

Trade Costs and International Development

Moving Research and Analysis into Operations

Policy Research Seminar

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World Development Report

“Spatial Disparities and Development Policy”

Transport and Communication Costs

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Main Messages

- Transportation and communication costs have strongly but discontinuously declined over the last 150 years
- The declines occurred in two eras of globalization in different ways
- The importance of trade and communication costs for development has only been understood in the last generation
- The further reduction of trade and communication costs requires public policies that go beyond traditional development policies

Transport costs in the first era of globalization

- Drastic transport cost reductions are due to
 - massive transport infrastructure investment
 - new rail and maritime transport technologies
- Fall in inland transport costs precedes surge in international trade
- Fall in transport costs promotes inter-industry trade strongly reducing international price differentials

Transport costs in the first era of globalization

- Canal construction
 - Productivity in the U.S. internal transportation grew at an annual rate of 4.7 % in four decades before the Civil War
 - Construction of the Erie Canal reduced the transportation costs between Buffalo and New York by 85 % and travel times from 21 to 8 days
 - British and French navigable waterways quadrupled between 1780 and 1820
 - Waterways transport was 50 to 75 % cheaper than road transport in Europe

Transport costs in the first era of globalization

- Railways

- Rapid expansion of railways determined the urbanization process in the US

- Rail substituted inland waterways

- In 1851-1852 boats carried six times as much freight as railroads, in 1889 five times as much freight as inland waterways

- Wheat price spread between New York and Iowa fell from 69 % to 19 % between 1870 and 1910

Transport costs in the first era of globalization

- Railways, cont.
 - Smaller impact of railways in continental European countries, reflecting smaller size of nations, with high productivity differential to the US
 - Strong impact of Russian railway development: export share of agriculture increased from 29 % to 42 % between 1906 and 1910
 - In India the railway expansion reduced transport costs by 80 %, reducing the coefficient of variation for wheat and rice from 40 to 20 % between 1870 and WWI

Transport costs in the first era of globalization

- International transport costs
 - Fall in international transport costs largely due to technical and organizational change in the maritime sector
 - Trade costs for grain fell by 40 % between 1880 and WWI
 - General price convergence between US and Europe
 - cotton textile price gap fell from 13.7 % 1870 to -3.6% 1913
 - pig iron price from 85.2 to 19.3 %

Transport costs in the second era of globalization

- Transport costs fall mainly in air and road transport
- Organizational and technical change dominate the fall
- International transport costs fall much less than perceived by public opinion
- Trade costs fall due to changing characteristics of goods trade and increasing returns to scale in the transport sector

Transport costs in the second era of globalization

- Land transport
 - Real fuel costs fell by 37 % despite oil price increases 1978-1998 in France
 - Distance-related costs fell by 41 to 51 % depending on road class (maintenance, tolls)
 - Time related costs fell by 27 %, lower wage expenditures due to re-organization of supply chains, deregulation of trucking
 - But: Low importance: 23 per cent of international trade associated with land transport

