

Trade Costs and Business Environment: A Focus on Africa

World Development Report
Reshaping Economic Geography
Transport and Regional Integration

Andreas Kopp

World Bank

Department for Energy, Transport and Water

The World Bank/African Economic Research Consortium

Saturday, May 31, 2008

Entebbe, Uganda



General Messages

World Development Report 2009

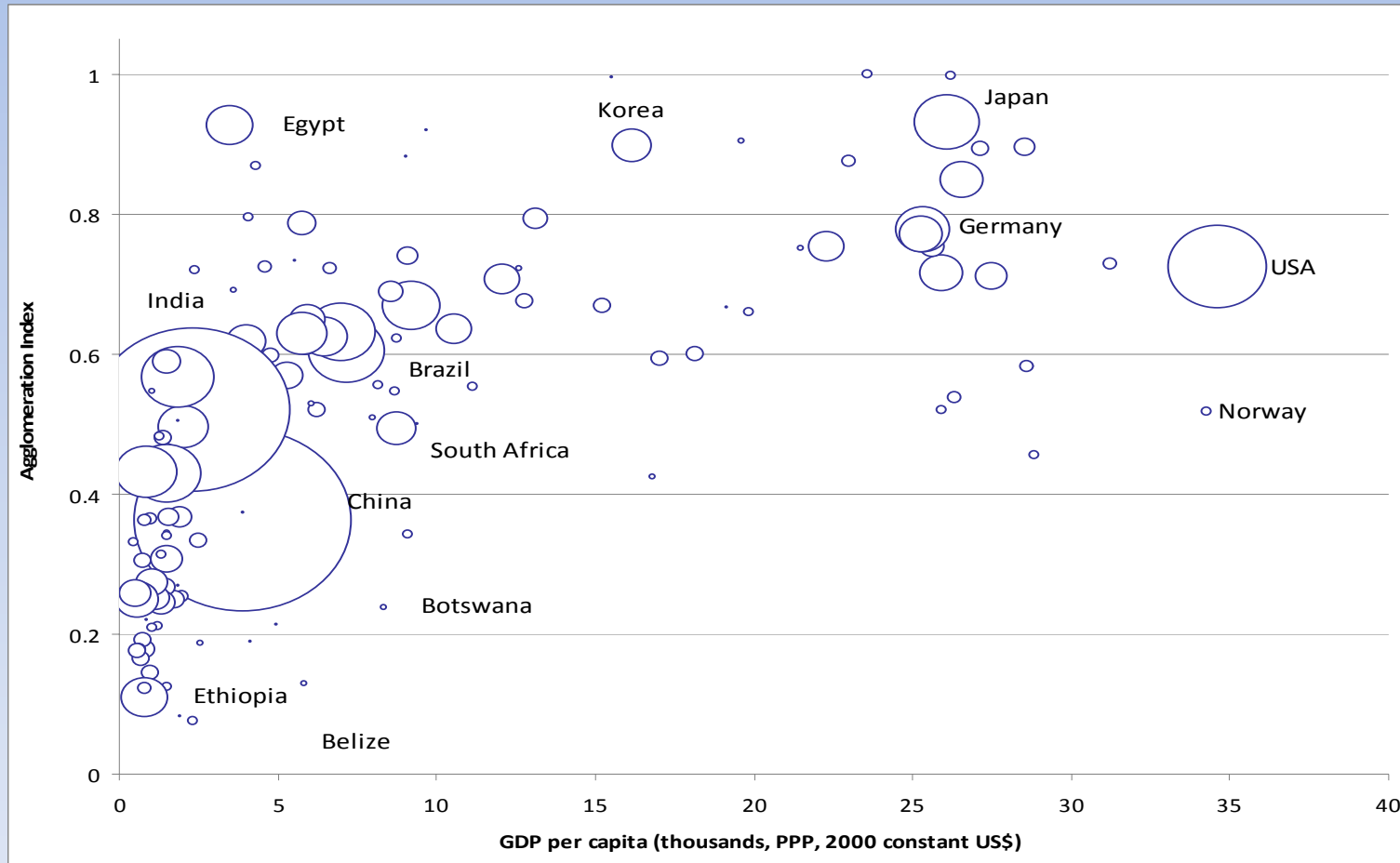
- **Concentration of economic mass** is inevitable and generally desirable
- But persistent **spatial disparities** in living standards are neither desirable nor inevitable
- The way to get both concentration and convergence is **integration**



