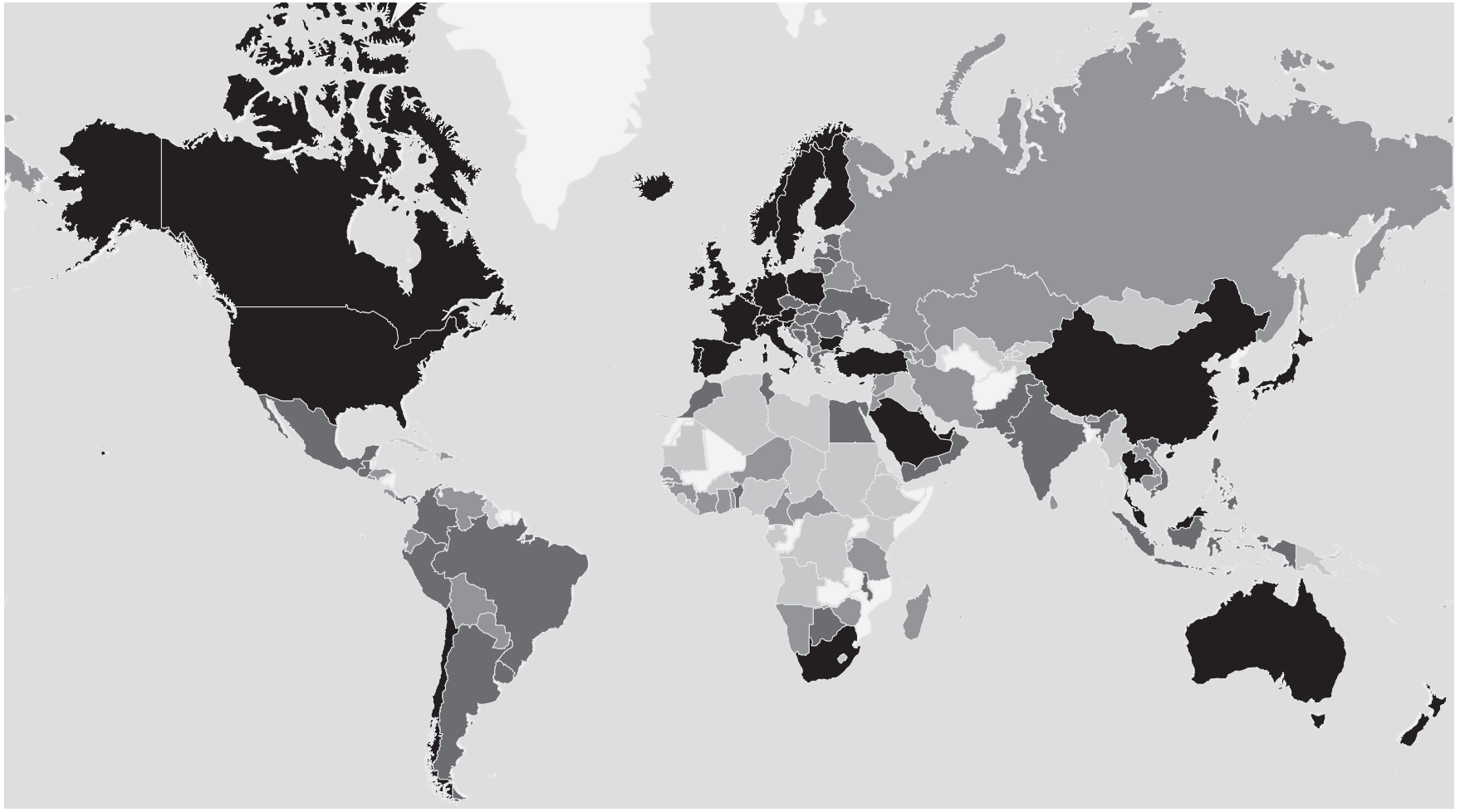
Connecting to Compete

2012

Trade Logistics in the Global Economy

The Logistics Performance Index and Its Indicators


LPI score
1.00–2.41
2.42–2.89
2.89–3.39
3.42–5.00
No data
1 is the lowest score; 5 is the highest score.

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Foreword

This is the third edition of *Connecting to Compete: Trade Logistics in the Global Economy*. At its heart is the Logistics Performance Index (LPI), which the World Bank has produced every two years since 2007. The LPI measures on-the-ground trade logistics performance—this year, in 155 countries—helping national leaders, key policymakers, and private sector traders understand the challenges they and their trading partners face in reducing logistical barriers to international commerce.

Logistics, organizing the movement of goods over time and space, has evolved from its 19th century military roots to today's international supply chains. As the backbone of international trade, logistics encompasses freight transportation, warehousing, border clearance, payment systems, and many other functions. These functions are performed mostly by private service providers for private traders and owners of goods, but logistics is also important for the public policies of national governments and regional and international organizations.

Because global supply chains are so varied and complex, the efficiency of logistics depends on government services, investments, and policies. Building infrastructure, developing a regulatory regime for transport services, and designing and implementing efficient customs clearance procedures are all areas where governments play an important role. The improvements in global logistics over the past two decades have been driven by innovation and a great increase in global trade. While policies and investments that enable good logistics practices help modernize the best-performing countries, logistics still lags in many developing countries. Indeed, the "logistics gap" evident in the first two editions of this report remains.

The tremendous importance of logistics performance for economic growth, diversification, and poverty reduction has long been widely recognized. Policies matter: national governments can facilitate trade through investments in both "hard" and "soft" infrastructure. Countries have improved their logistics performance by implementing strategic and sustained interventions, mobilizing actors across traditional sector silos, and involving the private sector. Logistics is also increasingly important for sustainability. For the first time, the LPI this year includes a focus on the environmental impacts of logistics practices.

The LPI provides a simple, global benchmark to measure logistics performance, filling gaps in datasets by providing systematic, cross-country comparisons. A joint venture of the World Bank, logistics service providers, and academics, the LPI is built around a survey of logistics professionals. By asking freight forwarders to rate countries on key logistics issues—such as customs clearance efficiency, infrastructure quality, and the ability to track cargo—it captures a broad set of elements that affect perceptions of the efficiency of trade logistics in practice. It is a "coarse-grained" indicator that shows where a country stands and that could motivate researchers to take on a deeper, finer, country-specific assessment of the determinants of logistics performance. LPI scores should not be overvalued—a country's LPI score is less relevant than its quintile (whether it is among the best or worst performing countries or is somewhere in the middle). The authors use confidence intervals to examine the sensitivity of each country's LPI score.

The LPI reflects the perspective of the global private sector on how countries are globally connected through their main trade gateways, so it

might not fully capture changes at the country level. The LPI complements, rather than substitutes for, the in-depth country assessments that many countries have undertaken in recent years, many of them with World Bank support.

Trade analysts, policymakers, and practitioners interested in measuring logistics performance all use the LPI. The World Bank and other international organizations are using it more and more in their advisory and implementation activities for trade facilitation in developing countries. The LPI allows leaders in government, business, and civil society to better assess the competitive advantage created by good logistics and to understand the varying importance of different intervention areas. We hope that this third edition of *Connecting to Compete* will continue to help this broad community of policymakers and stakeholders.

Otaviano Canuto
Vice-President and Head of Network
Poverty Reduction and Economic Management

Authors and acknowledgments

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 (Jarvis1@worldbank.org) and Monica Alina Mustra (Mmustra@worldbank.org). Authors included Professor Lauri Ojala (Turku School of Economics, University of Turku; Lauri.ojala@utu.fi), Ben Shepherd (Principal, Developing Trade Consultants; ben@developing-trade.com), and Daniel Saslavsky (dsaslavsky@worldbank.org).

Many colleagues at the World Bank provided major inputs to the survey concept and the review of the results or provided materials, including Robin Carruthers, Natalia Cubillos, Marc Juhel, Charles Kunaka, Somik Lall, Andreas Dietrich Kopp, Gerard McLinden, Julia Burr Oliver, Gaël Raballand, Julian Lampietti, Henry Sandee, Jordan Schwartz, Virginia Tanase, and Jos Verbeek. Selina Elisabeth Jackson, Mombert Hoppe, Jean Noel Guillossou, Ekaterina Vashakmadze, Giovanna Prennushi, Ivan Rossignol, Vijay Srinivas Tata, Saroj Kumar Jha, Yvonne Tsikata, and Ardo Hansson also contributed to the review of the results.

The authors are also grateful to external colleagues for their support and contributions, including Yann Duval (United Nations Economic and Social Commission for Asia and the Pacific), Jari Kauppila (International Transport Forum), and Louis-Paul Tardif (Transport Canada). Daniel Cramer of BlueTundra.com designed, developed, and maintained the LPI survey and results websites (the web-based survey questionnaire was offered in English, French, Spanish, Chinese, and Russian), under the guidance of the core team. Scott Johnson from the World Bank Information Solutions Group helped the team monitor survey responses.

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), 10 international logistics companies, and a large group of small and medium logistics companies worldwide. The survey was designed and implemented with Finland's Turku School of Economics, University of Turku (www.tse.fi/en), which has worked with the World Bank to develop the concept since 2000.

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

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LPI ranking and scores, 2012

Economy	2012 LPI Rank	Score	% of highest performer	Economy	2012 LPI Rank	Score	% of highest performer	Economy	2012 LPI Rank	Score	% of highest performer
Singapore	1	4.13	100.0	Vietnam	53	3.00	64.1	Honduras	105	2.53	49.1
Hong Kong SAR, China	2	4.12	99.9	Romania	54	3.00	63.8	Cameroon	106	2.53	48.9
Finland	3	4.05	97.6	Bosnia and Herzegovina	55	2.99	63.5	Bhutan	107	2.52	48.6
Germany	4	4.03	97.0	Uruguay	56	2.98	63.5	Ghana	108	2.51	48.2
Netherlands	5	4.02	96.7	Egypt, Arab Rep.	57	2.98	63.3	Lao PDR	109	2.50	48.0
Denmark	6	4.02	96.6	Lithuania	58	2.95	62.3	Senegal	110	2.49	47.7
Belgium	7	3.98	95.3	Indonesia	59	2.94	62.2	Venezuela, RB	111	2.49	47.7
Japan	8	3.93	93.8	Peru	60	2.94	61.9	Iran, Islamic Rep.	112	2.49	47.6
United States	9	3.93	93.7	Panama	61	2.93	61.6	Paraguay	113	2.48	47.4
United Kingdom	10	3.90	92.7	Oman	62	2.89	60.4	São Tomé and Príncipe	114	2.48	47.4
Austria	11	3.89	92.5	Yemen, Rep.	63	2.89	60.3	Guinea	115	2.48	47.4
France	12	3.85	91.2	Colombia	64	2.87	59.8	Azerbaijan	116	2.48	47.4
Sweden	13	3.85	91.2	Estonia	65	2.86	59.5	Uzbekistan	117	2.46	46.9
Canada	14	3.85	91.1	Ukraine	66	2.85	59.3	Gambia, The	118	2.46	46.8
Luxembourg	15	3.82	90.3	Benin	67	2.85	59.3	Liberia	119	2.45	46.3
Switzerland	16	3.80	89.7	Botswana	68	2.84	58.9	Montenegro	120	2.45	46.3
United Arab Emirates	17	3.78	88.9	Greece	69	2.83	58.6	Nigeria	121	2.45	46.3
Australia	18	3.73	87.2	Kuwait	70	2.83	58.5	Kenya	122	2.43	45.9
Taiwan, China	19	3.71	86.6	Pakistan	71	2.83	58.4	Fiji	123	2.42	45.4
Spain	20	3.70	86.4	Mauritius	72	2.82	58.2	Jamaica	124	2.42	45.3
Korea, Rep.	21	3.70	86.2	Malawi	73	2.81	57.8	Algeria	125	2.41	45.3
Norway	22	3.68	85.9	Guatemala	74	2.80	57.7	Solomon Islands	126	2.41	45.2
South Africa	23	3.67	85.5	Serbia	75	2.80	57.6	Mauritania	127	2.40	44.7
Italy	24	3.67	85.4	Latvia	76	2.78	56.9	Papua New Guinea	128	2.38	44.0
Ireland	25	3.52	80.6	Georgia	77	2.77	56.8	Myanmar	129	2.37	43.8
China	26	3.52	80.5	Albania	78	2.77	56.7	Kyrgyz Republic	130	2.35	43.3
Turkey	27	3.51	80.3	Ecuador	79	2.76	56.2	Gabon	131	2.34	43.0
Portugal	28	3.50	80.1	Bahamas, The	80	2.75	56.1	Moldova	132	2.33	42.6
Malaysia	29	3.49	79.8	Sri Lanka	81	2.75	56.0	Guyana	133	2.33	42.5
Poland	30	3.43	77.8	Costa Rica	82	2.75	55.9	Burkina Faso	134	2.32	42.3
New Zealand	31	3.42	77.4	Côte d'Ivoire	83	2.73	55.4	Afghanistan	135	2.30	41.5
Iceland	32	3.39	76.6	Madagascar	84	2.72	55.1	Tajikistan	136	2.28	41.1
Qatar	33	3.32	74.3	Dominican Republic	85	2.70	54.4	Libya	137	2.28	41.0
Slovenia	34	3.29	73.1	Kazakhstan	86	2.69	54.2	Angola	138	2.28	40.8
Cyprus	35	3.24	71.8	Niger	87	2.69	54.1	Rwanda	139	2.27	40.5
Bulgaria	36	3.21	70.7	Tanzania	88	2.65	52.9	Mongolia	140	2.25	40.0
Saudi Arabia	37	3.18	69.7	Namibia	89	2.65	52.9	Ethiopia	141	2.24	39.6
Thailand	38	3.18	69.6	Bolivia	90	2.61	51.6	Lesotho	142	2.24	39.5
Chile	39	3.17	69.5	Belarus	91	2.61	51.6	Congo, Dem. Rep.	143	2.21	38.6
Hungary	40	3.17	69.5	Syrian Arab Republic	92	2.60	51.3	Cuba	144	2.20	38.3
Tunisia	41	3.17	69.4	El Salvador	93	2.60	51.2	Iraq	145	2.16	37.1
Croatia	42	3.16	69.2	Guinea-Bissau	94	2.60	51.1	Comoros	146	2.14	36.5
Malta	43	3.16	69.0	Russian Federation	95	2.58	50.7	Eritrea	147	2.11	35.5
Czech Republic	44	3.14	68.5	Lebanon	96	2.58	50.6	Sudan	148	2.10	35.3
Brazil	45	3.13	68.2	Togo	97	2.58	50.5	Congo, Rep.	149	2.08	34.7
India	46	3.08	66.4	Central African Republic	98	2.57	50.3	Sierra Leone	150	2.08	34.5
Mexico	47	3.06	66.0	Macedonia, FYR	99	2.56	50.1	Nepal	151	2.04	33.1
Bahrain	48	3.05	65.7	Armenia	100	2.56	50.0	Chad	152	2.03	32.9
Argentina	49	3.05	65.5	Cambodia	101	2.56	50.0	Haiti	153	2.03	32.8
Morocco	50	3.03	65.0	Jordan	102	2.56	49.8	Djibouti	154	1.80	25.5
Slovak Republic	51	3.03	64.9	Zimbabwe	103	2.55	49.6	Burundi	155	1.61	19.5
Philippines	52	3.02	64.8	Maldives	104	2.55	49.4				

Summary and key findings

This third edition of *Connecting to Compete: Trade Logistics in the Global Economy* reports on the Logistics Performance Index (LPI) and its six component indicators. The LPI measures logistics efficiency, now widely recognized as vital for trade and growth. A country's ability to trade globally depends on its traders' access to global freight and logistics networks. And the efficiency of a country's supply chain (in cost, time, and reliability) depends on specific features of its domestic economy (logistics performance). Better overall logistics performance and trade facilitation are strongly associated with trade expansion, export diversification, attractiveness to foreign direct investment, and economic growth.

A multidimensional assessment of logistics performance, the LPI compares the trade logistics profiles of 155 countries and rates them on a scale of 1 (worst) to 5 (best). The ratings are based on 6,000 individual country assessments by nearly 1,000 international freight forwarders, who rated the eight foreign countries their company serves most frequently. The LPI's six components include:[1]

- The efficiency of the clearance process (speed, simplicity, and predictability of formalities) by border control agencies, including customs.
- The quality of trade- and transport-related infrastructure (ports, railroads, roads, information technology).
- The ease of arranging competitively priced shipments.
- The competence and quality of logistics services (transport operators, customs brokers).
- The ability to track and trace consignments.
- The frequency with which shipments reach the consignee within the scheduled or expected delivery time.

Connecting to Compete 2012 also includes a set of domestic performance indicators for 143 countries. For these data, survey respondents assess the logistics environments in the countries where they work, providing information on the quality of infrastructure, the performance of core services, the friendliness of trade clearance procedures, and the time, cost, and reliability of import and export supply chains. These domestic indicators help define logistics constraints within countries, not just at the gateways, such as ports or borders. They analyze the major determinants of overall logistics performance, focusing on country performance in four major determinants of overall logistics performance: infrastructure, services, border procedures and time, and supply chain reliability.

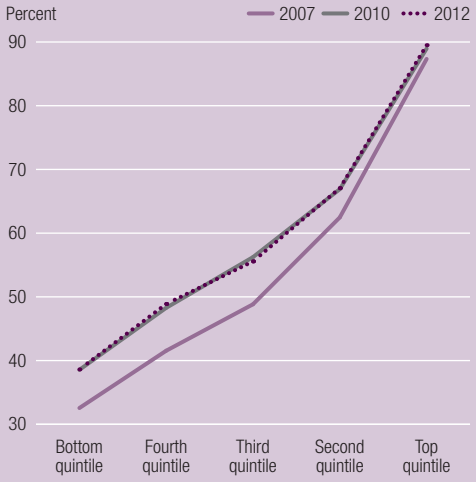
The gap between the highest and lowest scores in the 2012 LPI, and the score distribution across countries, are about the same as in 2010 (figure 1). Singapore ranked highest at 4.13, Burundi the lowest at 1.61 (19 percent of Singapore's top score).

The 2012 LPI does not suggest that the converging trend from the 2007 LPI to the 2010 LPI is continuing. From 2007 to 2010, lower performing countries improved their overall LPI scores more than did higher performing countries. But from 2010 to 2012, they were not able to further narrow the gap.

This stalled improvement likely reflects conditions that shifted governments' priorities away from logistics reform—such as the global recession and the European sovereign-debt crisis. In some regions, declining trade further disrupted supply chains. In the context of the recession, a slowing progression in

Infrastructure stands out as the chief driver of LPI progress, with the modest convergence since 2007 explained by a perceived improvement in the infrastructure of low- and middle-income countries

Figure 1 **LPI score as percentage of highest LPI score by LPI quintile, 2007, 2010, and 2012**



Source: Logistics Performance Index 2007, 2010, and 2012.

customs indicators could reflect an unusual focus on revenue collection at the expense of trade facilitation.

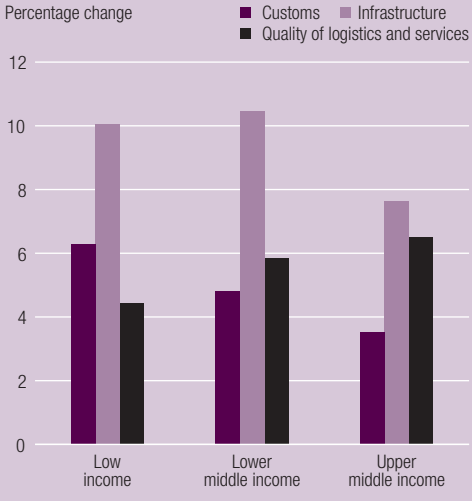
The "logistics gap" between high- and low-income countries remains wide. The countries with the worst performance in 2012 were least developed countries that were also landlocked countries, small-island states, or postconflict countries. Making up three-fourths of the bottom LPI quintile, these countries typically have small trade volumes, are far from trade hubs, and are hampered by severe capacity constraints. Adding to their difficulties—on top of their reform challenges and their lack of scale-economies for infrastructure and services—is their dependence on the logistics of similarly constrained neighboring countries.

Despite the broad association between low performance and difficult circumstances, the policies a country adopts are important. True, most high-income countries from the Organisation for Economic Co-operation and Development (OECD) are high logistics performers, but in other income groups some countries have had more efficient logistics than others over the three LPI surveys, including China, India, South Africa, and Vietnam. Among least developed countries, it is harder to find countries outperforming their income group. Benin jumped from 89 in 2007 to 67 in 2012, however, perhaps reflecting traders' satisfaction with the country's new national single window system in the Port of Coutonou.

Morocco's LPI rank jumped from 113 in 2007 to 50 in 2012, having implemented a comprehensive strategy to improve logistics and connectivity and take advantage of the country's proximity to Europe. Combining border management reform with large physical investments in the Tangier-Med Port, the strategy fostered the emergence of Morocco's just-in-time exports to Europe (especially textiles, electronics, and automotive components). Morocco's fast rise in the LPI highlights the payoffs of such a comprehensive approach.

Reformers are seeing more and more that many modern logistics problems are entrenched—that there are no quick fixes. Reaping low-hanging fruit will not sustainably improve logistics in the ways that count most for traders. The stagnancy of some performance indicators suggests that the source of problems is deeper than an errant regulation or a lack of equipment. In the 2012 LPI, infrastructure stands out as the chief driver of progress (figure 2), with the modest convergence since 2007 explained by a perceived improvement in the infrastructure of low- and middle-income

Figure 2 **Percentage change in LPI component as measured against the highest performer, 2007–2012**



Source: Logistics Performance Index 2007 and 2012.

countries—and to a lesser extent in their logistics services and their customs and border management. This perceived improvement attests to the success of donor efforts to close the infrastructure gap between high- and low-income countries.

The quality and availability of trade-related infrastructure, especially roads, still constrains logistics performance in developing countries, especially for countries with the lowest incomes. Yet countries nearer the middle of the LPI rankings are also hindered by the quality and availability of roads and ports. And railroads have low ratings almost everywhere. In developing countries, rail services dissatisfy more than 90 percent of survey respondents.

Efficient border management and the coordination of the agencies involved in border clearance are more critical now than ever. Across income groups, customs agencies have higher LPI ratings than all other agencies involved in border management. But in many countries, the agencies responsible for enforcing sanitary and phytosanitary regulations—and to less extent other product standards—lag well behind customs in their perceived performance. A comprehensive approach is needed to reform border management, with attention to all the relevant sectors and agencies.