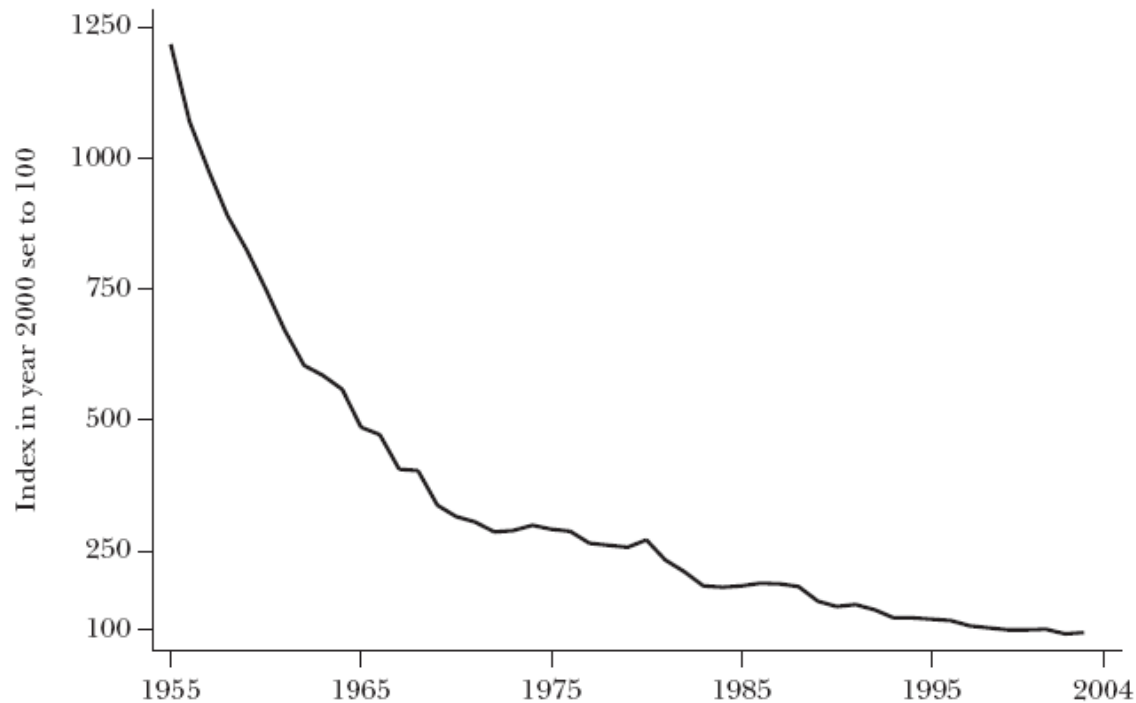
Transport costs in the second era of globalization

- Air transport cost decrease dramatically before the beginning of the surge of international trade
- Decrease still marked but flatter accounting for specific routes

Transport costs in the second era of globalization

Figure 1

Worldwide Air Revenue per Ton-Kilometer

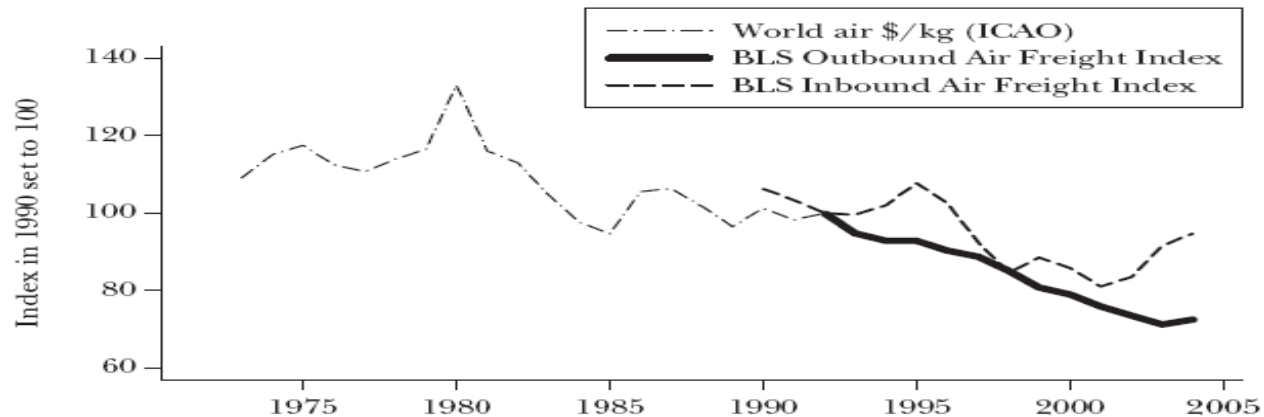


Source: International Air Transport Association, *World Air Transport Statistics*, various years.

Transport costs in the second era of globalization

Figure 2

Air Transport Price Indices



Source: International Civil Aviation Organization (ICAO), "Survey of Air Fares and Rates," various years; U.S. Department of Labor Bureau of Labor Statistics (BLS) import/export price indices, <http://www.bls.gov/mxp/>.