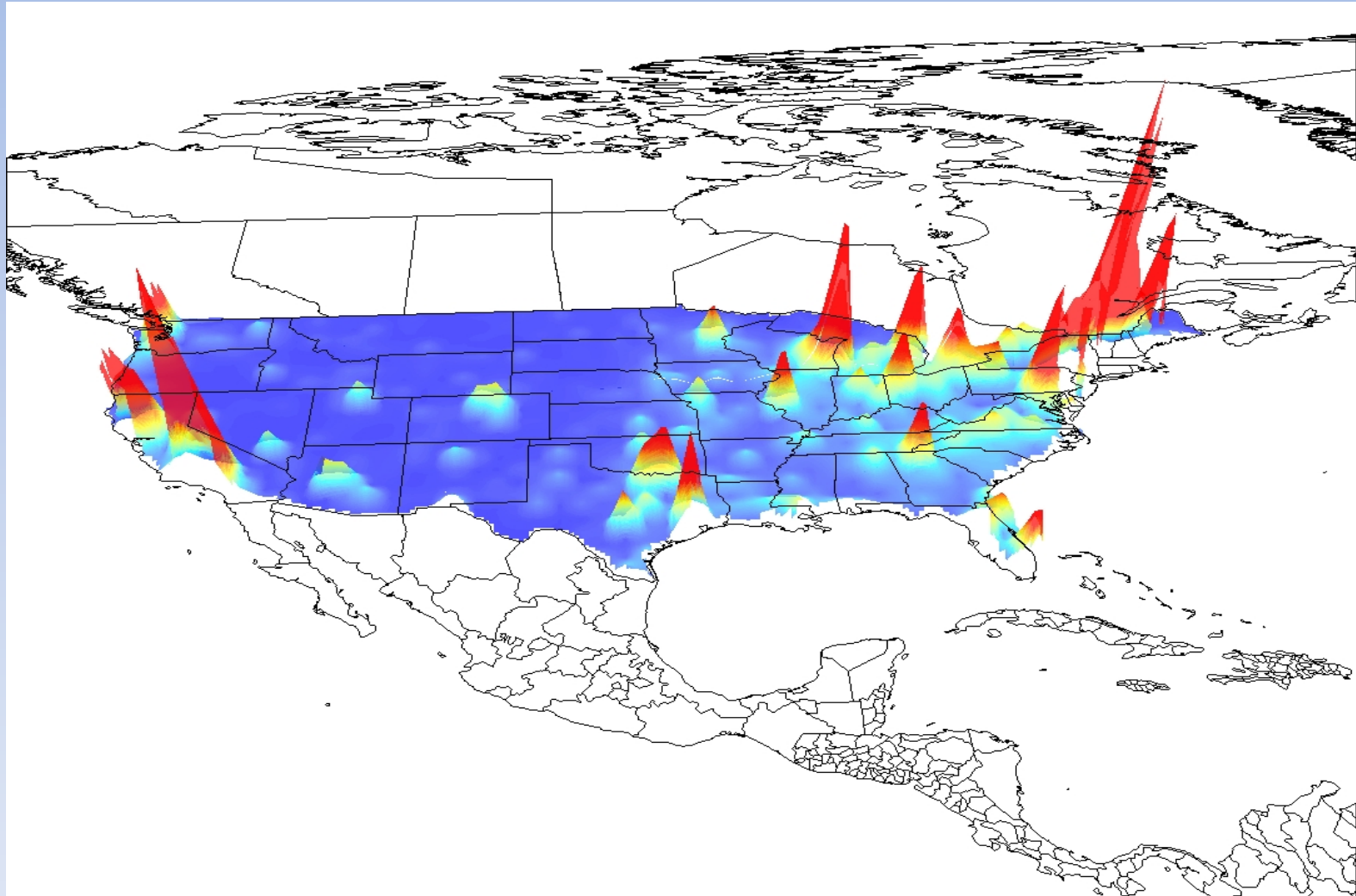
Concentration of economic mass is inevitable and generally desirable

The richer, the denser: People concentrate in towns and cities as nations develop