The quality of logistics services—trucking, forwarding, and customs brokerage—is also central to trade efficiency. Logistics services generally have higher LPI ratings in 2012 than in 2010. Yet the gap between high-income countries and developing countries remains wide. Low-income countries score poorly on trucking, despite trucking systems having recently attracted more policy attention.

Environmental sustainability concerns are emerging as a market driver. The 2012 LPI includes a new survey question on the demand for green logistics. A third of respondents shipping to OECD countries recognized a strong demand for green solutions (meaning modes or routes), compared with just a tenth of those shipping to low-income economies. Developing countries will need to consider the environmental footprint of logistics, especially in trading with developed countries.

Logistics performance is strongly associated with the reliability of supply chains and the predictability of service delivery available to producers and exporters. Supply chains—only as strong as their weakest links—are becoming more and more complex, often spanning many countries while remaining critical to national competitiveness. Comprehensive reforms and long-term commitments from policymakers and private stakeholders will be essential. Events such as the recession and economic troubles in Europe in 2011 may have derailed planned logistics reforms, so it is now all the more urgent that countries and donors renew their efforts to improve logistics.

The quality of logistics services is central to trade efficiency and is strongly associated with the reliability of supply chains and the predictability of service delivery available to producers and exporters

SECTION 1

The 2012 Logistics Performance Index

Freight transport and the accompanying logistics industry represent one of the most dynamic and important sectors of the European economy, accounting for at least 10 percent of GDP.

—Siim Kallas, Vice-President of the European Commission and European Commissioner responsible for Transport, speaking at the Launch of the Green Freight Europe initiative in Brussels (March 2012).[2]

If CBP [the U.S. Customs and Border Protection agency] does not support a strong economy, we're not doing our job.

—Brenda Brockman Smith, U.S. Executive Director, Trade Policy and Programs, Office of International Trade, U.S. Customs and Border Protection, speaking at the 12th annual Trans-Pacific Maritime Conference (March 2012).[3]

Countries—and groups of countries—have adopted forward-looking logistics policies. In 2011, Morocco adopted a public-private charter on logistics development. South Africa publishes a yearly state-of-logistics report. Indonesia and Malaysia have national logistics strategies. China is among the few countries with a bureau for logistics development. And the United States launched a Supply Chain Competitiveness Council, in cooperation with its Chamber of Commerce, in fall 2011.

Such public support affirms the importance of logistics services providers. The global network of logistics operators for international trade includes ocean shipping, air freight, land transport, warehousing, and third-party logistics. To keep global supply chains working uninterrupted, logistics services providers have had to both integrate and diversify. Key segments of the industry—air freight, container shipping, port operations, and contract logistics (or third/fourth-party service providers)—have become highly concentrated,[4] especially since the economic downturn of 2008.[5] Yet the industry is far less concentrated in local, traditional subsectors with low entry costs: trucking, traditional freight forwarding, and customs brokerage.

Global logistics requires that this ideally seamless chain of service providers support the physical movement of goods. But the ease with which a country's exporters can access the global logistics network depends on domestic factors subject to government intervention. Governments can improve the regulation of logistics services, finance trade-related infrastructure (either directly or in public-private partnerships), and smooth trade procedures. Although efficient logistics and trade facilitation are central to national competitiveness, the simultaneous involvement of many sectors can create difficulties for sound policymaking.

Supply chain performance is measured in time, cost, reliability, and flexibility. But these outcomes depend on local inputs that affect the supply chain within a country. There are trade-related procedures. There is the supply for trade-related support services. And there is infrastructure, which includes ports, roads, railroads, airports, and information and communications technology (ICT).

A trade supply chain is only as strong as its weakest link. Progress in one area cannot always offset a lack of progress elsewhere. So policymakers must strengthen the weakest links with targeted development interventions. Interventions that target areas not among those in most need of reform waste scarce resources.

Reforms need not have the sole objective of boosting supply chain performance. In border management reform, governments try to reconcile security and fiscal objectives with trade facilitation. Sustainability, too, is becoming more important in food security (box 1.1) and in reducing emissions.

By showing countries how they stack up against their competitors and highlighting the costs of poor logistics, the LPI helps policymakers and the private sector build a strong case for reform

Sound policymaking requires informed dialogue with stakeholders, especially those in the private sector. Global benchmarks such as the Logistics Performance Index (LPI) play an important informative role. By showing countries how they stack up against their competitors and highlighting the costs of poor logistics, the LPI catalyzes progress—helping policymakers and the private sector build a strong case for reform.

New features of the 2012 survey

The 2012 LPI survey is similar to the two before: a standardized questionnaire with two parts (international and domestic). For the international part, respondents assess six key areas of logistics performance in eight of the respondents' main overseas markets. For the domestic part, respondents provide qualitative and quantitative data on the logistics environment in the countries where they work—for example, information on time and costs in a typical supply chain (box 1.2). The survey also collects data on domestic logistics and on the time and cost burdens of import and export transactions. The private sector increased its participation in the LPI: in 2012, there were about 6,000 assessments, some 20 percent more than in 2010. Country coverage for the international LPI remained the same as in 2010, covering 155 countries.[6] Country coverage for the domestic LPI has increased to 143 countries.

To continue streamlining the LPI survey, feedback from users, policymakers, practitioners, and logistics professionals was considered. Minor changes were made to the international part, in which respondents assess the same six key components in eight of their most important overseas markets. A new question on green logistics was introduced to capture how environmental concerns are changing how logistics operators work.[7] The survey instrument for the 2012 LPI collects new information in the domestic part, too, providing more detail on such issues as border management (valuation). Further, new Incoterms®[8] were used to collect time and cost information for a typical supply chain.

Key findings from the 2012 LPI

As in the first two editions of the LPI, high-income countries dominate the top 10

Box 1.1 Better logistics—a piece of the global food security puzzle

There is no global food shortage. In 2010, the world produced 2.2 billion tons of cereals, more than 2.5 times its production five decades earlier. Food production outpaced population growth of 4 billion people, yet more than a billion people remain hungry or vulnerable to sharp changes in food prices. Why?

One answer is that transport and logistics do much to determine food prices. In developing countries—especially landlocked least developed countries—transport and logistics costs are disproportionately high, accounting for 20–60 percent of delivered food prices. For example, transport and logistics make up 48 percent of the cost of U.S. corn imported by Nicaragua and 40 percent of the cost of U.S. wheat imported by Honduras.[1] And an unreliable supply chain can cause domestic price shocks when supply chain disruptions cause local supply shortages.

In February 2011, world food prices reached a record high. They remained volatile in the following months—months reminiscent of the devastating price swings of the 1970s. When such fluctuations affect the price of cereals, which make up staple diets, the world's poorest people suffer most. In 2010, for example, cereals constituted 40 percent of the food imported by least developed countries.

In many cases, improved food supply chains can mitigate this vulnerability. More efficient logistics can reduce consumer prices, allow markets to respond quickly in a crisis, and increase access to food. A recent assessment of the wheat supply chain for countries in the Middle East and North Africa—which are among the countries most dependent on grain imports—reveals many causes of high logistics costs and vulnerability.[2] Product losses are high, typically greater than 5 percent. Wheat's average transit time from its main source markets to its target markets in Arab countries is 78 days, and the trip costs about $40 per metric ton. By contrast, the average transit time to target markets in the Netherlands is just 18 days, and the trip costs $11 per metric ton. (In the Republic of Korea, the average transit time is 47 days, and the trip costs $17 per metric ton.)

Individual countries cannot do much to reduce certain costs—such as ocean freight costs, which can make up a large part of the final price for grains and edible oils. Even so, policies can lower the costs of regional and domestic distribution by boosting overall logistics performance and by improving the trade environment.

Notes

1. Fernández and others 2011.
2. World Bank and FAO 2012.

Box 1.2 Using the Logistics Performance Index

The World Bank's Logistics Performance Index (LPI) analyzes countries in six components:

1. The efficiency of customs and border management clearance.
2. The quality of trade and transport infrastructure.
3. The ease of arranging competitively priced shipments.
4. The competence and quality of logistics services.
5. The ability to track and trace consignments.
6. The frequency with which shipments reach consignees within scheduled or expected delivery times.

The components were chosen based on recent theoretical and empirical research and on the practical experience of logistics professionals involved in international freight forwarding.

Earlier methodologies developed in 1993[1] used a survey format, a 2-point scale, and open-ended questions—to measure the perceived importance and influence of different component attributes affecting the logistical friendliness of countries. In a follow-up study,[2] only the characteristics identified as best encapsulating logistics performance were included for evaluation. The methodology was refined with contributions from interviews conducted for the Trade and Transport Facilitation Audits performed by the World Bank and others over more than a decade.[3]

The figure maps the six LPI indicators in two main categories:

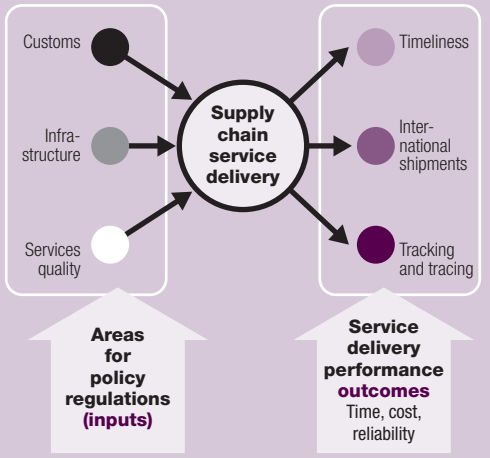
- Areas for policy regulation, indicating main inputs to the supply chain (customs, infrastructure, and services).
- Supply chain performance outcomes (corresponding to LPI indicators of time, cost, and reliability—timeliness, international shipments, and tracking and tracing).

The LPI uses standard statistical techniques to aggregate the data into a single indicator.[4] (See appendix 4 for a detailed description of how the LPI is calculated.) This single indicator can be used to compare countries, regions, and income groups. It can also be used for country-level work.

Because operators on the ground can best assess these vital aspects of logistics performance, 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 those best able to assess how countries perform. And their views matter, directly affecting the choice of shipping routes and gateways and influencing firms' decisions on production location, choice of suppliers, and selection of target markets. Their participation is central to the quality and credibility of the LPI, and their involvement and feedback have been essential in developing and refining the survey in this third edition of the LPI. Nearly 1,000 logistics professionals in 143 countries participated in the 2011 survey for the 2012 LPI, and 12 additional countries were covered.

See the 2012 LPI questionnaire at www.worldbank.org/lpi.

Input and outcome LPI indicators



Source: Authors' analysis.

Notes

1. Murphy, Daley, and Dalenberg 1993; Murphy and Daley 1999.
2. Ojala and Queiroz 2000, 2004.
3. Raven 2001.
4. In all three editions of the LPI (2007, 2010, and 2012), statistical aggregation has produced an overall index that is close to the simple average of country scores across the six LPI components.

(table 1.1). Indeed, the top 10 for 2012 are nearly the same as for 2010.[9] Most are well-established key logistics players with an important role in global or regional supply chains.

By contrast, the bottom 10 are all low-income countries, and 8 are in Africa (table 1.2). Geographic barriers—along with a history of unrest, armed conflict, and natural disasters—restrict these countries' access to markets, thus constraining their ability to participate in global supply chains.

The broad middle-income group, comprising upper and lower middle-income countries, is led—as expected—by some of the rapidly growing emerging economies that dominate the upper half of the LPI rankings (tables 1.3 and 1.4). Benin is the top low-income performer (table 1.5).

Figure 1.1 shows the cumulative distribution of LPI scores. The vertical lines indicate the boundaries of quintiles—five groups containing equal numbers of countries rated in the LPI. The bottom quintile comprises countries

Table 1.1 The top 10 performers on the 2012 LPI

	2012			2010			2007		
Economy	LPI rank	LPI score	% of highest performer	LPI rank	LPI score	% of highest performer	LPI rank	LPI score	% of highest performer
Singapore	1	4.13	100.0	2	4.09	99.2	1	4.19	100.0
Hong Kong SAR, China	2	4.12	99.9	13	3.88	92.4	8	4.00	94.1
Finland	3	4.05	97.6	12	3.89	92.6	15	3.82	88.3
Germany	4	4.03	97.0	1	4.11	100.0	3	4.10	97.1
Netherlands	5	4.02	96.7	4	4.07	98.5	2	4.18	99.6
Denmark	6	4.02	96.6	16	3.85	91.4	13	3.86	89.6
Belgium	7	3.98	95.3	9	3.94	94.5	12	3.89	90.7
Japan	8	3.93	93.8	7	3.97	95.2	6	4.02	94.8
United States	9	3.93	93.7	15	3.86	91.7	14	3.84	89.1
United Kingdom	10	3.90	92.7	8	3.95	94.9	9	3.99	93.8

Source: Logistics Performance Index 2007, 2010, and 2012.

Table 1.2 The bottom 10 performers on the 2012 LPI

	2012			2010			2007		
Economy	LPI rank	LPI score	% of highest performer	LPI rank	LPI score	% of highest performer	LPI rank	LPI score	% of highest performer
Comoros	146	2.14	36.5	120	2.45	46.5	85	2.48	46.3
Eritrea	147	2.11	35.5	154	1.70	22.4	124	2.19	37.2
Sudan	148	2.10	35.3	146	2.21	38.7	64	2.71	53.6
Congo, Rep.	149	2.08	34.7	116	2.48	47.4	na	na	na
Sierra Leone	150	2.08	34.5	153	1.97	31.2	144	1.95	29.9
Nepal	151	2.04	33.1	147	2.20	38.6	130	2.14	35.7
Chad	152	2.03	32.9	115	2.49	47.9	142	1.98	30.8
Haiti	153	2.03	32.8	98	2.59	51.1	123	2.21	38.0
Djibouti	154	1.80	25.5	126	2.39	44.8	145	1.94	29.5
Burundi	155	1.61	19.5	na	na	na	113	2.29	40.4

na is not applicable.
Source: Logistics Performance Index 2007, 2010, and 2012.

Table 1.3 The top 10 upper middle-income performers on the 2012 LPI

	2012			2010			2007		
Economy	LPI rank	LPI score	% of highest performer	LPI rank	LPI score	% of highest performer	LPI rank	LPI score	% of highest performer
South Africa	23	3.67	85.5	28	3.46	78.9	24	3.53	79.4
China	26	3.52	80.5	27	3.49	79.9	30	3.32	72.8
Turkey	27	3.51	80.3	39	3.22	71.4	34	3.15	67.5
Malaysia	29	3.49	79.8	29	3.44	78.4	27	3.48	77.7
Bulgaria	36	3.21	70.7	63	2.83	58.8	55	2.87	58.6
Thailand	38	3.18	69.6	35	3.29	73.6	31	3.31	72.5
Chile	39	3.17	69.5	49	3.09	67.3	32	3.25	70.5
Tunisia	41	3.17	69.4	61	2.84	58.9	60	2.76	55.3
Brazil	45	3.13	68.2	41	3.20	70.6	61	2.75	54.9
Mexico	47	3.06	66.0	50	3.05	65.7	56	2.87	58.6

Source: Logistics Performance Index 2007, 2010, and 2012.

Table 1.4 **The top 10 lower middle-income performers on the 2012 LPI**

	2012 LPI			2010 LPI			2007 LPI		
Economy	LPI rank	LPI score	% of highest performer	LPI rank	LPI score	% of highest performer	LPI rank	LPI score	% of highest performer
India	46	3.08	66.4	47	3.12	67.9	39	3.07	64.9
Morocco	50	3.03	65.0	na	na	na	94	2.38	43.4
Philippines	52	3.02	64.8	44	3.14	68.8	65	2.69	52.9
Vietnam	53	3.00	64.1	53	2.96	63.1	53	2.89	59.2
Egypt, Arab Rep.	57	2.98	63.3	92	2.61	51.8	97	2.37	43.0
Indonesia	59	2.94	62.2	75	2.76	56.5	43	3.01	63.0
Yemen, Rep.	63	2.89	60.3	101	2.58	50.8	112	2.29	40.4
Ukraine	66	2.85	59.3	102	2.57	50.6	73	2.55	48.7
Pakistan	71	2.83	58.4	110	2.53	49.1	68	2.62	50.7

na is not applicable.
Source: Logistics Performance Index 2007, 2010, and 2012.

Table 1.5 **The top 10 low-income performers on the 2012 LPI**

	2012			2010			2007		
Economy	LPI rank	LPI score	% of highest performer	LPI rank	LPI score	% of highest performer	LPI rank	LPI score	% of highest performer
Benin	67	2.85	59.3	69	2.79	57.4	89	2.45	45.3
Malawi	73	2.81	57.8	na	na	na	91	2.42	44.5
Madagascar	84	2.72	55.1	88	2.66	53.2	120	2.24	39.0
Niger	87	2.69	54.1	106	2.54	49.4	143	1.97	30.5
Tanzania	88	2.65	52.9	95	2.60	51.4	137	2.08	34.0
Guinea-Bissau	94	2.60	51.1	149	2.10	35.4	116	2.28	40.0
Togo	97	2.58	50.5	96	2.60	51.4	119	2.25	39.0
Central African Rep.	98	2.57	50.3	na	na	na	na	na	na
Cambodia	101	2.56	50.0	129	2.37	44.0	81	2.50	47.0
Zimbabwe	103	2.55	49.6	na	na	na	114	2.29	40.3

na is not applicable.
Source: Logistics Performance Index 2007, 2010, and 2012.

with the lowest LPI scores and the top quintile those with the highest LPI scores.

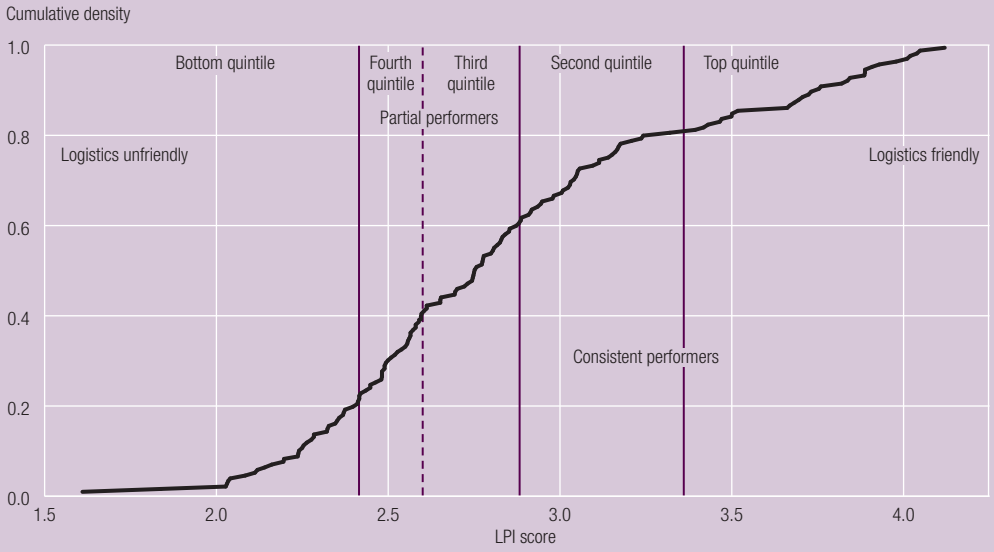
The distribution of LPI scores is broken down into four categories, used in all editions of *Connecting to Compete:*

- *Logistics unfriendly*—includes countries with severe logistics constraints, such as the least developed countries (bottom LPI quintile).
- *Partial performers*—includes countries with a level of logistics constraints most often seen in low- and middle-income countries (fourth and third LPI quintiles).
- *Consistent performers*—includes countries rated for logistics performance more highly than most others in their income group (second LPI quintile).
- *Logistics friendly*—includes high performers, mostly high-income countries (top LPI quintile).

Logistics performance does not improve overnight

Trade facilitation is crucial to economic development. Countries with better logistics can grow faster, become more competitive, and increase their investment. Boosting logistics

Figure 1.1 **Cumulative distribution of 2012 LPI scores**



Source: Logistics Performance Index 2012.

performance in low-income countries to the middle-income average could expand trade some 15 percent.[10] That would benefit both firms and consumers, who would receive lower prices and better services.

For such sustained improvement, policymakers and private stakeholders must commit long term to comprehensive reforms (box 1.3). To move products to market efficiently, reliably, and economically, countries must reduce trading costs, make their exports more competitive, and adopt policies to support trade. Reforming trade facilitation can especially help bolster trade competitiveness.[11]

In the international LPI, there are marked differences by component and quintile—especially

Box 1.3 **Indonesia's logistics progress**

Leaders in Indonesia have used LPI data to monitor government performance and improve logistics—raising national awareness and jumpstarting projects to make the country's main port more efficient. Shortly after *Connecting to Compete 2007* was published,[1] Indonesia launched an ambitious public and private dialogue on trade facilitation and logistics. The country prepared an action plan examining the costs of international trade through its ports and the unique logistics costs of a large archipelago. It used the domestic logistics costs component of the LPI to measure Ministry of Trade performance, and after 2010 it used the overall LPI score.

In 2008, the World Bank suggested ways to improve operations at Tanjung Priok, which handles two-thirds of Indonesia's international trade and has seen a rapid rise in container traffic. A main goal of the port initiative is to reduce dwell time—the average time it takes containers to clear the port. In 2011, Tanjung Priok's dwell time was six days, longer than Indonesia's regional peers (Singapore one day, Malaysia four days, Thailand five days). To reduce dwell time, the port operator raised storage fees (to discourage shippers from leaving containers for long periods) and introduced a new information technology system (to better monitor and direct port traffic). A scheduled expansion of the port is expected to double its container capacity by 2017.

But neither storage fees nor traffic monitoring will substantially reduce delays at Tanjung Priok.[2] On arriving there, an import container spends most of its wait time—about three and a half days—in preclearance (the time between unloading a container from the ship and submitting import declarations to customs). Cumbersome pre-customs clearance procedures cause much of the delay, and late submission of the shipping manifest by shippers and importers contributes, too.

The World Bank is working with Indonesia to establish a port community (with public and private sector participants) where leaders can discuss, monitor, and follow up on reform efforts.