Notes: ICAO Data on Route Groups:

Annualized growth rates for 1973–80 of shipping price per kg (in year 2000 dollars): All routes 2.87; North Atlantic 1.03; Mid Atlantic 3.45; South Atlantic 3.98; North and Mid Pacific -3.43; South Pacific -2.49; North to Central America 3.63; North and Central America to South America 2.34; Europe to Middle East 4.80; Europe and Middle East to Africa 1.84; Europe/Middle East/Africa to Asia/Pacific 3.32; Local Asia/Pacific 0.97; Local North America 1.63; Local Europe 4.51; Local South America 2.53; Local Middle East 1.92; Local Africa 4.94.

Annualized growth rates for 1980–93 of shipping price per kg (in year 2000 dollars): All routes -2.52; North Atlantic -3.59; Mid Atlantic -3.36; South Atlantic -3.92; North and Mid Pacific -1.48; South Pacific -0.98; North to Central America -0.72; North and Central America to South America -1.34; Europe to Middle East -3.02; Europe and Middle East to Africa -2.34; Europe/Middle East/Africa to Asia/Pacific -2.78; Local Asia/Pacific -1.52; Local North America -1.73; Local Europe -2.63; Local Central America 0.97; Local South America -2.25; Local Middle East -1.46; Local Africa -2.43.

Transport costs in the second era of globalization

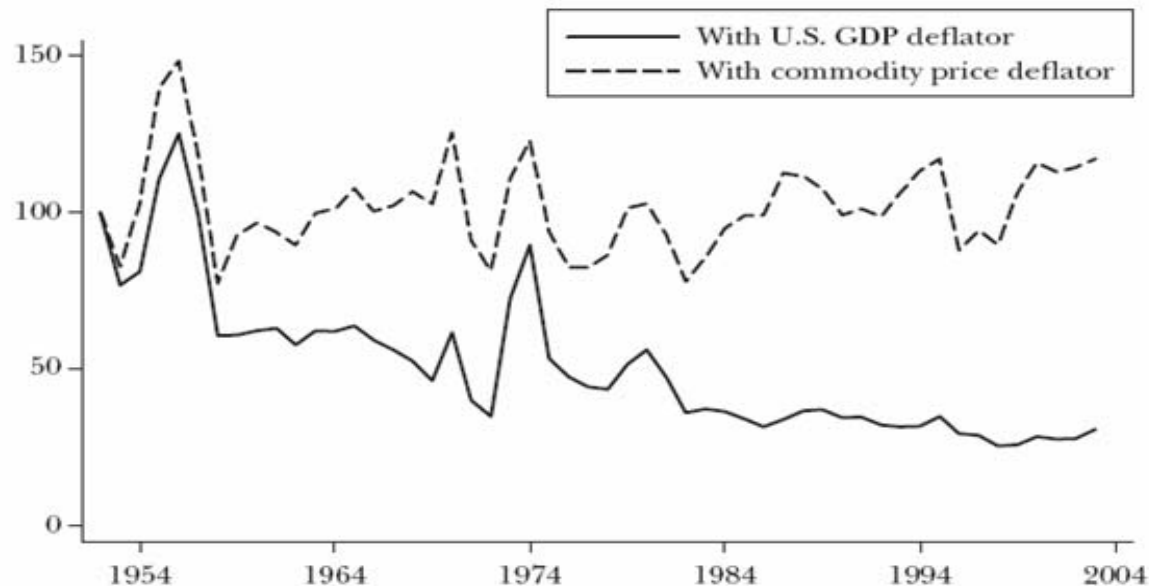
- Maritime price indices have hardly decreased despite progress in logistics and containerization
 - Oil price increases
 - High fixed costs of new logistics
 - Cartel in liner shipping

Transport costs in the second era of globalization

Figure 3

Tramp Price Index

(with U.S. GDP deflator and with commodity price deflator)



Source: United Nations Conference on Trade and Development, *Review of Maritime Transport*, various years.

Note: Tramp prices deflated by a U.S. GDP deflator and tramp prices deflated by commodity price deflator.