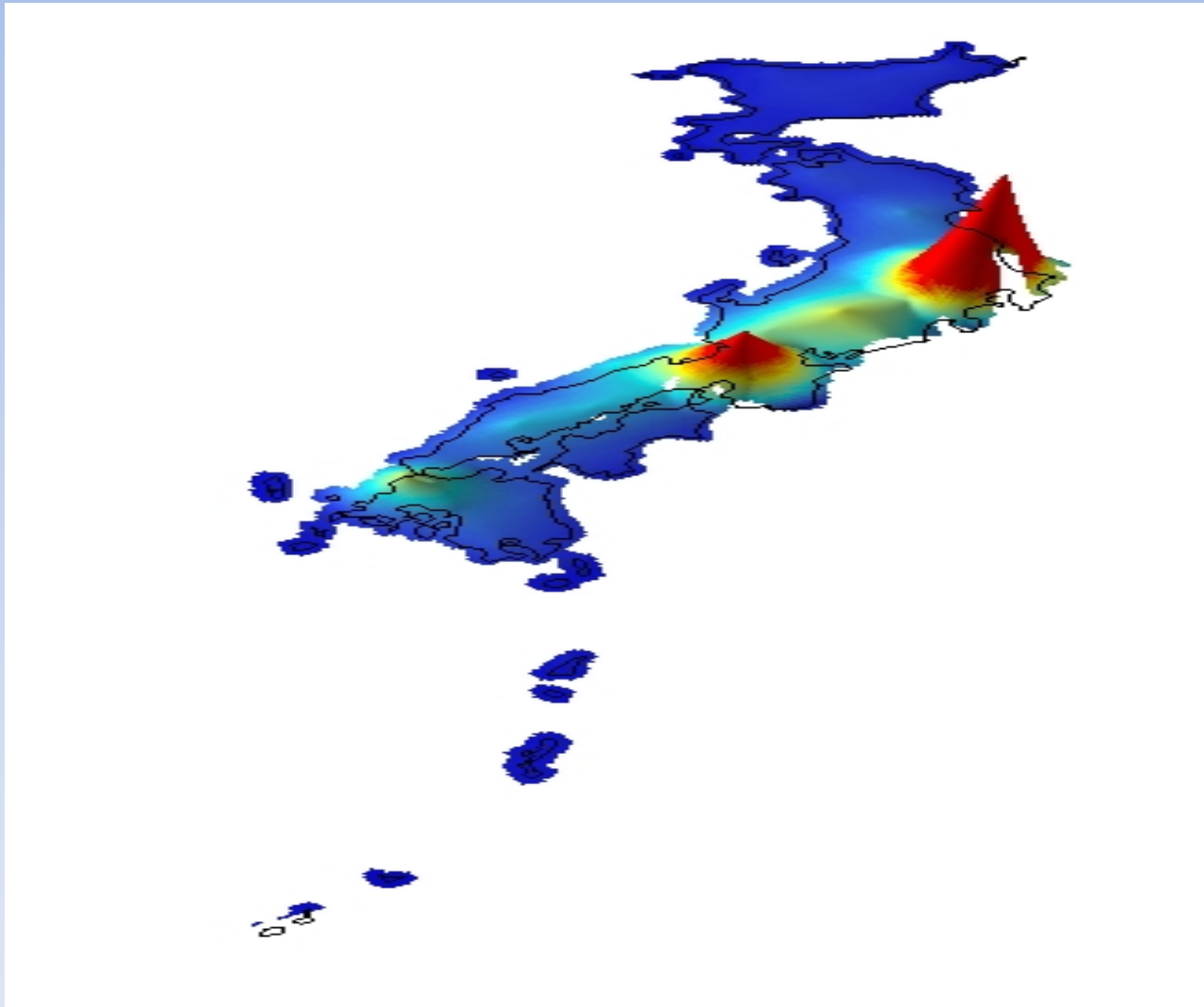
Agglomeration Index, using a spatial resolution of 1 square kilometer