Notes

1. Arvis and others 2007.
2. Sandee, Oliver, and Cubillos Salcedo 2012.

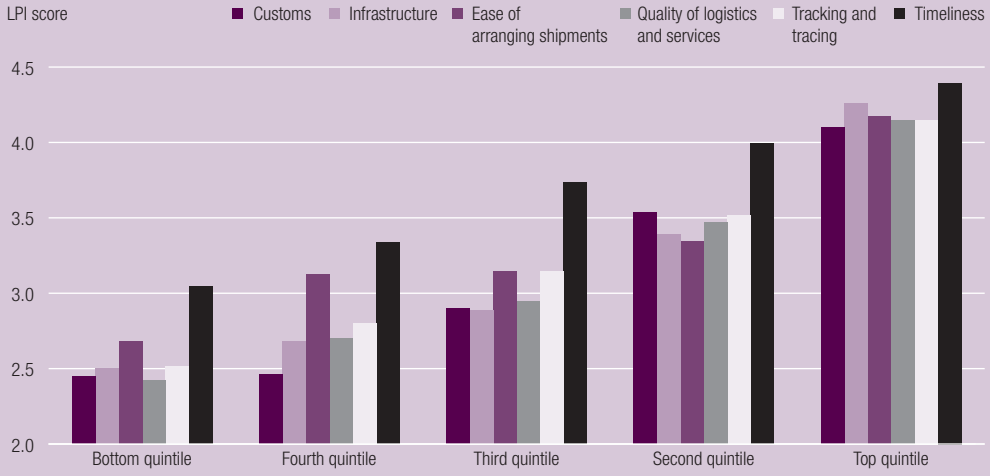
in the two lowest quintiles (figure 1.2). In these two quintiles, the two components that lag behind the rest are the efficiency of customs and border management clearance (component 1) and the competence and quality of logistics services (component 4). In the same two quintiles, the two components that outperform the rest are the ease of arranging competitively priced shipments (component 3) and the frequency with which shipments reach consignees within scheduled or expected delivery times (component 6).

As overall logistics performance improves, customs and other border agencies improve faster than do other aspects of logistics performance. Infrastructure lags in the two lowest quintiles, reflecting the continuing need for hard infrastructure investments in developing nations—especially the poorest.

Over 2007–2012, the two lowest quintiles have progressed the fastest in two components: the efficiency of customs and border management clearance (component 1) and the quality

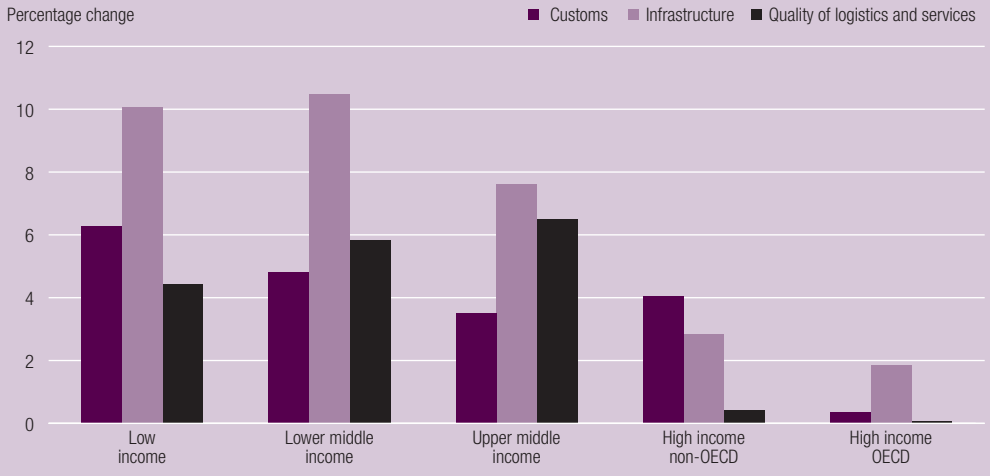
As overall logistics performance improves, customs and other border agencies improve faster than do other aspects of logistics performance

Figure 1.2 **LPI component scores, by LPI quintile**



Source: Logistics Performance Index 2012.

Figure 1.3 **Percentage change in LPI scores over 2007–2012, by LPI component and income group**



Source: Logistics Performance Index 2007 and 2012.

Table 1.6 Respondents indicating an improved or much improved logistics environment since 2009, by LPI quintile

Percent of respondents

	Bottom quintile	Fourth quintile	Third quintile	Second quintile	Top quintile
Customs	27	43	63	57	65
Other border procedures	22	31	41	48	52
Transport infrastructure	41	40	54	47	56
ICT infrastructure	67	65	71	79	68
Private logistics services	53	70	71	74	67
Logistics regulation	26	31	39	36	41
Incidence of corruption	12	35	36	35	37

ICT is information and communications technology.
Source: Logistics Performance Index 2012.

of trade and transport infrastructure (component 2; figure 1.3). For low-income countries, streamlining border clearance procedures and ensuring physical access to markets are necessary for closing basic capacity deficits. By contrast, upper middle-income countries and, to less extent, lower middle-income countries, have progressed the fastest in the competence and quality of logistics services (component 4). Indeed, middle-income countries have shifted their emphasis from basic hard infrastructure investments to soft infrastructure improvements based on regulatory reform.

Changes in the logistics environment are not one-dimensional. Rather, they vary by income group and LPI quintile. From the percentage of LPI survey respondents in each quintile who say that particular elements of the logistics environment are improved or much improved in 2012 over 2010 (table 1.6), perceived progress is much greater in the upper two LPI quintiles. Also, despite continued progress, the pace of improvement has slowed substantially in the two lowest quintiles—especially in the bottom quintile.

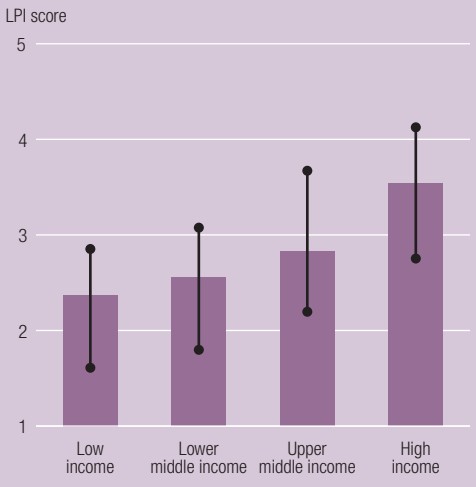
The "logistics gap" persists

On average, LPI scores remain much higher for high-income countries than for poorer ones (figure 1.4). High-income countries outperform low-income countries by 43 percent, lower middle-income countries by 34 percent, and upper middle-income countries by 24 percent. Among high-income OECD countries, almost 80 percent are ranked in the top quintile in terms of logistics performance worldwide (figure 1.5).

Income alone does not explain logistics performance

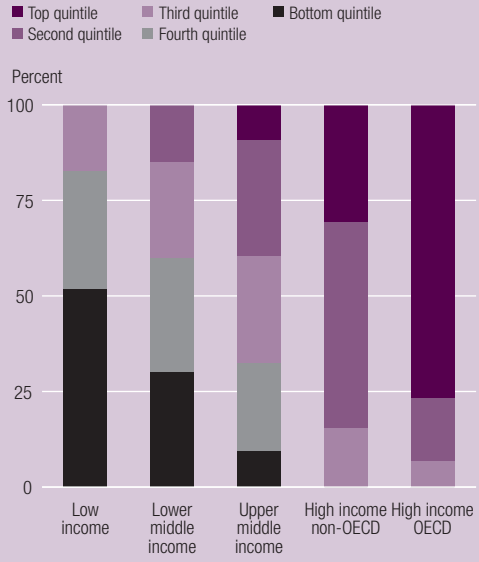
Despite the persistent logistics gap, income alone cannot explain why performance varies widely among countries in certain income groups—particularly in the low- and middle-income groups. High-income countries are

Figure 1.4 2012 LPI score, average and minimum/maximum range by income group



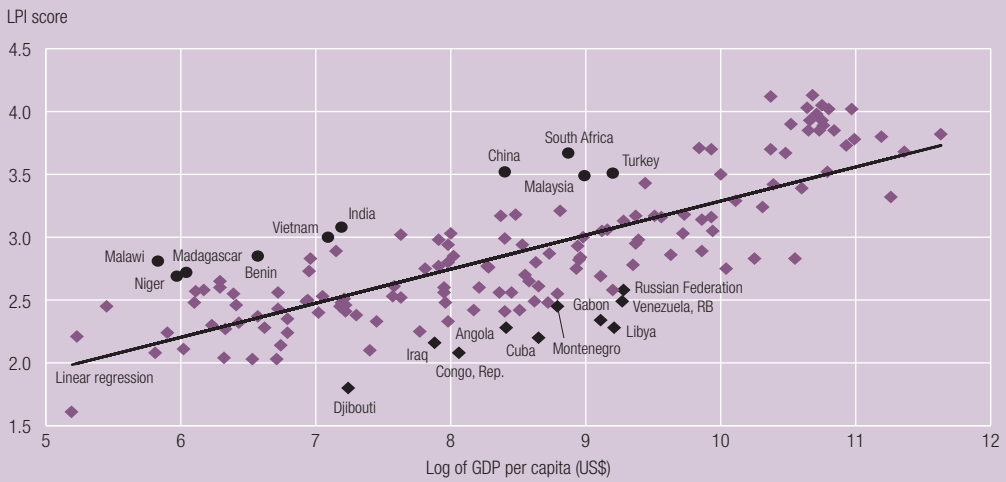
Note: Vertical rules show minimum/maximum range.
Source: Logistics Performance Index 2012.

Figure 1.5 Distribution of LPI quintiles across income groups



Source: Logistics Performance Index 2012.

Figure 1.6 **LPI overperformers and underperformers**



Note: Fitted values are based on an ordinary least squares regression using data for all countries. Underperformers (black diamonds) are the non-high-income countries with the 10 smallest residuals. Overperformers (black circles) are the non–high-income countries with the 10 largest residuals.
Source: Logistics Performance Index 2012.

Income alone cannot explain why performance varies widely among countries in certain income groups—particularly in the low- and middle-income groups

heavily concentrated in the top LPI quintile, but other income groups are more dispersed. Upper middle-income and lower middle-income countries range from the bottom LPI quintile to the top. Even low-income countries range across all but the top quintile (see figure 1.5).

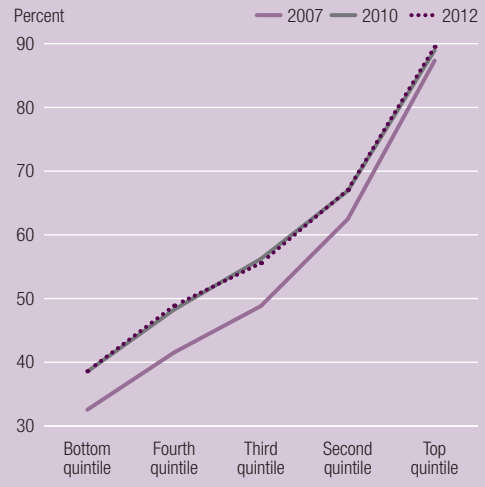
Against others in their income group, the most overperforming non-high-income countries are Vietnam, India, China, and South Africa (figure 1.6).[12] The most underperforming non-high-income countries are Djibouti, Republic of Congo, Iraq, Angola, Cuba, Montenegro, Libya, Gabon, República Bolivariana de Venezuela, and the Russian Federation. The dispersion within income groups suggests that policy, as well as income, affects logistics performance.

Despite the marked variation within income groups, caution should be taken when interpreting LPI scores to identify overperforming and underperforming countries. For example, in a large, diverse country, a high score might not indicate uniformly strong performance.

The gap between the best and worst relative LPI scores is about the same as in 2010

Another measure to compute underlying changes in performance, introduced in 2010, is the relative LPI score. The relative LPI score is obtained by normalizing the LPI score: Relative LPI = 100 × [LPI – 1] / [LPI highest – 1]. Thus, the best performer has the maximum relative LPI score of 100 percent (Singapore). For 2012, the worst relative performer is Burundi, with a relative LPI score of 19 percent. The distance between the best and worst relative performers in 2012 is about the same as in 2010 (though far smaller than in 2007; figure 1.7). High performers remain strong, while developing countries are slowly catching up. Yet the gap between

Figure 1.7 **LPI score as percentage of highest LPI score by LPI quintile, 2007, 2010, and 2012**



Source: Logistics Performance Index 2007, 2010, and 2012.

Box 1.4 How precise are LPI scores and ranks?

Although the LPI and its components now offer the most comprehensive and comparable data on country logistics and trade facilitation environments, they have a limited domain of validity. First, the experience of international freight forwarders might not represent the broader logistics environment in poor countries, which often rely on traditional operators. International and traditional operators might differ in their interactions with government agencies—and in their service levels. Most agents and affiliates of international networks in developing countries serve large companies, which perform at different levels—including for time and costs—than do traditional trading networks.

Second, for landlocked countries and small-island states, the LPI might reflect access problems outside the country assessed, such as transit difficulties. The low rating of a landlocked country, such as Rwanda, might not adequately reflect its trade facilitation reform efforts. Rwanda's trade must continue to depend on long international transit routes through Tanzania, Kenya, and Uganda.

To account for the sampling error created by the LPI's survey-based dataset, LPI scores are presented with approximate 80 percent confidence intervals (see appendix 4). These intervals yield upper and lower bounds for a country's LPI score and rank.[1] Confidence intervals must be examined carefully to determine whether a change in score or a difference between two scores is statistically significant. A statistically significant improvement in a country's performance should be concluded only if the lower bound of its 2012 LPI score exceeds the upper bound of its 2010 score.

Because of the LPI's limited domain of validity and the need for confidence intervals to account for sampling error, a country's exact ranking might be less relevant to policymakers than its proximity to others in a wider performance group or its statistically significant improvements.

Note

1. 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.

Box 1.5 Policy applications of the 2007 and 2010 LPI—regionally and globally

The 2007 and 2010 LPI data have been widely referenced internationally. The World Economic Forum's *Global Enabling Trade Report,* published yearly since 2009, uses LPI data in its composite Enabling Trade Index to capture important aspects of supply chain performance affecting international economic integration.[1]

The Asia-Pacific Economic Cooperation also uses data from the LPI, to measure performance under its Supply Chain Connectivity Initiative. The initiative's goal is to reduce by 10 percent the time, cost, and uncertainty of supply chain transactions in five years.

The World Bank uses the LPI in its *World Development Indicators* and as a standard performance indicator in such country reports as Country Economic Memorandums or Country Assistance Strategies.[2]

Advanced economies use the LPI, too. The Øresund EcoMobility project, a Swedish–Danish cross-border initiative to increase competence within climate-friendly transport of both goods and people, draws on 2007 and 2010 LPI data in the Logistics and Sustainability Performance Index that it is developing.[3]

Notes

1. World Economic Forum 2010.
2. See, for example, World Bank (2011).
3. www.cbs.dk/Forskning/Institutter-centre/Projekter/EcoMobility.

the highest performing countries and the lowest performing countries is still wide, and narrowing it will require substantial time and resources.

The correlation between countries' 2010 and 2012 LPI scores is about 90 percent, and the corresponding rank correlation about 85 percent. Although some changes in countries' ranks and scores appear large at first glance, the LPI is as subject to sampling error as any other survey-based dataset. Only when confidence intervals for 2010 and 2012 do not overlap should a statistically significant change—positive or negative—be concluded (box 1.4).

Recognizing the importance of trade facilitation and logistics, policymakers are aiming to put in place the structures that boost performance. Since the World Bank launched the LPI and its component indicators in 2007, they have rapidly gained acceptance among policymakers and professionals—nationally, regionally, and globally (box 1.5).

SECTION 2

Unbundling logistics performance

The LPI score and country rankings for the six main component indicators come from the international part of the survey, a collection of information provided by foreign logistics professionals.

In the domestic LPI, by contrast, surveyed logistics professionals assess the logistics environments in the countries where they work. The domestic part thus contains more detailed information on countries' logistics environments, core logistics processes and institutions, and performance time and cost. This approach looks at the logistics constraints within countries, not just at the gateways, such as ports or borders. It analyzes country performance in four major determinants of overall logistics performance: infrastructure, services, border procedures and time, and supply chain reliability.

Infrastructure

Survey respondents in countries in the top quintile rated their infrastructure far more highly than did those in countries in the other four quintiles (table 2.1). Differences across the other four quintiles are less striking, especially for road and rail links. Infrastructure, though still a logistics constraint in developing countries, seems to be improving.

Since 2010, satisfaction with many infrastructure types has risen—though to varying degrees across quintiles (see table 2.1 in *Connecting to Compete 2010*). Respondents in all LPI quintiles are most satisfied with ICT infrastructure: in the four lowest quintiles, the number of respondents rating its quality "high" or "very high" is at least twice as large as for any other infrastructure type. By contrast, rail infrastructure inspires general dissatisfaction: the number of respondents rating rail infrastructure "high" or "very high" is at most half as large as for any other type. Road infrastructure satisfies more respondents than most other types, except in the two lowest quintiles. In the bottom quintile, infrastructure generally fails to satisfy—an exception to the pattern of variation.

Similar patterns emerge when the domestic LPI data on infrastructure are disaggregated by World Bank region, omitting high-income countries (table 2.2). The highest ratings in all regions are for ICT—with ratings in Sub-Saharan Africa lagging behind those in other regions. Ratings for other infrastructure types vary more widely by region, but two features stand out. First, satisfaction with road infrastructure is especially low in South Asia and the Middle East and North Africa. Second, satisfaction with rail infrastructure is higher in the Middle East and North Africa and Europe and Central Asia than elsewhere, though it is still lower than for other infrastructure types.

Services

The quality and competence of core logistics service providers is another important part of overall country performance. For countries in the three lowest LPI quintiles, freight forwarders are rated much higher than other types of service providers (table 2.3).[13] Ratings for the other provider types vary more widely across all quintiles—though rail transport service provision, like rail infrastructure, consistently receives low ratings. And as with infrastructure, countries in the top quintile receive by far the highest ratings for service provider quality and competence.

Respondents in all but the top quintile are far more satisfied with service providers

Table 2.1 Respondents rating the quality of each infrastructure type "high" or "very high," by LPI quintile

Percent of respondents

	Ports	Airports	Roads	Rail	Warehousing and transloading	ICT
Bottom quintile	12	9	9	12	10	18
Fourth quintile	12	10	6	1	12	26
Third quintile	24	33	19	10	31	44
Second quintile	27	31	23	3	32	67
Top quintile	72	76	69	32	70	77

ICT is information and communications technology.
Source: Logistics Performance Index 2012.

Table 2.2 Respondents rating the quality of each infrastructure type "high" or "very high," by World Bank developing country region

Percent of respondents

	Ports	Airports	Roads	Rail	Warehousing and transloading	ICT
East Asia and Pacific	18	22	14	3	15	41
Europe and Central Asia	14	33	15	12	27	43
Latin America and Caribbean	21	24	15	4	19	39
Middle East and North Africa	25	29	5	10	19	39
South Asia	16	23	7	8	11	35
Sub-Saharan Africa	18	10	12	1	15	28

ICT is information and communications technology.
Source: Logistics Performance Index 2012.

than with infrastructure quality (compare tables 2.1 and 2.3). The same gap appears generally across World Bank regions (table 2.4). These data suggest a need to develop transport-related infrastructure. The difference in satisfaction with services and infrastructure is especially strong in air and maritime transport and, in some regions, road and rail transport. Unlike the 2010 LPI, the 2012 LPI shows a striking difference in satisfaction—throughout all LPI quintiles—between rail infrastructure and rail services. Yet both rail infrastructure and services receive low ratings, even in the top LPI quintile, consistent with Europe's long-term shift from rail freight to trucking.

It is also useful to compare the LPI indicators on service provider performance with external measures, such as the World Bank's Air Connectivity Index, which measures countries' centrality to the global air transport network on a scale from 0 to 1.[14] Higher satisfaction with air transport service providers is strongly associated with a higher Air Connectivity Index score (figure 2.1). Also positively correlated with the Air Connectivity Index score is the quality of air transport infrastructure. So improving country connectivity requires improving infrastructure, such as airports. But it also requires improving the domestic regulatory environment, with attention to competition, to entry barriers, and to policies that increase the costs of trade.

Understanding economic connectivity is becoming more and more important for understanding global supply chains. Logistics performance measures how well countries connect to global networks, while connectivity assesses how well countries are positioned toward their markets, considering their position on services networks (air, shipping). The United Nations Conference on Trade and Development has been developing since 2004 the Liner Shipping Connectivity Index for shipping networks. *Connecting to Compete 2010* showed a link between shipping connectivity and supply chain reliability, as in air transport. While connectivity influences domestic

Table 2.3 Respondents rating the quality and competence of each service provider type "high" or "very high," by LPI quintile

Percent of respondents

	Road transport	Rail transport	Air transport	Maritime transport and ports	Warehousing, transloading, and distribution	Freight forwarders	Customs brokers	Trade and transport associations	Cosignees or shippers
Bottom quintile	14	10	18	15	7	27	20	11	21
Fourth quintile	21	6	27	25	15	36	17	14	24
Third quintile	23	17	43	46	44	62	45	32	39
Second quintile	24	15	45	34	36	47	32	17	31
Top quintile	66	37	78	74	68	77	70	59	56

Source: Logistics Performance Index 2012.

logistics outcomes captured in the LPI, it is not fully exogenous. Indeed, national policies and cross-border arrangements also influence connectivity, whether for air, maritime, or land transport (which depends largely on transit agreements).

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 for port and airport supply chains, as measured for the LPI, is more than 3.5 times longer in low-performing countries than in high-performing countries (figure 2.2). The difference is around three times for land supply chains. These times are associated with distance, with a correlation coefficient of 0.6. The association suggests that geographical hurdles, and perhaps internal transport markets, still pose substantial difficulties in many countries.

Besides geography and speed en route, another factor in import lead times is the border process. Time can be reduced at all stages of this process, but especially in the clearance of goods on arrival (see figure 2.2). Countries with low logistics performance need to reform their border management so that they can reduce red tape, excessive and opaque procedural requirements, and physical inspections. Although the time to clear goods through customs is a fairly small fraction of total import time for all LPI quintiles, it rises sharply if goods are physically inspected. Core customs procedures are similar across quintiles. But low-performing countries have a far higher prevalence of physical inspection, even subjecting the same shipment to repeated inspections by multiple agencies (table 2.5).

