A recent trade facilitation audit in a Mediterranean country[6] found that leading express carriers were not permitted to operate 24/7, own bonded facilities, or employ their own brokers—all basic prerequisites for delivering courier or parcel service.

Facilitating trade and transport is essential for countries to compete in the global marketplace: traders need to be able to move goods and services across borders on time and with low transaction costs. Extensive recent research evidence confirms this link. As measured by the World Bank's Logistics Performance Index (LPI), trade logistics performance is directly linked with important economic outcomes, such as trade expansion, diversification of exports, and growth (see appendix 5 for more details).

Countries wishing to improve trade logistics may need to reform and modernize border management institutions, change transport regulation policy, and, in some cases, invest significantly in trade-related infrastructure. The key issue—highlighted by the 2007 LPI—is that a trade supply chain is only as strong as its weakest link. Determining where the weakest links are and addressing them through targeted development interventions has therefore become a major element of the trade facilitation and logistics agenda.

Until recently, policymakers and private sector stakeholders have not had the data they needed to identify trade constraints or create constituencies for reform. The LPI fills that gap. The first edition (2007) helped intensify the dialogue between policymakers and the private sector in several countries about logistics bottlenecks and facilitating international trade and transportation at the country or subregional level.

In the two years since the first LPI, several countries have launched programs promoting improvements in logistics performance. Rather than separately addressing issues such as border procedures, port performance, international transit, or investment in services, more countries are implementing comprehensive programs to address the weakest links in their macro-supply chain and stimulate cooperation between public agencies and private stakeholders.

For example, shortly after the 2007 LPI report, Indonesia launched an ambitious public and private dialogue on trade facilitation and

logistics. It prepared an action plan addressing the costs of international trade (port facilitation), as well as the unique logistics costs of a large archipelago. Vietnam has embarked on a similar process.

With the LPI, the World Bank aims to focus attention on an issue of global importance and provide a platform for dialogue among government, business, and civil society. By showing countries how they compare with their competitors and illuminating the costs of poor logistics performance, the LPI indicators can continue to serve as a catalyst, helping policymakers and the private sector build the case for reform—and helping countries break out of the vicious circle of "logistics unfriendliness."

Logistics performance in 2010: what's new?

The World Bank conducts the LPI survey every two years. The core approach remains the same as in 2007: in the first (international) part respondents assess six key dimensions of logistics performance in eight important overseas markets; in the second (domestic) part they provide detailed data on the logistics environment in their own country, including a mix of qualitative and quantitative time and cost data (see box 1.1). Thanks to increased private sector involvement in the LPI survey, country coverage for the international LPI has increased from 150 to 155.[11]

Although the LPI represents a useful benchmark of a country's logistics performance, the LPI survey also collects important and detailed data on domestic logistics and the time and cost burdens of import and export transactions. Country coverage for the domestic LPI has increased to nearly 130 countries. These data allow practitioners, analysts, and policymakers to examine the determinants of logistics performance in individual countries. Used jointly, the international and domestic data can identify supply chain bottlenecks. Comparison of index

Box 1.1 Measuring logistics performance using the LPI

The World Bank's Logistics Performance Index (LPI) summarizes the performance of countries in six areas that capture the most important aspects of the current logistics environment:

- Efficiency of the customs clearance process.
- Quality of trade and transport-related infrastructure.
- Ease of arranging competitively priced shipments.
- Competence and quality of logistics services.
- Ability to track and trace consignments.
- Frequency with which shipments reach the consignee within the scheduled or expected time.

These areas range from traditional issues (customs procedures and infrastructure quality) to new concerns (tracking and tracing shipments, timeliness in reaching a destination, and the competence of the domestic logistics industry).[7] None of these areas alone can ensure good logistics performance. Their selection is based on the latest theoretical and empirical research[8] and on extensive interviews with professionals involved in international freight logistics.[9] The LPI uses standard statistical techniques to aggregate the data into a single indicator[10] (see appendix 4 for a detailed description of the way in which the LPI is calculated). This approach makes it possible to conduct meaningful comparisons across countries, regions, and income groups, as well as to undertake country-specific diagnostic work.

Because these vital aspects of logistics performance can best be assessed by operators on the ground, the LPI relies on a structured online survey of logistics professionals from the companies responsible for moving goods around the world: multinational freight forwarders and the main express carriers. Freight forwarders and express carriers are in a privileged position to assess how countries perform. And their views matter, directly affecting the choice of shipping routes and gateways and influencing firms' decisions about production location, choice of suppliers, and selection of target markets. Their participation is central to the quality and credibility of the LPI project, and their continuing involvement and feedback have been essential in further developing and refining the survey in this second edition of the LPI. Nearly 1,000 logistics professionals from international logistics companies in 130 countries participated in this edition of the LPI survey, a 25 percent increase from 2007—and a testament to the interest the LPI has generated in the private sector.

The LPI survey consists of two major parts offering two different perspectives: international and domestic. The international LPI provides qualitative evaluations of a country, in the six areas described above, by its trading partners—logistics professionals working outside of the country. The domestic LPI provides both qualitative and quantitative assessments on the country by logistics professionals working inside it, including more detailed information on the logistics environment, core logistics processes, institutions, and performance time and cost data. This additional information on different aspects of logistics was used to interpret the LPI as well as validate and crosscheck the information underlying it.

The LPI questionnaire is available at www.worldbank.org/lpi.

scores across countries should therefore only be a starting point for using the LPI.

New features of the LPI survey

The LPI survey has been refined in light of feedback on the 2007 survey from users, policymakers, and logistics professionals. There is very little change in the first (international) section, in which respondents assess the same six key dimensions of logistics performance in eight important overseas markets as they did in 2007—thus maintaining a comparable way for computing the LPI. But the revised survey (conducted in 2009) collects extensive new information in the second (domestic) section—such as more detail about the customs clearance process—and increases the quality and scope of the quantitative physical performance indicators that can help support sound policymaking.

Expanded information includes:

- Time/cost data for import and export transactions.
- Customs administration and procedures.
- Border security measures (from an additional question in the international section).
- Quality data for infrastructure and service providers.

The major innovation of the revised survey is the import and export time/cost data. Respondents self-identified as having experience in export pre-carriage (between the seller's factory and port or airport, excluding international shipping), export carriage (by land, between the seller's factory and buyer's warehouse), import on-carriage (between port or airport to the buyer's warehouse), or import carriage (by land, between the seller's factory and buyer's warehouse).

These distinctions enabled the LPI to identify logistics concerns for specific types of shipping, including important differences between moving goods by land and by sea or by air. For example, respondents describing the export of a full load from their home country provided separate time and cost data for the two portions of the supply chain in their home country (figure 1.1): export pre-carriage between the seller's factory and port or airport and export carriage by land between the seller's factory and buyer's warehouse.[12]

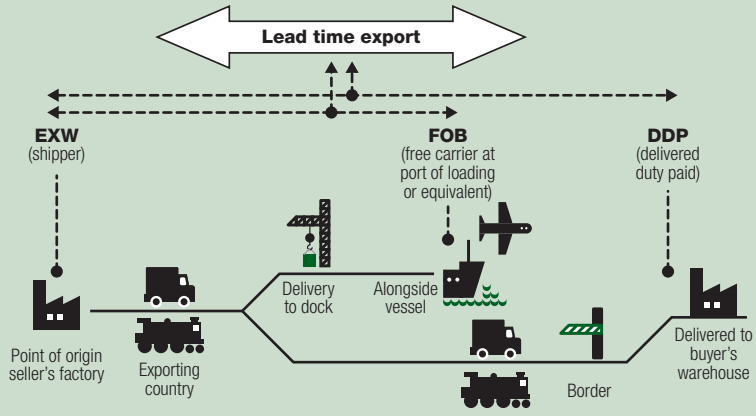
The revised survey instrument also provides extensive new details on the customs clearance process in the domestic section of the LPI, allowing a more nuanced analysis of particular aspects of customs and the clearance process. In addition to assessing clearance time and rating the efficiency of customs as in 2007, respondents also assessed customs valuation methods; methods for determining whether or not shipments will be physically inspected; use of electronic submission, pre-arrival clearance, and post-clearance audit procedures; and the transparency of customs procedures and administration, including the extent of industry consultation, advance notification of regulatory changes, and availability of review or appeal procedures.

Reflecting the important role now played by border security requirements, a new question on cargo security in the international part of the survey is designed to help assess the extent to which these measures constrain international supply chains. For each of the eight major trading partners of their home country, respondents indicate whether it has become easier or more complicated to comply with cargo security requirements, such as screening and provision of advance information. The base year for comparative purposes is 2005.

The 2007 LPI focused on the quality of two types of infrastructure—transport and telecommunications—and the competence of

The World Bank aims to focus attention on an issue of global importance and provide a platform for dialogue among government, business, and civil society

Figure 1.1 **Lead time to export**



Source: Authors.

Having an LPI lower by one point—such as 2.5 rather than 3.5—implies two to four additional days for moving imports and exports between the port and a company's warehouse

a range of logistics service providers. The 2010 LPI expands coverage in these areas in two ways. First, infrastructure data now separately identify ports, airports, road, rail, warehousing, and transloading facilities, and information and communications (ICT) infrastructure. Second, respondents are now asked to assess both the competence and quality of core logistics service providers, such as transport operators, distributors, freight forwarders, customs and border agencies, and shippers. Focusing on quality of service in addition to the competence of service providers provides important additional information on the determinants of overall logistics performance (box 1.2).

Key findings from the 2010 LPI

As in 2007, the 2010 LPI shows that high-income countries dominate the top logistics rankings (table 1.1). The list of countries in the global top 10 is very similar to the 2007 top 10.[14] Most of them can be seen as key players in the logistics sector, occupying important places in a variety of global and regional supply chains. The results mirror the openness of these countries to international trade and investment as part of their successful economic development strategy.

By contrast, the 10 lowest performing countries (table 1.2) are almost all from the low- and lower middle-income groups, geographically concentrated in Africa. In most cases, they can be regarded as heavily marginalized from regional and global supply chains. Tables 1.3 through 1.5, which present the top 10 performers by income group, largely reinforce these assessments.

How do the LPI scores and rankings relate to logistics performance on the ground? Using additional country-specific information gathered in the survey, it is possible to give an idea of the average association between LPI scores and performance in particular areas. For example, having an LPI lower by one point—such as 2.5 rather than 3.5—implies two to four additional days for moving imports and exports between the port and a company's warehouse. It also implies a rate of physical inspection that is 25 percentage points higher.[15] These findings show the ways in which the LPI can be used to help identify bottlenecks and supply chain reliability problems in practice.

Figure 1.2 shows the cumulative distribution of LPI scores, with vertical lines indicating the quintile boundaries.[16] This report will often present the components of the LPI by quintiles (containing equal numbers of countries) to facilitate reading the results. The fifth (bottom) quintile contains the countries with the lowest LPI scores, the first (top) quintile those with the highest score).

The distribution of LPI scores suggests four types of country logistics environments, introduced in the 2007 edition of *Connecting to Compete:* logistics unfriendly, or severely logistics constrained countries, such as least developed countries (bottom quintile); partial performers, such as the low- and middle-income countries facing similar constraints (fourth and third quintiles); consistent performers, such as countries achieving better logistics performance than their income group (second quintile); and logistics friendly, high performers, for the most part high-income countries (top quintile). The challenges faced by these different groups will be discussed in sections 2 and 3.

The "logistics gap" persists

LPI scores are on average about 45 percent higher for high-income countries than for low-income countries (figure 1.3). This gap is to be

Box 1.2 Private sector opinions matter

The LPI combines quantitative and qualitative assessments within dual international and domestic perspectives on logistics performance. Part 1 of the survey (international) relies on qualitative indicators—private sector experts rating performance of their trading partners on the basis of their own opinions and experience—across a range of indicators on various dimensions of logistics performance. In contrast, part 2 (domestic) contains both qualitative assessments of the domestic logistics environment and quantitative data on performance of domestic supply chains and core logistics processes (time, cost) by international professionals located in the country evaluated.

Hallward-Driemeier and Aterido show that firm-level qualitative data correlate strongly with quantitative measures of the business environment, whether taken from within a survey (such as in the LPI) or from outside sources.[13] This confirms that qualitative measures of constraints can capture meaningful variations across countries and within countries and therefore reflect a real assessment of actual conditions on the ground and how important they are to the firm.

Table 1.1 Top 10 logistics performers 2010

Economy	2010 LPI			2007 LPI		
	LPI rank	LPI score	% of highest performer	LPI rank	LPI score	% of highest performer
Germany	1	4.11	100.0	3	4.10	97.1
Singapore	2	4.09	99.2	1	4.19	100.0
Sweden	3	4.08	98.8	4	4.08	96.4
Netherlands	4	4.07	98.5	2	4.18	99.6
Luxembourg	5	3.98	95.7	23	3.54	79.5
Switzerland	6	3.97	95.5	7	4.02	94.5
Japan	7	3.97	95.2	6	4.02	94.8
United Kingdom	8	3.95	94.9	9	3.99	93.8
Belgium	9	3.94	94.5	12	3.89	90.7
Norway	10	3.93	94.2	16	3.81	88.1

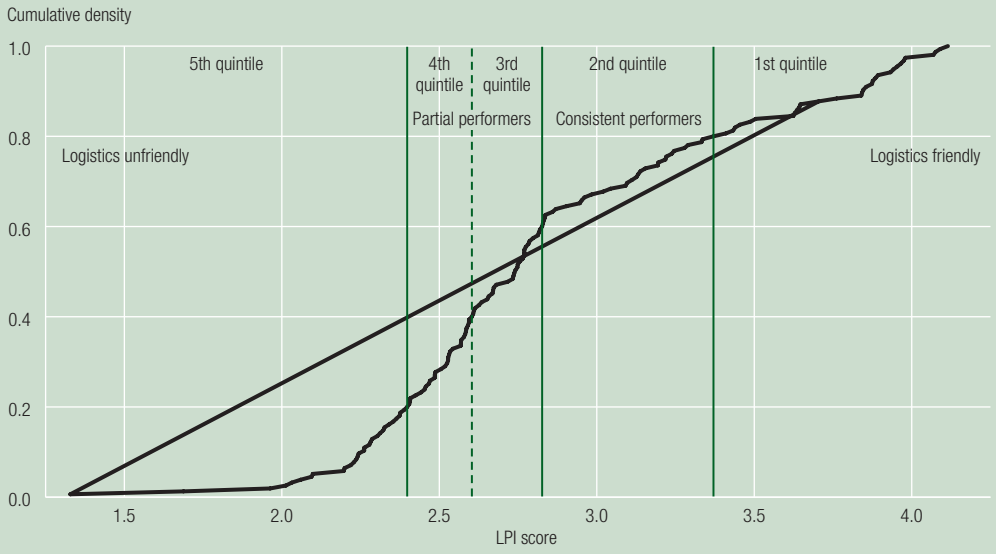
Source: Logistics Performance Index, 2007 and 2010.

Table 1.2 Bottom 10 logistics performers 2010

Economy	2010 LPI			2007 LPI		
	LPI rank	LPI score	% of highest performer	LPI rank	LPI score	% of highest performer
Somalia	155	1.34	10.9	127	2.16	36.3
Eritrea	154	1.70	22.4	124	2.19	37.2
Sierra Leone	153	1.97	31.2	144	1.95	29.9
Namibia	152	2.02	32.8	126	2.16	36.3
Rwanda	151	2.04	33.4	148	1.77	24.3
Cuba	150	2.07	34.3	n/a	n/a	n/a
Guinea-Bissau	149	2.10	35.4	116	2.28	40.0
Iraq	148	2.11	35.5	n/a	n/a	n/a
Nepal	147	2.20	38.6	130	2.14	35.7
Sudan	146	2.21	38.7	64	2.71	53.6

Source: Logistics Performance Index, 2007 and 2010.

Figure 1.2 Cumulative distribution of LPI scores, 2010



Source: Logistics Performance Index, 2010.

Table 1.3 Top 10 logistics performers 2010, upper middle-income countries

Economy	2010 LPI			2007 LPI		
	LPI rank	LPI score	% of highest performer	LPI rank	LPI score	% of highest performer
South Africa	28	3.46	78.9	24	3.53	79.4
Malaysia	29	3.44	78.4	27	3.48	77.7
Poland	30	3.44	78.2	40	3.04	63.9
Lebanon	33	3.34	75.1	98	2.37	42.9
Latvia	37	3.25	72.2	42	3.02	63.2
Turkey	39	3.22	71.4	34	3.15	67.5
Brazil	41	3.20	70.6	61	2.75	54.9
Lithuania	45	3.13	68.5	58	2.78	55.7
Argentina	48	3.10	67.4	45	2.98	62.1
Chile	49	3.09	67.3	32	3.25	70.5

Source: Logistics Performance Index, 2007 and 2010.

Table 1.4 Top 10 logistics performers 2010, lower middle-income countries

Economy	2010 LPI			2007 LPI		
	LPI rank	LPI score	% of highest performer	LPI rank	LPI score	% of highest performer
China	27	3.49	79.9	30	3.32	72.8
Thailand	35	3.29	73.6	31	3.31	72.5
Philippines	44	3.14	68.8	65	2.69	52.9
India	47	3.12	67.9	39	3.07	64.9
Tunisia	61	2.84	58.9	60	2.76	55.3
Honduras	70	2.78	57.1	80	2.50	47.0
Ecuador	71	2.77	57.0	70	2.60	50.1
Indonesia	75	2.76	56.5	43	3.01	63.0
Paraguay	76	2.75	56.3	71	2.57	49.2
Syrian Arab Republic	80	2.74	55.9	135	2.09	34.1

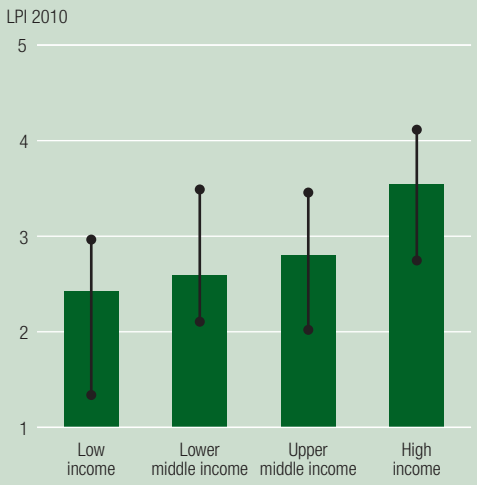
Source: Logistics Performance Index, 2007 and 2010.

Table 1.5 Top 10 logistics performers 2010, low-income countries

Economy	2010 LPI			2007 LPI		
	LPI rank	LPI score	% of highest performer	LPI rank	LPI score	% of highest performer
Vietnam	53	2.96	63.1	53	2.89	59.2
Senegal	58	2.86	59.8	101	2.37	42.8
Uganda	66	2.82	58.4	83	2.49	46.7
Uzbekistan	68	2.79	57.5	129	2.16	36.3
Benin	69	2.79	57.4	89	2.45	45.3
Bangladesh	79	2.74	56.0	87	2.47	46.1
Congo, Dem. Rep.	85	2.68	53.8	n/a	n/a	n/a
Madagascar	88	2.66	53.2	120	2.24	39.0
Kyrgyz Republic	91	2.62	52.0	103	2.35	42.3
Tanzania	95	2.60	51.4	137	2.08	34.0

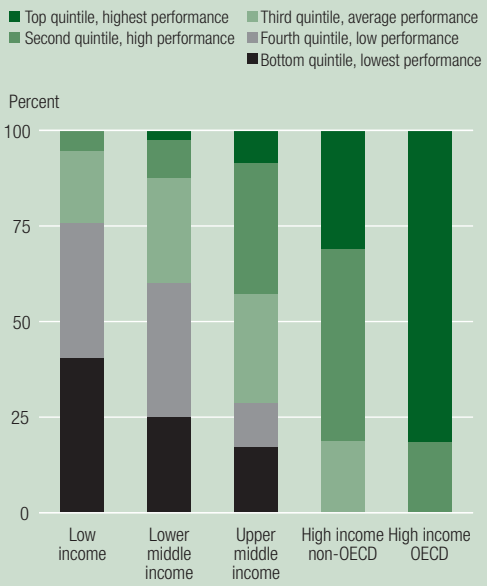
Source: Logistics Performance Index, 2007 and 2010.

Figure 1.3 **2010 LPI score, average and minimum/maximum range by income group**



Note: Vertical rules show minimum/maximum range.
Source: Logistics Performance Index, 2010.

Figure 1.4 **Distribution of country performance across income levels, by LPI quintile**



Source: Logistics Performance Index, 2010.

expected. Low-income countries face severe constraints on infrastructure quantity and quality, as well as human, technical, and financial capacity. These factors all negatively affect performance in a sector that is complex on a technical level and requires a mix of public and private inputs to function efficiently.

Income alone does not explain logistics performance

Despite this logistics gap, country income alone does not account for the wide variety of performance levels across countries. Logistics performance varies considerably within income groups (tables 1.3–1.5 and figure 1.3). This assessment is reinforced by grouping LPI scores into five equal-sized groups (quintiles) and examining the distribution of countries by quintiles across income groups (figure 1.4). Most high-income countries are in the top 20 percent of LPI performers, but other country income groups display considerably more dispersion. Upper and lower middle-income countries, for example, are distributed across all five of the 2010 LPI quintiles—with scores ranging from the bottom group of logistics performers to the top. Even low-income countries have LPI scores across four of the five quintiles. Vietnam, a low-income country, has an LPI score broadly comparable with those of some upper middle-income countries and sufficiently high to place it in the second 20 percent of logistics performers worldwide.