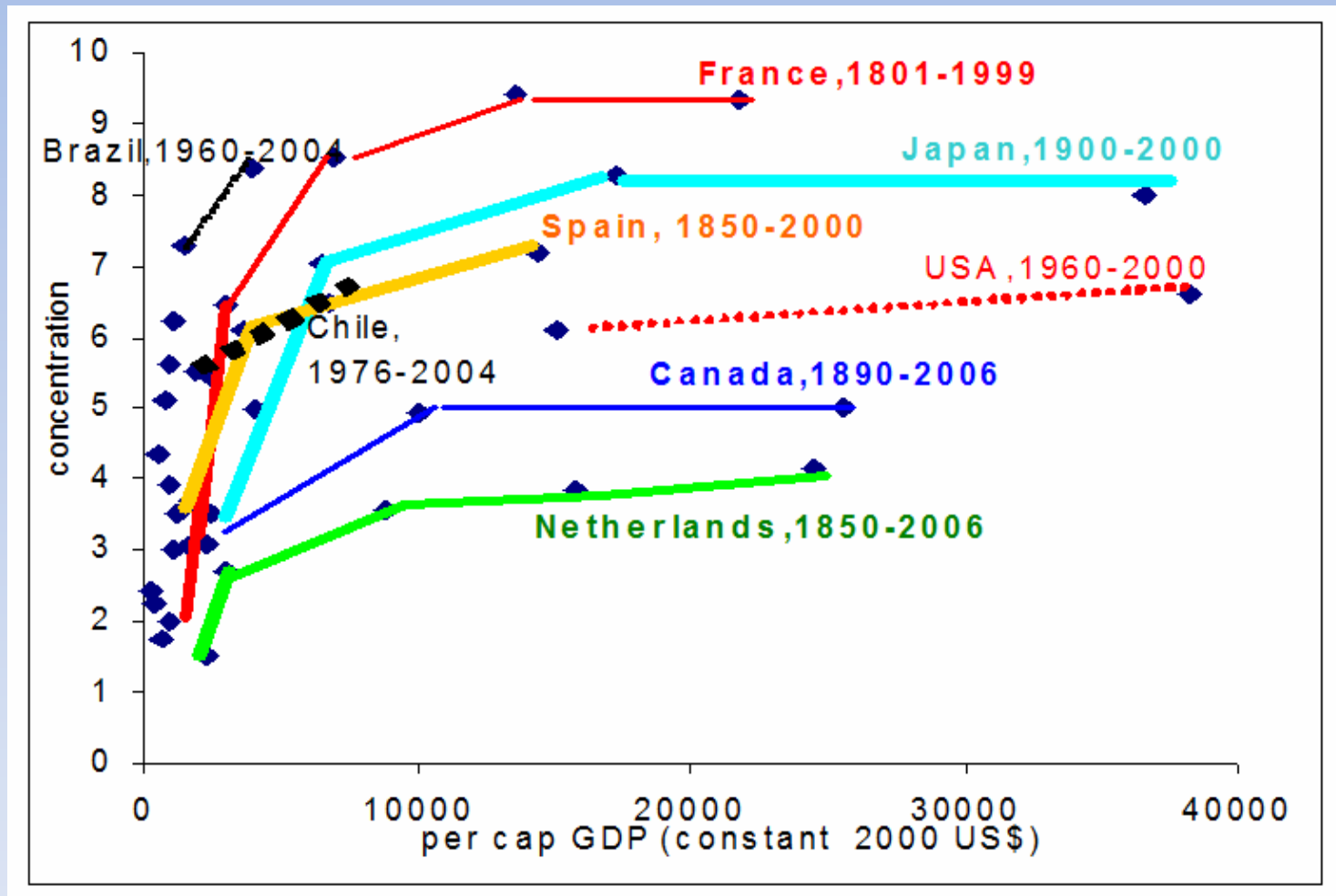
Concentration of economic mass is inevitable and generally desirable, example US