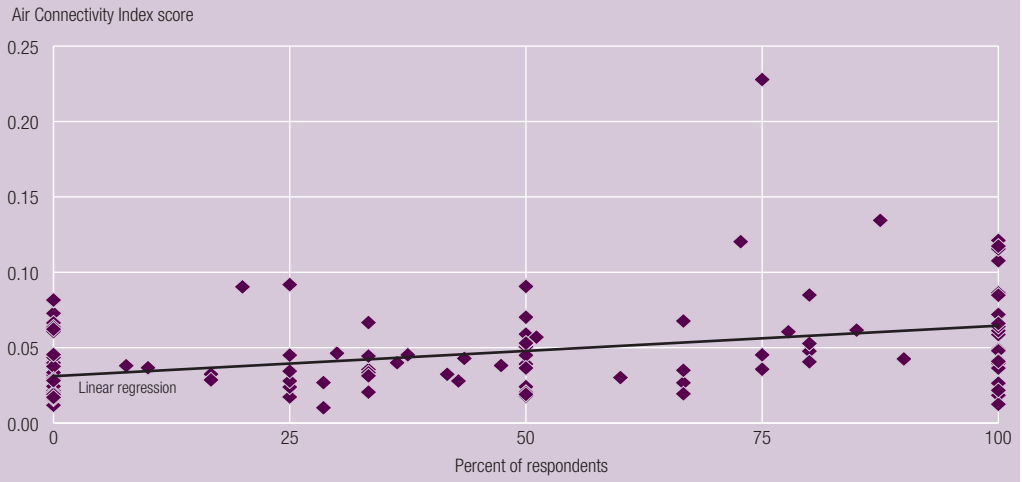
Table 2.4 Difference between respondents rating services "high" or "very high" and those rating infrastructure "high" or "very high," by World Bank developing country region

Percentage points

	Road transport	Rail transport	Air transport	Maritime transport and ports	Warehousing, transloading, and distribution
East Asia and Pacific	6	17	2	2	5
Europe and Central Asia	16	10	18	8	12
Latin America and Caribbean	21	11	0	–2	13
Middle East and North Africa	–4	2	10	–3	–9
South Asia	14	6	12	0	4
Sub-Saharan Africa	8	10	2	10	–2

Source: Logistics Performance Index 2012.

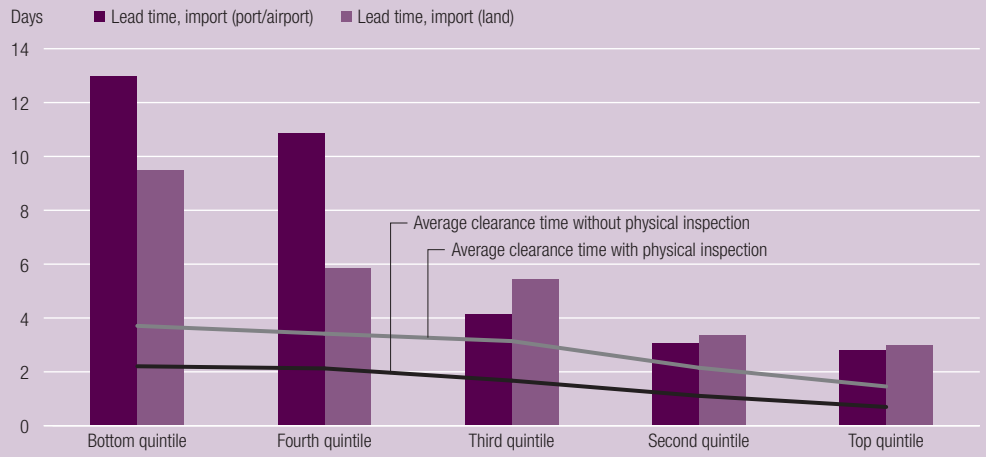
Figure 2.1 Relationship between country scores on the World Bank Air Connectivity Index and the percent of respondents rating the quality and competence of air transport service providers as "high" or "very high"



Source: Arvis and Shepherd 2011; Logistics Performance Index 2012.

The median import lead time for port and airport supply chains is more than 3.5 times longer in low-performing countries than in high-performing countries

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



Source: Logistics Performance Index 2012.

Table 2.5 Respondents indicating that listed customs procedures are available and being used, by LPI quintile

Percent of respondents unless otherwise indicated

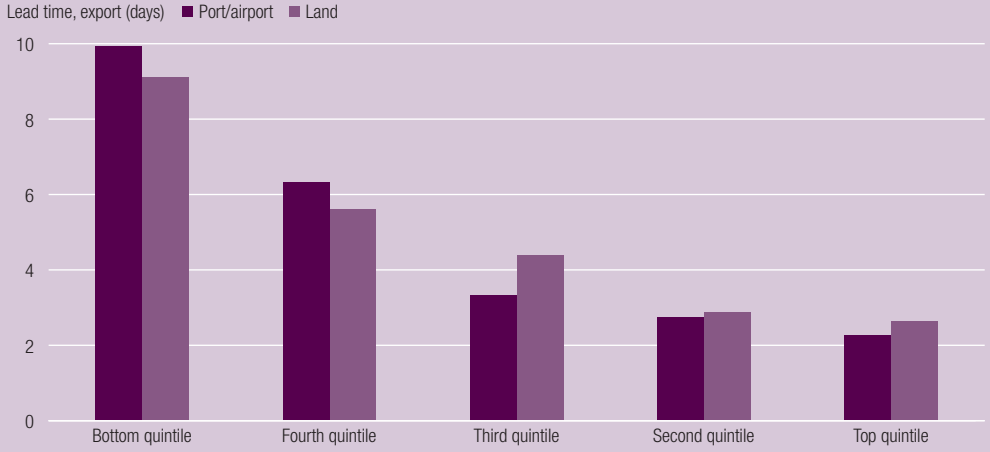
	Bottom quintile	Fourth quintile	Third quintile	Second quintile	Top quintile
Online processing of customs declaration	38	68	86	83	98
Online publication of procedures and requirements for export/import	27	62	77	75	97
Availability of review/appeal	47	48	73	69	87
Pre-arrival processing	22	58	54	52	86
Formal dialogue process	42	66	68	57	85
Online processing of supporting documentation	13	27	53	36	78
Choice of location of final clearance	51	68	63	66	76
Release with guarantee pending final clearance	47	66	61	49	69
Requirement that a licensed customs broker be used for clearance	79	89	73	82	59
Valuation using reference price or other arbitrary uplift	68	82	65	66	34
Physical inspection (percent of shipments)	38	39	19	17	7
Multiple physical inspections	14	19	8	8	4

Source: Logistics Performance Index 2012.

Export supply chains typically have a much lighter procedural burden than do import supply chains, so lead times are shorter for exports than for imports (figure 2.3). But export lead times display the familiar logistics gap—they are three or even four times longer for low-income countries than for high-income countries (figure 2.4). Moreover, they differ much more between low-income countries and the rest than between middle-income and high-income countries. Many low-income countries have long export lead times, reducing their export competitiveness and ability to participate in international trade.

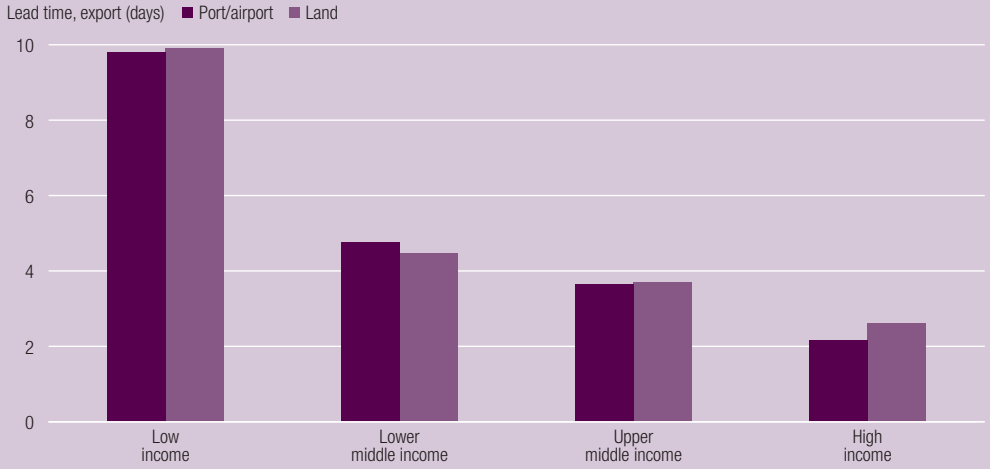
Unlike lead times, which vary considerably around the world, customs procedures are becoming more similar (see table 2.5). The largest performance gap for customs procedures is between the bottom LPI quintile and all other quintiles. Even that gap is much smaller for some procedures (such as the choice of a final clearance location) than for others (such as online processing). The valuation of goods still varies, with reference prices or other arbitrary

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



Source: Logistics Performance Index 2012.

Figure 2.4 **Median export lead time, by income group**



Source: Logistics Performance Index 2012.

Export lead times are three or even four times longer for low-income countries than for high-income countries

uplifts often applied in countries outside the top quintile.

Even as customs procedures become more similar, many countries still find their supply chain performance constrained by other border agencies. Customs is not the only agency involved in border management. Cooperation among all border management agencies —standards, transport, health, and sanitary and phytosanitary (SPS)—is critical to reform (box 2.1). So is the introduction of modern approaches to regulatory compliance (box 2.2).

Satisfaction with customs is generally higher than with other border agencies (table 2.6). Yet the gap is smaller for countries in the top LPI quintile—countries where border clearance has received broad-based policy attention. Here, again, the top quintile stands out.

The gap in satisfaction between customs and other border agencies is especially striking for health and SPS agencies, which in many countries may be impeding more efficient import procedures. By contrast, quality and standards inspection agencies receive higher satisfaction ratings. One reason is that fewer inspection procedures are required for products that are not perishable or time-sensitive. Another is that health and SPS agencies have been slow to automate.

Box 2.1 Innovative approaches to border agency cooperation: the Philippines and Indonesia

In 2010 and 2011, the Philippines government developed—and began to implement—a national single window system for trade. The system has already automated 33 government agencies' import and export permit and licensing requirements. Many of those agencies did not have automated back-office functions until 2011, but all are now connected to the system, and more than 80 paper-based processes are being fully automated. Traders can access the system online—first to submit and pay for permit applications, and then to track approval and clearance. Key performance indicators show that the system has reduced the time it takes traders to apply for various permits and licenses and be granted them.

The Indonesian government has also launched a national single window system, one that now links the national customs system with more than 25 government agencies. The new system's implementation brought to light conflicting trade regulations issued by various ministries over time, revealing a need to regularly review and harmonize trade-related regulations. The system also established a mechanism for regular private sector consultation. Initially created to fix deficiencies in system implementation, the consultation mechanism quickly evolved into a more general forum, where traders discuss trade regulations with government officials. These discussions have led to some regulations being simplified—and some being repealed.

In both countries, customs hosts the national single window system's information and communications technology infrastructure. Also in both countries, the system's design and development involved both public and private stakeholders. The Philippines's system was led by customs, Indonesia's by the Coordinating Ministry for Economic Affairs (directly led by the Deputy Minister for Industry and Trade Affairs). Although the two countries used different coordination mechanisms, each improved its border management substantially—without resorting to expensive, likely disruptive, organizational restructuring.

Box 2.2 Customs reform in Sub-Saharan Africa: Cameroon Customs' key performance indicators

Cameroon Customs has been collecting more revenue, facilitating more trade, and fighting more corruption since 2010. How? By introducing individual performance contracts and relying on verifiable indicators.

Cameroon began reforming its customs in 2007 with the installation of a new customs clearance system, not just to track processing for each consignment but also to measure the performance of customs officers.[1] Performance indicators measured how frontline officers applied reforms initiated by upper management.

The initial quantification phase bore fruit, but the next phase stalled. In 2010, Cameroon Customs conducted an experiment to give the reform new impact, introducing individual performance contracts to measure the actions and behaviors of customs officers at two of the seven Douala port bureaus. The performance indicators—extracted from the computer system—focused on trade facilitation (especially file processing speed) and on combating fraud and other malpractice.

After several months, the Cameroon Customs offices with individual performance contracts performed better than the offices without (the control group) on indicators for reducing corruption, collecting revenue, and facilitating trade. Duties and taxes assessed in Douala Port I were up 6.2 percent from the same period in 2009, though the number of imported containers was down 3 percent. The revenue added during the experiment was estimated at more than 23 million euros.[2]

The experiment has had a major impact on Cameroon Customs officers and trade stakeholders, demonstrating that change is possible and lucrative. Customs reform should take a comprehensive approach based on three principles:

- *Strengthen accountability.* Have an external audit or stronger scrutiny from parliament and systematically publish revenue collection data and other customs performance data in the media.
- *Make information more symmetrical between the principal (head of customs) and the agent (frontline customs officer).* Generate accurate information on economic activities and behaviors.
- *Design a new human resources policy.* Change the incentive structure for frontline customs officials and regularly monitor staff performance using objective data.

Notes

1. Cantens and others 2011.
2. The estimated revenue added during the pilot (all else equal) is the revenue collected during the experiment minus the number of declarations during the experiment, multiplied by the average taxes and duties of 2009.

Comparing table 2.6 with its equivalent for the 2010 LPI (*Connecting to Compete 2010,* table 2.4) shows that the logistics gap between the leading and lagging performers is not merely persistent but has widened over time. Since 2010, more respondents in the top LPI quintile have become satisfied with the performance of customs agencies (up from 62 percent to 68 percent) and of health and SPS agencies (up from 57 percent to 59 percent), while their rate of

Table 2.6 Respondents rating the quality and competence of three border agencies as "high" or "very high," by LPI quintile

Percent of respondents

	Customs agencies	Quality/standards inspection agencies	Health/sanitary and phytosanitary agencies
Bottom quintile	19	17	11
Fourth quintile	21	16	14
Third quintile	41	31	29
Second quintile	32	22	17
Top quintile	68	62	59

Source: Logistics Performance Index 2012.

The gap in satisfaction between customs and other border agencies is especially striking for health and sanitary and phytosanitary agencies

satisfaction with quality and standards inspection agencies has not changed. In the bottom quintile, however, the rate of satisfaction with all three border agencies has declined (customs down from 26 percent to 19 percent, quality and standards inspection agencies down from 24 percent to 17 percent, health and SPS agencies down from 15 percent to 11 percent).

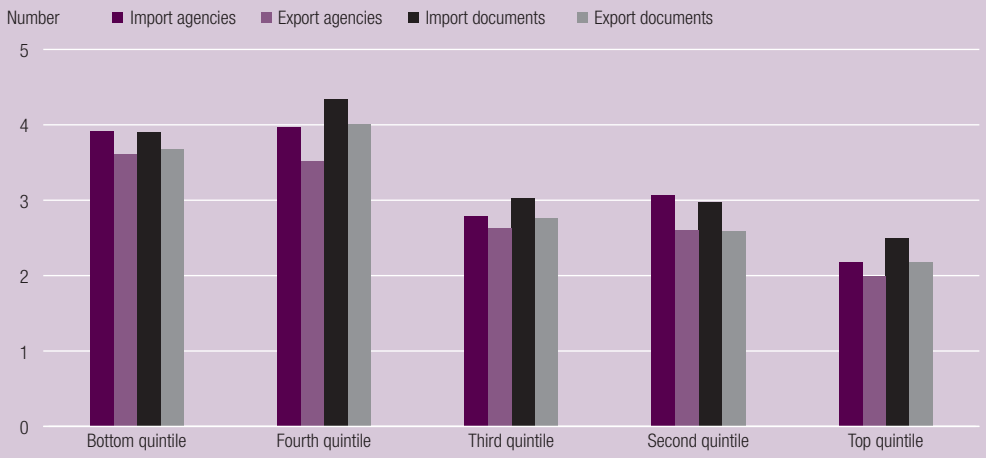
Red tape

Indicators for red tape show the same lack of coordination at the border, with a resulting burden on private logistics operators. In countries in the top LPI quintile, operators typically deal with around half as many government agencies as do those in countries in the bottom LPI quintile (figure 2.5). Similarly, countries in the top quintile typically require two or three documents for export and import transactions; those in the bottom quintile require four or five.

Yet a comparison of red tape indicators in the 2010 LPI with those in the 2012 LPI is encouraging. Importers and exporters saw a reduction in the number of agencies they must contact, except in countries in the top LPI quintile, where the number remains low. And all LPI quintiles reduced the number of documents required for importing and exporting.

Simplifying documentation for imports and exports has long been high on the trade facilitation agenda, prompting initiatives to bring border agencies together and to create a single window for trade. The International Finance Corporation's Doing Business indicators place high weight on such simplification. Still, simplification and single window initiatives themselves are not enough. Also essential is improving other aspects of border management and, more generally, soft and hard trade-related infrastructure.

Figure 2.5 Red tape affecting import and export transactions, by LPI quintile



Source: Logistics Performance Index 2012.

In the bottom LPI quintile, 60 percent of respondents report that shipments are often or nearly always delayed by compulsory warehousing or preshipment inspection

Delays, reliability, and service delivery

Some causes of underperformance are endogenous to a country's supply chain: the quality of service and the costs and speed of clearance processes. But other causes, such as dependence on indirect maritime routes, lie outside the domestic supply chain and are not under a country's control.

The LPI details possible causes of delay that are not directly related to how domestic services and agencies perform (table 2.7). Between the top and bottom LPI quintiles there is, again, a striking contrast. This contrast, appearing in all five LPI delay categories, is especially large in three: informal (corrupt) payments, compulsory warehousing, and maritime transshipment.

Delays and unexpected costs are common in low LPI quintiles, where they limit overall supply chain performance. Worse, the incidence of delays is increasing across LPI quintiles—especially in the lower ones. In the bottom quintile, 60 percent of 2012 LPI respondents report that shipments are often or nearly always delayed by compulsory warehousing or preshipment inspection—a stark increase from 2010, when 39 percent reported delays from compulsory warehousing and 34 percent from preshipment inspection. Sampling error may account for some of these differences, but it is unlikely to tell the full story. Declining supply chain predictability, an urgent commercial problem, has prompted some firms to launch premium on-time delivery guarantee services.

Predictable, reliable supply chains are central to good logistics performance. Indeed, highly variable lead times can disrupt production and exporting. Firms would have to adopt costly strategies, such as the use of express shipments or of sharp increases of inventories to hedge against the lack of inventory. Recent research introduced the concept of total logistics costs[15] encompassing three areas:

- Freight transport.
- Indirect costs and overheads, supported internally or paid externally to organize the supply chain (agency fees, official or non-official payments).
- Costs induced by the lack of the reliability, such as in inventories. All else equal, these costs are often much higher for time-sensitive goods.

Delays rise steeply with lower logistics performance—a fact highlighted in the two previous editions of *Connecting to Compete*.[16] Thus, a stark difference in on-schedule arrival rates separates countries at the bottom and top of the LPI ranking (figure 2.6). In the top LPI quintile, most respondents report that import and export shipments "nearly always" arrive on schedule. In the bottom quintile, fewer than a third of respondents report "nearly always" for imports—and fewer than two-thirds for exports.

The lack of reliability and unpredictable delays, which do more damage than the average costs and time that can be factored into the supply chains, create high induced-logistics costs in low logistics-performance environments and add dramatically to the challenge of economic diversification in low-income and many middle-income economies. By contrast, Morocco, which invested in improving

Table 2.7 **Respondents reporting that shipments are "often" or "nearly always" delayed, by delay category and LPI quintile**

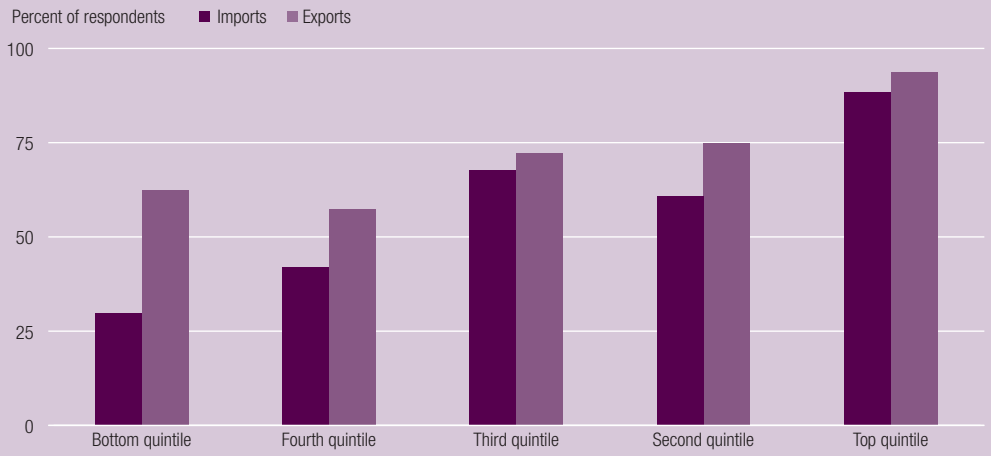
Percent of respondents

	Compulsory warehousing	Preshipment inspection	Maritime transshipment	Criminal activity	Informal payments
Bottom quintile	60	60	56	21	40
Fourth quintile	37	46	40	12	31
Third quintile	11	18	34	4	13
Second quintile	20	24	27	14	21
Top quintile	8	11	9	5	5

Source: Logistics Performance Index 2012.

The lack of reliability and unpredictable delays do more damage than the average costs and time

Figure 2.6 **Respondents reporting that shipments are "often" or "nearly always" cleared and delivered as scheduled, by LPI quintile**



Source: Logistics Performance Index 2012.

logistics during the 2000s, could develop a logistics industry that can support far more complex supply chains than in the recent past. In 2012, Renault-Nissan began operating at its Tangier factory with a production capacity of 400,000 cars for export, the first such venture in Africa.

The bottom LPI quintile has the largest difference between on-schedule arrival rates for exports and those for imports (see figure 2.6). The much lower percentage of high ratings for imports suggests that supply chain unreliability discriminates in practice (if not in law) against foreign goods. As traditional trade barriers collapse around the world, policies contributing to such de facto discrimination become ever larger determinants of performance and trade outcomes. Addressing the causes of unexpected delays—including unpredictability in clearance, inland transit delays, and low service reliability—should thus be an important part of logistics reform in low-performing countries.

Figure 2.7 **Respondents reporting that shipments are "often" or "nearly always" cleared and delivered as scheduled, by World Bank developing country region**

Source: Logistics Performance Index 2012.