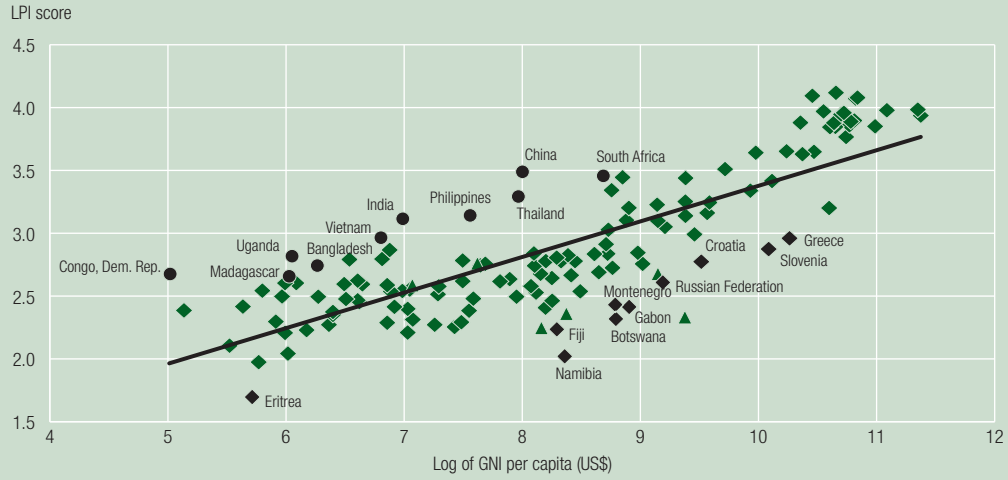
Plotting an average relation between country income and logistics performance makes it possible to identify over- and underperformers in the logistics sector (figure 1.5). An overperformer is a country with a higher LPI score than would be expected based solely on its income level, an underperformer a country with a lower than expected LPI score. Excluding high-income countries, the 10 most significant overperformers are Bangladesh, China, Democratic Republic of Congo, India, Madagascar, Philippines, South Africa, Thailand, Uganda, and Vietnam. The 10 most significant underperformers are Botswana, Croatia, Eritrea, Fiji, Gabon, Greece, Montenegro, Namibia, Russian Federation, and Slovenia. The existence of these two groups, as well as the general dispersion in performance within income groups, suggests that policy has a strong influence on logistics sector performance.

A number of countries stand out (see figure 1.5). Algeria, for example, has an LPI score of 2.36, ranking it 130 out of 155 countries. This is a low level of performance relative to its upper

Policy has a strong influence on logistics sector performance

The overwhelming majority of statistically significant LPI changes are positive

Figure 1.5 LPI overperformers and underperformers in 2010, relative to income per capita



Note: Fitted values are based on an ordinary least squares regression using data for all countries. Underperformers (black diamonds) are defined as the non-high income countries with the 10 smallest residuals. Overperformers (black circles) are defined as the non-high income countries with the 10 largest residuals. Other oil-producing countries are represented by triangles.
Source: Logistics Performance Index, 2010, and World Bank 2008b.

middle-income status. Comparatively low logistics performance is a feature of many oil exporting countries, possibly representing a significant drag on their broader economic integration and diversification agendas.

China, in contrast, is a lower middle-income country with an LPI score (3.49) far higher than would be expected based solely on its income level, ranking it in the top 20 percent of logistics performers on par with such high-income countries as the Czech Republic. Of course, it is important not to overinterpret this result. Because LPI survey respondents have much more experience with a country's main international gateways than with its smaller or more remote border crossings, a high LPI score does not necessarily indicate uniformly strong performance within a large and diverse country.

Least developed countries with higher scores, such as Uganda (see section 2) or Madagascar,[17] also underscore the impact of proactive trade and transport facilitation policies even in poor countries. Both have been relatively successful, despite post-conflict environments, in improving their customs or trade infrastructure.[18]

Logistics performance is (slowly) improving

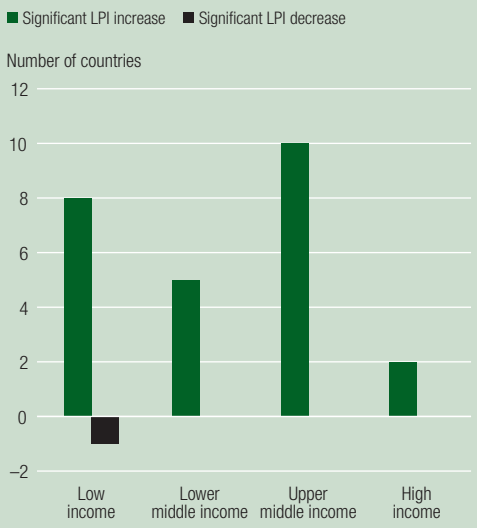
Results for the 2010 LPI are close to those for the 2007 LPI. The correlation between the two LPI scores is just over 90 percent, with the rank correlation only slightly weaker at 87 percent.

A number of changes at the level of individual country ranks and scores might appear to be large at first glance, but the LPI is subject to sampling error because of its survey methodology. A vital part of the LPI dataset is the estimated confidence interval for each country's score (box 1.3). Only in cases where the confidence intervals for 2007 and 2010 do not overlap can we conclude that a statistically significant change has taken place.

Based on this criterion of nonoverlapping confidence intervals, 26 countries have statistically significant LPI changes.[19] The overwhelming majority (25) of these changes are positive, indicating that overall logistics performance has improved (figure 1.6). Evident across all developing country income groups, this pattern suggests that very little backsliding is occurring.[20] The majority of these improvements (15 out of 25) are concentrated among lower middle-[21] and upper middle-income[22] countries. Eight low-income countries show statistically significant improvements in their performance,[23] but only two high-income economies do so.[24]

Among the countries showing statistically significant improvement, Colombia has implemented key reforms, such as an interagency single window, has approved a national logistics

Figure 1.6 **Number of countries with a statistically significant change in the LPI from 2007 to 2010, by income group**



Source: Logistics Performance Index, 2007 and 2010.

action plan, and is setting up a logistics observatory to assess its performance at a fine level and monitor the impact of reforms. Brazil is following a similar track to address "Custo Brasil."

Other countries are introducing reforms. In 2009 Tunisia established a national logistics council—involving the lead government agencies and the private sector and reporting to the Prime Minister—to implement a comprehensive action plan building on earlier successes, notably in port facilitation. Some key components of the action plan dealing with border procedures, ports, and logistics services were included in the competitiveness program designed with the European Union, the World Bank, and the African Development Bank. Morocco has developed a similar program.

It is not a coincidence that overachievers among emerging economies have followed the same strategy as top high-income countries, which have also outlined or are currently developing advanced national logistics policies to enhance their competitiveness. Germany, ranked first in the 2010 LPI, issued a Freight Transport and Logistics Masterplan in 2008. Similar documents are being drafted in a number of other countries, such as Sweden and Finland, ranked 3 and 12 in the 2010 LPI.

Policymakers clearly recognize the importance of trade facilitation and logistics and are making visible efforts to put in place the structures needed to boost performance. Since its launch in 2007, the LPI and its component indicators have gained rapid acceptance, used by policymakers and professionals at the national, regional, and global levels (box 1.4).

Another change since the 2007 version is visible by comparing a relative measure of

Box 1.3 **How precise are LPI scores and ranks?**

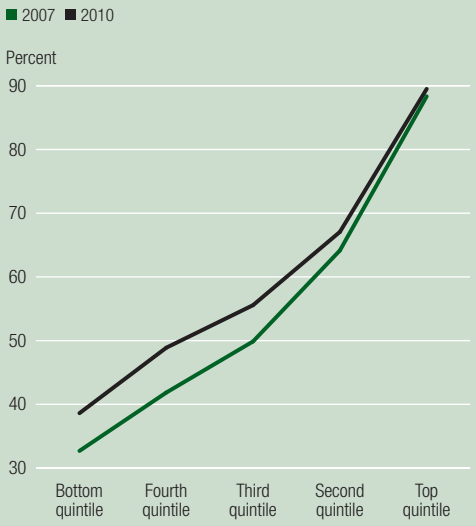
Although representing the most comprehensive and comparable data source currently available on country logistics and trade facilitation environments, the LPI and its components have their own domain of validity. First, the experience of international freight forwarders surveyed may not represent the broader logistics environment in poor countries, where they tend to co-exist with more traditional operators. The two groups' interactions with government agencies, as well as the service levels they offer, might differ significantly. In most developing countries, agents or affiliates of international networks tends to serve large companies and operate at different levels of performance than traditional trading networks, including in terms of time and costs.

Second, in the case of landlocked or island countries, the LPI may capture access problems outside the country being assessed—for example, transit difficulties. The low rating of a landlocked country such as Rwanda might not give full justice to its efforts to reform and facilitate trade because it is dependent upon long international transit routes (through Tanzania or Kenya, plus Uganda), the efficiency of which is dependent upon others.

As an additional aid to interpretation, LPI scores are presented with approximate confidence intervals (appendix 4). These ranges are designed to take into account the sampling error created by LPI's survey-based dataset. They make it possible to provide upper and lower bounds for a country's LPI score and rank.[25] Confidence intervals tend to be broader for the third and fourth quintile. It is important to pay close attention to confidence intervals before concluding that a change in score or a difference between two scores is significant. As shown in figure 1.6, only when the lower bound of a country's 2010 LPI score is higher than its 2007 upper bound can it be concluded that there has been a statistically significant improvement in performance.

For these reasons, excessive reliance on the exact ranking may not be as relevant for policymakers as the country's wider performance group or the existence of statistically significant improvements.

Figure 1.7 **LPI score as percentage of highest LPI score, by LPI quintile, 2007 and 2010**



Source: Logistics Performance Index, 2007 and 2009.

the 2007 and 2010 LPI.[34] The relative score is higher in 2010 across all quintiles, consistent with a gradual convergence of logistics performance, because all countries are now performing better compared with the country with the highest score (figure 1.7). Logistics performance appears to have improved in all groups, except for the top 20 percent. Although this development is potentially significant from the point of view of developing country competitiveness and integration with the world economy, it is important not to overstate it. The gap between the top performing countries and the lowest performing countries remains large and will require substantial time and resources to close.

The assessment of widespread, if gradual, improvement in the logistics environment is confirmed by other qualitative assessments from the LPI survey. Consider the percentage of survey respondents in each LPI quintile who

Box 1.4 **Policy applications of the 2007 LPI at the regional and global levels**

At the global level, a number of prominent reports have made extensive use of 2007 LPI data. The World Economic Forum's *Global Enabling Trade Report 2009* uses LPI data in its composite Enabling Trade Index to capture important aspects of supply chain performance affecting the extent of international economic integration. The World Bank's *Global Monitoring Report 2008* uses the LPI to highlight the importance of trade logistics for developing country competitiveness and the ways in which the sector can help countries reap the benefits of globalization and fight poverty. The United Nations Industrial Development Organization's *Industrial Development Report 2009* emphasizes the important role that logistics can play in helping poor countries become more competitive in breaking into new sectors and markets.

Another important policy application of the LPI, the United States Agency for International Development's *Estimating the Global In-Country Supply Chain Costs of Meeting the Millennium Development Goals by 2015,*[26] notes that supply chain performance can be an important determinant of a country's ability to meet some health-related aspects of the Millennium Development Goals, because they require the efficient and cost-effective distribution of medicines and medical supplies. Using data from the LPI and other sources, the authors analyze logistics costs across 49 International Development Association countries and develop a costing model designed to aid practitioners and policymakers in assessing the investments required to support achievement of the Millennium Development Goals by 2015.

A variety of regional policy initiatives have also made extensive use of the LPI. For example, a recent assessment of the Greater Mekong Subregion's East-West Economic Corridor used the LPI to highlight important cross-country divergences in performance and the need to pay particular attention to reforms in Myanmar and Laos.[27] The Economic Commission for Latin America and the Caribbean used the LPI as a benchmarking and diagnostic tool in analyzing the transport system challenges facing landlocked countries in South America.[28] The Asia-Pacific Economic Cooperation Secretariat highlighted the importance of the LPI's holistic approach to assessing performance and its strong links to evolving commercial practices in the sector.[29] Helble and colleagues used LPI data in constructing measures of transparency in the trading environment, which they show can constitute a major source of trade gains in the Asia-Pacific region.[30] And the World Economic Forum's *Africa Competitiveness Report 2009* used LPI data and the Enabling Trade Index to highlight how the logistics sector constrains export performance in a number of African countries.[31] The LPI can also be used to diagnose particular supply chain constraints in the regional context, as did Raballand and Macchi to show that the quality of transport services in Africa is low compared with other regions.[32]

As Daniel Ikenson of the Cato Institute concluded in 2008, "successful participation in the global economy will be increasingly determined by whether a country maintains high-quality, reliable trade infrastructure, whether competition is permitted to flourish in the logistics services industries, and whether the regulatory environment is conducive to the relatively frictionless movement of goods and services through the supply chain."[33]

say that particular elements of the logistics environment are improved or much improved since 2005. Although progress in some cases is more noticeable in the higher LPI quintiles, strong evidence of broad gains is visible at all levels of logistics performance (table 1.6). The bottom quintile—the most logistics-constrained group—has markedly improved ICT infrastructure, private logistics services, and logistics regulations. Progress in the same group seems less widespread for border agencies other than customs, transport infrastructure, and corruption.

Table 1.6 Respondents indicating an improved or much improved logistics environment since 2005, by LPI quintile

Percent of respondents

	Bottom quintile (lowest performance)	Fourth quintile (low performance)	Third quintile (average performance)	Second quintile (high performance)	Top quintile (highest performance)
Customs	48	54	53	56	66
Other border procedures	38	40	33	37	57
Transport infrastructure	46	41	47	46	57
ICT infrastructure	66	56	63	78	77
Private logistics services	63	62	66	78	70
Logistics regulation	53	30	26	29	41
Incidence of corruption	27	29	31	35	36

Source: Logistics performance survey data, 2009.

SECTION 2

Unbundling logistics performance

The quality of services sector regulation can be an important determinant of sector performance

The Logistics Performance Index (LPI) survey contains detailed information on countries' logistics environments, core logistics processes and institutions, and performance time and cost data. In the domestic LPI, respondents assess the logistics environment in the country where they work. This information can be used to analyze the major determinants of overall logistics performance, focusing on four main groups of factors: infrastructure, services, border procedures and time, and supply chain reliability. Country performance in these areas tends to be a strong determinant of overall logistics performance.

Infrastructure

Two pronounced trends emerge in the percentage of LPI survey respondents who consider that infrastructure in their country is of high or very high quality, averaged across LPI quintiles (table 2.1). First, satisfaction with infrastructure quality is much higher among top-performing countries than in the other four quintiles. Differences among the four other groups are relatively small compared with the difference between them and the top performers, especially for infrastructure such as logistics facilities (warehousing) or airports that are dependent on management quality or public–private partnerships. Infrastructure quality appears to be a widespread constraint on logistics performance in developing countries.

Second, satisfaction is not constant across infrastructure types included in the LPI survey. In all groups, survey participants view the quality of information and communication technologies (ICT) infrastructure as superior to that of other types of infrastructure, with two or three times more respondents indicating that ICT infrastructure is high or very high quality compared with other infrastructure. In contrast, rail infrastructure appears to be a problem: rail is rated as being of high or very high quality by at most half as many survey respondents as in other areas—frequently far fewer. Evident across all performance groups, this pattern suggests systematic dissatisfaction with rail infrastructure. Road infrastructure appears to be slightly less of a problem across performance groups than other types of infrastructure, but road quality is of higher concern in the third and fourth quintile of performance.

Table 2.1 Respondents indicating high or very high quality of infrastructure in listed areas, by LPI quintile

Percent of respondents

	Ports	Airports	Roads	Rail	Warehousing and transloading	Information and communication technologies (ICTs)
Bottom quintile (lowest performance)	7	11	21	4	18	39
Fourth quintile (low performance)	21	17	14	7	11	24
Third quintile (average performance)	11	14	13	1	16	37
Second quintile (high performance)	18	21	28	11	28	47
Top quintile (highest performance)	57	65	58	33	70	82

Source: Logistics performance survey data, 2009.

Services

The quality and competence of core logistics service providers is also an important aspect of overall country performance. The quality and competence of freight forwarders[35] tends to be significantly higher than that of other service providers in all LPI performance quintiles (table 2.2). There is a higher correlation between quality of services and overall level of logistics performance than is the case for infrastructure,

an observation consistent with the indicators on level of service (see figures 2.7 and 2.8 later in the section). Countries in the second quintile acknowledge an intermediate level of service quality, but there is less difference between countries in the three bottom quintiles.

Also important, in the air and maritime transport sectors survey respondents are significantly more satisfied with service providers than with infrastructure quality (compare tables 2.2 and 2.1), suggesting an important ongoing role for development of air and maritime transport infrastructure. But the low ranking for rail services is almost the same as for rail infrastructure, highlighting that survey respondents consider the two components to be very close. Rail quality is assessed as low even in the top-performing group, consistent with long-term trends in Europe of shifting from rail freight to trucking.

The quality of services sector regulation can be an important determinant of sector performance. Regulations supporting competition by lowering entry barriers and reducing the incidental costs falling on service providers can encourage quality upgrading and cost effectiveness. Figure 2.1 demonstrates this point, using data on trade restrictiveness in the wholesale and retail distribution sector (measured as the percentage markup over marginal cost induced by trade-related regulations) as a proxy for the quality of regulation in core logistics sectors. Regulatory data were collected by an Organisation for Economic Co-operation and Development survey and aggregated into a single index using standard econometric methods.

The downward sloping fitted line in figure 2.1 indicates that more restrictive regulation—which imposes higher costs on operators—is associated with significantly lower average quality and competence of service providers. Policymakers therefore have considerable scope to boost the scores reported in table 2.2 by implementing regulatory reform in core logistics services sectors.

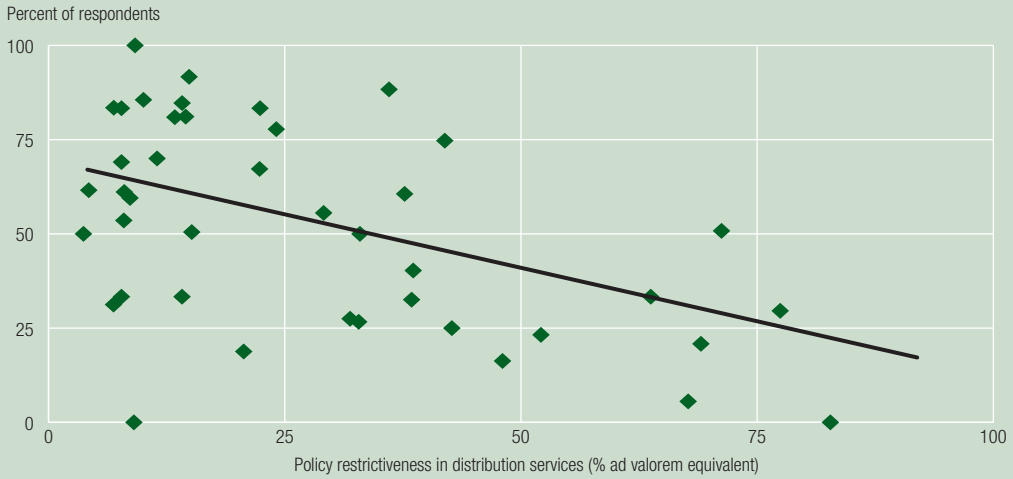
Table 2.2 Respondents indicating high or very high competence and quality of service in listed sectors, by LPI quintile

Percent of respondents

	Road transport	Rail transport	Air transport	Maritime transport and ports	Warehousing, transloading, and distribution	Freight forwarders
Bottom quintile (lowest performance)	22	4	34	24	11	41
Fourth quintile (low performance)	11	5	29	37	19	32
Third quintile (average performance)	19	1	38	28	27	40
Second quintile (high performance)	32	10	56	49	41	58
Top quintile (highest performance)	66	31	76	71	67	75

Source: Logistics performance survey data, 2009.

Figure 2.1 Respondents indicating high or very high average quality of services and policy restrictiveness of distribution services



Note: Policy restrictiveness is measured in percent ad valorem equivalent terms, the percentage difference between the cost of services at the border and their price within the domestic market. Measured in this way, the restrictiveness of services policies is expressed in an analogous manner to the ad valorem tariff in goods markets. Distribution is used as a proxy for the logistics sector because detailed data on logistics policies are not available.
Source: Logistics performance survey data, 2009, and Dihel and Shepherd 2007.

There is a generally higher level of satisfaction with customs than with other border agencies

Border procedures and time

The LPI includes several indicators of border procedures and time.