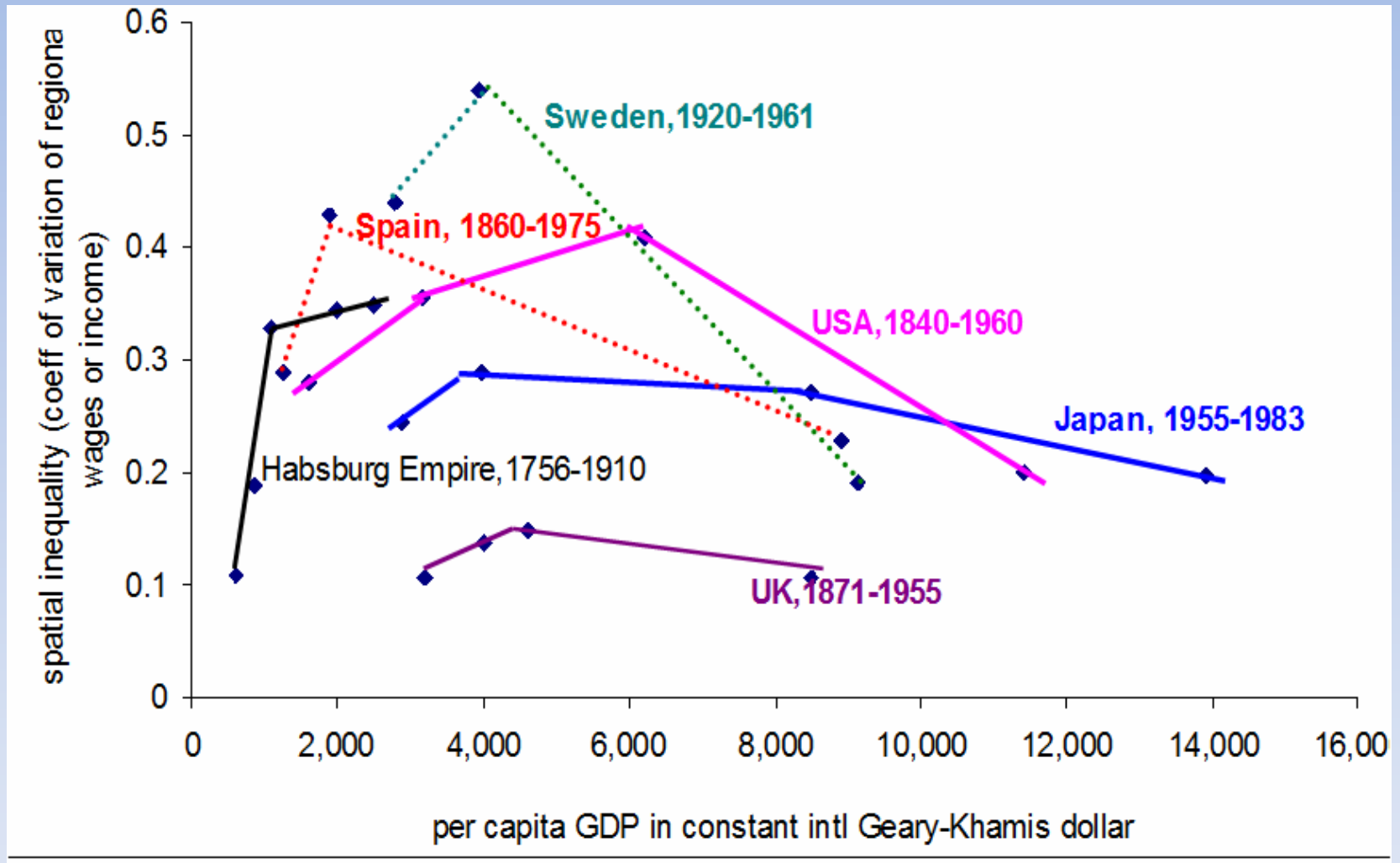
Concentration of economic mass is inevitable and generally desirable, Example Japan



Persistent spatial disparities in living standards are neither desirable nor inevitable



Persistent spatial disparities in living standards are neither desirable nor inevitable



The way to get both concentration and convergence is integration, example of slow EU process