Box 2.3 Who is to blame for delays?

A key indicator in international logistics is the dwell time of import containers in ports (the average delay between unloading and exit). The question of responsibility for dwell time often starts a blame game between control agencies and port authorities (faulted for slow clearance) and private operators (suspected of using the port for storage).

In ports with efficient logistics, dwell time can be just two or three days. In the main port gateways for the developing countries in Asia, North Africa, the Middle East, and Latin America, it is no longer than seven days or so. But in Sub-Saharan ports, it is a staggering 14 days on average.

Data from customs and from container operators, now generally available through computer systems, can shed light on what determines dwell time. One analysis found that in middle-income and emerging economies, most parties—including port authorities and private sector operators—want to reduce dwell time, but that inefficiencies in information management cause delays and unpredictability. For example, Morocco recently found that it could reduce dwell time by two days at the port of Casablanca by changing how shipping lines transmit their ship manifests to customs.

Another study pointed to a very different explanation for dwell time in the least developed countries of Sub-Saharan Africa, where much dwell time results from collusion among control agencies, port authorities, private terminal operators, logistics operators, and large shippers. At Douala, for example, the port—not an external facility—is an importer's cheapest storage option for up to 22 days. Firm surveys show that in most cases, reducing cargo dwell time would increase importers' input costs. And terminal operators earn large revenues from storage, giving them little incentive to reduce dwell time.[1] The same type of analysis found no evidence of such perverse incentives in Morocco and Indonesia—middle-income countries with a diversified producer base concerned with supply chain performance.

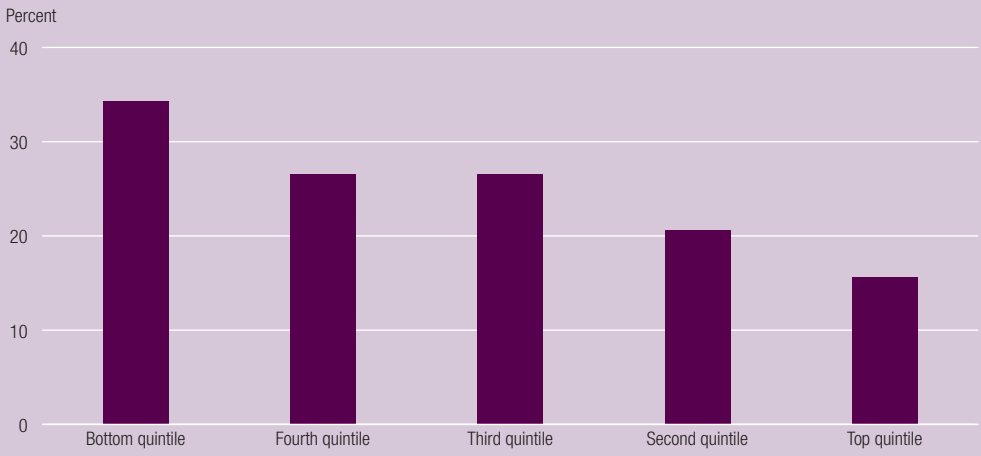
Note

1. Raballand and others 2012; World Bank 2012.

The patterns highlighted above are more striking in some World Bank regions than in others (figure 2.7). Export shipments are "often" or "nearly always" cleared and delivered as scheduled according to 59 percent of respondents in South Asia (the lowest performing region) and 75 percent of respondents in East Asia and Pacific (the highest performing region). Import performance varies more widely. In the Middle East and North Africa (the lowest performing region), 34 percent of respondents report that imports are "often" or "nearly always" cleared and delivered as scheduled, but in Europe and Central Asia (the highest performing region) the figure is 60 percent.

These data show a geographic predictability gap, with implications for competitiveness and the spread of regional supply chains and production networks. And this gap might be widening. Since the 2010 LPI, the percentage of respondents stating that shipments "often" or "nearly always" arrived as scheduled has risen strikingly in East Asia and Pacific—from 41 percent to 56 percent for imports and from 26 percent

Figure 2.8 **Shipments not meeting company quality criteria, by LPI quintile**



Source: Logistics Performance Index 2012.

to 75 percent for exports. In Sub-Saharan Africa, this figure has fallen for imports (from 56 percent to 43 percent) but risen for exports (from 47 percent to 69 percent). Sampling error might explain part of these changes. Still, it is important to renew attention to supply chain predictability in lower income regions. 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.

Supply chain predictability is not just a matter of time and cost (box 2.3). A further consideration—for private sector operators and their clients—is quality. And between low- and high-performing countries, the 2012 LPI reveals a wide gap in shipment quality (figure 2.8). In the top LPI quintile, just 15 percent of shipments do not meet company quality criteria. But in the bottom quintile, the proportion more than doubles—to around 35 percent.

The most important quality criterion in freight forwarding is delivery within the promised time window. Almost as important is the absence of errors in cargo composition or documentation. The acceptable quality window is much narrower (and errors much less tolerated) in high-performing countries than in low-performing countries. The shipment quality gap only partly reflects these differing expectations.

Since 2010, the percentage of shipments not meeting quality criteria has remained largely the same in all but the second quintile, where it rose 8 percentage points.

Since 2010, the percentage of shipments not meeting quality criteria has remained largely the same in all but the second LPI quintile, where it rose 8 percentage points

SECTION 3

The way forward: New challenges in trade facilitation and logistics

Since the release of *Connecting to Compete 2007*, logistics priorities have changed at the global and country levels, with special significance for poorer countries. Logistics efficiency and trade facilitation are now high on the agenda of policymakers, private firms, and international organizations. And many developing countries have pushed for reforms to increase supply chain efficiency and facilitate trade and transportation services.

The international community has supported these efforts. Projects dealing with logistics and trade facilitation constitute about 10 percent of the World Bank's overall portfolio. In 2010, the World Bank started the Trade Facilitation Facility, a donor-funded technical assistance initiative to target trade facilitation and logistics projects in low-income countries. Regional development banks in Asia, Africa, and the Americas have also stepped up their projects and capacity-building activities.[17]

Participants in the Doha Round negotiated new trade facilitation measures to be part of an eventual World Trade Organization agreement. The negotiations were productive, not only in their convergence toward common measures but also in the participation of low-income countries —with associated capacity building to ready countries for implementation. Regional forums have also made trade facilitation and supply chain performance a priority, integrating members through such initiatives as the Asia-Pacific Economic Cooperation (for supply chain connectivity) and the Association of Southeast Asian Nations (for a single window system). Specialized public and private organizations promoting awareness, good practices, and capacity building include the World Customs Organization, the International Road Transport Union, the International Federation of Freight Forwarders Associations, and the Global Express Association.

Despite this rise in global awareness, logistics and trade facilitation priorities are ultimately set by countries—or regionally, in small and consistent country groups. Countries have varying reform and improvement needs. Also, since a supply chain is no stronger than its weakest link, mitigating one performance bottleneck might not yield all the projected benefits until progress is made in other areas.

Constraints on logistics performance share similar patterns in countries with similarly advanced—or similarly lagging—reform programs. According to the typology used in *Connecting to Compete 2007* and *2010*, countries fall into four groups: logistics unfriendly, partial performers, consistent performers, and logistics friendly (see section 1 of this report for details).

Three trends are in play across these groups. One is the international community giving more attention to logistically constrained countries. These countries often face governance challenges (postconflict countries and fragile states), and some have their access to global markets limited by geography or the size of their economy (landlocked developing countries, small-island states, small economies distant from main trade routes). Even with fairly successful border management reforms and general improvements in the business climate, logistically constrained countries—such as Malawi, Rwanda, and other least developed countries in Sub-Saharan Africa—may be unable to boost their connectivity and logistics performance on their own. They must depend instead on international cooperation to achieve economies of scale or to loosen bottlenecks. The UN-supported Almaty Program of Actions for Landlocked and Transit Developing Countries demonstrates the international community's renewed attention to helping these countries address their logistics predicaments.[18]

Respondents in the 2012 LPI voiced widespread dissatisfaction with port infrastructure in all developing regions

A second trend is the increasing complexity of reforms—a clear trend in projects supported by the World Bank. New projects typically involve several sectors, complementary stakeholder groups, and, increasingly, several countries. Since hard and soft components often cannot be treated independently, investments in trade-related infrastructure should go hand in hand with efforts to reform border management agencies or to improve regulation and stimulate the market for competitive services.

A third trend is that logistics challenges and priorities are continually evolving. Policymakers and international organizations must shift their attention and adapt.

Infrastructure

Investment in trade-related infrastructure is the most established form of public intervention, either through direct investment and maintenance or through public-private partnerships. The LPI surveys show a wide gap in perceived infrastructure performance between OECD countries and developing countries—but with important variations.

First, although ICT is essential for trade operations and is increasingly automated, it is not a major cause for concern. Its quality and availability are high and generally consistent across all income groups.

Second, concerns with road quality are high in the two lowest LPI quintiles, in South Asia, and—surprisingly—in the Middle East and North Africa.

Third, poor rail infrastructure is persistent. Respondents who rate rail quality as "high" or "very high" number half as many as for other infrastructure areas at most (as in the 2010 LPI). Satisfaction with rail infrastructure is highest in the Middle East and North Africa and Europe and Central Asia. Yet even in these regions, rail infrastructure is rated lower than are other infrastructure types. Although rail use reduces carbon emissions, price signals alone are unlikely to shift traders toward freight modes that are more environmentally friendly than trucking. Only with major qualitative changes can countries bridge the gap in rail logistics performance and quality. For instance, highly efficient container movements that compete with road transport are very few and are concentrated in a few OECD countries.

More surprising, concerns with port logistics are high. Respondents in the 2012 LPI voiced widespread dissatisfaction with port infrastructure in all developing regions—and in all LPI quintiles except the top. What does this mean about the drive for developing country port reforms in recent decades? It is now normal in developing countries for commercial and services activities to be separated from the port authority, and there are many examples of successful private sector participation in container terminal operations. Anecdotal evidence suggests that investment has yet to catch up with the rapidly growing volume of container trade, with many older ports reaching their physical limits—notwithstanding the facilitation measures that speed up the throughput and that delay the need for investment.

Dissatisfaction with port infrastructure in developing countries likely stems from two principal sources:

- A sheer lack of capacity, and thus a lack of investment, resulting from the reduced fiscal space and from the reduced appetite for private sector involvement in the least developed countries that followed the global financial crisis (despite the resumption of trade flows).
- Inefficient operations at existing facilities—the result of lacking or incomplete sector reforms, in turn causing poor performance and artificial congestion (congestion not absolutely related to the lack of capacity, though quite real for users).

The natural course of action would be to start with attention to sector reforms, making port operations more efficient before considering new capacity investments.

Improving logistics services in developing countries

Because service to traders is ultimately delivered by private companies, another key part

of the new agenda is improving logistics and trade-supporting services. Their quality is central to facilitating trade and transport—both directly and indirectly, through related regulatory reforms.

Some emerging countries are trying to position themselves as logistics hubs, seeing an opportunity to diversify in the development of logistics services. In 2011, for example, Morocco established an agency for logistics development. Banking on its location and on the success of its investment in the transshipment port at Tanger Med, the country is pursuing a policy to develop freight and logistics facilities and services that reach beyond its own economy—to North Africa, Southern Europe, and West Africa. Similar strategies are in place in Malaysia, Panama, and elsewhere.

Two main causes of inefficiency in developing countries are the fragmentation of services and the small size of local markets. Fragmentation, which cuts against the integration of global supply chains,[19] has many causes. One is the policy of separating functions. For instance, certain regulations still require customs brokers to be independent from transport providers.

Since the 2010 LPI, the trucking market has become a major focus of service reforms. Trucking surveys indicate that freight cost differentials across countries often result from inefficiencies in the market structure for transport providers and from regulatory barriers preventing open competition.[20]

National and regional regulators must create substantial incentives to promote reliable, high-quality services—especially through eliminating barriers to entry. This agenda presents many new challenges, but the political economy might not favor changing current business practices or limiting conventional rent-seeking. Also, change could require tradeoffs that are difficult socially and for the poor. Traditional organizations tend to be labor-intensive: West Africa's small truckers' organization needs twice as many trucks per quantity transported than does commercial trucking in Southern Africa—and employs one and a half times as many workers per truck (2.2 to 1.5).

Coordinating border management

The 2010 and 2012 LPI data suggest that customs procedures are already converging, with pre-arrival clearance, online submission, and post-clearance auditing now widely available (see table 2.5). One reason is the dissemination of World Customs Organization and World Trade Organization principles, supported by technical assistance and capacity building.

Yet customs is not the whole of border management. Delays and unexpected problems in quality and standards inspection agencies, and in health and sanitary and phytosanitary agencies, are just as able as poor customs procedures to create supply chain problems and thus poor overall logistics performance (see table 2.6).

Key to the new agenda is a more holistic approach to the clearance of goods. Such an approach requires more collaboration among all border management agencies—standards, sanitary, phytosanitary, transport, and health—and the adoption of modern approaches to regulatory compliance. Even if customs is highly automated and practices risk management through the selective use of physical inspection, these improvements will matter little as long as other government agencies are not automated and persist in routine physical inspections of all imported goods.[21]

Reducing the number of formalities and procedures is a main tool of trade facilitation. Countries are now seeking to reduce the incidence of intervention—in number of agencies or at least in number of physical interfaces with these agencies. The holistic approach has elicited innovative border management approaches. One is the electronic national single window, which allows traders to submit all the import, export, and transit formalities required by multiple regulatory agencies through a single online gateway (rather than through various government entities, some automated and others still relying on paper). Such initiatives benefit the trading community by cutting the cost and time for formalities and provide governments with opportunities to streamline the processes. The same is true for cross-border initiatives, such as one-stop border posts, which aim to integrate

Key to the new agenda is a more holistic approach to the clearance of goods, which requires more collaboration among all border management agencies

Developing regions need extensive changes in their transit regimes and corridor arrangements, most of which were designed more than 30 years ago and few of which are fully in place

agency processes by harmonizing two countries' procedures and sharing their information and resources.

Yet implementing these innovative approaches is complex. The many participating agencies, often with diverging mandates and interests, create a challenge to sustainable institutional reform and determining which agency or entity is responsible for the operation.

Regional facilitation and integration

Regional integration initiatives sought, early on, to facilitate trade and transport. Much trade among neighbors takes place on overland transport corridors. And logistics-unfriendly countries—many of them landlocked and post-conflict, with small economies—depend heavily on trade and transit systems set up with larger neighbors, themselves not always high logistics performers. As the UN Almaty Program of Action underlined, countries with these challenges require the international community's help to reduce logistics costs and develop sustainable exports. The World Bank supports facilitation and integration projects in 14 of its subregions.

But the challenge is not just to improve border crossing. Regional facilitation and integration involve provisions and agreements to organize the movement of goods, vehicles, and trade-related information.[22] Making transit systems effective for trade across corridors has been least problematic in Western Europe and North America. The United States and Canada have recently reengineered their border procedures to facilitate trade while reinforcing security. And a new Beyond the Border Action Plan, announced on December 7, 2011, includes cutting-edge trade and traveler facilitation measures and greater information sharing.[23]

Developing regions need extensive changes in their transit regimes and corridor arrangements, most of which were designed more than 30 years ago and few of which are fully in place. But these regions also need other logistics changes, especially in services and border management. All these efforts face similar obstacles.[24]

National data for reforms

Logistics-related reforms and projects need reliable indicators—to inform the dialogue among policymakers, the private sector, and other stakeholders and to monitor impact. The LPI and its indicators allow comparisons across countries, but as benchmarks they are coarse-grained.

For greater detail and specificity, countries can tailor new logistics-related indicators (such as port and corridor indicators) to their projects. And for some activities, countries can also measure logistics costs. Some high-income and emerging economies have government initiatives and partnership projects to systematically measure national supply chain performance. Canada has focused on collecting, aggregating, and analyzing supply chain data (cost, time, and reliability) at the micro level (box 3.1). Other countries have focused on the demand side, looking at the share of logistics in production costs for the country's main activities—through surveys (Finland, France, Germany, Thailand)[25] or through a reinterpretation of available statistics (Brazil, Germany, South Africa, the United States).

The turn toward national observatories to measure logistics costs should be encouraged, and it should be part of the emerging international effort to solve methodological problems cooperatively. Still, it should be clear that gains in national detail often diminish the comparability of data across borders. A country's supply chain depends on its geography and production structure, and primary data differ considerably across countries. Canada and Australia have recently proposed a common core—based on the LPI—to make data more comparable and to help develop new data capacities and observatories in developing countries.

Supply chain sustainability and development

Logistics is increasingly seen as important, for both competitiveness and sustainability. Logistics directly affects food security—price and local availability—through the performance

Box 3.1 **Beyond the LPI: Canada's effort to develop in-depth, customized data collection**

Adapting to an age of increasing competiveness in global trade networks, Canada has looked beyond the LPI to monitor domestic logistics performance. Are Canada's gateways and supply chains reliable, given its geography and trade composition? To answer that question, its federal ministry of transportation (Transport Canada) began using performance indicators to measure efficiency in ports and supply chain transport. Canada hopes to use these indicators to help set performance targets, guide national policy, and measure returns on infrastructure investments.

The monitoring project began in 2008. Canada's largest port authorities worked with academics to develop indicators that could capture the complexities of port operations in container and bulk cargo transport, as well as in transport along attached land corridors. To discover how efficiently freight moved through the country, Transport Canada used fluidity indicators to capture the average travel time of cargo from overseas through Canadian gateways to North American inland destinations.

The fluidity indicators look at the operational interaction of gateways and strategic trade corridors, using data exchange partnerships with private carriers, such as trucking companies (who voluntarily supply the primary data). What has been learned so far? One example: Western Canadian gateways connecting Asia to Central Canadian markets performed well in 2010 and 2011. Substantial gains were made in the port interface (reduced dwell time) and in rail transit performance—two ports in British Columbia improved 21 percent. But because ocean transit times increased over the same period, overall cargo transit times in 2011 were much the same as in 2010.

The monitoring project shows how countries can build on the LPI to shed light on more specific factors in trade-related performance, increasing accountability and oversight for key assets and trade-related infrastructure. Insightful performance measurement can help governments, such as Canada's, amend policies and investments with greater precision. It can also involve international collaboration. Through an initiative of the Asia-Pacific Economic Co-operation (APEC), Canada and Australia (which has been developing its own indicator strategy) are working toward a common, in-depth set of detailed indicators. The two countries hope that developing economies in the APEC group will use the new indicators and so benefit from the experience and expertise of more advanced countries and international institutions.

and resilience of food supply chains. That is especially true for African and Middle Eastern countries that depend heavily on food imports (see box 1.1).

Logistics affects the environment and climate change even more directly. How can the world achieve a more sustainable balance among economic, environmental, and social objectives? Green logistics is quickly gaining prominence in high-income and emerging economies[26] and is likely to become more important elsewhere.

Logistics and freight-related activities may account for up to 15 percent of human carbon dioxide emissions, in part because of fossil fuels. More fuel-efficient vehicles and cleaner practices mean better logistics. It may be possible for logistics to diminish its carbon footprint with higher load factors or fewer trips. But emissions can be reduced the most through a shift away from higher emission transport modes—that is, if lower emission modes (which in many cases are also slower) can be made more attractive through better service delivery and predictability.[27] To meet shippers' expectations, lower emission modes in most regions will require vast qualitative improvements.

Environmentally friendly initiatives have combined regulation with the voluntary changes of industry actors. In Europe, 20 years of consistent policies and large investments in new technologies helped reduce emissions of carbon monoxide, hydrocarbons, nitrogen oxides, and particulates by 98 percent. The global road transport industry, on its own initiative, has committed to reducing its carbon dioxide emissions 30 percent by 2030.[28] Another driver of change, likely to become a major one, is shipper demand (box 3.2).

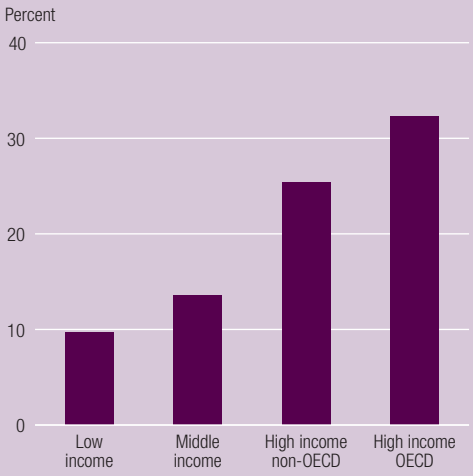
Large logistics service providers, notably the four main express carriers (DHL, FedEx, UPS, TNT), have anticipated this trend in shipper demand and developed global products and programs to meet it. First, they have global initiatives to reduce the footprint of their operations and those of contractors—shifting to more efficient vehicles (as in DHL's conversion of its New York fleet to hybrid and electric),[29] making facilities more efficient, training staff members, and so on. Second, they have ways to help shippers reduce their supply chain footprint. For example, under DHL's GoGreen program, clients are offered offsets for carbon-neutral logistics, consultation on greener

Box 3.2 A shipper's demand for green supply chain solutions

The survey for the 2012 LPI included a question on shippers' environmental preferences: "How often do shippers ask for environmentally friendly options (e.g., in view of emission levels, choice of routes, vehicles, schedules) when shipping to . . .?"

The responses show that one-third of shippers, on average, are concerned with the environmental footprint of their international supply chain when shipping to OECD countries. For shippers to low-income countries, the share is only one-tenth.

Respondents reporting that shippers have "often" or "almost always" asked for environmentally friendly options when shipping to particular regions, by income group



Source: Logistics Performance Index 2012.

solutions (including modal and distributional changes), and logistics footprint dashboards for decisionmaking. The program handled 1.8 billion shipments in 2011 and offset 135,000 tons of carbon emissions.

These changes will likely help expand the green logistics movement from rich, already environmentally sensitive economies to developing countries. Logistics performance and sustainability are being seen, more and more, as complementary objectives.

A trade logistics reform matrix

Reforms must be implemented as coherent packages, and they require sustained, long-term attention. There is not one unique institutional arrangement for countries to implement logistics-related reforms. Indeed, policymaking is a responsibility shared among government agencies in charge of transportation policies and investment, commerce, industry, and customs and border management. No country has a ministry for logistics. Instead, a collective framework that includes the private sector is important for consistent implementation. Canada, China, Finland, Germany, Malaysia, and Morocco have all introduced councils or similar coordination mechanisms.