Import and export time

A useful outcome measure of logistics performance is the time taken to complete trade transactions. The median import lead time, as measured by the LPI survey (left scale of figure 2.2), shows that lead time for port or airport supply chains is nearly twice as long in low performance countries as in high performance ones. For land supply chains the contrast is even stronger: lead time in low performance countries is more than five times longer. These times are strongly correlated with distance in both cases, with a correlation coefficient of 0.67 for port and airport supply chains and 0.62 for land supply chains. This association suggests that geographic hurdles, and possibly internal transport markets, continue to pose substantial difficulties in those countries.

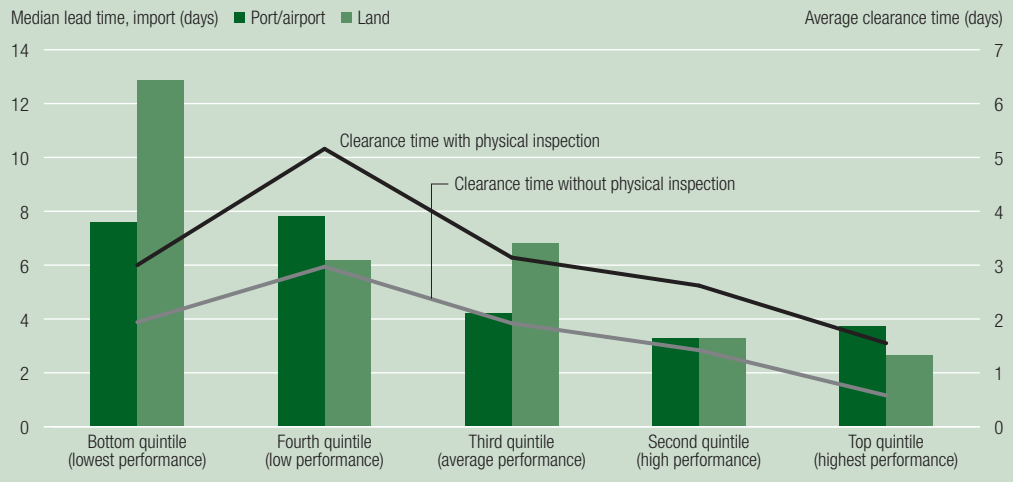
Of course, geography and speed en route are not the only factors that can affect import lead times. There is scope for reducing time across all dimensions of the border process (time to clear goods as opposed to lead time, which also includes transport), especially on the import side. Ongoing efforts at border management reform need to focus on the prevalence of physical inspection, proliferation of procedures, and red tape in low performance countries. In all performance groups, the time taken to clear goods through customs is a relatively small fraction of total import time, but that time increases significantly when goods are physically inspected (see figure 2.2, right scale). Core customs procedures converge strongly across all performance groups, but physical inspection—and even multiple inspections of the same shipment by different agencies—are much more common in low performance countries (table 2.3).

Export supply chains typically face fewer procedural burdens than imports, evidenced by the shorter lead time to exports than to imports (figure 2.3).

Customs is not the only agency involved in border management; collaboration among all border management agencies—including standards, sanitary, phytosanitary, transport, and veterinary agencies—and the introduction of modern approaches to regulatory compliance are especially important. Evidence points to more streamlined processes by customs agencies, across performance groups (tables 2.3 and 2.4).

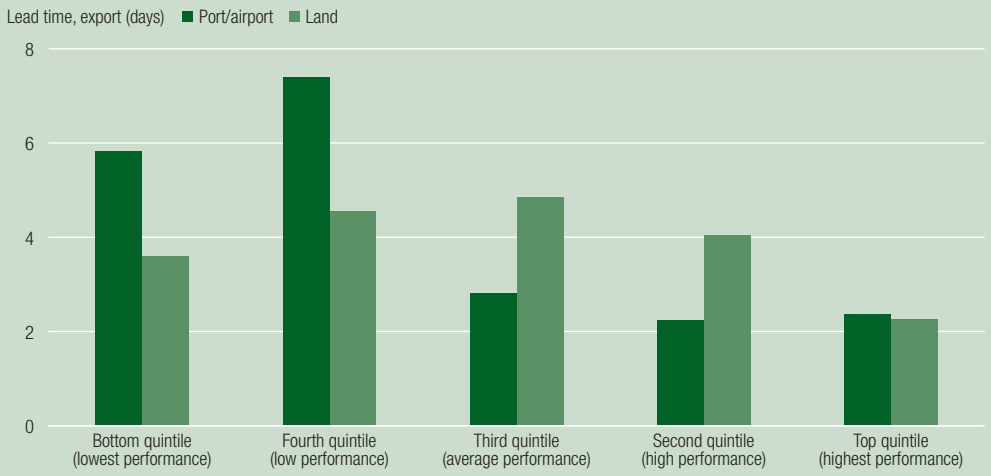
A corollary of the gradual convergence of customs procedures worldwide is that other border agencies are seen to be an increasingly serious constraint on supply chain performance in many countries. There is a generally higher level of satisfaction with customs than with other border agencies, such as quality and standards inspection agencies and even more so with health or sanitary and phytosanitary agencies

Figure 2.2 Median import lead time and average clearance time, by LPI quintile



Source: Logistics performance survey data, 2009.

Figure **2.3** **Median export lead time, by LPI quintile**



Source: Logistics performance survey data, 2009.

Table **2.3** **Respondents indicating that listed customs procedures are available and being used, by LPI quintile**

Percent of respondents

	Bottom quintile (lowest performance)	Fourth quintile (low performance)	Third quintile (average performance)	Second quintile (high performance)	Top quintile (highest performance)
Online processing	86	85	100	99	99
Pre-arrival clearance	80	91	100	97	94
Post-clearance audits	72	95	100	96	93
Release with guarantee pending final clearance	89	92	98	100	95
Formal dialogue process	83	85	96	89	92
Availability of review/appeal	88	92	94	94	98
Advance notification of changes	86	93	100	96	96
Physical inspection (percent of shipments)	36	38	32	20	3
Multiple physical inspections	13	10	7	4	2
Valuation using reference price	91	96	93	88	92
Valuation using invoice value	89	100	100	97	98
Valuation using inspector discretion	97	97	88	83	87
Valuation using other methods	67	85	84	70	70

Source: Logistics performance survey data, 2009.

Table **2.4** **Respondents indicating that listed border agencies are of high or very high competence and quality, by LPI quintile**

Percent of respondents

	Customs agencies	Quality/standards inspection agencies	Health/SPS agencies
Bottom quintile (lowest performance)	26	24	15
Fourth quintile (low performance)	25	11	14
Third quintile (average performance)	18	19	4
Second quintile (high performance)	35	21	20
Top quintile (highest performance)	62	62	57

Source: Logistics performance survey data, 2009.

Operators in countries with high-quality logistics environments appear to be relatively well placed to adapt to new security requirements, but the same is not true of operators in logistics constrained environments

(see table 2.4). The contrast is particularly striking with health and phytosanitary agencies, suggesting that they may constrain the efficiency of import procedures in a wide variety of countries. Experience on the ground indicates that one reason quality and standards inspection agencies are perceived to be less of a problem than health and sanitary and phytosanitary agencies is the higher level of automation these agencies employ, as well as the fact that they are typically not dealing with time-sensitive, perishable products, thus requiring fewer inspection procedures.

Indicators of red tape also illustrate a lack of coordination at the border and the burden it imposes on private logistics operators. Operators in the highest performing countries typically deal with around half the number of government agencies as operators in low performance countries (figure 2.4). The same is true for document requirements: two or three documents are typically required in the countries with the highest LPI scores, versus five or six in those with the lowest scores. The question of simplifying documentation has always been high on the trade facilitation agenda, reflected in the many initiatives to create single trade windows. Some business environment indicators—such as the Doing Business indicators from the World Bank and the International Finance Corporation—give high weight to simplification in this area.

However, simplifying documentation and single window initiatives may not be enough without addressing weaknesses in the other dimensions of border management and, more generally, the soft and hard trade-related infrastructure. This partly explains why some top performers in the Doing Business database, such as Egypt, do not fare as well in logistics performance as measured by the LPI.

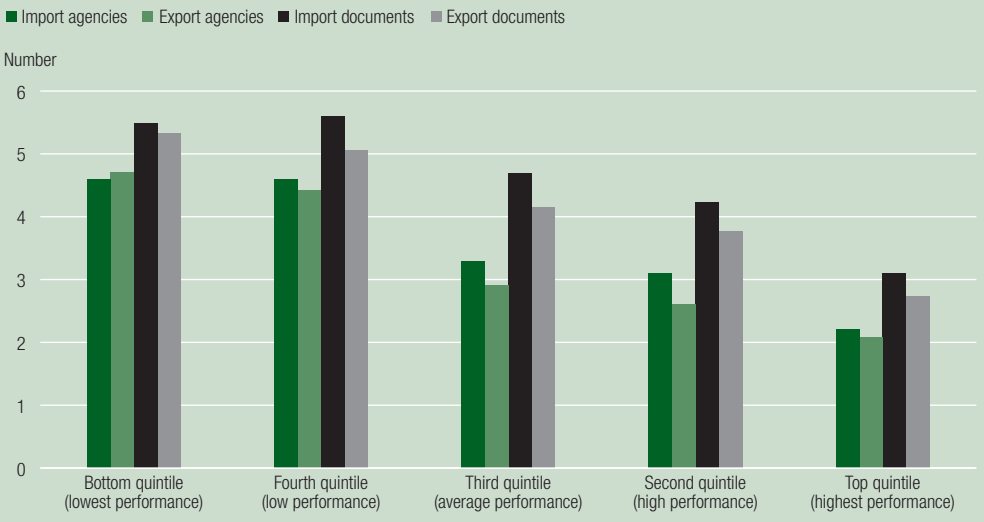
In the post–September 11 environment, cargo security[36] also looms large as an important border management issue in which coordination is key. Although increased attention to border security is understandable, it is important to be aware of the costs it imposes on the private sector and thus its potential to inhibit international trade. It is clearly preferable from an economic welfare point of view for security requirements to be implemented in the most efficient, timely, and cost-effective way possible.

Results from the LPI survey suggest that operators in countries with high-quality logistics environments appear to be relatively well placed to adapt to new security requirements,[37] but the same is not true of operators in logistics constrained environments (figure 2.5).[38]

Delays and governance

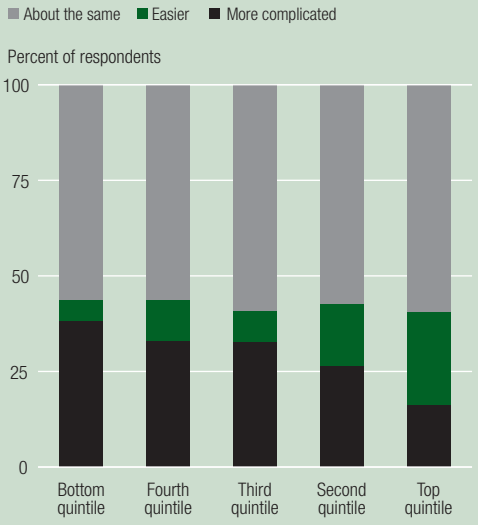
Sources of underperformance are not all as endogenous to the supply chain as the quality

Figure 2.4 **Red tape affecting import and export transactions, by LPI quintile**



Source: Logistics performance survey data, 2009.

Figure 2.5 **Compliance with overseas security requirements compared with 2005, by LPI quintile**



Source: Logistics performance survey data, 2009.

Table 2.5 **Respondents indicating that they often or nearly always experience delay factors, by LPI quintile**

Percent of respondents

	Major delays from compulsory warehousing	Major delays from preshipment inspection	Major delays from maritime transshipment	Theft	Informal payments
Bottom quintile (lowest performance)	39	34	30	18	36
Fourth quintile (low performance)	32	23	29	19	38
Third quintile (average performance)	32	25	24	13	33
Second quintile (high performance)	21	28	22	9	18
Top quintile (highest performance)	2	6	4	2	3

Source: Logistics performance survey data, 2009.

of service or the costs and speed of the clearance processes. Other constraints, such as dependence on an indirect maritime route, may be out of the country's control.

The LPI dataset provides more detailed information on the possible sources of delays not directly related to the performance of domestic services and agencies (table 2.5). The contrast between the lowest and highest performing countries is striking across all five delay categories for which LPI data are available but particularly large in relation to three factors: compulsory warehousing, theft, and informal (corrupt) payments. Delays and unexpected costs are commonplace in low performance countries, with strong potential to hold back overall supply chain performance.

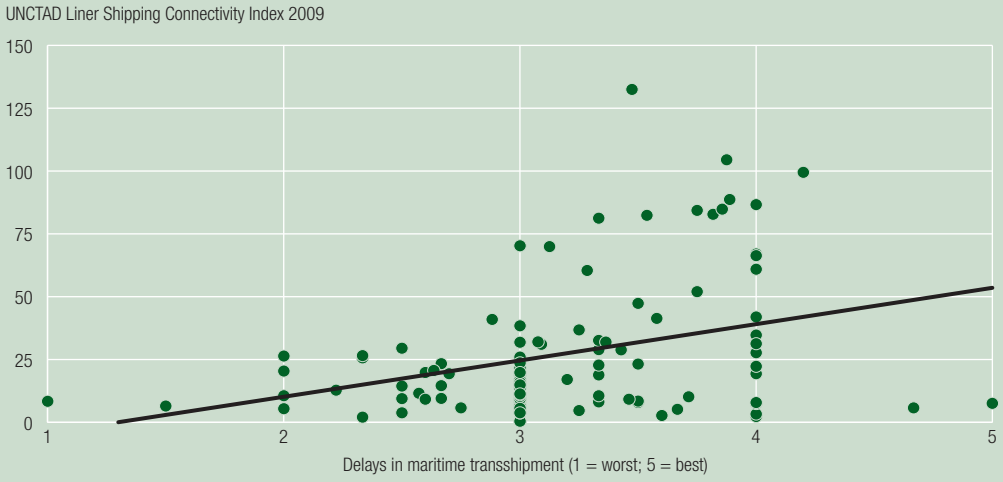
The case of transshipment illuminates how a country's connectivity to its market through the hierarchical hub-and-spoke network of international shipments can affect trade. Lack of connectivity primarily affects smaller countries and south-south trade. For example, Algerian and Tunisian respondents complain the most about the impact of transshipment. Those countries are dependent on shipping to a European or Moroccan hub even to trade over short distances in the Mediterranean. The LPI data on transshipment constraints are consistent with the United Nations Conference on Trade and Development Liner Shipping Connectivity Index, which measures how much a country has direct access to its markets by container shipping (figure 2.6).[39]

Trade corridors

Another case of dependence is that of landlocked countries, which depend on trade corridors to access ports or regional trade partners. Evidence from the LPI survey confirms that landlocked developing countries, most of them in Africa or Central Asia (box 2.1), are typically at a disadvantage, whether in terms of time or costs (table 2.6). The state of trade corridor infrastructure, rehabilitation needs, and, above all, sustainable resources for maintenance are key concerns, especially for landlocked developing countries. But of increasing concern are the transit procedures that make the movement of goods possible without payment of duties or excessive control in the transit country.[40]

In rare cases facilitation efforts by the landlocked countries may almost eliminate this handicap. For example, landlocked Uganda is the third best performing low-income country in the entire sample (66th place), even doing better than its transit country Kenya (99th). Uganda's story is closely related to successful ongoing regional integration efforts with neighboring countries and trade logistics and facilitation projects supported by the World Bank Group and a number of international donors and development agencies. In particular, the Malaba project—located

Figure 2.6 **Comparison of UNCTAD Liner Shipping Connectivity Index and the LPI measures of the transshipment constraint**



Source: Logistics performance survey data, 2009, and UNCTAD 2009.

Table 2.6 **Export distance, cost, and time in landlocked countries**

		Africa		Europe	
		Coastal countries	Landlocked countries	Coastal countries	Landlocked countries
	LPI score	2.46	2.39	3.68	3.58
Port or airport	Export time (days)	4.82	18.10	2.3	2.4
	Import time (days)	7.21	6.99	2.2	3.6
	Export cost (US$)	1,810	2,867	696	1,227
	Import cost (US$)	2,701	3,059	823	1,496
Land	Export time (days)	4.13	4.67	2.3	6.0
	Import time (days)	6.93	8.41	2.9	2.9
	Export cost (US$)	2,125	4,000	593	1,704
	Import cost (US$)	2,581	3,221	670	1,489

Note: African coastal countries: Benin, Cameroon, Côte d'Ivoire, Ghana, Kenya, Mozambique, Namibia, Nigeria, Senegal, Togo, Tanzania, and South Africa. African landlocked countries: Burkina Faso, Central African Republic, Chad, Ethiopia, Malawi, Mali, Rwanda, Uganda, and Zambia. European coastal countries: Belgium, Croatia, Germany, Italy, Netherlands, and Poland. European landlocked countries: Austria, Czech Republic, Hungary, Luxembourg, and Slovak Republic.
Source: Logistics performance survey data, 2009.

at the border of Kenya and Uganda and one of the busiest border posts in the region—is key to understanding the improvements in Uganda's logistics performance.[41]

Supply chain reliability

The reliability of the supply chain is the most important aspect of logistics performance. A high degree of uncertainty means that operators have to adopt costly hedging strategies, such as maintaining relatively high inventory levels. Recent research suggests that these induced costs on the supply chain can be even larger than the direct costs of freight.[42] Traders face a trade-off between direct freight costs and reliability, depending on their commodity and the logistics performance of each country (figure 2.7). Reliability and logistics costs directly affect firm competitiveness and, for developing countries, the potential to diversify from time-insensitive commodities.

In Malawi, for example, exporters face different trade-offs between direct transportation costs and costs induced by a long supply chain. For sugar—an inexpensive and time-insensitive

Box 2.1 Trade logistics and facilitation in landlocked Central Asia

Central Asia is one of the two large concentrations of landlocked developing countries in the world. The nine landlocked countries in Central Asia have a population of more than 70 million people. For obvious reasons, these landlocked developing countries are particularly dependent on the performance of their trade and transit connections. Since the Almaty Declaration on landlocked developing countries at the Almaty Ministerial Conference in October 2003, assistance has increased substantially, including corridor projects, customs reform, multimodal transport, railroad projects, and restructuring airport and aviation services. The World Bank is increasingly linking lending with advisory activities to stimulate change in trade facilitation, customs, and transit systems.

In parallel with the web-based LPI survey, about 300 operators were interviewed using the LPI questionnaire with a focus on scoring their countries and other countries in the region. This subsurvey provided not only information on regional bottlenecks but also a comparison between regional assessments and the global ranking.

Interesting findings emerge when LPI data collected in Central Asia are compared with LPI data received from outside Central Asia. The LPI assessment from outside Central Asia is lower than the scores collected within the region. Kazakh freight forwarders in particular see the regional operational environment as much easier.

China's regional score is the only exception. Uzbek freight forwarders rate China significantly lower than do LPI respondents from outside the region or from Kazakhstan or Kyrgyzstan. But Kyrgyz freight forwarders rate China higher than its LPI index score, indicating the closer trade relations between these two countries.

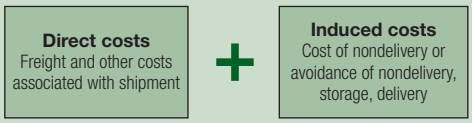
2010 LPI scores of selected Central Asian countries: 2010 LPI "outside view" versus "Central Asian view"

		Freight forwarders		
	2010 LPI	Kazakh	Uzbek	Kyrgyz
China	3.49	3.31	2.91	3.57
Russian Federation	2.61	3.64	2.97	3.22
Uzbekistan	2.79	3.07	—	2.75
Tajikistan	2.35	3.01	2.64	2.66
Kyrgyz Rep.	2.62	3.16	2.68	—
Kazakhstan	2.83	—	2.63	3.24

Source: The Central Asian data was provided by the USAID Regional Trade Liberalization and Customs Project located in Bishkek, Kyrgyz Republic. A team of researchers was trained in the survey methodology and helped collect data through face-to-face interviews of international freight forwarding agencies' personnel.

The most notable difference between observations from Central Asia and those from "the rest of the world" concern the Russian Federation and Tajikistan, ranked 94th and 131st in the 2010 LPI, respectively. If scores given by Central Asian respondents were used, Russia would rank 20th to 40th, and Tajikistan 52nd to 90th in the 2010 LPI (box table): illustrating the impact of long-standing relationships and a common language and legacy facilitating trade between the Commonwealth of Independent States (CIS) countries. Conversely, the absence of these ties and differences in trade regimes create impediments for trade between CIS countries and many other parts of the world.

Figure 2.7 **Structure of logistics costs faced by traders**



Source: Authors.