Transport costs in the second era of globalization

Figure 4

Liner Price Index

(with German GDP deflator and with German traded goods price deflator)



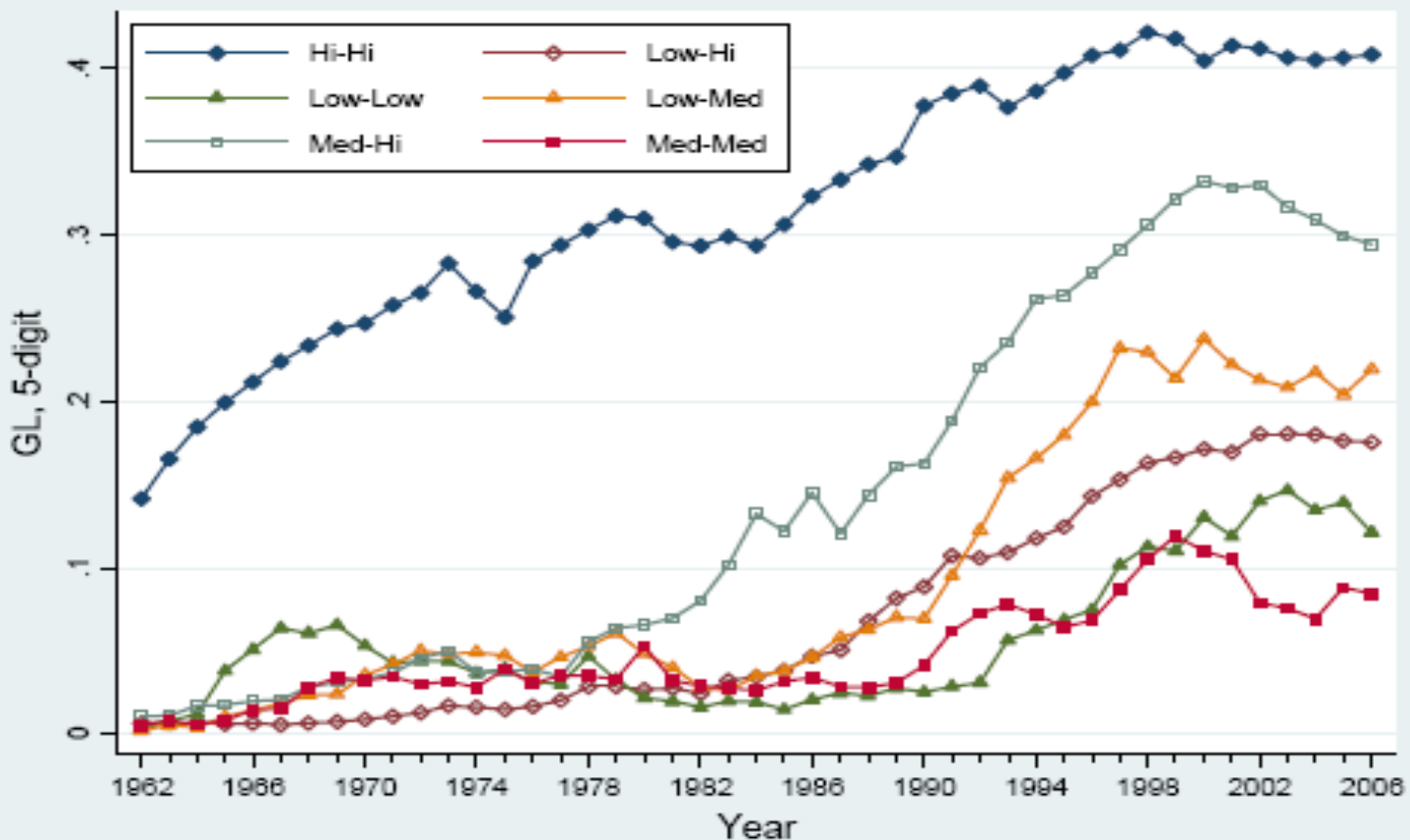
Source: United Nations Conference on Trade and Development *Review of Maritime Transport*, various years.

Note: Liner prices deflated by a German GDP deflator and liner prices deflated by a German traded-goods price deflator.