The focus and leadership of logistics reforms depend on local circumstances. In advanced and emerging economies, transportation agencies have more often led the coordination, with an increasingly environmental focus. In developing countries, the agencies in charge of commerce and economic development have also played a major role in promoting the facilitation and logistics agenda. Experience shows the complementarities between hard and soft interventions, especially in low-income regions. For

Table 3.1 Trade logistics reform matrix

LPI component	Bottom quintile	Third and fourth quintiles	Second quintile	Top quintile
Physical infrastructure	✔✔	✔✔	✔✔	
Information and communications technology	✔	✔		
Customs	✔✔✔	✔✔	✔	
Integration of border management	✔	✔✔✔	✔✔✔	✔
Services	✔✔	✔✔✔	✔✔✔	
Regional facilitation and corridors	✔✔✔	✔✔	✔✔	
National data tools	✔	✔	✔✔✔	✔✔✔
Green logistics			✔✔	✔✔✔

✔✔✔ is very important; ✔✔ is important; ✔ is fairly important.
Source: Authors.

example, improvements in trade facilitation are implemented more easily with physical investment to develop or rehabilitate international transport infrastructures, such as road or rail corridors.

The 2012 LPI shows preconditions for efficient logistics. All top performers have developed and maintained a long tradition of strong public-private partnership and dialogue; good cooperation between policymakers, practitioners, administrators, and academics; a comprehensive approach in the development of services, infrastructure, and efficient logistics; and consistent policies in transport and logistics.

Focus areas and priorities also depend on countries and their level of performance. The association between needs and level of performance is not entirely scientific. However, based on the results in section 2 and on project experience from the many contributors to this report, a matrix can suggest reforms appropriate to a country's level of logistics efficiency (table 3.1).

Improvements in trade facilitation are implemented more easily with physical investment to develop or rehabilitate international transport infrastructures

Notes

1 This report references the six LPI indicators by their short names: customs, infrastructure, international shipments, logistics quality and competence, tracking and tracing, and timeliness.

2 Kallas 2012.

3 Mongelluzzo 2012.

4 Klaus and Kille 2007.

5 Klaus, Kille, and Schwemmer 2011.

6 The following countries had to be excluded from the international LPI sample due to an insufficient number of responses or other data reliability concerns: Bangladesh, Israel, Mali, Mozambique, Nicaragua, Somalia, Turkmenistan, Uganda, and Zambia.

7 The responses from this question were used not to compute the LPI but as a floating question to capture trends that might be relevant.

8 The Incoterms® (International Commercial Terms) rules are an internationally recognized standard and are used worldwide in international and domestic contracts for the sale of goods. First published in 1936, Incoterms® rules provide internationally accepted definitions and rules of interpretation for most common commercial terms. Developed and maintained by experts and practitioners brought together by the International Chamber of Commerce, the rules help traders avoid costly misunderstandings by clarifying the tasks, costs, and risks involved in delivering goods from sellers to buyers. The United Nations recognizes Incoterms® rules as the global standard for interpreting the most common terms in foreign trade (International Chamber of Commerce 2010).

9 Only Belgium, Norway, and Luxembourg were outside the top 10 in 2007, but Belgium and Norway were in the top 20 in 2007 and Luxembourg in the top 25.

10 Hoekman and Nicita 2011.

11 Reis and Farole 2012.

12 Other countries in the overperformers group, mostly low income and lower middle income, are not counted here, as there is little ground-based evidence indicating their engagement in any reforms that could be linked to their better performance, other than the statistical relationship between income and LPI score.

13 Although the respondents in the LPI survey are freight forwarders and express carriers, the quality and competence of service providers are assessed by their competitors.

14 Arvis and Shepherd 2011.

15 Arvis and others 2010.

16 Arvis and others 2010.

17 IDB 2012.

18 Arvis and others 2011.

19 Kunaka, Mustra, and Saez forthcoming.

20 Raballand and Teravaninthorn 2008.

21 McLinden and others 2011.

22 Arvis, Raballand, and Marteau 2010; Arvis and others 2011.

23 www.borderactionplan.gc.ca.

24 Arvis, Raballand, and Marteau 2010; World Bank 2008.

25 Rantasila and Ojala 2012.

26 McKinnon and others 2010.

27 World Bank 2012.

28 Resolution of the General Assembly of the International Road Transport Union, representing truck, bus, coach, and taxi operators through its 180 members in 74 countries on five continents (see www.iru.org/cms-filesystem-action?file=en_Resolutions_General%20transport%20policy/09_30-30.E.pdf).

29 Deutsche Post DHL 2012.

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
Singapore	1	1	2	4.13	4.06	4.19	100.0	1	4.10	2	4.15	2	3.99	6	4.07	6	4.07	1	4.39
Hong Kong SAR, China	2	1	2	4.12	4.05	4.19	99.9	3	3.97	7	4.12	1	4.18	5	4.08	5	4.09	4	4.28
Finland	3	1	15	4.05	3.81	4.29	97.6	2	3.98	6	4.12	4	3.85	1	4.14	1	4.14	15	4.10
Germany	4	3	7	4.03	3.97	4.09	97.0	6	3.87	1	4.26	11	3.67	4	4.09	7	4.05	2	4.32
Netherlands	5	3	7	4.02	3.94	4.11	96.7	8	3.85	3	4.15	3	3.86	7	4.05	2	4.12	12	4.15
Denmark	6	1	15	4.02	3.82	4.22	96.6	4	3.93	10	4.07	8	3.70	2	4.14	4	4.10	7	4.21
Belgium	7	3	13	3.98	3.85	4.11	95.3	7	3.85	8	4.12	6	3.73	8	3.98	8	4.05	9	4.20
Japan	8	7	11	3.93	3.88	3.99	93.8	11	3.72	9	4.11	14	3.61	9	3.97	9	4.03	6	4.21
United States	9	8	11	3.93	3.88	3.98	93.7	13	3.67	4	4.14	17	3.56	10	3.96	3	4.11	8	4.21
United Kingdom	10	8	14	3.90	3.84	3.96	92.7	10	3.73	15	3.95	13	3.63	11	3.93	10	4.00	10	4.19
Austria	11	3	19	3.89	3.70	4.08	92.5	9	3.77	11	4.05	7	3.71	3	4.10	11	3.97	31	3.79
France	12	10	17	3.85	3.77	3.93	91.2	14	3.64	14	3.96	5	3.73	14	3.82	12	3.97	23	4.02
Sweden	13	5	22	3.85	3.68	4.02	91.2	12	3.68	5	4.13	29	3.39	12	3.90	17	3.82	5	4.26
Canada	14	8	17	3.85	3.76	3.94	91.1	17	3.58	12	3.99	18	3.55	13	3.85	14	3.86	3	4.31
Luxembourg	15	1	29	3.82	3.49	4.16	90.3	18	3.54	20	3.79	9	3.70	15	3.82	13	3.91	11	4.19
Switzerland	16	8	24	3.80	3.66	3.95	89.7	5	3.88	13	3.98	24	3.46	18	3.71	15	3.83	24	4.01
United Arab Emirates	17	12	19	3.78	3.70	3.85	88.9	15	3.61	17	3.84	15	3.59	17	3.74	18	3.81	13	4.10
Australia	18	16	24	3.73	3.63	3.82	87.2	16	3.60	18	3.83	28	3.40	16	3.75	19	3.79	17	4.05
Taiwan, China	19	16	24	3.71	3.60	3.82	86.6	22	3.42	21	3.77	16	3.58	20	3.68	21	3.72	14	4.10
Spain	20	17	24	3.70	3.60	3.80	86.4	25	3.40	24	3.74	10	3.68	19	3.69	23	3.67	22	4.02
Korea, Rep.	21	18	24	3.70	3.64	3.76	86.2	23	3.42	22	3.74	12	3.67	22	3.65	22	3.68	21	4.02
Norway	22	7	32	3.68	3.36	4.01	85.9	21	3.46	16	3.86	21	3.49	23	3.57	24	3.67	16	4.09
South Africa	23	16	24	3.67	3.52	3.82	85.5	26	3.35	19	3.79	20	3.50	24	3.56	16	3.83	20	4.03
Italy	24	18	24	3.67	3.61	3.73	85.4	27	3.34	23	3.74	19	3.53	21	3.65	20	3.73	18	4.05
Ireland	25	23	32	3.52	3.36	3.68	80.6	24	3.40	31	3.35	27	3.40	25	3.54	25	3.65	33	3.77
China	26	25	29	3.52	3.46	3.58	80.5	30	3.25	26	3.61	23	3.46	28	3.47	31	3.52	30	3.80
Turkey	27	25	32	3.51	3.38	3.64	80.3	32	3.16	25	3.62	30	3.38	26	3.52	29	3.54	27	3.87
Portugal	28	25	32	3.50	3.34	3.66	80.1	31	3.19	28	3.42	25	3.43	27	3.48	26	3.60	26	3.88
Malaysia	29	25	31	3.49	3.40	3.59	79.8	29	3.28	27	3.43	26	3.40	30	3.45	28	3.54	28	3.86
Poland	30	25	34	3.43	3.27	3.59	77.8	28	3.30	42	3.10	22	3.47	32	3.30	37	3.32	19	4.04
New Zealand	31	25	39	3.42	3.17	3.67	77.4	20	3.47	29	3.42	33	3.27	34	3.25	27	3.58	48	3.55
Iceland	32	25	36	3.39	3.20	3.59	76.6	19	3.53	30	3.39	47	3.01	29	3.47	35	3.39	40	3.62
Qatar	33	25	48	3.32	3.05	3.59	74.3	34	3.12	34	3.23	64	2.88	35	3.25	32	3.50	25	4.00
Slovenia	34	25	48	3.29	3.05	3.52	73.1	38	3.05	33	3.24	31	3.34	33	3.25	44	3.20	43	3.60
Cyprus	35	25	62	3.24	2.89	3.60	71.8	39	3.02	38	3.17	36	3.21	37	3.17	36	3.36	51	3.54
Bulgaria	36	33	51	3.21	3.03	3.39	70.7	41	2.97	36	3.20	34	3.25	42	3.10	48	3.16	47	3.56
Saudi Arabia	37	35	45	3.18	3.10	3.25	69.7	51	2.79	35	3.22	42	3.10	47	2.99	42	3.21	34	3.76
Thailand	38	35	46	3.18	3.07	3.28	69.6	42	2.96	44	3.08	35	3.21	49	2.98	45	3.18	39	3.63
Chile	39	33	55	3.17	2.99	3.36	69.5	35	3.11	37	3.18	44	3.06	46	3.00	41	3.22	54	3.47
Hungary	40	33	52	3.17	3.01	3.33	69.5	47	2.82	40	3.14	52	2.99	36	3.18	30	3.52	61	3.41
Tunisia	41	30	61	3.17	2.90	3.44	69.4	33	3.13	54	2.88	65	2.88	40	3.13	40	3.25	35	3.75
Croatia	42	33	56	3.16	2.98	3.34	69.2	37	3.06	32	3.35	58	2.95	55	2.92	43	3.20	50	3.54

	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
Malta	43	33	54	3.16	2.99	3.33	69.0	49	2.81	41	3.10	37	3.17	45	3.01	56	3.05	32	3.79
Czech Republic	44	33	61	3.14	2.90	3.38	68.5	43	2.95	50	2.96	45	3.01	31	3.34	46	3.17	63	3.40
Brazil	45	35	52	3.13	3.02	3.24	68.2	78	2.51	46	3.07	41	3.12	41	3.12	33	3.42	49	3.55
India	46	44	53	3.08	3.00	3.15	66.4	52	2.77	56	2.87	54	2.98	38	3.14	54	3.09	44	3.58
Mexico	47	37	59	3.06	2.94	3.18	66.0	66	2.63	47	3.03	43	3.07	44	3.02	49	3.15	55	3.47
Bahrain	48	33	82	3.05	2.74	3.37	65.7	60	2.67	43	3.08	72	2.83	53	2.94	34	3.42	60	3.42
Argentina	49	37	61	3.05	2.90	3.19	65.5	83	2.45	52	2.94	32	3.33	51	2.95	38	3.30	72	3.27
Morocco	50	37	65	3.03	2.86	3.21	65.0	65	2.64	39	3.14	46	3.01	59	2.89	58	3.01	53	3.51
Slovak Republic	51	33	84	3.03	2.70	3.36	64.9	45	2.88	48	2.99	71	2.84	43	3.07	68	2.84	46	3.57
Philippines	52	37	67	3.02	2.85	3.20	64.8	67	2.63	62	2.80	56	2.97	39	3.14	39	3.30	69	3.30
Vietnam	53	37	72	3.00	2.81	3.20	64.1	63	2.65	72	2.68	39	3.14	82	2.68	47	3.16	38	3.64
Romania	54	45	66	3.00	2.85	3.14	63.8	61	2.65	87	2.51	53	2.99	64	2.83	53	3.10	29	3.82
Bosnia and Herzegovina	55	44	71	2.99	2.82	3.15	63.5	62	2.65	57	2.86	49	3.00	54	2.93	71	2.81	41	3.61
Uruguay	56	44	72	2.98	2.81	3.16	63.5	40	2.99	55	2.87	60	2.91	48	2.98	61	2.98	81	3.16
Egypt, Arab Rep.	57	40	75	2.98	2.79	3.17	63.3	69	2.60	45	3.07	51	3.00	50	2.95	66	2.86	64	3.39
Lithuania	58	36	87	2.95	2.68	3.22	62.3	55	2.73	82	2.58	55	2.97	57	2.91	83	2.73	37	3.70
Indonesia	59	46	76	2.94	2.78	3.11	62.2	75	2.53	85	2.54	57	2.97	62	2.85	52	3.12	42	3.61
Peru	60	46	76	2.94	2.78	3.09	61.9	58	2.68	67	2.73	66	2.87	56	2.91	60	2.99	62	3.40
Panama	61	46	81	2.93	2.75	3.11	61.6	74	2.56	51	2.94	79	2.76	63	2.84	57	3.01	56	3.47
Oman	62	44	89	2.89	2.63	3.14	60.4	36	3.10	49	2.96	77	2.78	77	2.73	94	2.59	80	3.17
Yemen, Rep.	63	45	89	2.89	2.64	3.14	60.3	110	2.29	74	2.62	38	3.14	69	2.79	51	3.12	70	3.29
Colombia	64	46	87	2.87	2.66	3.08	59.8	64	2.65	68	2.72	78	2.76	52	2.95	85	2.66	57	3.45
Estonia	65	41	102	2.86	2.55	3.17	59.5	79	2.51	63	2.79	74	2.82	65	2.82	59	3.00	75	3.23
Ukraine	66	55	84	2.85	2.72	2.99	59.3	88	2.41	70	2.69	83	2.72	61	2.85	50	3.15	68	3.31
Benin	67	41	104	2.85	2.53	3.17	59.3	70	2.59	83	2.57	119	2.44	58	2.90	65	2.87	36	3.74
Botswana	68	36	118	2.84	2.46	3.22	58.9	48	2.82	60	2.82	111	2.53	75	2.74	81	2.73	58	3.43
Greece	69	43	108	2.83	2.50	3.16	58.6	94	2.38	53	2.88	87	2.69	73	2.76	63	2.98	67	3.32
Kuwait	70	48	93	2.83	2.60	3.06	58.5	53	2.73	61	2.82	90	2.68	84	2.68	62	2.98	87	3.11
Pakistan	71	46	98	2.83	2.57	3.08	58.4	46	2.85	71	2.69	68	2.86	72	2.77	90	2.61	83	3.14
Mauritius	72	47	98	2.82	2.57	3.07	58.2	72	2.58	59	2.83	113	2.50	85	2.67	69	2.83	52	3.52
Malawi	73	48	101	2.81	2.56	3.06	57.8	77	2.51	64	2.78	48	3.01	60	2.85	102	2.56	88	3.09
Guatemala	74	58	89	2.80	2.64	2.97	57.7	68	2.62	81	2.59	75	2.82	71	2.78	73	2.80	77	3.19
Serbia	75	46	106	2.80	2.52	3.08	57.6	92	2.39	75	2.62	80	2.76	66	2.80	55	3.07	82	3.14
Latvia	76	48	109	2.78	2.50	3.06	56.9	56	2.71	86	2.52	84	2.72	93	2.64	64	2.97	90	3.08
Georgia	77	53	104	2.77	2.54	3.01	56.8	44	2.90	58	2.85	91	2.68	70	2.78	93	2.59	115	2.86
Albania	78	47	112	2.77	2.48	3.06	56.7	86	2.43	99	2.43	70	2.84	91	2.65	88	2.65	45	3.58
Ecuador	79	62	91	2.76	2.61	2.91	56.2	98	2.36	76	2.62	67	2.86	90	2.65	96	2.58	59	3.42
Bahamas, The	80	55	107	2.75	2.51	2.99	56.1	57	2.69	66	2.77	81	2.72	80	2.69	87	2.65	98	2.99
Sri Lanka	81	50	116	2.75	2.47	3.03	56.0	71	2.58	89	2.50	50	3.00	68	2.80	86	2.65	110	2.90
Costa Rica	82	62	97	2.75	2.58	2.91	55.9	80	2.47	80	2.60	69	2.85	101	2.53	72	2.81	78	3.19
Côte d'Ivoire	83	58	108	2.73	2.51	2.96	55.4	107	2.31	114	2.31	62	2.90	78	2.73	84	2.69	65	3.36
Madagascar	84	53	122	2.72	2.43	3.02	55.1	50	2.80	108	2.40	124	2.40	67	2.80	74	2.80	84	3.13
Dominican Republic	85	68	102	2.70	2.55	2.85	54.4	76	2.53	77	2.61	73	2.83	76	2.74	110	2.49	100	2.97
Kazakhstan	86	61	118	2.69	2.46	2.93	54.2	73	2.58	79	2.60	92	2.67	74	2.75	70	2.83	132	2.73
Niger	87	50	130	2.69	2.35	3.04	54.1	59	2.67	96	2.45	61	2.91	105	2.49	109	2.49	91	3.07
Tanzania	88	76	107	2.65	2.52	2.79	52.9	130	2.17	105	2.41	59	2.91	94	2.64	77	2.77	99	2.97

	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
Namibia	89	66	120	2.65	2.45	2.86	52.9	54	2.73	69	2.72	114	2.49	88	2.65	67	2.85	144	2.52
Bolivia	90	62	134	2.61	2.32	2.90	51.6	89	2.40	109	2.39	104	2.60	97	2.58	82	2.73	103	2.95
Belarus	91	68	127	2.61	2.38	2.84	51.6	121	2.24	65	2.78	107	2.58	89	2.65	98	2.58	114	2.87
Syrian Arab Republic	92	73	127	2.60	2.39	2.82	51.3	104	2.33	84	2.54	100	2.62	107	2.48	125	2.35	73	3.26
El Salvador	93	79	121	2.60	2.44	2.76	51.2	114	2.28	95	2.46	108	2.57	95	2.60	92	2.60	89	3.08
Guinea-Bissau	94	61	139	2.60	2.26	2.93	51.1	90	2.39	73	2.68	103	2.61	98	2.58	97	2.58	128	2.74
Russian Federation	95	88	109	2.58	2.49	2.68	50.7	138	2.04	97	2.45	106	2.59	92	2.65	79	2.76	94	3.02
Lebanon	96	62	139	2.58	2.26	2.90	50.6	124	2.21	102	2.41	85	2.71	119	2.38	91	2.61	86	3.11
Togo	97	68	134	2.58	2.32	2.84	50.5	112	2.29	94	2.46	40	3.13	124	2.29	115	2.46	123	2.77
Central African Republic	98	62	140	2.57	2.25	2.90	50.3	82	2.45	134	2.09	132	2.33	79	2.70	113	2.48	66	3.33
Macedonia, FYR	99	64	139	2.56	2.26	2.87	50.1	120	2.24	78	2.60	95	2.66	86	2.66	120	2.41	120	2.79
Armenia	100	76	130	2.56	2.35	2.78	50.0	116	2.27	110	2.38	96	2.65	115	2.40	99	2.57	92	3.07
Cambodia	101	62	142	2.56	2.23	2.89	50.0	108	2.30	128	2.20	101	2.61	103	2.50	78	2.77	104	2.95
Jordan	102	65	140	2.56	2.25	2.87	49.8	115	2.27	91	2.48	63	2.88	137	2.17	104	2.55	106	2.92
Zimbabwe	103	80	131	2.55	2.34	2.75	49.6	105	2.31	127	2.20	93	2.67	127	2.27	107	2.50	71	3.27
Maldives	104	85	128	2.55	2.37	2.72	49.4	119	2.24	93	2.47	117	2.47	81	2.68	118	2.43	102	2.96
Honduras	105	88	127	2.53	2.38	2.69	49.1	91	2.39	111	2.35	86	2.70	109	2.44	126	2.35	108	2.90
Cameroon	106	85	129	2.53	2.35	2.70	48.9	96	2.37	121	2.24	128	2.37	114	2.41	103	2.55	76	3.19
Bhutan	107	88	127	2.52	2.38	2.66	48.6	109	2.29	117	2.29	102	2.61	111	2.42	101	2.56	111	2.90
Ghana	108	64	146	2.51	2.13	2.89	48.2	103	2.33	136	2.05	76	2.81	83	2.68	133	2.31	125	2.76
Lao PDR	109	69	145	2.50	2.16	2.84	48.0	93	2.38	106	2.40	123	2.40	104	2.49	111	2.49	118	2.82
Senegal	110	84	139	2.49	2.25	2.73	47.7	81	2.46	115	2.31	82	2.72	99	2.55	145	2.10	130	2.74
Venezuela, RB	111	88	134	2.49	2.31	2.67	47.7	134	2.10	129	2.17	109	2.54	123	2.33	100	2.57	79	3.18
Iran, Islamic Rep.	112	84	139	2.49	2.25	2.73	47.6	126	2.19	100	2.42	115	2.49	87	2.66	108	2.49	138	2.66
Paraguay	113	88	134	2.48	2.30	2.67	47.4	97	2.36	103	2.41	137	2.31	106	2.49	95	2.59	127	2.74
São Tomé and Príncipe	114	80	142	2.48	2.21	2.75	47.4	100	2.33	122	2.24	136	2.33	113	2.42	76	2.78	121	2.78
Guinea	115	79	144	2.48	2.19	2.77	47.4	87	2.42	112	2.34	94	2.67	96	2.59	131	2.33	147	2.50
Azerbaijan	116	59	153	2.48	2.02	2.95	47.4	147	1.92	101	2.42	120	2.43	143	2.14	80	2.75	74	3.23
Uzbekistan	117	61	153	2.46	2.00	2.93	46.9	118	2.25	120	2.25	127	2.38	117	2.39	105	2.53	101	2.96
Gambia, The	118	86	142	2.46	2.23	2.70	46.8	111	2.29	147	1.90	98	2.63	100	2.55	75	2.80	142	2.55
Liberia	119	88	142	2.45	2.22	2.68	46.3	140	2.00	104	2.41	110	2.54	108	2.46	119	2.42	117	2.84
Montenegro	120	88	142	2.45	2.21	2.69	46.3	106	2.31	116	2.30	141	2.22	120	2.35	89	2.62	112	2.89
Nigeria	121	90	140	2.45	2.24	2.65	46.3	146	1.97	118	2.27	105	2.60	102	2.52	128	2.35	105	2.92
Kenya	122	85	145	2.43	2.15	2.71	45.9	136	2.08	130	2.16	88	2.69	118	2.38	130	2.34	113	2.88
Fiji	123	88	144	2.42	2.17	2.67	45.4	137	2.07	123	2.22	122	2.41	136	2.18	112	2.48	85	3.12
Jamaica	124	94	140	2.42	2.24	2.60	45.3	123	2.22	119	2.27	121	2.43	132	2.21	117	2.43	107	2.91
Algeria	125	88	145	2.41	2.15	2.68	45.3	117	2.26	139	2.02	89	2.68	145	2.13	114	2.46	116	2.85
Solomon Islands	126	90	142	2.41	2.21	2.61	45.2	95	2.37	137	2.03	118	2.44	144	2.14	122	2.39	93	3.04
Mauritania	127	88	146	2.40	2.12	2.68	44.7	102	2.33	113	2.34	112	2.52	125	2.28	135	2.28	139	2.60
Papua New Guinea	128	90	146	2.38	2.13	2.62	44.0	145	1.98	126	2.20	131	2.34	135	2.18	106	2.51	95	3.01
Myanmar	129	90	148	2.37	2.10	2.64	43.8	122	2.24	133	2.10	116	2.47	110	2.42	129	2.34	140	2.59
Kyrgyz Republic	130	107	144	2.35	2.18	2.52	43.3	84	2.45	90	2.49	147	2.00	129	2.25	132	2.31	135	2.69
Gabon	131	82	153	2.34	1.94	2.75	43.0	142	2.00	143	2.00	125	2.40	116	2.40	137	2.20	96	3.00
Moldova	132	107	146	2.33	2.14	2.52	42.6	129	2.17	98	2.44	145	2.08	142	2.15	116	2.44	126	2.74