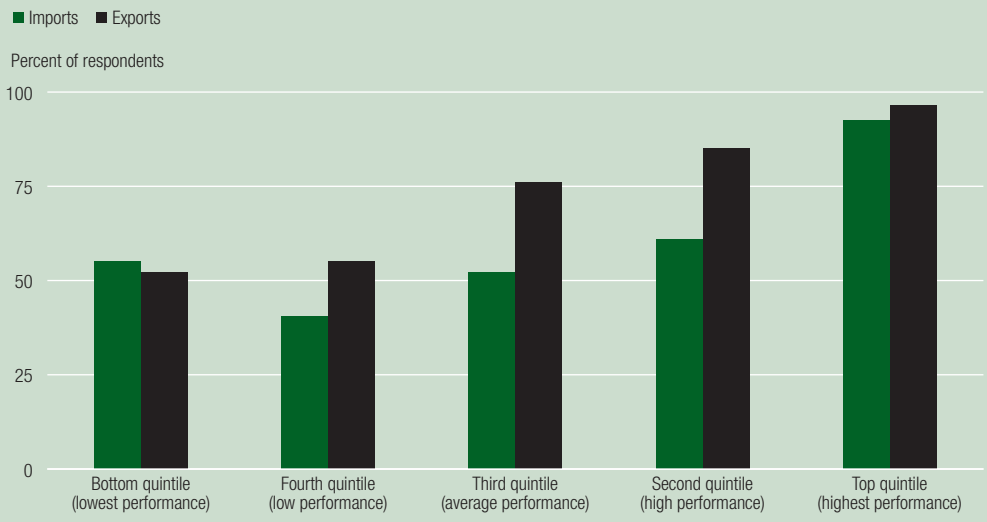
commodity—exporters prefer to save money by using a very unreliable railway to intermediate storage in the small and not-very-productive port of Nacala in northern Mozambique. But garment manufacturers participating in the preferential African Growth and Opportunity Act program with the United States pay the cost of trucking to the distant but efficient ports of Durban or the Cape in South Africa (2,500 to 5,000 km and up to US$ 10,000) to use as direct a maritime connection as possible.[43]

As highlighted in the 2007 LPI report, delays tend to rise steeply with lower logistics performance, illustrated by a stark difference in reliability between countries at the bottom and top ends of the LPI ranking (figure 2.8). In the highest performing countries, import and export shipments nearly always arrive on schedule. In low performing countries only about half of survey respondents feel that this condition is fulfilled. In the fourth through second quintiles there is also a considerable gap in performance between exports and imports: the reliability of the export supply chain appears to be substantially higher. Addressing sources of unexpected delays should therefore be an important aspect of logistics upgrading in low performance countries. Delays can be caused by the unpredictability of the clearance process itself (see figure 2.8), delays in inland transit, or the low reliability of some services.

Delay in and predictability of actual delivery may be more important than average import/export lead time in understanding logistics

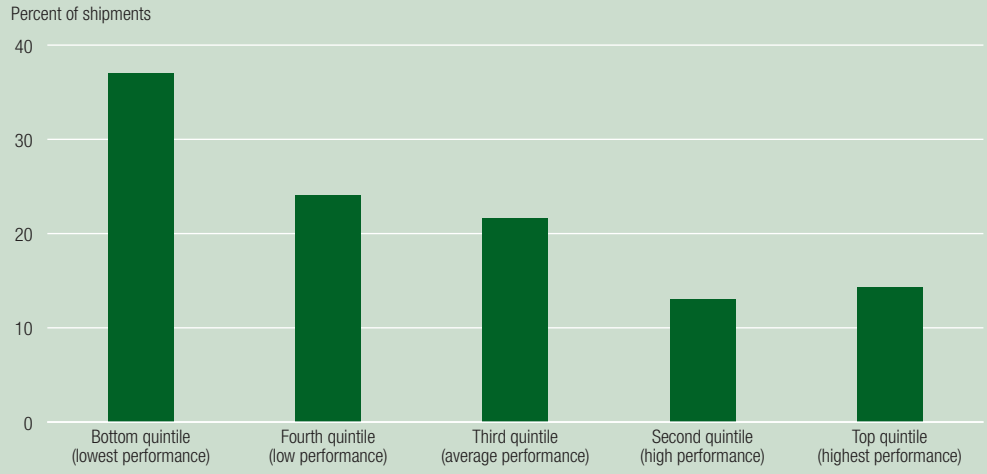
Delay in and predictability of actual delivery may be more important than average import/export lead time in understanding logistics performance

Figure 2.8 Respondents indicating shipments are often or nearly always cleared and delivered as scheduled, by LPI quintile



Source: Logistics performance survey data, 2009.

Figure 2.9 Shipments not meeting company quality criteria, by LPI quintile



Source: Logistics performance survey data, 2009.

performance. Surprisingly, the lead times revealed by this survey are relatively lower—at least in developing countries—than information previously available: lead time to import/export is usually much shorter than typical ocean shipping time to distant markets.

Time and cost are not the only dimensions in which reliability is important. Quality is also a significant consideration for private sector operators and their clients, with a large gap between high and low performers (figure 2.9). In the top LPI quintile, fewer than 15 percent of shipments do not meet company quality criteria, a proportion more than doubled in the bottom quintile. The most important quality criterion in freight forwarding is delivery within the promised time window. Another is the share of shipments that have no errors in cargo composition or in documentation. In high performing countries the acceptable quality window is much narrower and tolerance for quality defects is much lower than in low performing countries, magnifying the actual gap in quality shown in figure 2.9.

SECTION 3

Policy priorities in trade facilitation and logistics

Priorities for trade logistics and facilitation are set at the country or regional level. However, because the robustness of a supply chain depends on its weakest link, the benefits of progress in one area may not be reaped until impediments to trade in other areas are removed as well.

The impediments observed in logistics performance show similar patterns in countries according to their progress on reform. Following the typology proposed in the 2007 *Connecting to Compete* report and section 1 of this report (see figure 1.2), countries belong to one of four broad groups:

- *Logistics friendly* (top quintile)—high performers, for the most part high-income countries.
- *Consistent performers* (second quintile)—typically emerging economies with a strong logistics constituency.
- *Partial performers* (third and fourth quintile)—typically low or middle-income countries that have not yet consistently addressed all the factors of non-performance.
- *Logistics unfriendly* (bottom quintile)—severely logistically constrained (least developed countries).

Using these categories, and based on the analysis of various performance factors, a rough intuitive typology of typical constraints faced by these four groups of countries can be identified (table 3.1).

Achieving practical trade or transport facilitation reform has become a key development priority in recent years. Traditional efforts to facilitate trade have focused on supporting trade infrastructure investment and modernizing customs, notably through the use of information technology. However, the focus needs to be extended to new areas of intervention highlighted in this report, such as the market for logistics services, the coordination of border processes, and the case for joint cross-border initiatives, especially to serve landlocked countries.

Progression from the logistics unfriendly group to the partial performers group requires a very large increase in a country's LPI score—a trade logistics "big push" in which a country advances simultaneously on a number of fronts. The gap between partial and consistent performers is considerably narrower, with passage from one group to the other depending on the steady design and implementation of reforms in weak areas. Moving from consistent performer

Table 3.1 Typology of countries according to impediments to logistics performance

Logistics performance impediments	Logistics unfriendly	Partial performers	Consistent performers	Logistics friendly
Trade-related infrastructure	Serious constraint	Major constraint	Capacity bottlenecks to support trade expansion	Few bottlenecks, except rail
Quality and supply of logistics services	Low development	Weak market	Emergence of a diversified supply of logistics services	Industry leaders
Core customs modernization	Often still a major constraint	Potentially a major constraint	No longer a constraint	Best practice
Integration of border management	Comparatively a lesser problem	Major constraint	Typically the final binding constraint	Lesser problem
Regional facilitation and transit	Main issue for landlocked least developed countries	Problematic	Depends on the region	Streamlined

Source: Logistics performance survey data, 2009.

Many improvements in trade facilitation have contributed to the overall convergence process

to logistics friendly again requires a substantial improvement, including development and use of state-of-the-art trade facilitation.

Even though moving forward simultaneously on different policy fronts is challenging, many improvements in trade facilitation have contributed to the overall convergence process.[44] Some of these efforts stem from reforms implemented at the country level. Others require bilateral and regional cooperation schemes for trade facilitation reform to be effective, such as land border trade and transit trade for landlocked countries.

Infrastructure

The LPI survey data shows encouraging trends, reflecting successful trade facilitation projects. In port management, the separation of commercial activities from statutory and regulatory missions of the port authority is now the norm in developing countries, with many examples of successful private sector participation in container terminal operations. Automation of customs procedures is now commonplace, with few countries still without some form of automated customs system. But logistics professionals also confirmed that the quantity and performance of infrastructure, especially roads and ports, remain important factors in virtually all developing countries—and, in relative terms, probably even more so in middle-income countries.

The massive distrust of railways by freight forwarders is not a surprise, but it is a problem as the world seeks to reduce carbon emissions by shifting to environmentally friendly freight modes. So far there are few examples of efficient container movements by rail that compete with roads. Price signals alone are unlikely to encourage a substantial shift toward rail freight beyond captive markets such as bulk goods. Major qualitative changes are needed to bridge the gap of logistics performance, quality, and reliability in rail services. Because these improvements often hinge on institutional changes in rail transport management and operations, railway reform is becoming an important part of the transport sector development agenda.

Improving the quality of trade and transport services

Improving the quality of logistics and trade-supporting services is also a key element of the new agenda, recognizing that high quality is central to achieving effective trade and transport facilitation and associated regulatory reforms. Recent trucking surveys indicate that freight cost differentials among countries often result from inefficiencies in the market structure for transport providers and from regulatory barriers preventing open competition.[45]

Although the problem is recognized, governments and the international development community have limited experience implementing reforms to improve private logistics services. Therefore it is essential for the new trade facilitation agenda to focus on providing meaningful incentives to encourage high quality and reliable services, most notably through eliminating barriers to entry.

Tackling this agenda presents many new challenges, as a range of political economy considerations may not favor changes that depart from current business practices or that limit historical rent seeking activities. In even the most inefficient environments, some stakeholders stand to lose from reforms. In many developing countries, for example, customs broker licenses are a de facto privilege for retired customs officers, and fragmented informal trucking regimes are often maintained to meet social goals even when the long-term economic impact is negative.

Coordinating border management

The trade facilitation and logistics agenda must go beyond customs. LPI data suggest that customs procedures are already converging, with pre-arrival clearance, online submission, and post-clearance audit now widely available (see table 2.3). This development undoubtedly owes something to the gradual dissemination of World Customs Organization/World Trade Organization principles, supported by technical assistance and capacity building.

But customs is not the only agency involved in border management. Two other key players

are quality and standards inspection agencies and health, sanitary, and phytosanitary inspection agencies. Data from the LPI survey show that in all LPI performance groups customs is consistently rated as providing a better level of service than the other agencies (see table 1.6). Delays and unexpected problems in quality and standards and in health and sanitary and phytosanitary areas have just as much potential as customs to create supply chain problems and thus poor overall logistics performance.

Taking a more holistic approach to the clearance of goods is a key element of the new agenda. It will require better collaboration among all border management agencies—including standards, sanitary, phytosanitary, transport, and veterinary agencies—and the introduction of modern approaches to regulatory compliance. It matters little if customs employs high levels of automation and adopts principles of risk management allowing them to selectively examine goods if other government agencies are not automated and continue to routinely inspect all imported goods regardless of the risk they pose.

Regional facilitation: making trade corridors work better

Many of the economies in the logistics unfriendly group are small and are often landlocked and post-conflict, heavily dependent on trade and transit systems set up with bigger neighbors—not always good logistics performers themselves. These cases require urgent attention from the international community to help reduce logistics costs and develop sustainable export-oriented activities.

Efforts should target not only the corridor infrastructure but also the transit regime or regional agreements. These arrangements—often designed decades ago with state intervention in logistics organization—are often at odds with the current paradigm of service quality and international logistics networks. Extensive changes may be needed. But new regimes and agreements will depend also on progress in the other dimensions, especially services and border management, and may face the same obstacles.[46]

* * *

Both "new" and "old"-style reforms, as well as investments in improving logistics performance, need reliable indicators to inform the dialogue among policymakers, the private sector, and other stakeholders and to monitor impact. Although the LPI and its components guarantee international comparability, they are coarse-grained indicators. They need to be complemented by efforts in countries to develop logistics-related indicators that are more specific—for example, port indicators for a facility, corridor performance indicators for a route, or measurement of logistics costs for certain activities. An increasing number of countries are beginning to do so.[47]

Delays and unexpected problems in quality and standards and in health and sanitary and phytosanitary areas have just as much potential as customs to create supply chain problems

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APPENDIX 1

International LPI results

	LPI rank			LPI score			% of highest performer	Customs		Infrastructure		International shipments		Logistics quality and competence		Tracking and tracing		Timeliness	
	Rank	Lower bound	Upper bound	Score	Lower bound	Upper bound		Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Germany	1	4	1	4.11	4.07	4.16	100.0	3	4.00	1	4.34	9	3.66	4	4.14	4	4.18	3	4.48
Singapore	2	4	1	4.09	4.01	4.17	99.2	2	4.02	4	4.22	1	3.86	6	4.12	6	4.15	14	4.23
Sweden	3	10	1	4.08	3.90	4.25	98.8	5	3.88	10	4.03	2	3.83	2	4.22	3	4.22	11	4.32
Netherlands	4	4	1	4.07	4.00	4.14	98.5	4	3.98	2	4.25	11	3.61	3	4.15	9	4.12	6	4.41
Luxembourg	5	20	1	3.98	3.68	4.28	95.7	1	4.04	9	4.06	7	3.67	21	3.67	19	3.92	1	4.58
Switzerland	6	17	2	3.97	3.84	4.11	95.5	12	3.73	6	4.17	25	3.32	1	4.32	1	4.27	15	4.20
Japan	7	10	5	3.97	3.91	4.03	95.2	10	3.79	5	4.19	12	3.55	7	4.00	8	4.13	13	4.26
United Kingdom	8	11	5	3.95	3.89	4.02	94.9	11	3.74	16	3.95	8	3.66	9	3.92	7	4.13	8	4.37
Belgium	9	14	5	3.94	3.86	4.02	94.5	9	3.83	12	4.01	26	3.31	5	4.13	2	4.22	12	4.29
Norway	10	19	1	3.93	3.72	4.14	94.2	6	3.86	3	4.22	24	3.35	13	3.85	10	4.10	10	4.35
Ireland	11	19	5	3.89	3.74	4.05	92.9	18	3.60	19	3.76	5	3.70	16	3.82	13	4.02	4	4.47
Finland	12	19	5	3.89	3.74	4.03	92.6	7	3.86	8	4.08	19	3.41	10	3.92	11	4.09	25	4.08
Hong Kong SAR, China	13	18	6	3.88	3.78	3.98	92.4	8	3.83	13	4.00	6	3.67	14	3.83	17	3.94	26	4.04
Canada	14	18	7	3.87	3.78	3.97	92.3	13	3.71	11	4.03	32	3.24	8	3.99	15	4.01	5	4.41
United States	15	18	11	3.86	3.82	3.89	91.7	15	3.68	7	4.15	36	3.21	11	3.92	5	4.17	16	4.19
Denmark	16	20	5	3.85	3.65	4.04	91.4	19	3.58	15	3.99	16	3.46	15	3.83	18	3.94	7	4.38
France	17	18	11	3.84	3.78	3.91	91.3	17	3.63	14	4.00	28	3.30	12	3.87	14	4.01	9	4.37
Australia	18	19	9	3.84	3.73	3.95	91.2	14	3.68	18	3.78	3	3.78	17	3.77	20	3.87	18	4.16
Austria	19	25	5	3.76	3.53	4.00	88.7	20	3.49	21	3.68	4	3.78	20	3.70	22	3.83	23	4.08
Taiwan, China	20	25	16	3.71	3.56	3.85	86.9	25	3.35	22	3.62	10	3.64	22	3.65	12	4.04	30	3.95
New Zealand	21	40	3	3.65	3.22	4.08	85.0	16	3.64	26	3.54	23	3.36	26	3.54	25	3.67	17	4.17
Italy	22	25	20	3.64	3.57	3.72	84.9	23	3.38	20	3.72	37	3.21	18	3.74	21	3.83	24	4.08
Korea, Rep.	23	25	21	3.64	3.57	3.70	84.7	26	3.33	23	3.62	15	3.47	23	3.64	23	3.83	28	3.97
United Arab Emirates	24	25	20	3.63	3.54	3.72	84.5	21	3.49	17	3.81	14	3.48	27	3.53	28	3.58	33	3.94
Spain	25	25	20	3.63	3.52	3.73	84.3	22	3.47	25	3.58	48	3.11	24	3.62	16	3.96	21	4.12
Czech Republic	26	32	21	3.51	3.36	3.66	80.5	27	3.31	34	3.25	17	3.42	35	3.27	27	3.60	19	4.16
China	27	28	26	3.49	3.45	3.53	79.9	32	3.16	27	3.54	27	3.31	29	3.49	30	3.55	36	3.91
South Africa	28	36	24	3.46	3.28	3.63	78.9	31	3.22	29	3.42	31	3.26	25	3.59	24	3.73	57	3.57
Malaysia	29	35	26	3.44	3.29	3.59	78.4	36	3.11	28	3.50	13	3.50	31	3.34	41	3.32	37	3.86
Poland	30	36	26	3.44	3.25	3.62	78.2	34	3.12	43	2.98	35	3.22	36	3.26	33	3.45	2	4.52
Israel	31	42	24	3.41	3.19	3.63	77.5	35	3.12	24	3.60	42	3.17	28	3.50	38	3.39	46	3.77
Bahrain	32	40	26	3.37	3.22	3.53	76.2	37	3.05	30	3.36	54	3.05	30	3.36	26	3.63	39	3.85
Lebanon	33	51	21	3.34	3.02	3.65	75.1	29	3.27	41	3.05	69	2.87	19	3.73	49	3.16	29	3.97
Portugal	34	43	26	3.34	3.16	3.51	75.0	28	3.31	35	3.17	59	3.02	33	3.31	39	3.38	40	3.84
Thailand	35	43	31	3.29	3.15	3.43	73.6	39	3.02	36	3.16	30	3.27	39	3.16	37	3.41	48	3.73
Kuwait	36	49	28	3.28	3.09	3.47	73.2	38	3.03	32	3.33	47	3.12	43	3.11	34	3.44	52	3.70
Latvia	37	51	28	3.25	3.02	3.48	72.2	40	2.94	49	2.88	21	3.38	46	2.96	29	3.55	49	3.72
Slovak Republic	38	51	28	3.24	3.02	3.46	71.9	47	2.79	42	3.00	57	3.05	41	3.15	31	3.54	34	3.92
Turkey	39	49	33	3.22	3.08	3.37	71.4	46	2.82	39	3.08	44	3.15	37	3.23	56	3.09	31	3.94
Saudi Arabia	40	49	33	3.22	3.09	3.36	71.3	43	2.91	33	3.27	82	2.80	32	3.33	42	3.32	45	3.78
Brazil	41	47	35	3.20	3.10	3.29	70.6	82	2.37	37	3.10	65	2.91	34	3.30	36	3.42	20	4.14
Iceland	42	51	32	3.20	3.02	3.37	70.5	30	3.22	31	3.33	50	3.10	42	3.14	53	3.14	84	3.27