Transport costs in the second era of globalization

- Despite less dramatic decrease of monetary transport costs reduction of ad valorem trade friction due to higher value-weight ratios
- Corresponds to the relative increase of intra-industry trade (in contrast to the surge of inter-industry trade in the first era)

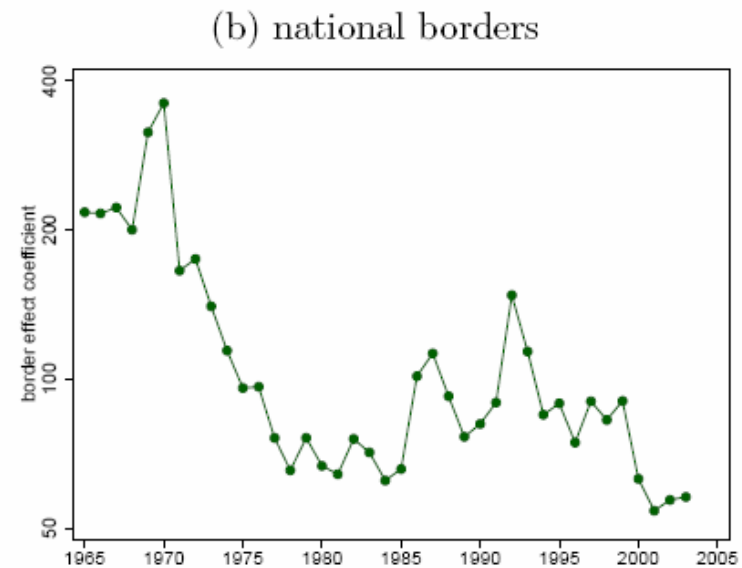
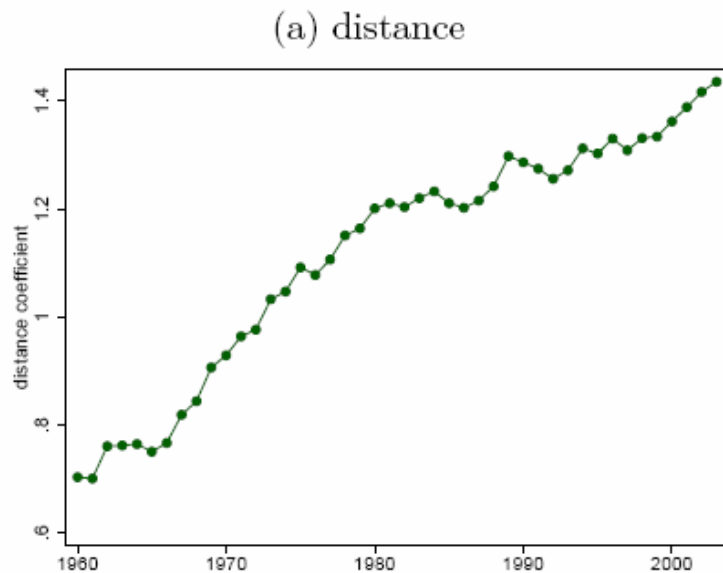
Transport costs in the second era of globalization



Notes: Country grouping according to World Bank categorization (see Table 1); "long coverage" data set