	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
Guyana	133	107	146	2.33	2.13	2.52	42.5	113	2.29	131	2.15	129	2.35	122	2.33	140	2.14	136	2.67
Burkina Faso	134	95	150	2.32	2.05	2.60	42.3	132	2.12	107	2.40	133	2.33	126	2.28	142	2.13	137	2.67
Afghanistan	135	117	146	2.30	2.13	2.47	41.5	99	2.33	141	2.00	134	2.33	139	2.16	146	2.10	119	2.80
Tajikistan	136	105	151	2.28	2.03	2.53	41.1	85	2.43	138	2.03	135	2.33	130	2.22	143	2.13	146	2.51
Libya	137	113	150	2.28	2.08	2.49	41.0	135	2.08	152	1.75	99	2.63	128	2.25	123	2.38	145	2.51
Angola	138	108	151	2.28	2.03	2.52	40.8	101	2.33	92	2.48	139	2.26	149	2.00	147	2.00	141	2.59
Rwanda	139	113	150	2.27	2.05	2.49	40.5	127	2.19	148	1.88	138	2.27	147	2.06	121	2.39	124	2.76
Mongolia	140	123	150	2.25	2.07	2.43	40.0	144	1.98	125	2.22	142	2.13	152	1.88	134	2.29	97	2.99
Ethiopia	141	127	150	2.24	2.07	2.40	39.6	139	2.03	124	2.22	130	2.35	140	2.16	144	2.10	143	2.54
Lesotho	142	92	153	2.24	1.87	2.61	39.5	143	2.00	132	2.13	143	2.13	112	2.42	148	1.99	131	2.73
Congo, Dem. Rep.	143	127	153	2.21	2.01	2.40	38.6	133	2.10	144	1.96	140	2.23	138	2.17	124	2.35	149	2.38
Cuba	144	129	153	2.20	2.02	2.37	38.3	128	2.18	135	2.08	144	2.12	131	2.21	136	2.26	152	2.31
Iraq	145	132	153	2.16	1.98	2.34	37.1	152	1.75	146	1.92	126	2.38	134	2.19	151	1.86	122	2.77
Comoros	146	130	153	2.14	1.92	2.36	36.5	141	2.00	145	1.94	153	1.81	133	2.20	138	2.20	134	2.70
Eritrea	147	106	154	2.11	1.69	2.53	35.5	151	1.78	150	1.83	97	2.63	148	2.03	152	1.83	148	2.43
Sudan	148	128	153	2.10	1.83	2.38	35.3	131	2.14	140	2.01	150	1.93	121	2.33	150	1.89	151	2.31
Congo, Rep.	149	135	153	2.08	1.85	2.31	34.7	149	1.80	155	1.27	149	1.94	141	2.15	127	2.35	109	2.90
Sierra Leone	150	130	154	2.08	1.80	2.36	34.5	153	1.73	88	2.50	152	1.85	151	1.98	141	2.14	150	2.35
Nepal	151	134	154	2.04	1.74	2.33	33.1	125	2.20	149	1.87	151	1.86	146	2.12	149	1.95	153	2.21
Chad	152	129	154	2.03	1.68	2.37	32.9	148	1.86	142	2.00	146	2.00	150	2.00	155	1.57	133	2.71
Haiti	153	145	153	2.03	1.87	2.19	32.8	150	1.78	151	1.78	148	1.94	154	1.74	139	2.15	129	2.74
Djibouti	154	154	155	1.80	1.58	2.02	25.5	154	1.72	154	1.51	154	1.77	153	1.84	153	1.73	154	2.19
Burundi	155	154	155	1.61	1.29	1.93	19.5	155	1.67	153	1.68	155	1.57	155	1.43	154	1.67	155	1.67

Note: The LPI index is a multidimensional assessment of logistics performance, rated on a scale from 1 (worst) to 5 (best). The six core components 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 Index 2012.

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	Low income	Lower middle income	Upper middle income	High income
Question 17: Level of fees and charges											
Port charges	Low or very low	38	45	52	55	37	68	60	57	47	43
	High or very high	11	9	15	19	6	17	11	7	22	11
Airport charges	Low or very low	31	44	52	47	19	63	53	55	41	38
	High or very high	7	5	11	29	14	16	13	11	16	9
Road transport rate	Low or very low	6	32	59	20	47	69	73	51	39	32
	High or very high	15	25	8	39	10	7	7	12	23	22
Rail transport rates	Low or very low	30	38	25	19	29	30	37	29	24	30
	High or very high	21	18	48	38	31	30	35	22	37	14
Warehousing/transloading charges	Low or very low	41	33	51	39	24	46	38	45	40	34
	High or very high	10	24	13	27	37	11	13	19	19	15
Agent fees	Low or very low	18	23	27	42	15	25	21	32	23	21
	High or very high	24	28	20	14	34	32	32	19	28	18
Question 18: Quality of infrastructure											
Ports	Low or very low	41	43	45	40	61	39	57	34	42	12
	High or very high	18	14	21	25	16	18	17	21	17	60
Airports	Low or very low	41	24	36	40	32	27	39	29	29	8
	High or very high	22	33	24	29	23	10	11	17	32	62
Roads	Low or very low	56	51	50	29	72	55	66	50	44	13
	High or very high	14	15	15	5	7	12	6	10	18	60
Warehousing/transloading facilities	Low or very low	58	57	91	55	53	78	78	67	67	34
	High or very high	3	12	4	10	8	1	6	2	8	28
Rail	Low or very low	48	36	30	53	50	48	60	43	30	4
	High or very high	15	27	19	19	11	15	9	17	26	64
Telecommunications and IT	Low or very low	26	9	20	44	27	30	44	18	18	4
	High or very high	41	43	39	39	35	28	18	40	45	79
Question 19: Quality and competence of service											
Road	Low or very low	37	16	37	31	33	33	50	18	29	6
	High or very high	16	33	15	15	19	13	9	18	24	59
Rail	Low or very low	57	43	87	69	65	68	80	55	66	26
	High or very high	5	19	3	7	7	10	9	10	8	38
Air transport	Low or very low	21	18	16	16	10	20	25	21	10	4
	High or very high	39	43	34	31	28	19	20	26	42	73
Maritime transport	Low or very low	20	23	10	12	13	24	31	17	11	3
	High or very high	24	30	41	21	30	26	24	26	36	67
Warehousing/transloading and distribution	Low or very low	35	19	16	64	28	29	36	31	21	6
	High or very high	20	39	33	10	16	13	7	22	35	65
Freight forwarders	Low or very low	5	8	4	38	1	14	21	4	11	0
	High or very high	25	54	53	24	45	33	27	38	51	76
Customs agencies	Low or very low	50	29	26	38	19	39	47	35	24	12
	High or very high	12	53	29	31	23	16	16	25	37	60
Quality/standards inspection agencies	Low or very low	49	22	27	38	39	45	52	38	24	8
	High or very high	13	30	14	12	17	19	16	15	22	57

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	Low income	Lower middle income	Upper middle income	High income
Health/sanitary and phytosanitary agencies	Low or very low	47	35	42	34	65	55	60	48	35	13
	High or very high	7	30	13	21	8	11	7	12	24	54
Customs brokers	Low or very low	24	10	22	43	6	22	31	12	22	8
	High or very high	16	39	19	31	25	23	20	23	31	69
Trade and transport associations	Low or very low	42	23	37	51	30	41	50	35	30	13
	High or very high	16	30	16	20	14	12	12	12	26	50
Consignees or shippers	Low or very low	17	11	14	18	10	25	29	12	14	4
	High or very high	15	31	33	30	19	24	18	26	32	56
Question 20: Efficiency of processes											
Clearance and delivery of imports	Hardly ever or rarely	9	20	21	37	24	27	39	17	17	5
	Often or nearly always	56	61	52	35	39	43	41	41	59	88
Clearance and delivery of exports	Hardly ever or rarely	6	10	11	19	32	8	14	9	13	4
	Often or nearly always	75	73	62	65	59	69	69	62	71	85
Transparency of customs clearance	Hardly ever or rarely	32	22	27	39	41	22	38	28	19	8
	Often or nearly always	26	54	50	34	24	43	34	35	54	80
Transparency of other border agencies	Hardly ever or rarely	42	22	25	28	42	29	48	28	17	9
	Often or nearly always	14	52	49	41	25	31	33	35	43	72
Provision of adequate and timely information on regulatory changes	Hardly ever or rarely	45	21	39	64	55	42	55	41	31	20
	Often or nearly always	23	62	40	19	26	31	19	39	45	64
Expedited customs clearance for traders with high compliance levels	Hardly ever or rarely	27	13	27	34	37	47	56	29	18	14
	Often or nearly always	25	50	42	42	35	22	20	34	46	65
Question 21: Sources of major delays											
Compulsory warehousing/ transloading	Often or nearly always	24	31	34	37	36	33	46	35	21	7
	Hardly ever or rarely	31	36	28	29	29	30	27	22	40	73
Preshipment inspection	Often or nearly always	33	32	30	54	33	38	50	44	20	13
	Hardly ever or rarely	22	34	22	12	26	41	33	22	34	70
Maritime transshipment	Often or nearly always	14	46	30	42	28	56	64	36	29	12
	Hardly ever or rarely	21	22	29	12	24	6	7	18	24	56
Criminal activities (such as stolen cargo)	Often or nearly always	10	7	19	14	5	14	19	13	9	4
	Hardly ever or rarely	63	75	45	52	53	55	59	54	59	80
Solicitation of informal payments	Often or nearly always	19	25	34	24	35	26	42	28	16	5
	Hardly ever or rarely	35	47	38	32	23	30	23	27	51	77

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	Low income	Lower middle income	Upper middle income	High income
Question 22: Changes in the logistics environment since 2009											
Customs clearance procedures	Much worsened or worsened	8	24	23	19	5	17	17	21	16	10
	Improved or much improved	41	51	49	49	53	49	42	49	54	63
Other official clearance procedures	Much worsened or worsened	4	22	16	16	9	11	13	14	15	10
	Improved or much improved	34	45	37	45	49	29	31	32	46	46
Trade and transport infrastructure	Much worsened or worsened	3	11	22	18	26	10	12	12	17	5
	Improved or much improved	45	47	37	56	31	57	45	44	53	51
Telecommunications and IT infrastructure	Much worsened or worsened	2	0	7	15	4	3	6	4	4	1
	Improved or much improved	63	74	71	54	62	76	67	71	72	71
Private logistics services	Much worsened or worsened	3	0	1	15	4	0	1	3	3	1
	Improved or much improved	70	81	74	63	58	65	59	75	73	64
Regulation related to logistics	Much worsened or worsened	5	0	18	29	9	9	10	12	11	12
	Improved or much improved	48	29	31	35	48	37	33	42	32	35
Solicitation of informal payments	Much worsened or worsened	6	10	20	18	15	29	28	21	11	5
	Improved or much improved	38	34	37	21	16	20	19	23	37	43

Note: Responses are calculated at the country level and then averaged by region and income group.
Source: Logistics Performance Index 2012.

APPENDIX 3

Domestic LPI results, time and cost data

	Question 23: 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[d] (kilometers)	Lead time (days)	Cost[e] (US$)	Distance (kilometers)	Lead time (days)	Cost[f] (US$)	Distance (kilometers)	Lead time (days)	Cost[e] (US$)	Distance (kilometers)	Lead time (days)	Cost[f] (US$)
Afghanistan	25	5	250	—	—	—	—	—	—	—	—	—
Albania	75	11	750	—	—	—	—	—	—	75	7	1,000
Algeria	75	8	1,000	—	—	—	750	39	2,000	—	—	—
Argentina	55	5	943	130	16	1,145	84	11	822	25	—	750
Armenia	—	—	—	—	—	—	—	—	—	—	—	—
Australia	30	4	1,020	43	2	433	43	3	785	75	7	1,500
Austria	—	—	—	—	—	—	—	—	—	—	—	—
Azerbaijan	—	—	—	—	—	—	—	—	—	—	—	—
Bahamas, The	25	3	3,000	—	—	—	25	3	2,000	—	—	—
Bahrain	25	2	250	25	2	250	25	2	250	25	2	250
Bangladesh	181	3	1,257	—	—	—	301	6	1,089	—	—	—
Belarus	300	2	1,000	775	3	1,061	750	3	1,500	387	3	2,121
Belgium	144	2	707	750	3	750	149	3	585	237	3	433
Benin	—	—	—	—	—	—	—	—	—	—	—	—
Bolivia	2,000	3	1,500	2,000	3	1,500	2,000	3	3,000	2,000	3	3,000
Bosnia and Herzegovina	300	2	354	750	3	474	300	2	354	750	3	612
Botswana	—	—	—	1,250	9	4,000	—	—	—	750	7	4,000
Brazil	150	2	612	83	3	439	150	2	274	150	5	750
Bulgaria	257	2	944	667	3	1,277	189	2	1,030	550	3	1,287
Burkina Faso	—	—	—	—	—	—	—	—	—	—	—	—
Burundi	2,000	6	4,000	300	1	1,500	2,000	18	5,000	300	2	4,000
Cambodia	111	2	565	444	3	1,060	118	2	865	240	3	1,159
Cameroon	—	18	2,000	—	—	—	—	45	3,162	—	—	—
Canada	233	2	646	325	2	734	152	2	736	389	2	748
Central African Rep.	—	—	—	—	—	5,000	2,000	12	5,000	2,000	12	5,000
Chad	3,500	25	—	3,500	74	5,000	2,000	32	5,000	3,500	74	5,000
Chile	114	2	1,861	300	2	750	83	2	909	—	—	—
China	162	3	454	215	3	645	133	4	453	171	3	637
Colombia	160	4	1,275	—	—	—	430	8	1,783	—	—	—
Congo, Dem. Rep.	300	88	5,000	—	—	—	—	—	—	—	—	—
Congo, Rep.	87	11	1,000	—	—	—	—	—	—	75	—	—
Costa Rica	125	2	849	300	6	500	79	1	438	—	—	—
Côte d'Ivoire	25	2	1,000	—	—	—	680	5	1,145	137	1	474
Croatia	150	1	866	255	2	641	25	8	2,000	—	—	—
Cyprus	75	1	750	—	—	—	75	2	750	—	—	—
Czech Republic	—	—	—	—	—	—	—	—	—	—	—	—
Denmark	75	2	612	300	2	500	300	2	500	87	3	612
Dominican Republic	43	2	500	—	—	—	43	2	500	—	—	—
Ecuador	25	2	612	750	5	1,000	36	4	979	750	9	1,000
Egypt, Arab Rep.	280	2	773	578	4	1,097	346	3	1,123	1,024	6	1,392
El Salvador	344	2	595	—	—	—	630	5	806	474	5	433
Estonia	75	1	500	75	1	250	75	1	500	75	1	250

	Question 23: 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[d] (kilometers)	Lead time (days)	Cost[e] (US$)	Distance (kilometers)	Lead time (days)	Cost[f] (US$)	Distance (kilometers)	Lead time (days)	Cost[e] (US$)	Distance (kilometers)	Lead time (days)	Cost[f] (US$)
Ethiopia	750	4	1,000	750	4	1,000	1,250	3	1,000	1,250	5	1,500
Finland	509	4	1,055	453	4	977	252	3	592	296	2	804
France	300	2	500	300	2	500	750	9	1,500	300	4	1,500
Gambia, The	25	2	500	—	—	—	25	3	500	—	—	—
Georgia	429	6	572	297	8	630	1,025	12	612	1,025	15	707
Germany	150	1	1,500	868	5	1,784	150	1	1,500	483	4	1,145
Ghana	300	2	775	300	3	775	300	19	866	150	6	1,000
Greece	300	1	1,000	75	1	3,000	300	2	3,000	300	7	4,000
Guatemala	189	4	1,957	300	4	612	162	4	1,310	—	—	—
Guinea	—	—	—	—	—	—	—	—	—	—	—	—
Haiti	130	6	909	300	7	500	78	12	1,587	300	9	750
Honduras	52	3	500	25	3	750	75	2	354	—	3	750
Hong Kong SAR, China	36	1	270	87	1	354	41	1	309	25	1	274
Hungary	474	2	—	474	2	866	474	2	750	300	3	1,000
Iceland	—	—	—	—	—	—	—	—	—	—	—	—
India	626	3	918	197	3	1,043	375	3	1,097	241	4	921
Indonesia	81	2	415	104	3	309	78	3	501	104	5	426
Iran, Islamic Rep.	43	3	387	750	10	500	75	4	150	—	—	—
Iraq	75	3	1,500	—	—	—	300	5	2,000	300	4	2,000
Ireland	25	1	194	1,620	7	2,121	25	2	250	137	7	1,732
Israel	115	2	487	489	8	1,061	81	2	595	775	5	1,000
Italy	300	3	909	300	2	750	300	4	794	300	3	1,000
Jamaica	25	14	750	—	—	—	75	14	750	—	—	—
Japan	392	1	931	75	1	707	171	1	931	75	1	866
Jordan	300	3	572	483	5	909	300	5	1,000	—	—	—
Kazakhstan	25	2	500	—	—	—	—	—	—	—	—	—
Kenya	132	2	1,455	478	8	1,651	253	4	3,203	889	7	2,289
Korea, Rep.	300	2	572	300	3	500	300	3	707	300	3	500
Kuwait	75	2	500	—	—	—	75	3	500	—	—	—
Kyrgyz Republic	25	1	500	—	—	—	—	—	—	—	—	—
Lao PDR	—	—	—	—	2	1,500	—	—	—	—	3	1,500
Lebanon	60	2	672	79	3	1,145	82	3	975	94	3	1,285
Liberia	—	—	—	—	—	—	—	—	—	—	—	—
Libya	43	2	548	750	1	150	25	4	671	—	—	—
Luxembourg	—	—	—	—	—	—	—	—	—	—	—	—
Macedonia, FYR	—	—	—	1,250	2	1,500	—	—	—	237	1	474
Madagascar	300	2	2,000	—	—	—	300	5	3,000	—	—	—
Malawi	25	—	5,000	—	6	3,000	—	—	—	—	—	—
Malaysia	73	3	285	172	2	298	84	2	285	105	2	298
Maldives	300	4	500	—	—	—	—	—	—	—	—	—
Mali	—	5	5,000	1,250	6	5,000	1,250	7	5,000	1,250	6	5,000
Malta	25	2	250	25	2	1,000	25	2	250	25	2	1,000
Mauritania	25	8	3,000	300	2	2,000	25	7	2,000	300	5	3,000
Mauritius	43	1	750	25	1	1,000	25	1	750	25	1	1,000
Mexico	398	3	884	1,617	3	707	352	6	1,413	2,092	5	1,000
Moldova	—	—	—	300	4	1,500	—	—	—	300	7	1,500
Mongolia	230	5	487	237	18	2,081	224	4	794	638	10	1,974