	LPI rank			LPI score			% of highest performer	Customs		Infrastructure		International shipments		Logistics quality and competence		Tracking and tracing		Timeliness	
	Rank	Lower bound	Upper bound	Score	Lower bound	Upper bound		Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Estonia	43	58	28	3.16	2.85	3.47	69.3	33	3.14	53	2.75	40	3.17	38	3.17	65	2.95	53	3.68
Philippines	44	51	35	3.14	2.99	3.29	68.8	54	2.67	64	2.57	20	3.40	47	2.95	44	3.29	42	3.83
Lithuania	45	56	32	3.13	2.89	3.38	68.5	48	2.79	54	2.72	38	3.19	56	2.85	46	3.27	35	3.92
Cyprus	46	52	36	3.13	2.97	3.29	68.4	42	2.92	46	2.94	45	3.13	58	2.82	32	3.51	75	3.44
India	47	51	41	3.12	3.02	3.21	67.9	52	2.70	47	2.91	46	3.13	40	3.16	52	3.14	56	3.61
Argentina	48	51	43	3.10	3.01	3.19	67.4	56	2.63	52	2.75	43	3.15	45	3.03	51	3.15	43	3.82
Chile	49	55	38	3.09	2.95	3.24	67.3	41	2.93	50	2.86	94	2.74	48	2.94	40	3.33	44	3.80
Mexico	50	55	44	3.05	2.95	3.15	65.7	62	2.55	44	2.95	77	2.83	44	3.04	45	3.28	54	3.66
Panama	51	64	39	3.02	2.82	3.23	65.0	49	2.76	61	2.63	71	2.87	57	2.83	47	3.26	47	3.76
Hungary	52	86	35	2.99	2.66	3.31	63.8	45	2.83	38	3.08	86	2.78	53	2.87	71	2.87	62	3.52
Vietnam	53	69	44	2.96	2.78	3.14	100.0	53	2.68	66	2.56	58	3.04	51	2.89	55	3.10	76	3.44
Greece	54	86	38	2.96	2.67	3.24	99.2	68	2.48	45	2.94	73	2.85	65	2.69	43	3.31	67	3.49
Qatar	55	88	37	2.95	2.65	3.25	98.8	99	2.25	51	2.75	63	2.92	81	2.57	57	3.09	22	4.09
Costa Rica	56	81	50	2.91	2.72	3.09	98.5	58	2.61	67	2.56	105	2.64	59	2.80	54	3.13	51	3.71
Slovenia	57	82	51	2.87	2.71	3.04	95.7	60	2.59	58	2.65	76	2.84	50	2.90	50	3.16	103	3.10
Senegal	58	112	39	2.86	2.50	3.23	63.1	70	2.45	59	2.64	90	2.75	63	2.73	58	3.08	63	3.52
Romania	59	101	48	2.84	2.58	3.11	62.8	85	2.36	99	2.25	34	3.24	66	2.68	66	2.90	73	3.45
Oman	60	111	44	2.84	2.52	3.16	62.6	24	3.38	40	3.06	138	2.31	108	2.37	145	2.04	32	3.94
Tunisia	61	118	41	2.84	2.46	3.21	61.3	73	2.43	65	2.56	22	3.36	109	2.36	102	2.56	58	3.57
Kazakhstan	62	99	50	2.83	2.59	3.08	60.2	79	2.38	57	2.66	29	3.29	73	2.60	85	2.70	86	3.25
Bulgaria	63	105	47	2.83	2.55	3.12	59.8	65	2.50	94	2.30	52	3.07	55	2.85	62	2.96	95	3.18
Malta	64	114	44	2.82	2.49	3.16	59.1	55	2.65	48	2.89	64	2.91	52	2.89	104	2.56	117	3.02
Dominican Republic	65	93	51	2.82	2.61	3.03	59.1	63	2.51	90	2.34	107	2.59	100	2.42	48	3.17	38	3.85
Uganda	66	88	52	2.82	2.64	3.00	58.9	44	2.84	89	2.35	60	3.02	76	2.59	114	2.45	60	3.52
Peru	67	87	56	2.80	2.66	2.94	58.9	64	2.50	56	2.66	93	2.75	71	2.61	70	2.89	79	3.38
Uzbekistan	68	94	53	2.79	2.60	2.98	58.8	107	2.20	70	2.54	83	2.79	89	2.50	63	2.96	50	3.72
Benin	69	111	50	2.79	2.52	3.05	58.6	80	2.38	73	2.48	103	2.65	70	2.64	60	3.07	66	3.49
Honduras	70	82	58	2.78	2.69	2.87	58.5	76	2.39	93	2.31	101	2.67	82	2.57	74	2.83	41	3.83
Ecuador	71	88	57	2.77	2.65	2.90	58.4	92	2.32	82	2.38	72	2.86	72	2.60	72	2.84	59	3.55
Colombia	72	94	56	2.77	2.60	2.95	57.9	66	2.50	62	2.59	112	2.54	61	2.75	82	2.75	64	3.52
Macedonia, FYR	73	90	56	2.77	2.62	2.93	57.5	61	2.55	68	2.55	79	2.83	60	2.76	76	2.82	105	3.10
Croatia	74	112	51	2.77	2.51	3.03	57.4	57	2.62	87	2.36	62	2.97	87	2.53	75	2.82	91	3.22
Indonesia	75	96	56	2.76	2.60	2.92	57.1	72	2.43	69	2.54	80	2.82	92	2.47	80	2.77	69	3.46
Paraguay	76	91	57	2.75	2.62	2.89	57.0	84	2.37	78	2.44	70	2.87	78	2.59	83	2.72	72	3.46
Uruguay	77	91	57	2.75	2.62	2.89	57.0	51	2.71	63	2.58	88	2.77	74	2.59	79	2.78	112	3.06
Bahamas, The	78	104	56	2.75	2.57	2.92	56.9	78	2.38	81	2.40	99	2.69	64	2.69	77	2.81	71	3.46
Bangladesh	79	94	57	2.74	2.60	2.88	56.8	90	2.33	72	2.49	61	2.99	96	2.44	92	2.64	70	3.46
Syrian Arab Republic	80	104	56	2.74	2.56	2.92	56.5	83	2.37	75	2.45	68	2.87	75	2.59	95	2.63	74	3.45
Jordan	81	104	56	2.74	2.57	2.91	56.3	93	2.31	55	2.69	49	3.11	90	2.49	133	2.33	78	3.39
Mauritius	82	131	48	2.72	2.34	3.10	56.3	50	2.71	96	2.29	33	3.24	97	2.43	100	2.57	127	2.91
Serbia	83	133	50	2.69	2.32	3.05	56.1	108	2.19	95	2.30	18	3.41	84	2.55	88	2.67	137	2.80
Venezuela, RB	84	105	67	2.68	2.54	2.81	56.0	133	2.06	76	2.44	56	3.05	85	2.53	73	2.84	116	3.05
Congo, Dem. Rep.	85	147	43	2.68	2.19	3.16	55.9	59	2.60	98	2.27	109	2.56	49	2.93	119	2.43	94	3.20
El Salvador	86	112	60	2.67	2.51	2.84	55.8	67	2.48	77	2.44	148	2.18	68	2.66	87	2.68	55	3.63
Bosnia and Herzegovina	87	125	56	2.66	2.40	2.93	55.3	89	2.33	105	2.22	51	3.10	116	2.30	86	2.68	96	3.18

	LPI rank			LPI score			% of highest performer	Customs		Infrastructure		International shipments		Logistics quality and competence		Tracking and tracing		Timeliness	
	Rank	Lower bound	Upper bound	Score	Lower bound	Upper bound		Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Madagascar	88	126	56	2.66	2.38	2.93	54.1	87	2.35	60	2.63	53	3.06	102	2.40	109	2.51	128	2.90
Azerbaijan	89	120	61	2.64	2.44	2.84	53.9	117	2.14	104	2.23	55	3.05	91	2.48	91	2.65	100	3.15
Guatemala	90	120	64	2.63	2.43	2.83	53.8	91	2.33	84	2.37	150	2.16	62	2.74	84	2.71	61	3.52
Kyrgyz Republic	91	127	59	2.62	2.38	2.86	53.7	71	2.44	118	2.09	39	3.18	107	2.37	132	2.33	106	3.10
Egypt, Arab Rep.	92	143	52	2.61	2.24	2.99	53.4	122	2.11	106	2.22	110	2.56	54	2.87	101	2.56	81	3.31
Georgia	93	115	78	2.61	2.48	2.75	53.2	81	2.37	109	2.17	95	2.73	83	2.57	89	2.67	111	3.08
Russian Federation	94	112	83	2.61	2.51	2.71	52.6	115	2.15	83	2.38	96	2.72	88	2.51	97	2.60	88	3.23
Tanzania	95	124	68	2.60	2.41	2.79	52.4	74	2.42	129	2.00	85	2.78	105	2.38	103	2.56	80	3.33
Togo	96	134	57	2.60	2.31	2.89	52.0	75	2.40	142	1.82	126	2.42	94	2.45	35	3.42	118	3.02
Guinea	97	147	52	2.60	2.17	3.02	51.8	88	2.34	116	2.10	124	2.43	67	2.68	68	2.89	104	3.10
Haiti	98	126	68	2.59	2.38	2.80	51.8	121	2.12	108	2.17	41	3.17	93	2.46	120	2.43	119	3.02
Kenya	99	126	68	2.59	2.39	2.79	51.6	103	2.23	113	2.14	75	2.84	122	2.28	69	2.89	113	3.06
Nigeria	100	124	74	2.59	2.40	2.77	51.4	109	2.17	80	2.43	74	2.84	95	2.45	116	2.45	107	3.10
Yemen, Rep.	101	152	43	2.58	2.01	3.16	51.4	69	2.46	88	2.35	142	2.24	110	2.35	94	2.63	68	3.48
Ukraine	102	140	57	2.57	2.26	2.89	51.2	135	2.02	79	2.44	84	2.79	77	2.59	112	2.49	114	3.06
Iran, Islamic Rep.	103	124	80	2.57	2.41	2.74	51.1	106	2.22	86	2.36	121	2.44	69	2.65	110	2.50	85	3.26
Moldova	104	120	83	2.57	2.43	2.71	51.0	124	2.11	123	2.05	78	2.83	132	2.17	61	3.00	97	3.17
Cameroon	105	140	59	2.55	2.25	2.84	49.7	123	2.11	115	2.10	100	2.69	86	2.53	98	2.60	99	3.16
Niger	106	140	66	2.54	2.26	2.82	49.4	132	2.06	97	2.28	102	2.66	98	2.42	115	2.45	83	3.28
Nicaragua	107	133	78	2.54	2.33	2.75	49.3	101	2.24	102	2.23	106	2.63	114	2.31	107	2.51	92	3.21
Jamaica	108	147	54	2.53	2.11	2.96	49.2	140	2.00	121	2.07	81	2.82	112	2.32	59	3.07	134	2.82
Côte d'Ivoire	109	138	69	2.53	2.28	2.79	49.2	114	2.16	85	2.37	122	2.44	80	2.57	64	2.95	140	2.73
Pakistan	110	131	83	2.53	2.34	2.72	49.1	134	2.05	120	2.08	66	2.91	120	2.28	93	2.64	110	3.08
Armenia	111	133	82	2.52	2.32	2.73	48.9	125	2.10	92	2.32	123	2.43	79	2.59	139	2.26	77	3.40
Bolivia	112	129	89	2.51	2.37	2.66	48.5	97	2.26	100	2.24	115	2.53	104	2.38	127	2.38	93	3.20
Gambia, The	113	143	79	2.49	2.24	2.74	48.0	77	2.38	110	2.17	113	2.54	106	2.37	137	2.27	101	3.15
Turkmenistan	114	140	83	2.49	2.26	2.72	47.9	119	2.14	101	2.24	137	2.31	111	2.34	126	2.38	65	3.51
Chad	115	147	67	2.49	2.18	2.80	47.9	96	2.27	126	2.00	91	2.75	145	2.04	96	2.62	102	3.14
Congo, Rep.	116	147	60	2.48	2.11	2.84	47.4	137	2.02	151	1.62	132	2.33	101	2.42	131	2.33	27	4.00
Ghana	117	147	68	2.47	2.15	2.79	47.3	86	2.35	71	2.52	129	2.38	99	2.42	108	2.51	142	2.67
Lao PDR	118	138	89	2.46	2.28	2.64	47.0	113	2.17	132	1.95	97	2.70	137	2.14	113	2.45	89	3.23
Albania	119	145	83	2.46	2.22	2.70	46.8	129	2.07	112	2.14	104	2.64	103	2.39	124	2.39	120	3.01
Comoros	120	147	82	2.45	2.16	2.73	46.5	142	1.96	146	1.76	108	2.56	124	2.26	78	2.79	90	3.23
Montenegro	121	147	88	2.43	2.20	2.66	45.9	112	2.17	74	2.45	114	2.54	113	2.32	117	2.44	145	2.65
Gabon	122	147	84	2.41	2.15	2.68	45.4	102	2.23	117	2.09	139	2.29	115	2.31	90	2.67	130	2.87
Ethiopia	123	149	82	2.41	2.10	2.73	45.4	120	2.13	145	1.77	89	2.76	136	2.14	67	2.89	144	2.65
Papua New Guinea	124	146	92	2.41	2.21	2.62	45.3	138	2.02	135	1.91	111	2.55	131	2.20	118	2.43	87	3.24
Maldives	125	147	91	2.40	2.19	2.62	45.1	98	2.25	111	2.16	125	2.42	117	2.29	121	2.42	133	2.83
Djibouti	126	147	91	2.39	2.17	2.62	44.8	100	2.25	91	2.33	116	2.50	133	2.17	123	2.42	143	2.67
Liberia	127	147	90	2.38	2.13	2.64	44.4	94	2.28	127	2.00	133	2.33	134	2.16	125	2.38	109	3.08
Bhutan	128	149	87	2.38	2.09	2.67	44.3	118	2.14	141	1.83	120	2.44	127	2.24	105	2.54	122	2.99
Cambodia	129	147	100	2.37	2.15	2.59	44.0	95	2.28	114	2.12	146	2.19	118	2.29	111	2.50	132	2.84
Algeria	130	144	116	2.36	2.23	2.49	43.7	141	1.97	122	2.06	98	2.70	129	2.24	138	2.26	136	2.81
Tajikistan	131	147	112	2.35	2.17	2.52	43.2	147	1.90	128	2.00	127	2.42	125	2.25	141	2.25	98	3.16
Libya	132	152	88	2.33	2.01	2.66	42.8	116	2.15	107	2.18	140	2.28	121	2.28	143	2.08	124	2.98

	LPI rank			LPI score			% of highest performer	Customs		Infrastructure		International shipments		Logistics quality and competence		Tracking and tracing		Timeliness	
	Rank	Lower bound	Upper bound	Score	Lower bound	Upper bound		Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Myanmar	133	149	105	2.33	2.09	2.56	42.7	146	1.94	134	1.92	131	2.37	148	2.01	129	2.36	82	3.29
Botswana	134	153	85	2.32	1.96	2.68	42.3	126	2.09	119	2.09	152	1.91	119	2.29	99	2.59	123	2.99
Solomon Islands	135	147	120	2.31	2.16	2.46	42.0	127	2.08	103	2.23	147	2.18	123	2.27	147	2.03	115	3.05
Mozambique	136	152	98	2.29	1.99	2.60	41.5	145	1.95	124	2.04	87	2.77	130	2.20	135	2.28	150	2.40
Sri Lanka	137	152	105	2.29	2.02	2.56	41.4	143	1.96	138	1.88	117	2.48	142	2.09	142	2.23	125	2.98
Zambia	138	153	67	2.28	1.76	2.81	41.2	111	2.17	140	1.83	128	2.41	149	2.01	130	2.35	131	2.85
Mali	139	153	92	2.27	1.92	2.62	40.7	128	2.08	125	2.00	149	2.17	138	2.13	134	2.31	129	2.90
Guyana	140	149	121	2.27	2.10	2.44	40.7	136	2.02	130	1.99	136	2.31	126	2.25	136	2.28	141	2.70
Mongolia	141	150	121	2.25	2.05	2.45	40.2	149	1.81	133	1.94	119	2.46	128	2.24	122	2.42	147	2.55
Angola	142	151	119	2.25	2.03	2.46	40.1	151	1.75	149	1.69	130	2.38	147	2.02	106	2.54	121	3.01
Afghanistan	143	150	122	2.24	2.06	2.42	39.9	104	2.22	139	1.87	141	2.24	141	2.09	128	2.37	146	2.61
Fiji	144	152	118	2.24	2.00	2.47	39.7	144	1.95	131	1.98	118	2.48	139	2.11	151	1.96	135	2.82
Burkina Faso	145	153	83	2.23	1.75	2.70	39.4	105	2.22	137	1.89	153	1.73	146	2.02	81	2.77	138	2.77
Sudan	146	153	105	2.21	1.84	2.57	38.7	139	2.02	144	1.78	151	2.11	135	2.15	148	2.02	108	3.09
Nepal	147	152	126	2.20	2.01	2.40	38.6	130	2.07	143	1.80	143	2.21	143	2.07	140	2.26	139	2.74
Iraq	148	153	132	2.11	1.87	2.34	35.5	131	2.07	147	1.73	144	2.20	140	2.10	150	1.96	148	2.49
Guinea-Bissau	149	154	112	2.10	1.69	2.52	35.4	148	1.89	153	1.56	92	2.75	153	1.56	153	1.71	126	2.91
Cuba	150	153	137	2.07	1.84	2.29	34.3	150	1.79	136	1.90	135	2.32	151	1.88	146	2.03	149	2.41
Rwanda	151	153	132	2.04	1.73	2.34	33.4	153	1.63	150	1.63	67	2.88	152	1.85	149	1.99	154	2.05
Namibia	152	154	125	2.02	1.63	2.41	32.8	152	1.68	148	1.71	145	2.20	144	2.04	144	2.04	151	2.38
Sierra Leone	153	153	148	1.97	1.75	2.19	31.2	110	2.17	152	1.61	134	2.33	154	1.53	152	1.73	152	2.33
Eritrea	154	155	151	1.70	1.34	2.06	22.4	154	1.50	155	1.35	154	1.63	150	1.88	154	1.55	153	2.21
Somalia	155	155	155	1.34	1.05	1.63	10.9	155	1.33	154	1.50	155	1.33	155	1.33	155	1.17	155	1.38

Note: The LPI index is a multidimensional assessment of logistics performance, rated on a scale from 1 (worst) to 5 (best). The six core dimensions captured by the LPI survey are rated by respondents on a scale of 1–5, where 1 is very low or very difficult and 5 is very high or very easy, except for question 15, where 1 is hardly ever and 5 is nearly always.
Source: Logistics performance survey data, 2009.

APPENDIX 2

Domestic LPI results, by region and income group

Percent of respondents

Question	Response categories	Region						Income group			
		East Asia and Pacific	Europe and Central Asia	Latin America and Caribbean	Middle East and North Africa	South Asia	Sub-Saharan Africa	High income	Upper middle income	Lower middle income	Low income
Question 16: Level of fees and charges											
Port charges	Very high or high	61	40	49	33	40	53	49	40	50	51
	Low or very low	8	16	7	20	2	16	7	13	11	15
Airport charges	Very high or high	55	54	42	39	39	43	50	45	45	47
	Low or very low	6	14	7	12	20	16	9	9	17	12
Road transport rates	Very high or high	42	34	52	31	35	45	39	38	40	47
	Low or very low	12	23	6	27	28	22	20	20	20	18
Rail transport rates	Very high or high	52	24	35	10	29	25	49	25	31	28
	Low or very low	17	25	22	53	9	34	14	27	33	25
Warehousing/transloading charges	Very high or high	49	27	39	20	14	40	46	29	35	37
	Low or very low	17	27	9	26	15	17	16	21	21	14
Agent fees	Very high or high	48	33	16	17	17	21	33	24	26	23
	Low or very low	16	34	11	18	15	26	22	18	24	23
Question 17: Quality of infrastructure											
Ports	Low or very low	37	57	34	47	36	42	28	43	43	44
	High or very high	13	16	19	9	9	23	46	25	13	12
Airports	Low or very low	42	41	25	48	47	41	20	39	35	46
	High or very high	19	18	27	6	11	21	50	23	17	15
Roads	Low or very low	51	57	50	45	64	50	8	54	49	52
	High or very high	11	19	19	8	6	20	55	18	15	16
Rail	Low or very low	69	49	86	61	65	81	39	64	67	79
	High or very high	2	17	3	0	11	3	29	11	5	2
Warehousing/transloading facilities	Low or very low	49	33	20	48	37	28	13	25	35	40
	High or very high	12	18	32	5	12	21	61	30	14	12
Telecommunications and IT	Low or very low	41	32	15	27	12	30	4	18	28	35
	High or very high	15	28	46	23	62	38	75	41	36	28
Question 18: Competence and quality of service											
Road	Low or very low	32	23	32	21	29	30	11	20	38	26
	High or very high	11	31	10	27	18	25	60	25	18	21
Rail	Low or very low	70	51	86	71	60	70	40	60	70	74
	High or very high	2	12	3	0	9	6	27	10	5	2
Air transport	Low or very low	10	24	9	11	6	21	3	14	14	19
	High or very high	33	29	46	41	54	38	74	41	43	32
Maritime transport	Low or very low	27	22	4	11	14	18	3	7	18	25
	High or very high	15	38	35	30	30	47	67	46	26	35
Warehousing/transloading and distribution	Low or very low	26	18	21	33	20	20	4	17	23	27
	High or very high	17	30	41	9	15	22	63	38	21	13
Freight forwarders	Low or very low	12	12	1	11	1	9	1	7	5	12
	High or very high	38	39	55	29	41	50	71	53	40	39
Customs agencies	Low or very low	63	34	29	30	44	34	9	29	43	36
	High or very high	5	23	27	22	16	37	59	30	22	25
Quality/standards inspection agencies	Low or very low	46	47	32	24	31	26	12	32	43	25
	High or very high	17	13	18	22	30	20	54	18	24	15

Question	Response categories	Region						Income group			
		East Asia and Pacific	Europe and Central Asia	Latin America and Caribbean	Middle East and North Africa	South Asia	Sub-Saharan Africa	High income	Upper middle income	Lower middle income	Low income
Health/sanitary and phytosanitary agencies	Low or very low	43	45	45	47	33	45	16	41	51	41
	High or very high	3	11	12	27	12	17	49	13	16	13
Customs brokers	Low or very low	36	27	20	17	37	17	7	16	28	26
	High or very high	23	25	24	20	18	28	57	32	19	22
Trade and transport associations	Low or very low	42	34	30	38	25	38	15	33	36	37
	High or very high	20	13	12	11	21	20	49	15	15	18
Consignees or shippers	Low or very low	25	25	10	13	5	16	14	16	14	19
	High or very high	22	19	14	27	20	27	47	22	22	22
Question 19: Efficiency of processes											
Clearance and delivery of imports	Hardly ever or rarely	12	15	9	19	11	17	7	13	12	18
	Often or nearly always	48	64	46	50	49	52	81	64	46	48
Clearance and delivery of exports	Hardly ever or rarely	0	6	9	23	9	8	1	7	11	8
	Often or nearly always	82	71	70	69	70	60	90	78	67	59
Transparency of customs clearance	Hardly ever or rarely	33	38	11	38	30	27	11	20	30	36
	Often or nearly always	24	33	54	36	30	52	77	42	44	37
Provision of adequate and timely Information on regulatory changes	Hardly ever or rarely	35	39	15	33	44	31	16	28	24	43
	Often or nearly always	25	36	53	47	15	40	72	47	37	33
Expedited customs clearance for traders with high compliance levels	Hardly ever or rarely	20	28	19	27	33	29	14	17	24	38
	Often or nearly always	38	38	57	37	26	37	63	48	43	29
Question 20: Sources of major delays											
Compulsory warehousing/ transloading	Often or nearly always	15	24	29	35	19	40	7	22	27	41
	Hardly ever or rarely	30	39	39	21	23	36	68	42	27	31
Preshipment inspection	Often or nearly always	30	25	17	27	23	31	9	21	24	34
	Hardly ever or rarely	28	34	32	29	35	23	73	37	31	21
Maritime transshipment	Often or nearly always	27	19	28	39	36	22	5	25	26	28
	Hardly ever or rarely	16	38	26	21	32	25	53	31	22	28
Criminal activities (such as stolen cargo)	Often or nearly always	11	7	17	12	21	20	1	13	13	20
	Hardly ever or rarely	56	71	49	65	53	49	81	62	57	52
Solicitation of informal payments	Often or nearly always	41	28	29	36	34	37	2	20	40	39
	Hardly ever or rarely	12	33	44	25	20	25	81	39	23	23

Question	Response categories	Region						Income group			
		East Asia and Pacific	Europe and Central Asia	Latin America and Caribbean	Middle East and North Africa	South Asia	Sub-Saharan Africa	High income	Upper middle income	Lower middle income	Low income
Question 21: Changes in the logistics environment since 2005											
Customs clearance procedures	Much worsened or worsened	31	13	12	10	17	22	11	12	13	27
	Improved or much improved	41	57	59	49	43	56	62	56	59	44
Other official clearance procedures	Much worsened or worsened	23	14	18	8	16	21	12	14	12	26
	Improved or much improved	26	42	32	41	19	47	51	38	36	40
Trade and transport infrastructure	Much worsened or worsened	26	7	16	0	6	25	5	14	9	22
	Improved or much improved	30	52	49	48	51	43	55	50	50	38
Telecommunications and information technology infrastructure	Much worsened or worsened	7	1	3	0	0	9	1	4	1	7
	Improved or much improved	57	68	73	71	88	62	72	75	71	58
Private logistics services	Much worsened or worsened	6	3	6	0	6	2	1	4	1	5
	Improved or much improved	48	68	76	57	76	63	72	75	67	54
Regulation related to logistics	Much worsened or worsened	25	6	7	0	22	9	21	7	7	14
	Improved or much improved	26	23	17	36	43	58	34	29	36	43
Incidence of corruption	Much worsened or worsened	38	21	19	14	23	33	1	14	23	39
	Improved or much improved	19	33	32	33	24	30	35	34	27	28

Note: Responses are calculated at the country level and then averaged by quintiles.
Source: Logistics performance survey data, 2009.