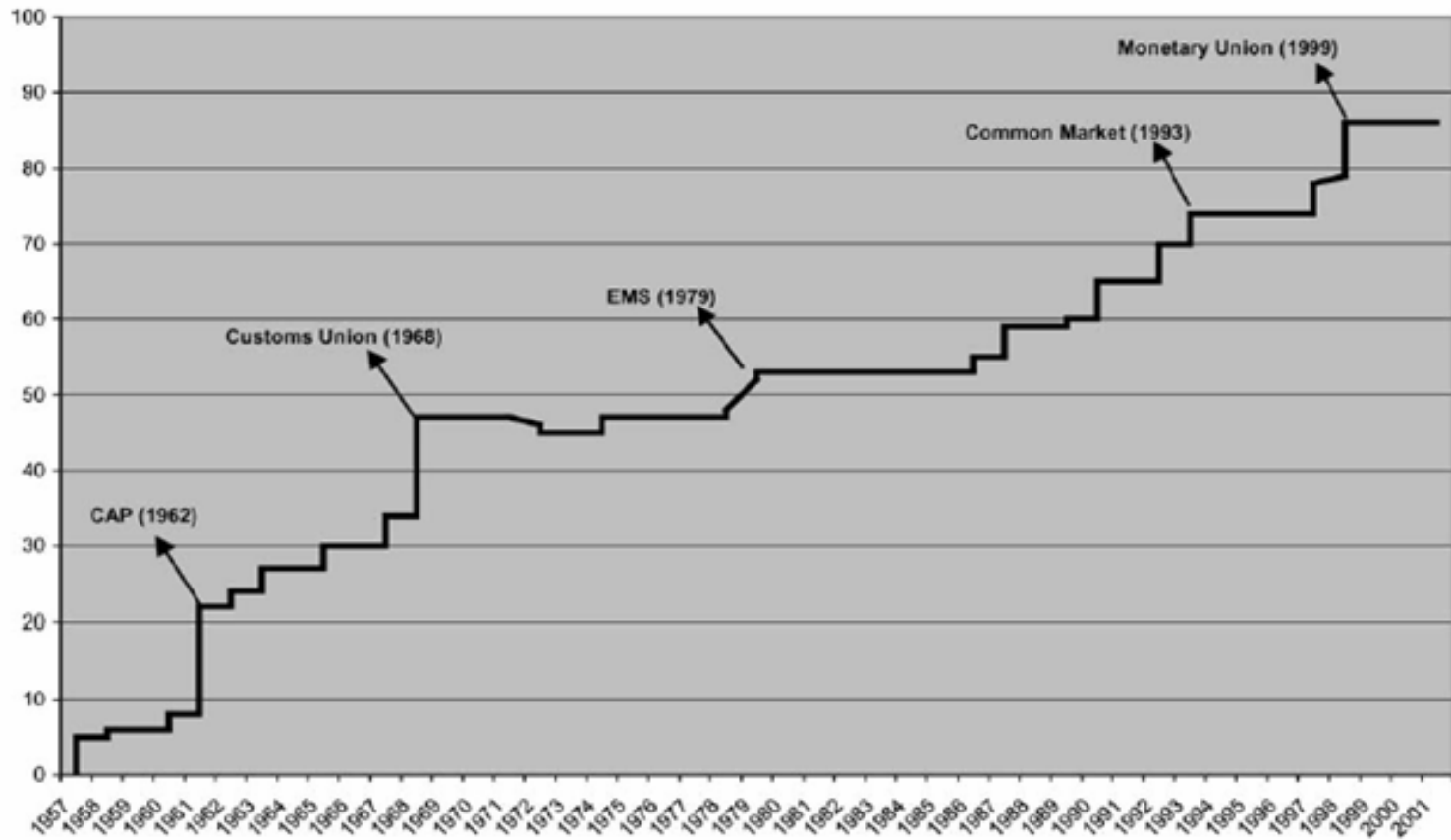
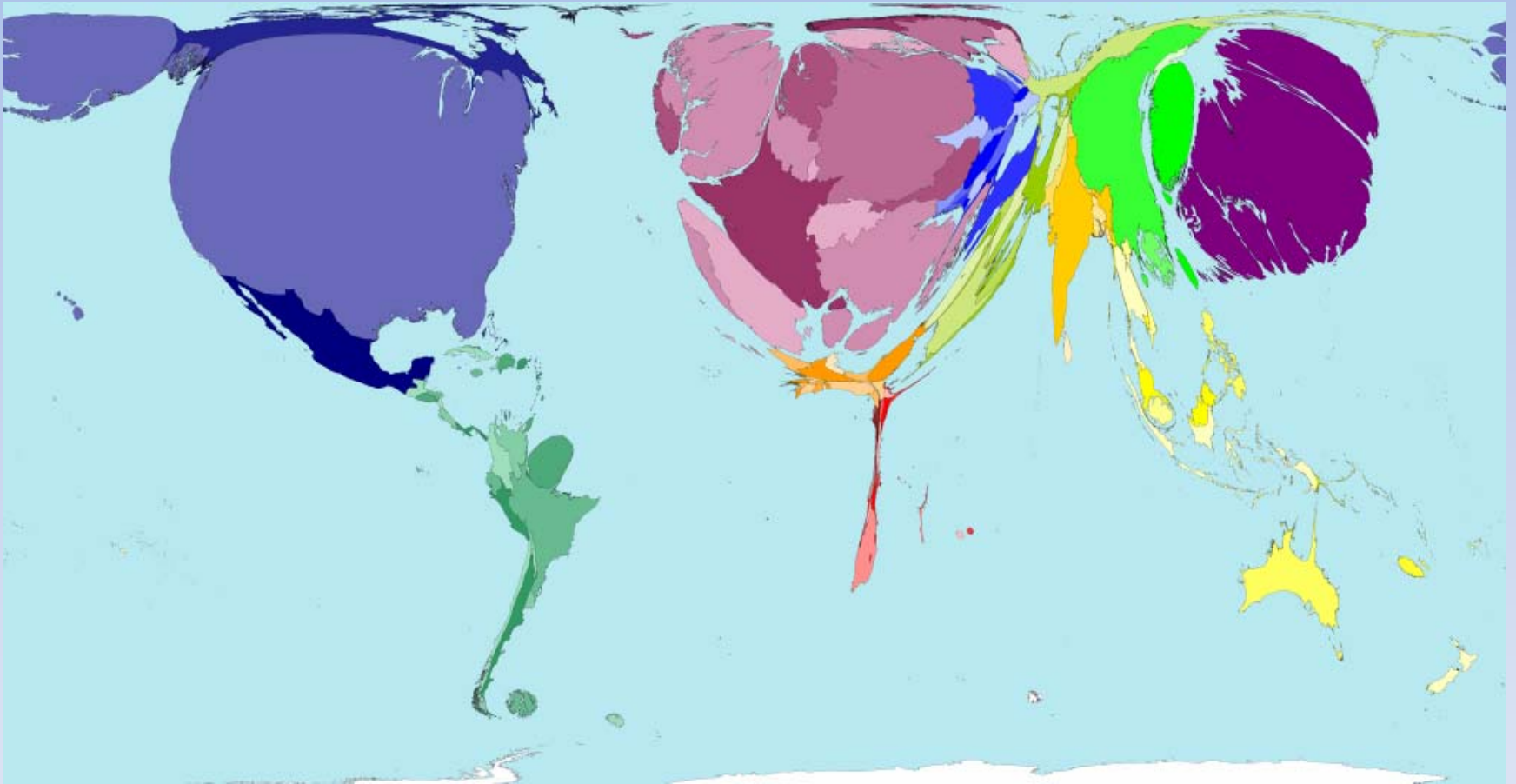