Transport costs in the second era of globalization

Figure 1: The effects of distance and national borders on trade

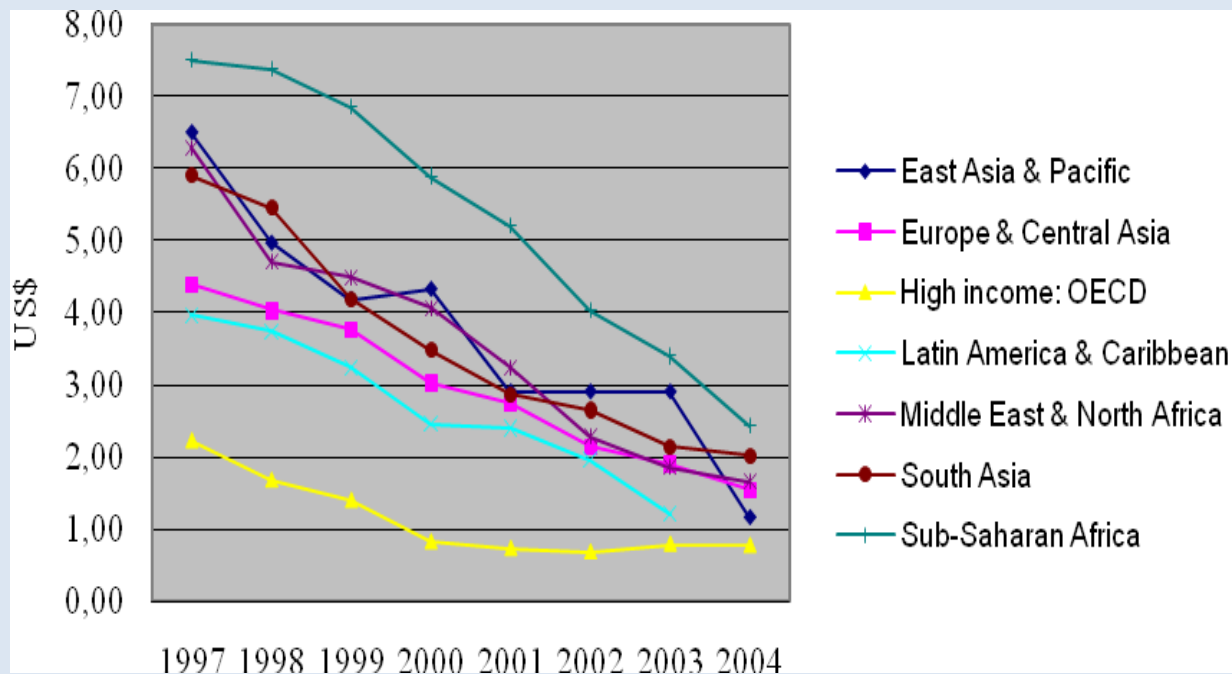


Transport costs in the second era of globalization

- The surprisingly small reduction in any of transportation costs reflects higher quality of services
- A day more of travel time in ocean shipping reduces the prob. of sourcing imports in that country by 1 per cent.
- Higher demand for speed has led to relocation to closer outsourcing locations with higher wage costs

The fall of communication costs

- Figure 6.6: Average telephone cost of call to US



The fall of communication costs

- Communication costs have fallen dramatically:
3 minute phone call from New York to London fell from \$ 293 in 1931 to around \$ 1 in 2001 and a few cents in 2006
- Differences between regions still exist but are getting smaller

The fall of communication costs

- Consequences for international economic relations
 - Falling communication costs change trade networks
 - by reducing search costs
 - by reducing transaction costs on product design in markets for differentiated goods
 - Falling communication costs change production networks by facilitating the vertical disintegration of production processes

The fall of communication costs

- Consequences for international economic relations, cont.
 - Falling communication costs have led to a dramatic increase in trade in business, professional and technical services
 - US imports of these services increased by 66 % in real terms between 1997 and 2004
 - Trade in business services is intra-industry trade rather than inter-industry trade, rich countries are major exporters and importers at the same time

Transportation costs and the development process

- An understanding of the importance of transport costs for economic geography and development was for long limited by the absence of a tractable model to depict the interdependence of transport costs and market form
- A generation of research in economic geography provides the general equilibrium analytics to explain the spatial distribution of economic activity and growth

Transportation costs and the development process

- The approach informs development policy on the importance of reduced transportation costs and infrastructure investment
- The interaction of transportation and communication costs explains the importance of intermediate goods trade in the current changes in the spatial division of labor

Transport sector specifics and transport costs

- The parsimonious treatment of the transportation sector limits the discussion of transport policy
- The transport sector is a sector with increasing returns to scale or decreasing average costs due to high fixed costs of transport systems
- Decreasing transport costs induce a cumulative process of intensified trade and decreasing transport cost

Transportation costs and development policy

- Regulatory policies to respond to the fact that technologies of the transport sector create market power
- Infrastructure policies:
 - Infrastructure facilities function as a coordination device
 - High rates of return from completing basic network structure
 - Coordination failure between jurisdiction, bias against international infrastructure

Transportation costs and development policy

- Trade facilitation
 - Harmonization and simplification of border crossing procedures
 - Change of technology of customs procedures
 - Regulation to increase port efficiency