APPENDIX 3

Domestic LPI results, time and cost data

	Question 22: Export time and cost						Question 25: Import time and cost					
	Port or airport supply chain[a]			Land supply chain[b]			Port or airport supply chain[c]			Land supply chain[b]		
	Distance (kilometers)	Lead time (days)	Cost[d] (US$)	Distance (kilometers)	Lead time (days)	Cost[e] (US$)	Distance (kilometers)	Lead time (days)	Cost[d] (US$)	Distance (kilometers)	Lead time (days)	Cost[e] (US$)
Afghanistan	1,250.00	2.00	—	1,250.00	4.42	1,914	300.00	4.00	1,500	750.00	3.16	1,712
Albania	75.00	1.73	1,000	75.00	3.00	250	75.00	2.00	500	300.00	4.00	1,500
Algeria	750.00	4.58	—	—	—	—	750.00	7.07	1,500	—	—	—
Angola	—	6.00	150	—	—	—	—	8.00	2,000	—	—	—
Argentina	214.31	3.73	1,070	306.19	2.83	1,000	269.48	3.79	743	1,250.00	2.00	1,000
Australia	388.90	2.64	955	268.14	1.84	881	277.22	2.83	869	428.63	2.93	2,178
Austria	237.17	2.00	474	612.37	3.00	1,500	237.17	3.74	474	889.22	3.00	2,000
Azerbaijan	—	7.00	1,414	750.00	5.00	2,000	—	3.00	4,000	750.00	7.00	4,000
Bahrain	—	1.00	150	—	1.00	150	—	2.00	250	—	2.00	250
Bangladesh	300.00	1.41	2,449	—	—	—	150.00	1.41	2,000	—	—	—
Belarus	—	—	—	2,000.00	7.00	4,000	—	—	—	2,000.00	8.00	3,000
Belgium	119.06	1.66	1,260	328.01	2.63	1,260	172.30	1.62	931	172.30	2.05	500
Bolivia	1,620.19	15.00	5,000	1,581.14	10.00	5,000	3,500.00	28.28	4,000	2,091.65	11.31	4,472
Bosnia and Herzegovina	300.00	2.00	—	300.00	2.00	—	300.00	2.00	—	300.00	2.00	—
Brazil	222.06	2.80	1,614	491.95	3.39	1,024	202.97	3.88	1,570	212.13	3.48	1,414
Bulgaria	300.00	2.00	1,500	482.74	2.88	500	300.00	3.87	250	564.62	3.30	500
Burkina Faso	1,250.00	4.00	3,000	—	—	—	1,250.00	14.00	5,000	—	—	—
Cambodia	188.99	1.32	1,000	—	—	—	188.99	4.00	2,924	3,500.00	67.00	1,500
Cameroon	306.19	3.37	1,125	968.25	13.61	2,466	689.73	8.89	2,551	2,000.00	18.71	3,873
Canada	291.86	2.83	731	765.97	2.63	1,123	565.34	3.68	1,015	266.74	1.89	622
Central African Republic	1,581.14	7.07	3,873	2,000.00	12.00	5,000	—	—	—	2,000.00	10.00	5,000
Chad	75.00	74.00	—		—		—	—	—	300.00	5.00	1,500
Chile	196.03	3.48	1,587	75.00	9.00	1,000	512.35	3.04	1,225	—	—	—
China	163.74	2.77	419	150.00	2.00	371	155.68	2.56	376	564.62	3.56	658
Colombia	—	—	—	924.40	3.06	2,659	—	—	—	2,070.41	6.96	4,309
Congo, Dem. Rep.	—	2.00	4,000	—	—	—	—	3.00	4,000	—	—	—
Costa Rica	75.00	2.00	250	—	—	—	75.00	2.00	150	—	—	—
Côte d'Ivoire	—	1.00	—	—	—	—	—	1.00	—	—	—	—
Croatia	75.00	1.00	500	150.00	2.00	150	75.00	1.00	500	237.17	2.45	387
Czech Republic	474.34	2.45	1,500	75.00	1.00	—	474.34	3.46	1,500	300.00	1.00	—
Denmark	75.00	1.00	500	—	—	—	75.00	1.00	500	—	—	—
Dominican Republic	75.00	2.24	354	—	—	—	—	3.46	354	—	—	—
Ecuador	300.00	2.06	608	—	—	—	300.00	3.41	671	—	—	—
Egypt, Arab Rep.	188.99	1.26	315	1,024.70	6.48	707	188.99	3.11	274	1,024.70	8.37	707
Equatorial Guinea	—	10.00	5,000	—	—	—	—	8.00	4,000	—	—	—
Eritrea	300.00	3.00	2,000	300.00	3.00	2,000	300.00	3.00	2,000	300.00	4.00	2,000
Estonia	300.00	4.00	2,000	150.00	1.00	194	300.00	4.00	2,000	150.00	1.41	194
Ethiopia	1,250.00	5.00	1,000	2,000.00	5.00	5,000	750.00	6.00	2,000	750.00	7.00	5,000
Finland	262.23	1.59	579	411.57	2.10	758	317.21	1.83	674	612.37	2.24	—
Gabon	—	4.28	—	—	2.83	—	—	13.01	—	—	—	—
Gambia, The	—	4.58	1,225	—	3.00	1,500	—	3.46	3,000	—	3.00	1,000

	Question 22: Export time and cost						Question 25: Import time and cost					
	Port or airport supply chain[a]			Land supply chain[b]			Port or airport supply chain[c]			Land supply chain[b]		
	Distance (kilometers)	Lead time (days)	Cost[d] (US$)	Distance (kilometers)	Lead time (days)	Cost[e] (US$)	Distance (kilometers)	Lead time (days)	Cost[d] (US$)	Distance (kilometers)	Lead time (days)	Cost[e] (US$)
Germany	972.15	3.63	612	407.16	1.41	354	—	—	—	407.16	3.04	1,000
Ghana	256.37	2.89	1,626	256.50	3.50	1,030	396.34	6.76	2,542	119.06	3.16	2,060
Greece	—	—	—	1,250.00	7.00	1,500	—	—	—	1,250.00	7.00	3,000
Guatemala	282.88	2.58	715	632.53	2.63	658	280.52	3.36	1,612	479.37	3.94	1,355
Hong Kong SAR, China	119.06	1.71	465	188.99	2.21	335	75.00	1.62	459	75.00	1.86	274
Hungary	—	—	—	750.00	—	2,000	750.00	5.00	3,000	750.00	6.00	1,000
India	302.73	2.34	660	458.18	4.78	976	421.74	5.31	1,267	616.55	5.36	972
Indonesia	277.22	2.12	379	300.00	4.00	1,000	492.98	5.35	1,024	75.00	10.00	3,000
Iran, Islamic Rep.	1,250.00	2.62	707	1,250.00	2.00	1,000	3,500.00	28.28	2,739	2,091.65	9.17	5,000
Iraq	—	—	—	1,250.00	7.00	5,000	—	—	—	1,250.00	4.00	5,000
Ireland	—	1.00	500	—	1.00	500	—	1.00	500	—	1.00	500
Israel	75.00	2.00	500	75.00	1.00	250	75.00	2.00	500	75.00	1.00	500
Italy	303.69	2.60	641	700.57	2.78	707	311.37	2.97	831	680.41	4.58	500
Japan	75.00	1.00	500	75.00	1.00	—	75.00	1.00	707	75.00	1.00	1,000
Jordan	300.00	3.16	1,000	1,024.70	7.75	707	300.00	4.58	1,225	300.00	5.00	—
Kazakhstan	—	—	—	1,620.19	7.42	1,807	—	—	—	3,500.00	8.85	1,904
Kenya	371.62	2.96	1,236	428.63	2.21	1,554	486.69	5.92	2,460	680.41	7.00	2,466
Korea, Rep.	188.99	1.59	354	300.00	2.00	500	188.99	2.00	500	—	—	—
Kuwait	75.00	2.00	5,000	75.00	2.00	3,000	75.00	3.00	5,000	75.00	3.00	3,000
Kyrgyz Republic	3,500.00	2.00	—	75.00	8.83	2,277	—	—	—	—	11.97	2,122
Latvia	75.00	1.26	483	75.00	1.00	274	75.00	1.59	483	191.58	1.00	387
Lebanon	75.00	3.42	500	75.00	2.00	354	75.00	2.15	1,000	75.00	2.00	1,000
Libya	150.00	3.16	2,739	387.30	2.24	2,449	150.00	10.00	2,828	75.00	3.00	2,000
Lithuania	300.00	2.00	354	482.74	2.00	356	300.00	2.29	335	150.00	1.41	150
Luxembourg	313.69	1.70	1,351	407.16	1.59	1,817	224.30	1.59	1,000	300.00	2.70	1,732
Malaysia	172.30	2.64	354	188.99	2.29	266	212.13	2.75	330	150.00	3.46	354
Maldives	—	2.00	3,000	—	—	—	—	2.00	4,000	—	—	—
Mali	1,250.00	5.00	3,000	—	—	—	1,250.00	4.00	3,000	—	—	—
Mauritania	300.00	2.00	4,000	—	—	—	300.00	3.00	5,000	—	—	—
Mexico	578.01	2.06	1,314	890.91	2.51	1,817	617.37	2.52	1,275	564.62	1.82	1,414
Mongolia	750.00	14.00	—	—	—	—	750.00	12.00	1,000	750.00	14.00	1,500
Morocco	387.30	2.00	3,000	300.00	1.73	4,000	774.60	3.16	2,449	300.00	4.00	2,000
Mozambique	—	—	—	3,500.00	—	3,000	—	—	—	—	—	—
Myanmar	75.00	4.58	150	—	3.00	150	75.00	8.37	150	75.00	2.00	150
Namibia	1,620.19	3.00	2,000	750.00	1.00	2,000	1,024.70	3.00	2,236	1,250.00	5.00	3,000
Nepal	750.00	1.82	1,145	968.25	8.06	2,449	1,250.00	6.32	707	1,250.00	18.00	3,000
Netherlands	75.00	1.81	459	174.75	2.70	266	165.61	1.92	707	106.07	3.03	410
New Zealand	75.00	1.26	250	750.00	1.59	250	—	1.59	194	—	1.59	194
Nicaragua	612.37	3.16	1,225	750.00	2.00	250	300.00	3.16	866	75.00	2.00	150
Nigeria	237.17	2.51	2,289	968.25	3.04	2,289	270.02	4.09	2,621	412.74	5.24	2,621
Norway	75.00	1.00	500	75.00	1.00	500	75.00	2.00	500	75.00	2.00	500
Pakistan	387.30	2.30	729	612.37	3.11	931	75.00	1.59	335	968.25	3.87	1,732
Panama	150.00	1.44	500	75.00	1.00	274	75.00	1.41	194	75.00	1.41	274
Peru	75.00	2.03	500	983.99	6.34	2,866	179.30	3.80	944	300.00	4.00	1,500
Philippines	75.00	1.82	1,118	75.00	3.00	500	75.00	5.00	1,357		2.00	250
Poland	436.40	3.04	702	392.06	2.28	822	588.98	3.55	1,145	841.47	2.00	1,225

	Question 22: Export time and cost						Question 25: Import time and cost					
	Port or airport supply chain[a]			Land supply chain[b]			Port or airport supply chain[c]			Land supply chain[b]		
	Distance (kilometers)	Lead time (days)	Cost[d] (US$)	Distance (kilometers)	Lead time (days)	Cost[e] (US$)	Distance (kilometers)	Lead time (days)	Cost[d] (US$)	Distance (kilometers)	Lead time (days)	Cost[e] (US$)
Qatar	270.02	3.83	855	75.00	2.00	531	75.00	2.29	721	75.00	2.29	354
Romania	774.60	2.00	2,236	300.00	2.00	500	300.00	2.00	1,000	1,024.70	6.35	1,357
Russian Federation	948.79	3.98	1,310	1,510.95	5.97	1,861	908.56	2.88	1,145	2,056.13	5.67	2,280
Saudi Arabia	75.00	2.29	250	1,250.00	3.00	1,500	—	6.32	274	489.36	4.93	696
Senegal	—	1.41	—	—	2.00	—	—	2.65	1,000	—	—	—
Serbia	750.00	2.00	1,000	612.37	1.73	500	750.00	3.00	1,500	1,581.14	3.00	1,732
Sierra Leone	750.00	2.00	2,000	750.00	2.00	2,000	3,500.00	32.00	5,000	—	—	—
Singapore	224.07	2.17	422	119.06	2.38	298	75.00	1.78	335	241.03	2.51	409
Slovak Republic	750.00	3.00	1,500	968.25	2.45	1,500	1,250.00	5.00	1,500	968.25	2.45	1,225
Slovenia	300.00	1.00	500	300.00	1.00	250	300.00	2.00	500	300.00	1.00	250
South Africa	499.35	2.28	907	738.63	3.15	1,873	660.53	3.25	1,516	633.44	4.47	2,667
Spain	1,250.00	4.00	707	1,250.00	4.00	1,500	3,500.00	7.07	707	1,250.00	4.00	1,000
Sri Lanka	75.00	1.32	170	—	1.73	194	75.00	2.45	150	—	—	—
Sudan	3,500.00	39.00	2,000	1,250.00	6.00	—	2,000.00	5.00	5,000	2,000.00	18.00	5,000
Sweden	300.00	1.00	1,500	3,500.00	3.00	3,000	—	—	—	—	—	—
Switzerland	256.37	2.61	1,310	474.34	3.00	—	119.06	2.62	1,500	237.17	2.00	—
Syrian Arab Republic	474.34	2.45	150	237.17	2.45	250	150.00	3.16	250	512.35	8.49	1,118
Taiwan, China	150.00	1.32	393	188.99	1.26	721	188.99	2.06	500	212.13	1.57	500
Tajikistan	75.00	7.00	1,000	—	3.64	1,959	—	—	—	2,000.00	3.54	2,269
Tanzania	300.00	3.16	2,000	1,062.66	4.00	5,000	300.00	7.07	3,000	774.60	3.17	3,162
Thailand	75.00	1.59	250	75.00	1.73	250	75.00	2.62	354	75.00	2.00	250
Togo	3,500.00	—	—	1,250.00	8.00	3,000	—	—	—	1,250.00	7.00	3,000
Tunisia	—	1.73	—	—	—	—	1,250.00	7.00	1,732	—	—	—
Turkey	367.44	2.19	1,626	849.54	4.05	2,225	512.35	3.83	785	3,188.32	4.32	1,870
Turkmenistan	750.00	3.00	1,500	750.00	3.00	1,500	—	—	—	3,500.00		3,000
Uganda	612.37	5.48	2,466	1,250.00	8.00	2,000	306.19	13.96	2,236	1,250.00	13.23	3,162
Ukraine	552.60	1.68	1,612	1,224.74	3.16	1,414	750.00	7.00	3,000	1,224.74	3.46	1,225
United Arab Emirates	428.63	2.46	649	428.62	2.53	551	482.74	2.03	960	536.14	3.45	1,170
United Kingdom	—	—	—	1,040.04	3.68	1,225	281.64	1.89	1,140	—	—	—
United States	434.10	2.82	1,145	483.84	4.78	1,249	783.57	4.04	1,482	633.32	3.82	1,133
Uruguay	—	3.00	500	—	—	—	—	3.00	500	—	—	—
Uzbekistan	75.00	1.41	387	300.00	9.48	1,341	300.00	2.00	387	300.00	12.52	618
Venezuela, RB	1,024.70	9.44	3,347	3,500.00	—	—	1,024.70	12.05	3,347	—	—	—
Vietnam	300.00	1.41	500	2,000.00	8.00	3,000	300.00	1.73	500	—	—	—
Yemen, Rep.	300.00	3.11	1,500	407.16	4.48	794	474.34	3.63	1,000	150.00	6.48	—
Zambia	—	—	—	—	—	—	2,000.00	4.00	5,000	—	—	—

— is not available.

a. From the point of origin (the seller's factory, typically located either in the capital city or in the largest commercial center) to the port of loading or equivalent (for port/airport), and excluding international shipping (EXW to FOB).

b. From the point of origin (the seller's factory, typically located either in the capital city or in the largest commercial center) to the buyer's warehouse (EXW to DDP).

c. From the port of discharge or equivalent to the buyer's warehouse (DES to DDP).

d. Typical charge for a 40-foot dry container or a semi-trailer (total freight including agent fees, port, airport, and other charges).

e. Typical charge for a 40-foot dry container or a semi-trailer (total freight including agent fees and other charges).

Source: Logistics performance survey data, 2009.