	Question 23: 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[d] (kilometers)	Lead time (days)	Cost[e] (US$)	Distance (kilometers)	Lead time (days)	Cost[f] (US$)	Distance (kilometers)	Lead time (days)	Cost[e] (US$)	Distance (kilometers)	Lead time (days)	Cost[f] (US$)
Montenegro	—	—	—	—	—	—	—	—	—	—	—	—
Morocco	247	3	500	1,025	3	1,118	247	3	500	1,025	3	1,118
Mozambique	—	—	—	750	4	3,000	—	—	—	25	4	250
Myanmar	25	1	150	25	1	150	25	1	150	25	1	150
Namibia	131	2	794	150	2	707	300	3	1,145	300	2	866
Nepal	—	—	—	777	7	1,651	286	5	1,957	712	8	2,322
Netherlands	43	2	354	—	—	—	43	2	500	—	—	—
New Zealand	43	2	262	81	2	420	57	3	572	75	3	612
Nicaragua	403	8	3,464	553	3	1,040	512	—	4,472	553	3	1,040
Nigeria	297	4	1,261	75	2	500	183	4	1,587	750	3	3,000
Norway	—	—	—	—	—	—	—	—	—	—	—	—
Oman	—	—	—	—	—	—	—	—	—	—	—	—
Pakistan	274	3	731	369	3	1,051	363	5	926	570	5	1,540
Panama	36	2	383	150	2	2,121	162	3	1,310	43	3	866
Paraguay	—	—	—	300	3	2,000	300	2	2,000	300	2	2,000
Peru	43	1	866	—	—	—	25	2	866	—	—	—
Philippines	155	3	500	87	1	866	296	4	1,732	25	2	1,500
Poland	750	4	—	968	3	—	750	2	1,500	474	2	1,500
Portugal	113	2	539	43	1	194	25	2	440	25	1	194
Qatar	75	2	750	—	—	—	75	2	1,000	—	—	—
Romania	474	2	707	474	5	1,225	474	2	750	474	6	1,061
Russian Federation	750	2	2,000	3,500	5	5,000	1,620	3	3,162	—	—	—
Saudi Arabia	132	5	506	186	3	932	145	6	1,225	43	4	410
Senegal	—	7	—	—	—	—	582	9	1,310	—	—	—
Serbia	—	—	—	474	3	1,061	—	—	—	1,250	4	1,500
Sierra Leone	300	2	4,000	300	2	4,000	300	2	4,000	300	2	4,000
Singapore	130	2	178	25	2	250	130	2	266	25	2	250
Slovak Republic	474	2	707	474	2	1,030	750	2	866	377	2	1,140
South Africa	364	2	1,861	553	3	1,442	320	3	2,000	474	4	1,732
Spain	114	1	515	256	2	721	150	2	658	300	1	1,000
Sri Lanka	43	2	616	43	1	658	50	2	575	43	2	1,732
Sudan	414	3	866	1,250	3	1,040	1,054	8	1,442	968	9	1,225
Sweden	87	1	500	300	1	500	300	2	612	—	—	—
Switzerland	697	6	1,107	852	4	1,456	256	6	1,145	407	2	1,145
Syrian Arab Rep.	300	3	866	300	3	3,000	300	4	1,225	300	5	3,000
Taiwan, China	43	1	324	49	1	306	38	2	258	25	1	178
Tajikistan	3,500	2	—	—	—	—	3,500	2	—	—	—	—
Tanzania	—	—	—	—	—	—	—	—	—	—	—	—
Thailand	300	2	707	300	2	250	189	1	1,000	300	2	—
Togo	—	—	—	2,000	13	5,000	2,000	15	5,000	—	—	—
Tunisia	300	2	250	—	—	—	300	1	250	—	—	—
Turkey	101	2	806	458	3	1,670	122	2	831	562	4	1,362
Uganda	—	—	—	3,500	7	5,000	3,500	81	5,000	—	—	—
Ukraine	87	2	866	137	2	1,061	75	2	5,000	150	6	1,732
United Arab Emirates	166	1	495	427	3	626	103	2	618	455	3	743
United Kingdom	377	3	1,000	565	2	1,414	150	5	1,225	565	4	2,466
United States	206	2	680	346	3	745	126	2	603	273	3	729

	Question 23: 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[d] (kilometers)	Lead time (days)	Cost[e] (US$)	Distance (kilometers)	Lead time (days)	Cost[f] (US$)	Distance (kilometers)	Lead time (days)	Cost[e] (US$)	Distance (kilometers)	Lead time (days)	Cost[f] (US$)
Uruguay	300	14	750	—	—	—	—	—	—	—	—	—
Uzbekistan	—	—	—	—	—	—	474	25	1,118	474	23	1,000
Venezuela, RB	300	7	2,121	612	5	1,732	300	7	2,739	1,025	5	2,000
Vietnam	52	2	310	59	2	293	63	2	361	55	2	289
Yemen, Rep.	—	—	—	—	—	—	—	—	—	—	—	—
Zambia	2,000	5	5,000	2,000	5	5,000	2,000	7	5,000	2,000	7	5,000
Zimbabwe	—	4	1,936	—	3	3,500	—	4	2,943	—	4	2,866

— 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 (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. Aggregates of the distance indicator for port and airport.

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

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

Source: Logistics Performance Index 2012.

	Question 26: % of shipments meeting quality criteria	Question 27: Number of agencies		Question 28: Number of forms		Question 29: Clearance time (days)[a]		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	40	3	3	3	3	2	2	3	3
Albania	40	1	1	3	2	1	1	50	50
Algeria	83	4	2	4	2	8	3	75	35
Argentina	73	3	3	3	3	2	3	26	20
Armenia	—	2	2						
Australia	73	2	2	3	2	1	3	6	2
Austria	—	—	—	—	—	—	—	—	—
Azerbaijan	—	—	—	—	—	—	—	—	—
Bahamas, The	93	1	1	2	1	1	3	18	1
Bahrain	88	5	5	2	2	1	1	18	1
Bangladesh	79	4	4	5	4	3	4	10	5
Belarus	72	2	2	3	3	1	1	7	2
Belgium	93	2	2	2	2	0	1	2	1
Benin	40	4	4	2	2	5	6	11	7
Bolivia	93	4	2	1	1	7	15	50	35
Bosnia and Herzegovina	89	2	2	3	3	1	1	50	6
Botswana	83	1	1	1		2	4	18	3
Brazil	70	3	3	2	3	2	5	6	2
Bulgaria	87	2	2	2	2	1	1	7	2
Burkina Faso	—	—	—	—	—	—	—	—	—
Burundi	40	3	2	4	3	4	5	50	3
Cambodia	93	3	3	5	5	1	1	11	3
Cameroon	84	7	5	6	6	2	4	9	6
Canada	83	2	1	2	2	1	3	3	2
Central African Republic	40	3	4	3	5	3	4	75	3
Chad	40	3	2	4	3	6	7	30	7
Chile	89	2	2	3	3	1	1	10	5
China	69	3	3	6	5	2	4	17	5
Colombia	74	3	3	3	2	1	2	13	1
Congo, Dem. Rep.	—	—	—	—	—	—	—	—	—
Congo, Rep.	83	2	—	2	2	—	—	1	3
Costa Rica	64	3	3	2	2	1	2	3	1
Croatia	74	2	2	2	2	1	1	14	1
Côte d'Ivoire	88	3	3	11	8	1	2	3	1
Cyprus	88	2	2	1	1	0	1	3	1
Czech Republic	—	—	—	—	—	—	—	—	—
Denmark	89	2	1	2	1	1	1	1	1
Dominican Republic	96	3	3	2	2	1	3	15	1
Ecuador	89	3	3	3	3	2	4	14	7
Egypt, Arab Rep.	70	4	2	5	3	2	4	25	7
El Salvador	85	3	3	3	3	0	2	5	4
Estonia	88	1	1	1	1	0	0	3	3
Ethiopia	83	—	—	—	—	—	—	—	—
Finland	79	1	1	1	2	0	1	1	1
France	97	3	3	4	4	3	2	1	1

	Question 26: % of shipments meeting quality criteria	Question 27: Number of agencies		Question 28: Number of forms		Question 29: Clearance time (days)[a]		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
Gambia, The	83	3	3	3	3	1	1	75	1
Georgia	87	2	2	3	3	1	1	5	2
Germany	80	1	1	2	2	0	1	3	2
Ghana	57	4	4	3	2	1	1	42	4
Greece	93	—	—	—	—	—	—	—	—
Guatemala	89	2	3	1	1	1	2	20	2
Guinea	—	—	—	—	—	—	—	—	—
Haiti	51	4	2	3	2	1	2	25	2
Honduras	86	1	2	3	3	2	6	41	7
Hong Kong SAR, China	79	2	1	1	1	0	0	1	1
Hungary	95	3	2	2	2	1	1	3	3
Iceland	—	—	—	—	—	—	—	—	—
India	59	3	3	6	5	2	4	35	16
Indonesia	51	5	5	5	3	1	4	31	18
Iran, Islamic Rep.	40	—	—	6	2	3	3	75	75
Iraq	40	3	2	5	5	2	4	18	1
Ireland	96	2	2	4	4	0	1	2	1
Israel	92	2	2	4	3	1	2	3	1
Italy	93	4	4	4	3	1	1	3	1
Jamaica	88	5	5	3	4	1	5	50	35
Japan	93	3	3	4	4	0	1	3	2
Jordan	83	5	1	1	1	1	2	35	1
Kazakhstan	88	1	1	1	1	1	1	6	3
Kenya	88	3	3	4	3	2	5	25	2
Korea, Rep.	97	1	1	2	1	1	1	3	1
Kuwait	93	4	1	4	5	2	4	50	50
Kyrgyz Republic	83	1	3	5	5	1	1	75	3
Lao PDR	97	11	11	11	11	3	2	75	75
Lebanon	60	4	4	4	4	1	3	33	7
Liberia	—	—	—	—	—	—	—	—	—
Libya	93	3	3	3	3	2	4	75	3
Luxembourg	—	—	—	—	—	—	—	—	—
Macedonia, FYR	90	2	1	6	5	1	1	42	42
Madagascar	40	11	11	2	2	2	4	35	1
Malawi	83	1	1	3	3	1	2	1	3
Malaysia	71	2	3	2	2	1	1	6	3
Maldives	—	—	—	—	—	—	—	—	—
Mali	40	3	3	2	2	3	7	75	50
Malta	59	1	1	1	1	0	1	15	1
Mauritania	40	2	4	5	6	1	4	18	3
Mauritius	87	2	2	2	2	1	1	6	2
Mexico	69	4	2	2	2	1	2	7	1
Moldova	93	11	11	8	8	2	7	35	35
Mongolia	56	4	5	3	4	1	1	71	6
Montenegro	—	5	5	2	2	1	1	18	—
Morocco	65	3	3	3	2	1	3	17	3

	Question 26: % of shipments meeting quality criteria	Question 27: Number of agencies		Question 28: Number of forms		Question 29: Clearance time (days)[a]		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
Mozambique	40	2	2	4	5	2	5	75	75
Myanmar	40	3	4	3	4	2	3	75	75
Namibia	91	2	3	2	2	3	3	22	2
Nepal	69	5	5	6	5	1	1	30	10
Netherlands	95	1	1	2	2	0	1	3	1
New Zealand	87	2	2	3	2	0	2	1	1
Nicaragua	86	4	3	3	2	1	3	13	4
Nigeria	57	8	6	6	6	5	8	43	8
Norway	—	—	—	—	—	—	—	—	—
Oman	—	—	—	—	—	—	—	—	—
Pakistan	55	4	4	4	4	2	4	27	5
Panama	93	5	3	4	3	1	2	6	2
Paraguay	88	3	3	3	3	2	3	50	50
Peru	89	2	2	3	2	1	2	6	3
Philippines	97	7	3	6	3	2	4	6	2
Poland	57	3	3	4	4	1	2	75	61
Portugal	72	2	2	2	2	1	1	18	2
Qatar	97	2	3	1	1	3	3	50	75
Romania	65	4	3	4	4	1	1	11	3
Russian Federation	88	2	2	8	8	1	2	61	61
Saudi Arabia	79	2	2	3	2	3	4	36	3
Senegal	66	3	3	4	4	3	5	18	11
Serbia	57	2	2	5	3	1	1	6	6
Sierra Leone	40	1	1	4	4	4	4	50	50
Singapore	95	2	1	1	1	0	1	1	1
Slovak Republic	78	1	1	2	2	0	1	4	3
South Africa	89	2	2	2	2	1	2	5	2
Spain	74	2	1	2	1	1	1	5	1
Sri Lanka	80	4	3	5	5	1	2	33	7
Sudan	86	5	4	3	3	2	4	18	1
Sweden	97	2	2	2	2	1	2	1	1
Switzerland	76	4	4	2	2	1	1	1	1
Syrian Arab Republic	61	3	2	5	3	3	3	51	18
Taiwan, China	82	2	1	2	2	0	1	2	1
Tajikistan	88	5	3	5	3	1	1	3	1
Tanzania	—	—	—	—	—	—	—	—	—
Thailand	97	5	4	5	4	1	1	5	2
Togo	59	3	3	3	3	3	5	11	1
Tunisia	88	—	—	—	—	—	—	—	—
Turkey	77	3	2	4	3	1	2	8	3
Uganda	88	10	5	1	1	4	10	75	35
Ukraine	72	7	7	8	7	1	2	21	3
United Arab Emirates	86	2	2	2	2	1	1	4	2
United Kingdom	90	3	4	3	3	1	2	3	2
United States	93	3	2	4	2	1	3	7	3
Uruguay	—	—	—	—	—	—	—	—	—

	Question 26: % of shipments meeting quality criteria	Question 27: Number of agencies		Question 28: Number of forms		Question 29: Clearance time (days)[a]		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
Uzbekistan	57	3	2	3	3	3	5	14	9
Venezuela, RB	59	6	6	8	7	3	6	30	4
Vietnam	78	4	4	5	4	1	2	8	8
Yemen, Rep.	—	—	—	—	—	—	—	—	—
Zambia	40	4	3	1	1	2	4	6	1
Zimbabwe	59	4	4	4	5	1	3	33	4

— is not available.
a. Time taken between the submission of an accepted customs declaration and notification of clearance.
Source: Logistics Performance Index 2012.

APPENDIX 4

The LPI methodology

Because logistics has many dimensions, measuring and summarizing performance across countries is challenging. Examining the time and costs associated with logistics processes—port processing, customs clearance, transport, and the like—is a good start, and in many cases this information is readily available. But even when complete, this information cannot be easily aggregated into a single, consistent, cross-country dataset, because of structural differences in countries' supply chains. Even more important, many critical elements of good logistics—such as process transparency, service quality, predictability, and reliability—cannot be assessed using only time and cost information.

Respondent demographics

The vital aspects of logistics performance are best assessed by operators on the ground. So the LPI uses a structured online survey of logistics professionals at multinational freight forwarders and at the main express carriers.

The 2012 LPI data are based on the 2011 survey, which was administered to nearly 1,000 respondents at international logistics companies in 143 countries (domestic performance indicators). The international LPI covers 155 countries. The number of respondents is about the same as for the 2010 LPI.

In addition, the location of respondents for the 2012 LPI reflects the growing importance of trade facilitation for the developing world. Among the respondents, 69 percent are in either low-income countries (13 percent) or middle-income countries (56 percent).

The LPI assesses both large companies and small and medium enterprises. Large companies (those with 250 employees or more) account for roughly 18 percent of responses. Most of the responses are thus from small and medium enterprises.

Knowledgeable senior company members are important to the survey. The 2012 respondents include senior executives (50 percent), area or country managers (16 percent), and department managers (17 percent). These groups of professionals are directly involved in day-to-day operations, not only from company headquarters but also from country offices. Almost two-thirds of respondents are at corporate or regional headquarters (39 percent) or at country branch offices (23 percent). The rest are at local branch offices (7 percent) or independent firms (31 percent).

The majority of respondents (54 percent) are involved in providing most logistics services as their main line of work. Such services include warehousing and distribution, customer-tailored logistics solutions, courier services, bulk or break bulk cargo transport, and less-than-full container, full-container, or full-trailer load transport. By contrast, just 32 percent of respondents are at companies with business models based on full-container or full-trailer load transport (22 percent) or on customer-tailored logistics solutions (10 percent).

Among all respondents, 45 percent deal with multimodal transport, 23 percent with maritime transport, and 13 percent with air transport. Whereas 42 percent usually oversee both domestic and international operations, another 30 percent deal exclusively with international shipping (both exports and imports). And whereas 30 percent work with most of the world's regions, others concentrate their work in Asia (24 percent), Europe (23 percent), or the Americas (9 percent).

Constructing the international LPI

The first part of the LPI survey (questions 10–15) informs the international LPI. Each survey respondent rates eight overseas markets on six core components of logistics performance. The eight countries are chosen based on the most important export and import markets of the country where the respondent is located, on random selection, and—for landlocked countries—on 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 by the characteristics of the country where the respondent is located (table A4.1).

Respondents take the survey online. A new web engine was designed for the 2012 LPI to solve problems in the previous engines (Iarossi 2006). The 2012 engine also incorporates a newly developed Uniform Sampling Randomized (USR) approach, to gain the most possible responses from underrepresented countries. Because the survey engine relies heavily on a specialized country selection methodology for survey respondents based on high trade volume between countries, the USR approach can help countries with lower trade volumes rise to the top during country selection.

The 2012 survey engine builds a set of countries for the survey respondents that are subject to the rule set (see table A4.1). After 200 surveys, the USR approach is introduced into the engine's process for country selection. For each new survey respondent, the USR approach solicits a response from a country chosen at random but with non-uniform sampling—with weights chosen to evolve the sampling toward uniform probability. Specifically, a country i is chosen with a probability (N – ni) / 2N, where ni is the sample size of country i so far, and N is the total sample size.

The international LPI is a summary indicator of logistics sector performance, combining data on six core performance components into a single aggregate measure. Some respondents did not provide information for all six components,

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: a. Africa b. East Asia and Central Asia c. Latin America d. OECD and Europe less Central Asia	Two countries randomly from a list of five most important export partner countries and five most important import partner countries + Four 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 + Two countries randomly from the combined country groups a, b, c, and d
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, East Asia and Central Asia, and Latin America b. OECD and Europe less Central Asia	

Source: Logistics Performance Index 2012.

so interpolation is used to fill in missing values. The missing values are replaced with the country mean response for each question, adjusted by the respondent's average deviation from the country mean in the answered questions.

The six core components are:

- *The efficiency of customs and border management clearance,* rated from "very low" (1) to "very high" (5) in survey question 10.
- *The quality of trade and transport infrastructure,* rated from "very low" (1) to "very high" (5) in survey question 11.
- *The ease of arranging competitively priced shipments,* rated from "very difficult" (1) to "very easy" (5) in survey question 12.
- *The competence and quality of logistics services,* rated from "very low" (1) to "very high" (5) in survey question 13.
- *The ability to track and trace consignments,* rated from "very low" (1) to "very high" (5) in survey question 14.
- *The frequency with which shipments reach consignees within scheduled or expected delivery times,* 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), a standard statistical technique used to reduce the dimensionality of a dataset. In the LPI, the inputs for PCA are country scores on questions 10–15, 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 before conducting PCA. The output from PCA 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 LPI's original six indicators.

Full details of the PCA procedure are 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 a single principal component be retained to summarize the underlying data. This principal component is the international LPI. Table A4.2 shows that the international LPI accounts for 92 percent of the variation in the six components.

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

			Variance proportion	
Component	Eigenvalue	Difference	Individual	Cumulative
1	5.55	5.39	0.92	0.92
2	0.16	0.04	0.03	0.95
3	0.12	0.05	0.02	0.97
4	0.07	0.02	0.01	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	0.41
Infrastructure	0.41
International shipments	0.40
Logistics quality and competence	0.42
Tracking and tracing	0.41
Timeliness	0.40

Source: Authors' analysis.

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

To account for the sampling error created by the LPI's survey-based dataset, LPI scores are presented with approximate 80 percent confidence intervals. These intervals make it possible to provide upper and lower bounds for a country's LPI score and rank. To determine whether a change in score or a difference between two scores is statistically significant, confidence intervals must be examined carefully. For

example, a statistically significant improvement in a country's performance should not be concluded unless the lower bound of the country's 2012 LPI score exceeds the upper bound of its 2010 score.

To calculate the confidence interval, the standard error of LPI scores across all respondents is estimated for a 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. As a result of this approach, confidence intervals and low-high ranges for scores and ranks are larger for small markets with few respondents, since these estimates are less certain.

The high and low scores are used to calculate upper and lower bounds on country ranks. 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 at 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 at the center. In both cases, the scores of all other countries are kept constant.

The average confidence interval on the 1–5 scale is 0.21, or about 7.4 percent of the average country's LPI score. On average, this is equivalent to 13 places in the LPI ranking. Caution must be taken when interpreting small differences in LPI scores and rankings.

Despite being the most comprehensive data source for country logistics and trade facilitation, the LPI has two important limitations. First, the experience of international freight forwarders might not represent the broader logistics environment in poor countries, which often rely on traditional operators. And the international and traditional operators might differ in their interactions with government agencies—and in their service levels. Second, for landlocked countries and small-island states, the LPI might reflect access problems outside the country assessed, such as transit difficulties. The low rating of a landlocked country might not adequately reflect its trade facilitation efforts, which depend on the workings of complex international transit systems. Landlocked countries cannot eliminate transit inefficiencies with domestic reforms.

Constructing the domestic LPI database

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

Questions 17–22 ask respondents to choose one of five performance categories. In question 17, 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 (worst) to 5 (best). 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 23–34 ask respondents for quantitative information on their countries' international supply chains, offering choices in a dropdown menu. When a response indicates a single value, the answer is coded as the logarithm of that value. When a 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, 50–100 kilometers, 100–500 kilometers, and so forth—so a response of 50–100 kilometers is coded as log(75). Full details of the coding matrix are available on request.

Country scores are produced by exponentiating the average of responses in logarithms across all respondents for a given country. This method is equivalent to taking a geometric average in levels. Scores for regions, income groups, and LPI quintiles are simple averages of the relevant country scores.

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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

Turun yliopisto
University of Turku

THE WORLD BANK

This is the third edition of *Connecting to Compete,* a report summarizing the findings from the new dataset for the 2012 Logistics Performance Index (LPI) and its component indicators. The 2012 LPI also provides expanded data on import and export supply chains in 143 countries, including information on time, cost, and reliability and ratings on domestic infrastructure quality, the performance of core services, and the friendliness of trade clearance procedures. The 2012 LPI and its indicators encapsulate the firsthand knowledge of movers of international trade. This information is relevant for policymakers and the private sector seeking to identify priorities for reform of their "soft" and "hard" trade and logistics infrastructure. Findings include:

- Despite a positive trend in performance since 2007, infrastructure, clearance procedures, and quality of services remain serious constraints, except in high-income countries.
- Countries with substantial performance improvement are the ones that have implemented long-term and comprehensive reforms and investments.
- Efficient border clearance goes beyond customs and implies coordination of the various agencies involved.
- Greening the logistics is a growing concern, especially when shipping with Organisation for Economic Co-operation and Development countries.