	Question 27: % of shipments meeting quality criteria	Question 28: Number of agencies		Question 29: Number of documents		Question 30: Clearance time (days)[f]		Question 31: Physical inspection	Question 32: Multiple inspection
	% of shipments	Imports	Exports	Imports	Exports	Without physical inspection	With physical inspection	% of import shipments	% of shipments physically inspected
Afghanistan	84	4.91	5.09	4.54	4.71	3.04	1.75	6	4
Albania	93	1.00	1.00	4.00	3.50	0.50	1.41	37	9
Algeria	59	4.50	3.00	10.50	9.00	2.00	4.47	61	2
Angola	83	3.00	2.00	4.00	3.00	3.00	7.00	3	1
Argentina	93	3.57	2.33	4.14	3.67	2.10	3.85	34	4
Australia	85	2.57	2.57	3.15	3.17	0.48	1.76	5	1
Austria	92	1.00	1.00	3.00	3.33	0.66	1.32	2	1
Azerbaijan	88	2.00	2.00	8.00	8.00	4.00	4.00	75	75
Bahrain	88	4.00	3.00	4.00	3.00	1.00	2.00	6	1
Bangladesh	97	2.50	2.50	6.50	8.00	2.83	4.47	50	3
Belarus	83	3.00	5.00	6.00	8.00	1.00	3.00	35	18
Belgium	95	1.80	1.90	2.60	2.40	0.47	1.17	2	2
Bolivia	96	1.50	2.00	5.50	5.00	1.73	4.58	37	4
Bosnia and Herzegovina	40	3.00	3.00	6.00	6.00	1.00	1.00	35	1
Brazil	89	4.21	3.47	4.72	4.06	1.67	5.47	11	2
Bulgaria	91	1.50	1.50	3.00	3.25	0.59	1.00	5	2
Burkina Faso	40	5.00	5.00	4.00	4.00	2.00	3.00	75	35
Cambodia	69	6.50	6.00	6.75	5.50	1.39	5.92	29	11
Cameroon	51	4.00	3.83	4.80	5.00	2.64	3.31	12	4
Canada	79	2.67	2.06	2.42	1.80	0.52	2.16	3	1
Central African Republic	—	5.00	8.00	8.00	9.00	—	—	50	—
Chad	88	4.00	5.00	3.00	6.00	1.00	15.00	18	18
Chile	95	2.00	2.60	3.20	3.60	0.50	1.32	2	4
China	70	4.20	4.06	5.36	4.87	1.70	3.38	9	2
Colombia	91	4.29	4.57	6.33	5.67	0.79	2.04	21	3
Congo, Dem. Rep.	97	3.00	3.00	—	—	—	—	—	—
Costa Rica	93	5.00	3.00	4.00	3.00	2.00	3.00	18	18
Côte d'Ivoire	—	—	—	—	—	—	—	—	—
Croatia	62	3.50	3.50	2.50	2.50	0.50	0.50	3	18
Czech Republic	—	1.00	1.00	3.00	2.50	0.35	1.00	2	1
Denmark	92	2.00	1.50	3.00	2.00	0.50	1.41	2	1
Dominican Republic	88	1.50	2.50	2.00	1.50	1.00	2.00	37	1
Ecuador	91	2.25	1.75	3.75	2.25	1.86	3.13	27	2
Egypt, Arab Rep.	72	6.50	3.25	4.25	3.50	1.68	2.55	43	4
Equatorial Guinea	40	4.00	3.00	6.00	6.00	4.00	8.00	3	1
Eritrea	40	3.00	3.00	5.00	5.00	3.00	3.00	75	75
Estonia	94	1.67	1.67	2.67	2.67	0.31	1.00	1	1
Ethiopia	83	8.00	5.00	9.00	5.00	18.00	20.00	75	75
Finland	91	1.50	1.46	2.82	2.85	0.36	0.60	2	2
Gabon	48	3.00	2.60	6.20	5.00	5.89	9.12	55	3
Gambia, The	40	5.50	5.00	3.50	3.50	0.50	1.00	37	3
Germany	92	2.75	2.25	3.00	3.00	0.71	1.57	3	5
Ghana	69	5.50	5.20	4.80	3.90	2.41	3.41	36	9
Greece	97	1.00	1.00	1.00	2.00	1.00	2.00	1	1
Guatemala	78	3.25	3.63	4.38	4.25	1.25	2.34	33	6

	Question 27: % of shipments meeting quality criteria	Question 28: Number of agencies		Question 29: Number of documents		Question 30: Clearance time (days)[f]		Question 31: Physical inspection	Question 32: Multiple inspection
	% of shipments	Imports	Exports	Imports	Exports	Without physical inspection	With physical inspection	% of import shipments	% of shipments physically inspected
Hong Kong SAR, China	81	1.88	1.75	2.14	2.14	0.32	0.55	2	1
Hungary	83	2.00	2.00	2.00	2.00	2.00	4.00	3	1
India	73	3.71	3.43	5.00	4.00	1.92	3.45	14	6
Indonesia	68	3.67	2.50	5.00	3.50	2.14	5.12	11	3
Iran, Islamic Rep.	83	8.00	8.00	8.00	5.50	3.00	4.90	61	4
Iraq	88	11.00	11.00	11.00	11.00	1.00	2.00	50	50
Ireland	100	1.00	1.00	1.00	1.00	0.25	1.00	1	1
Israel	88	5.00	3.00	5.00	3.00	0.50	2.00	3	1
Italy	79	1.36	1.31	2.60	2.40	0.86	2.35	5	2
Japan	92	1.67	2.00	3.67	3.33	0.79	1.26	3	2
Jordan	40	4.00	2.00	5.00	2.00	1.41	2.83	37	4
Kazakhstan	95	4.71	4.19	5.44	7.41	1.62	1.74	42	21
Kenya	81	5.38	4.50	5.50	3.38	1.36	3.05	29	7
Korea, Rep.	92	2.00	2.50	3.00	3.00	0.63	1.00	3	5
Kuwait	97	6.00	6.00	11.00	7.00	2.00	3.00	75	18
Kyrgyz Republic	76	4.38	4.64	5.21	5.90	0.80	0.56	12	2
Latvia	95	1.33	1.33	3.33	3.00	0.40	0.79	1	2
Lebanon	83	4.33	4.33	5.00	5.00	3.68	3.91	22	4
Libya	61	2.50	3.00	3.00	2.00	1.00	1.22	37	1
Lithuania	90	2.00	1.67	3.33	2.67	0.40	0.63	14	1
Luxembourg	89	1.71	1.81	4.14	2.81	0.39	0.64	5	2
Malaysia	71	3.00	2.86	3.17	2.67	0.74	2.08	6	3
Maldives	93	3.00	3.00	4.00	4.00	2.00	3.00	75	1
Mali	40	2.00	3.00	4.00	5.00	2.00	3.00	75	3
Mauritania	97	5.00	3.00	5.00	2.00	0.50	1.00	50	1
Mexico	86	2.57	2.57	4.14	3.00	0.87	2.32	26	2
Mongolia	40	5.00	8.00	5.00	9.00	2.00	2.00	50	50
Morocco	93	4.33	4.33	4.33	4.00	0.40	0.79	16	1
Mozambique	40	1.00	1.00	3.00	3.00	4.00	6.00	6	1
Myanmar	59	4.00	5.00	5.00	6.00	2.00	3.46	50	15
Namibia	—	2.50	3.00	5.00	4.50	1.00	1.41	4	1
Nepal	57	7.50	6.00	8.50	8.00	1.00	1.41	22	3
Netherlands	77	1.40	1.70	1.70	1.70	0.44	1.13	4	3
New Zealand	63	2.67	2.67	3.33	3.33	0.50	1.26	2	1
Nicaragua	87	2.50	2.00	3.50	3.50	0.50	1.00	18	3
Nigeria	68	7.75	8.00	7.75	6.75	3.81	6.40	61	9
Norway	93	2.00	2.00	2.00	2.00	0.25	2.00	1	1
Pakistan	83	3.80	4.20	5.40	7.60	3.58	6.75	64	6
Panama	97	2.00	2.00	3.00	3.00	1.00	1.71	8	4
Peru	91	1.83	2.00	4.80	4.00	1.74	3.65	12	5
Philippines	75	3.00	3.33	5.00	4.33	1.82	3.42	19	2
Poland	80	2.56	1.44	3.78	2.44	0.79	1.42	5	3
Qatar	95	2.33	2.00	4.33	4.67	1.00	1.44	41	1
Romania	88	1.67	2.00	4.00	4.33	1.00	1.59	7	1
Russian Federation	55	5.17	5.83	8.40	9.00	2.57	4.62	44	10
Saudi Arabia	87	3.00	3.50	5.50	4.00	3.98	7.61	66	3

	Question 27: % of shipments meeting quality criteria	Question 28: Number of agencies		Question 29: Number of documents		Question 30: Clearance time (days)[f]		Question 31: Physical inspection	Question 32: Multiple inspection
	% of shipments	Imports	Exports	Imports	Exports	Without physical inspection	With physical inspection	% of import shipments	% of shipments physically inspected
Senegal	59	4.00	2.50	3.00	3.00	1.73	3.16	18	1
Serbia	93	2.50	1.00	3.00	2.00	1.00	1.41	15	1
Sierra Leone	88	6.00	6.00	4.00	4.00	2.00	3.00	75	1
Singapore	82	2.57	2.43	2.29	1.86	0.50	1.22	2	1
Slovak Republic	97	1.00	1.00	3.00	3.00	0.25	0.50	3	1
Slovenia	83	2.00	1.00	2.00	2.00	0.50	0.50	6	1
South Africa	90	3.08	3.20	3.18	3.70	0.50	2.67	5	2
Spain	90	3.00	3.00	2.67	2.33	0.50	2.83	4	1
Sri Lanka	51	3.00	3.33	4.33	4.00	0.79	1.59	16	1
Sudan	93	11.00	11.00	9.00	5.00	1.00	3.00	3	3
Sweden	—	—	—	—	—	—	—	—	—
Switzerland	92	1.00	1.00	2.00	2.00	0.31	0.40	2	1
Syrian Arab Republic	97	3.00	2.50	5.50	4.00	1.73	2.45	51	3
Taiwan, China	91	1.40	1.20	3.20	2.40	0.57	1.25	5	1
Tajikistan	73	4.48	4.64	5.14	5.60	3.55	0.85	11	11
Tanzania	68	4.00	4.00	4.67	3.67	3.27	3.11	7	1
Thailand	91	2.25	1.75	3.33	2.67	0.71	1.41	9	1
Togo	100	4.50	4.00	3.00	2.50	0.71	2.45	9	18
Tunisia	57	5.50	2.50	5.50	3.00	2.00	4.47	50	3
Turkey	83	3.44	3.11	5.67	6.22	1.36	3.06	16	6
Turkmenistan		4.00	5.00	7.00	8.00	2.00	3.00	6	3
Uganda	59	6.00	3.50	5.00	3.00	3.87	7.48	75	11
Ukraine	89	6.33	5.00	7.33	6.00	1.26	2.52	51	8
United Arab Emirates	81	2.43	2.86	4.43	4.43	0.74	1.37	4	1
United Kingdom	90	2.20	2.40	4.80	3.80	0.87	2.05	2	2
United States	81	2.75	2.20	3.53	2.81	0.69	2.15	3	2
Uruguay	93	2.00	3.00	3.00	4.00	1.00	2.00	18	1
Uzbekistan	77	4.14	4.12	4.56	4.47	2.87	1.50	49	4
Venezuela, RB	61	4.00	4.67	6.00	5.00	6.30	12.81	39	2
Vietnam	89	5.50	3.00	6.50	5.50	1.41	3.46	42	4
Yemen, Rep.	87	3.33	3.67	5.00	3.33	1.71	2.41	66	4
Zambia	40	2.00	2.00	4.00	4.00	1.00	3.00	3	1

— is not available.
f. Time taken between the submission of an accepted customs declaration and notification of clearance.
Source: Logistics performance survey data, 2009.

APPENDIX 4

The LPI methodology

The multidimensional nature of logistics makes measuring and summarizing performance across countries a challenge. Information on time and costs associated with some important logistics processes—such as port processing time, time to clear customs, and transport—provides a good starting point, and in many cases is readily available. But this information, even when complete, cannot be easily aggregated into a single, consistent, cross-country dataset because of essential differences in the supply chain structure among countries. Even more important, many critical elements of good logistics performance—such as the transparency of processes and the quality, predictability, and reliability of services—cannot be assessed using information on time and cost only.

Respondent demographics

Because these vital aspects of logistics performance can best be assessed by operators on the ground, the Logistics Performance Index (LPI) relies on a structured online survey of logistics professionals from the companies responsible for moving goods around the world: multinational freight forwarders and the main express carriers. Nearly 1,000 logistics professionals from international logistics companies in 130 countries participated in the 2009 LPI survey, a 25 percent increase from 2007—and a testament to the interest the LPI has generated in the private sector.

In this context, the location of private operators assessing the performance of logistics also reflects the growing importance of trade facilitation issues in the developing world: 55 percent of the respondents are located in middle-income (45 percent) and low-income (10 percent) countries, the rest in high-income economies.

The LPI also includes the assessment of large companies and small and medium-size enterprises from the logistics sector. Large corporations account for roughly 45 percent of the responses, including multinational freight forwarders (34 percent) and global express carriers (11 percent). The remaining 55 percent of the responses in this sample are from small and medium-size freight forwarders.

It is also important to stress the participation of knowledgeable senior members of these companies in assessing the logistics environment in different countries. Survey responses come from senior executives (35 percent), area or country managers (25 percent), and department managers (24 percent). Moreover, this group of professionals is directly involved with day-to-day operations, not only from company headquarters but also from country offices. Almost 75 percent of respondents are in the country branch offices (39 percent) or corporate or regional headquarters (36 percent). Only 25 percent of the answers are from personnel from local branch offices (11 percent) or independent firms (14 percent).

The majority of respondents (54 percent) are involved in the provision of all or most logistics services in their main line of work. These may include warehousing and distribution, customer-tailored logistics solutions, courier services, bulk or break-bulk cargo transport, and less-than-full or full containers or trailer load shipping. In contrast, 27 percent of responses come from companies that base their business model on full-container or full-trailer load transport (15 percent) or the provision of customer-tailored logistics solutions (12 percent).

By freight mode, almost 50 percent of the logistics professionals typically deal with multimodal transport operations. However, other

modes of transport are also well represented, such as the maritime (19 percent) and air transportation (17 percent) services. Approximately half of respondents usually oversee both domestic and international operations; another 30 percent deal exclusively with international shipping (both exports and imports). Almost 4 of 10 respondents work in most of the regions in the world, while the rest concentrate on Europe (21 percent), Asia (19 percent), and the Americas (13 percent).

Constructing the international LPI

The first part of the LPI survey (questions 9–15) provides the information used to construct the international LPI. Each survey respondent is asked to rate eight overseas markets on six core dimensions of logistics performance. The eight markets are chosen based on the most important export and import markets of the country in which the respondent is located, random selection, and, in the case of landlocked countries, neighboring countries that form part of the land bridge connecting them with international markets. The method used to select the group of countries rated by each respondent varies according to the characteristics of the country in which the respondent is located (table A4.1).

The international LPI is a summary indicator of logistics sector performance, in the sense that it combines data on six core dimensions of performance into a single, aggregate measure. Since some respondents provide information on some dimensions but not others, interpolation is used to fill in missing values. They are replaced with the country mean response for each question, adjusted by the respondent's average deviation from the country mean in the questions that have been answered.

The six core dimensions captured in the LPI survey are:

- *Efficiency of the clearance process*, rated from "very low" (1) to "very high" (5) in survey question 9.
- *Quality of trade and transport related infrastructure*, rated from "very low" (1) to "very high" (5) in survey question 10.
- *Ease of arranging competitively priced shipments*, rated from "very difficult" (1) to "very easy" (5) in survey question 11.

Table **A4.1** **Methodology for selecting country groups for survey respondents**

	Respondents from low-income countries	Respondents from middle-income countries	Respondents from high-income countries
Respondents from coastal countries	Five most important export partner countries + Three most important partner countries	Three most important export partner countries + The most important import partner country + Four countries randomly, one from each country group: Africa East Asia and Central Asia Latin America OECD and Europe less Central Asia	Two countries randomly out of one list of five most important export partner countries and five most important import partner countries + Six countries randomly, one from each country group: a. Africa b. East Asia and Central Asia c. Latin America d. OECD and Europe less Central Asia
Respondents from landlocked countries	Four most important export partner countries + Two most important import partner countries + Two land bridge countries	Three most important export partner countries + One most important import partner country + Two land bridge countries + Two countries randomly, one from each country group: a. Africa and East Asia and Central Asia and Latin America b. OECD and Europe less Central Asia	

Source: Logistics performance survey data, 2009.

- *Competence and quality of logistics services*, rated from "very low" (1) to "very high" (5) in survey question 12.
- *Ability to track and trace consignments*, rated from "very low" (1) to "very high" (5) in survey question 13.
- *Frequency with which shipments reach the consignee within the scheduled or expected delivery time*, rated from "hardly ever" (1) to "nearly always" (5) in survey question 15.

The LPI is constructed from these six indicators using principal component analysis (PCA). PCA is a standard statistical technique used to reduce the dimensionality of a dataset. In the LPI, the inputs for PCA are country scores on the six questions above, averaged across all respondents providing data on a given overseas market. Scores are normalized by subtracting the sample mean and dividing by the standard deviation prior to conducting the PCA. The output from the analysis is a single indicator—the LPI—that is a weighted average of those scores. The weights are chosen to maximize the percentage of variation in the original six indicators accounted for by the LPI.

Full details of the PCA procedure are provided in tables A4.2 and A4.3. The first line of table A4.2 shows that the first (principal) eigenvalue of the correlation matrix of the six core indicators is greater than one and much larger than any other eigenvalue. Standard statistical tests such as the Kaiser Criterion and the eigenvalue scree plot suggest that it is appropriate to retain a single principal component to summarize the underlying data. This principal component is the international LPI. Table A4.2 shows that the international LPI accounts for 88 percent of the variation in the six original data series.

To construct the international LPI, normalized scores for each of the six component indicators are multiplied by their component loadings in table A4.3 and then summed. The component loadings represent the weight accorded to each of the component indicators in constructing the international LPI. Since the loadings are similar for all six indicators, the international LPI is relatively close to a simple average of the six component indicators.

Table A4.2 Results of principal component analysis for the international LPI

			Variance proportion	
Component	Eigenvalue	Difference	Individual	Cumulative
1	5.27	4.96	0.88	0.88
2	0.31	0.11	0.05	0.93
3	0.20	0.08	0.03	0.96
4	0.12	0.06	0.02	0.98
5	0.06	0.02	0.01	0.99
6	0.04		0.01	1.00

Source: Authors' analysis.

Table A4.3 Component loadings for the international LPI

Dimension	Weight
Customs	0.42
Infrastructure	0.42
International shipments	0.37
Logistics quality and competence	0.42
Tracking and tracing	0.41
Timeliness	0.40

Source: Authors' analysis.

Confidence intervals

The LPI is a robust combination of the various dimensions from the international assessments, built by standard econometric techniques. A vital part of the LPI dataset is the estimated 80 percent confidence interval calculated for each country's score. The confidence interval is used to construct upper and lower bounds for a country's LPI score. These bounds are then used to calculate lower and upper bounds on country rankings. Together, these ranges are designed to take account of the fact that the LPI is based on a survey and is therefore subject to sampling error.[48] Confidence intervals and low-high ranges for scores and ranks are larger for small markets that have few respondents, which reflects the greater uncertainty to which these estimates are subject.

To calculate the confidence interval, the standard error of LPI scores is estimated across all respondents for a particular country. The upper and lower bounds of the confidence interval are then

$$LPI \pm \frac{t_{(0.1,N-1)}S}{\sqrt{N}},$$

where *LPI* is a country's LPI score, *N* is the number of survey respondents for that country, *s* is the estimated standard error of each country's LPI score, and *t* is Student's t-distribution.

The high and low scores are also used to calculate upper and lower bounds on country rankings. The upper bound is the LPI rank a country would receive if its LPI score were at the upper bound of the confidence interval rather than the center. The lower bound is the LPI rank a country would receive if its LPI score were at the lower bound of the confidence interval rather than the center. In both cases, the scores of all other countries are kept constant.

The average confidence interval on the 1–5 scale is 0.22, or about 7.5 percent of the average country's LPI score. On average, this is equivalent to 10 places in the LPI ranking. It is therefore necessary to be cautious in interpreting small differences in LPI scores and rankings. Jordan, for example, has a relatively low LPI ranking (81) but a wide confidence interval due to a small number of respondents. At the high point of its confidence interval, Jordan would have an LPI rank of 56.

When comparing LPI results for 2010 and 2007, it is important to pay attention to the confidence intervals. The focus should be on statistically significant changes as indicated by nonoverlapping low-high ranges, rather than on simple comparisons of individual scores. Only when, for example, the lower bound of a country's 2010 LPI score is higher than its 2007 upper bound can it be concluded that there has been a statistically significant improvement in performance. This approach takes account of the influence of sampling error in both surveys.

Although representing the most comprehensive data source currently available on country logistics and trade facilitation environments, the LPI is also subject to important limitations. First, the experience of international freight forwarders may not represent the broader logistics environment in poor countries, where they tend to coexist with more traditional operators. The two groups' interactions with government agencies, as well as service levels, might differ. Second, for landlocked or island countries, the LPI may capture access problems outside the country being assessed—for example, transit difficulties. The low rating of a landlocked country such as Rwanda might not give full justice to its trade facilitation efforts because they are dependent on complex international transit systems. And landlocked countries cannot address transit inefficiencies through domestic reforms.

Constructing the domestic LPI

The second part of the LPI survey instrument is the domestic LPI, in which respondents provide detailed qualitative information on the logistics environment in the country where they work.

For questions 16–21 of the LPI survey, respondents choose one of five categories, in increasing order of performance. In question 16, for example, they can describe port charges in their country as "very high," "high," "average," "low," or "very low." As in the international LPI, these options are coded from 1 through 5. Appendix 2 displays country averages of the percentage of respondents rating each aspect of the logistics environment as 1/2 or 4/5.

With a few exceptions, questions 22–35 ask respondents to provide quantitative information on particular aspects of international supply chains in their countries, choosing from a set of responses in a dropdown menu in each case. When the response indicates a single value, the answer is coded as the logarithm of that value. When the response indicates a range, the answer is coded as the logarithm of the midpoint of that range. For example, export distance can be indicated as fewer than 50 kilometers (km), 50–100 km, 100–500 km, and so forth, so a response of 50–100 km is coded as log(75). Full details of the coding matrix are available on request.

To produce country scores, responses in logarithms are averaged across all respondents for a given country and the result is exponentiated. This method is equivalent to taking a geometric average in levels. Scores for regions, income groups, and LPI quintiles are simple averages of the corresponding country scores.

APPENDIX 5

Comparing the international LPI with other indicators

A number of other indicators on trade facilitation and logistics are now available. It is useful to highlight the similarities and differences between the Logistics Performance Index (LPI) and these indicators. While designed for different purposes and measuring different dimensions of performance, these indexes broadly correlate in their relative rankings of countries.

Why logistics performance matters

Extensive empirical evidence links logistics performance, as measured by the World Bank's LPI, with important economic outcomes, such as the level of trade integration.

For example, Hoekman and Nicita use a standard gravity model of international trade to show that a higher LPI score is strongly associated with increased bilateral trade.[49] Both the LPI and the World Bank's Doing Business trade cost data are important determinants of international trade flows because they capture different aspects of the international supply chain. Based on a counterfactual experiment, Hoekman and Nicita conclude that increasing logistics performance, as measured by the LPI, in low-income countries to the middle-income average would boost trade by about 15 percent. Reducing the trade costs measured by Doing Business in the same way would boost exports by about half as much (7 percent). Both effects are much greater than those from liberalizing traditional trade barriers, however. Reducing tariffs to 5 percent would increase trade by only 6 percent, and reducing the tariff equivalent of nontariff measures to 10 percent would result in an 8 percent trade gain.

Mirza uses econometric methods to obtain an estimate of the sensitivity of bilateral trade to the LPI and then conducts simulations using the Global Trade Analysis Project model of the world economy.[50] The model shows that reducing the gap between the logistics scores of countries in Sub-Saharan Africa and those of countries in South Asia and Latin America would require a very large increase in border-related capital investments (400 percent). But the economic benefits far outweigh these costs, with Sub-Saharan African countries likely to enjoy substantial increases in economic welfare from this kind of investment program. Moreover, the nondiscriminatory nature of logistics sector reforms means that they result in significant trade creation and very little trade diversion.

One area that can be explored further is the potential for logistics upgrading to affect different economic sectors in different ways. One sector that might be particularly sensitive to the quality of logistics is trade in parts and components. These products are traded within international production networks in which speed and reliability of delivery are vital. Networked production relies heavily on efficient and cost-effective logistics services to spread production across multiple countries and reduce inventory carrying costs to a minimum.

Figure A5.1 shows a strong, positive association between logistics performance and the share of parts and components in total exports. A higher trade share in parts and components indicates stronger involvement in international production networks, as well as a higher degree of specialization in that sector. Should more detailed research confirm these associations, that would provide another strong reason for countries to upgrade logistics performance: the widespread desire for further and deeper integration in internationalized production.

Figure A5.1 **Relation of the share of parts and components in total exports and the LPI score**

Note: Export shares are constructed as the value of parts and components exports divided by the value of total exports. Data are for 2008, sourced from Comtrade via WITS. The parts and components sector is defined using the classification in appendix 1 of Kimura, Takahashi, and Hayakawa (2007).
Source: Logistics performance survey data, 2009, and United Nations Commodity Trade Statistics Database (Comtrade), http://comtrade.un.org/db.

The LPI and other international indicators

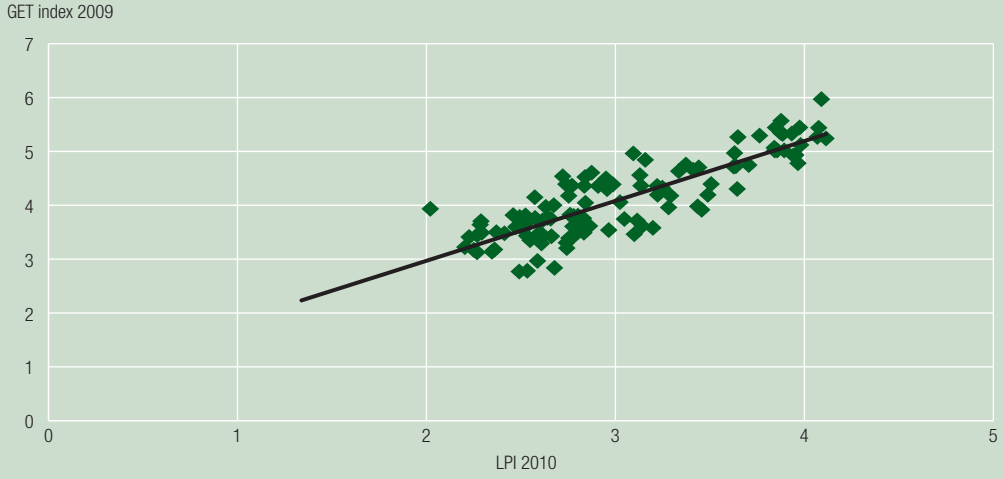
The LPI is the first international benchmarking tool focused specifically on measuring the trade and transport facilitation friendliness of countries. It complements other international data collection efforts and trade facilitation benchmarking exercises by focusing exclusively on logistics and assessing performance using a holistic approach grounded in global supply chain analysis. It measures some of the critical factors of trade logistics performance, including the quality of infrastructure and logistics services, the security of property from theft and looting, the transparency of government procedures, macroeconomic conditions, and the underlying strength of institutions.

The World Economic Forum's *Global Competitiveness Report* features the Global Competitiveness Index (GCI), a composite index based on macro and micro data as well as interviews with key business and societal stakeholders featuring the 12 pillars of competitiveness.[51] It contains detailed profiles of 125 economies and data tables with global rankings covering more than 100 indicators in nine areas: institutions, infrastructure, macroeconomy, health and primary education, higher education and training, market efficiency, technological readiness, business sophistication, and innovation. Several indicators are directly relevant to trade facilitation and logistics.

The World Economic Forum's Global Enabling Trade (GET) Index, like the LPI, is an aggregate indicator constructed from a range of original data but focuses not on logistics but on the broader trading environment in a country.[52] Nonetheless, the association between the LPI and GET Index is very strong (correlation coefficient = 0.85; figure A5.2). The GET Index is based on more than 50 individual data series—the five drawn from the 2007 LPI introduce some degree of correlation by construction. But LPI data play a smaller role than other sources used to construct the GET Index. The strong correlation between the two cannot be explained solely by construction but instead suggests that logistics are vital to facilitating trade.

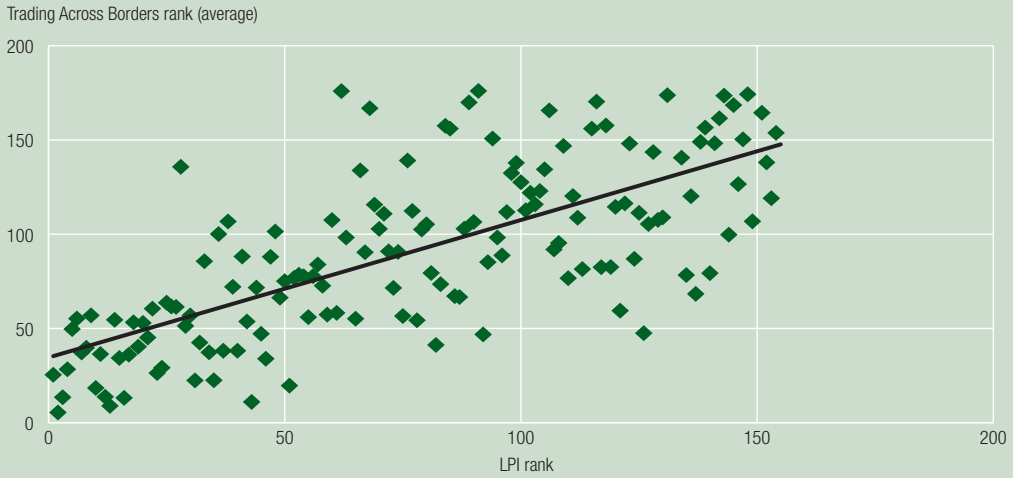
The World Bank and International Finance Corporation's Doing Business project also collects extensive data on trade facilitation to provide objective measures of business regulations and enforcement. *Doing Business 2009* presents quantitative indicators on business regulations and the protection of property rights that can be compared across 175 economies and over time.[53] For example, the Doing Business Trading across Borders topic focuses on red-tape

Figure **A5.2** **Relationship of Global Enabling Trade Index 2009 and 2010 LPI**



Source: Logistics Performance Index, 2010, and World Economic Forum 2009b.

Figure **A5.3** **Doing Business trade facilitation data and LPI 2010**



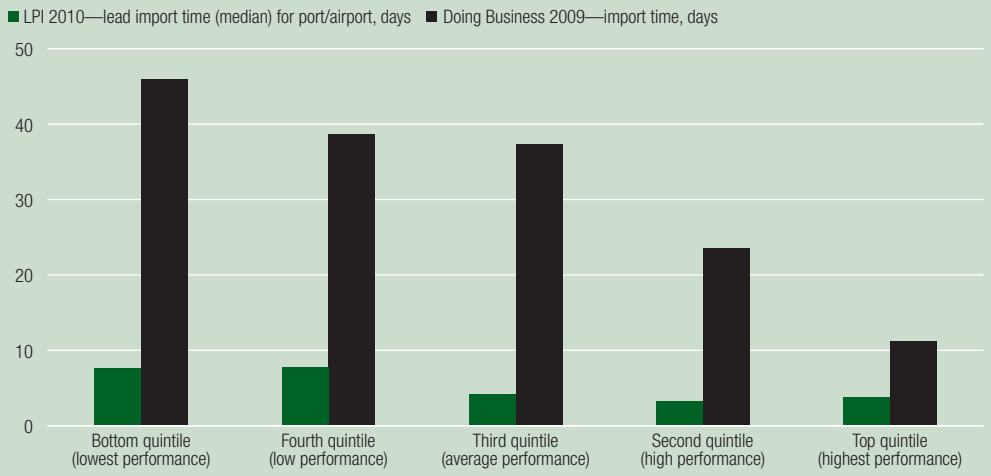
Note: Trading Across Borders rank is calculated as the average rank across the six indicators: number of documents (export and import), time (export and import), and cost (export and import).
Source: Logistics Performance Index, 2010, and World Bank and International Finance Corporation 2010.

obstacles to the movement of goods across borders and the ease of export and import for small and medium-size enterprises by looking at such things as the number of documents and signatures for imports and exports. Unlike the LPI, Doing Business collects only objective measures of the trade facilitation environment, such as the number of documents and days required for export and import transactions and the cost of each transaction.

Even though the data collection approaches are very different, the two datasets have a significant overall association, as shown by a plot of 2010 LPI ranks against average country rankings across the six Doing Business trade facilitation indicators (figure A5.3).

Another important difference between the two datasets is how they define time to import or export, resulting in values differing by almost an order of magnitude (figure A5.4). The LPI concept of time is that of the lead time between two events in the supply chain (for example, from factory to free carrier at port of loading). Doing Business aggregates the time spent on

Figure **A5.4** **Doing Business import time versus LPI lead import time (median) for port/airport**



Source: Logistics performance survey data, 2009, and World Bank and International Finance Corporation 2010.

Table **A5.4** **Correlation matrix of Doing Business and LPI time data**

	LPI score	LPI export time (port)	LPI export time (land)	LPI import time (port)	LPI import time (land)	Doing Business export time	Doing Business import time
LPI score	1						
LPI export time (port)	–0.22	1					
LPI export time (land)	–0.39	0.30	1				
LPI import time (port)	–0.09	0.20	0.26	1			
LPI import time (land)	–0.48	0.50	0.79	0.32	1		
Doing Business export time	–0.66	0.16	0.48	0.05	0.48	1	
Doing Business import time	–0.62	0.22	0.48	0.08	0.48	0.96	1

Source: Logistics performance survey data, 2009, and World Bank and International Finance Corporation 2010.

red tape and other procedures, including before or after the actual movement of goods captured in lead time.

A more detailed comparison of the two datasets discloses significant associations between them in some important areas of trade facilitation. For instance, their respective measures of import and export documents have a correlation coefficient of around 0.50. But the transactional concepts underlying the two datasets are very different, meaning that individual data points can vary considerably from one to the other. For example, table A5.4 shows a much stronger association between Doing Business time data and the corresponding figures from the port/airport supply chain portion of the LPI data. The same is true for export and import cost data, with very similar coefficients of correlation.

Notes

1. Authors can be reached by email: Arvis, Jarvis1@worldbank.org; Mustra, Mmustra@worldbank.org; Ojala, Lauri.ojala@tse.fi; Shepherd, ben@developing-trade.com; and Saslavsky, dsaslavski@worldbank.org.
2. The web-based survey questionnaire was offered in five languages—English, French, Spanish, Chinese, and Russian—enabling respondents to provide their assessment in their most familiar language.
3. For example, air freight, container shipping, and contract logistics or so-called third/fourth party logistics providers.
4. Ojala 2009.
5. Paul Makillie characterizes this network as "the physical internet" (*The Economist,* June 15).
6. World Bank 2009c.
7. These new concerns are particularly important in a world of low inventories, just-in-time management, and global value chains (see Memedovic and others 2008).
8. The methodology developed by Murphy, Daley, and Dalenberg (1993)—using a survey format, a 2-point scale, and open-ended questions—measured the perceived importance and influence of different component attributes affecting the logistical friendliness of countries. In a follow-up study by Ojala and Queiroz (2001 and 2004), only those characteristics identified as best encapsulating logistics performance were included for evaluation.
9. These interviews were conducted in the context of the Trade and Transport Facilitation Audits performed by the World Bank and others (Raven 2001) and contributed substantially to refining the methodology.
10. In both the 2007 and 2010 versions of the LPI, statistical aggregation has produced an overall index that is very close to the simple average of country scores across the six dimensions of logistics performance.
11. This was made possible by expanding the country selection matrix to include new countries, such as the Bahamas, Botswana, Central African Republic, Congo Democratic Republic, Congo Republic, Cuba, Equatorial Guinea, Fiji, Georgia, Iceland, Iraq, Libya, Maldives, Malta, and Turkmenistan. But ten countries later had to be excluded from the international LPI sample due to insufficient number of responses or other data reliability concerns: Belarus, Burundi, Central African Republic, Equatorial Guinea, Lesotho, Malawi, Mauritania, Morocco, São Tomé and Principe, and Zimbabwe. Serbia and Montenegro, treated as one country in the 2007 edition, were evaluated as separate countries in 2010. And one country covered in the 2007 edition, Timor-Leste, could not be assessed in this edition because of the absence of survey data.
12. For the questions on lead time to export (Q22) and lead time to import (Q25), the respondents also provided the typical distance (in km) for each leg of the supply chain they identified as best describing their work (port, airport, or land). For exports, this distance is meant to capture *the typical distance from the point of origin* (the seller's factory, typically located either in the capital city or in the largest commercial center) *to the port of loading or equivalent (*for port/airport), and excluding international shipping, or *to the buyer's warehouse* (for land). For imports, this distance is meant to capture the typical distance from *the port of discharge or equivalent to the buyer's warehouse* (for port/airport) or *from the point of origin* (the seller's factory, typically located either in the capital city or in the largest commercial center) *to the buyer's warehouse* (for land).
13. Hallward-Driemeier and Aterido 2009.
14. Only Belgium, Norway, and Luxembourg were outside the top ten in 2007, but the first two were in the top 20 in 2007 and Luxembourg in the top 25.
15. These counterfactuals are based on an OLS regression with import lead time, export lead time, and percentage of shipments that are physically inspected as the dependent variables and the LPI score as the independent variable.
16. The best performing landlocked country (countries marked with a ** are also least developed countries) is Kazakhstan (second quintile), followed by Uganda**, Uzbekistan, Macedonia, Paraguay, Serbia, Azerbaijan and Kyrgyz Republic (all belonging to the third quintile). The rest of the landlocked countries are located in the two lowest quintiles: Moldova, Niger**, Armenia, Bolivia, Turkmenistan, Chad**, Lao PDR, and Ethiopia** (fourth quintile); and Bhutan**, Tajikistan, Botswana, Zambia**, Mali**, Mongolia, Afghanistan**, Burkina Faso**, Nepal** and Rwanda** (fifth quintile).
17. World Bank 2009a.
18. For the Democratic Republic of Congo, the finding represents income and not logistics performance because the country has the lowest gross national income per capita in the sample.
19. The different size of the two samples—150 countries in 2007 and 155 in 2009—can have a modest influence on changes in country rankings. But it does not change any conclusions related to the statistical significance of changes in LPI scores from one year to the other.
20. The only backslider is Somalia.
21. The improvers in the lower middle-income group are China, Djibouti, Honduras, Philippines, and Syria.
22. The improvers in the upper middle-income group are Brazil, Colombia, Costa Rica, Dominican Republic, Kazakhstan, Lebanon, Mexico, Poland, Russian Federation, and Uruguay.
23. The improvers in the low-income group are Afghanistan, Chad, Haiti, Myanmar, Niger, Tajikistan, Tanzania, and Uzbekistan.
24. The improvers in the higher income group (OECD and non-OECD) are Saudi Arabia and the Czech Republic.
25. Upper bounds for LPI ranks are calculated by increasing a country's LPI score to its upper bound while maintaining all other

country scores constant and then recalculating LPI ranks. An analogous procedure is adopted for the lower bounds.

26. Sarley, Allain, and Akkihal 2009.
27. EWEC 2009.
28. ECLAC 2008.
29. APEC Secretariat 2009.
30. Helble, Shepherd, and Wilson 2009.
31. World Economic Forum 2009a.
32. Raballand and Macchi 2008.
33. Ikenson 2008, p. 20.
34. The relative LPI is obtained by normalizing the LPI score, so that the Relative LPI=100 x [LPI – 1]/[LPI highest –1]. In this way, the best performer (Germany) reaches the maximum score of 100% (Germany), and the worst performer reaches the minimum with 11% (Somalia) for the 2010 version.
35. It is important to note that although the respondents in the LPI survey are freight forwarders and express carriers, the quality and competence of service providers is assessed by their competitors.
36. The most visible initiatives in this area include compulsory regulatory requirements such as the implementation in 2003 of the "24h advance manifest rule" and similar Advance (electronic) Cargo Information requirements for shipments to US ports; the "100% scanning" program, mandating overseas radiation scanning and non-intrusive inspection of 100% of all cargo containers destined for the U.S. by 2012 (these requirements became U.S. law in 2007).
37. Donner and Kruk 2009.
38. All figures are obtained by first calculating responses at the country level and then averaging the results by quintiles.
39. LSCI data cover only container shipping. This means that countries such as Albania, Finland, Ireland, and Norway, which depend on roll-on/roll-off shipping, score low in LSCI. The LPI transshipment question, however, includes transshipment by all types of liner shipping as well as by road and rail. In container shipping connections covered by LSCI, only 17.2 percent of pairs of countries are serviced by direct liner shipping services. For 62 percent of pairs of countries, shippers can find container shipping connections that require only one transshipment, and for 20.8 percent of routes two or more container shipping transshipments would be necessary (UNCTAD 2009). Containers can also be transshipped by road, rail, or roll-on/roll-off shipping, which may reduce the actual number of interchanges.
40. World Bank 2008a.
41. For more information on the Malaba project, see the World Bank East Africa Trade and Transport Facilitation Project, which aims to interconnect revenue authorities' information systems along the northern corridor (www.worldbank.org/projects).
42. Arvis, Raballand, and Marteau 2007.
43. World Bank 2009b.
44. World Bank 2006.
45. Raballand and Teravaninthorn 2008.
46. Arvis, Raballand, and Marteau 2007; World Bank 2008a.
47. Solakivi and others 2009.
48. Kaufmann, Kraay, and Mastruzzi (2009) apply an analogous approach to the analysis of governance indicators and are similarly cautious in their interpretation of differences across countries and through time.
49. Hoekman and Nicita 2008.
50. Mirza 2008, 2009.
51. World Economic Forum 2009b.
52. World Economic Forum 2009c.
53. World Bank and International Finance Corporation 2009.

What is the Logistics Performance Index?

Based on a worldwide survey of global freight forwarders and express carriers, the Logistics Performance Index is a benchmarking tool developed by the World Bank that measures performance along the logistics supply chain within a country. Allowing for comparisons across 155 countries, the index can help countries identify challenges and opportunities and improve their logistics performance. The World Bank conducts the survey every two years.

Technological progress and worldwide trade and investment liberalization are presenting new opportunities for countries to harness global markets for growth and poverty reduction. But with the advent of global supply chains, a new premium is being placed on being able to move goods rapidly, reliably, and cheaply. The ability to connect to the global logistics web depends on a country's infrastructure, service markets, and trade processes. Government and the private sector in many developing countries should improve these areas—or face the large and growing costs of exclusion.

Logistics Performance Index

International Federation for Freight Forwarders Associations

GFP

Global Facilitation Partnership for Transportation and Trade

GEA Global Express Association

TURKU SCHOOL OF ECONOMICS

THE WORLD BANK

This report presents the findings of the second edition of *Connecting to Compete,* a report on the new dataset for the 2010 Logistics Performance Index (LPI) and its component indicators. The 2010 LPI also provides a snapshot of selected performance indicators in nearly 130 countries, including expanded information on the time, cost, and reliability of import and export supply chains, infrastructure quality, performance of core services, and the friendliness of trade clearance procedures. The 2010 LPI and its indicators encapsulate the firsthand knowledge of movers of international trade, collected amid the economic turmoil of 2009. This information is relevant for policymakers and the private sector seeking to identify priorities for reform agendas. Findings include:

- Except in high-income countries, the availability and quality of trade-related infrastructure is a major constraint to performance—but the specific priorities tend to vary across countries.
- Efficient border management and coordination of the various agencies involved in border clearance is increasingly important.
- A major challenge for the international community is how to help the lowest performing countries benefit from an increasingly open global trading system.