Figure 1. Institutional index of integration for EU-6 (BE, DE, FR, LU, IT, NL) (1957–2001).

The way to get both concentration and convergence is integration, some borders have remained thick



**The way to get both concentration and convergence
is integration;
US, EU15 and Japan as eco-geographic entities**



What the report proposes

- 1. *Understand the spatial transformations necessary for economic progress***
 - *Higher Densities*
 - *Shorter Distances*
 - *Fewer Divisions*
- 2. *Unleash the market forces that promote concentration and convergence***
 - *Agglomeration*
 - *Migration*
 - *Specialization and trade*
- 3. *Calibrate policies to achieve economic integration***
 - *Spatially blind “institutions”*
 - *Spatially connective “infrastructure”*
 - *Spatially targeted “incentives”*
- 4. *Result:***
 - *Unbalanced growth, balanced development*

The calibrated policy response

An 'I' for a 'D'? An indicative matrix for calibrating the policy response

Complexity of challenge	Place type—local (L), national (N), and international (I) spatial scales	Policy priorities for economic integration		
		<i>Institutions</i> <i>(Spatially blind)</i>	<i>Infrastructure</i> <i>(Spatially connective)</i>	<i>Incentives</i> <i>(Spatially targeted)</i>
<i>One-dimensional</i>	L. Areas of incipient urbanization N. Nations with sparse lagging areas I. Regions close to world markets	●		
<i>Two-dimensional</i>	L. Areas of intermediate urbanization N. Nations with dense lagging areas I. Regions distant from world markets	●	●	
<i>Three-dimensional</i>	L. Areas of advanced urbanization that have within-city divisions N. Nations with dense lagging areas and domestic divisions I. Regions distant from markets with small economies	●	●	●

Note: Throughout the report, areas are within-country economic neighborhoods or administrative units such as states or provinces, and regions are groupings of countries based on geographic proximity.

Source: WDR Team.

Transport and Regional Integration

- How have transport costs shaped the global economic geography?
- Why do falling transport costs concentrate economic mass?
- The challenges: Is the world flat?



How have transport costs shaped the global economic geography?

- Global economic geography was shaped by two waves of falling real transport costs
 - Mid 19th century to WWI
 - From the 1970's to today
- The waves differed in the drivers and in the modes concerned
- The outcomes of the two waves differ



How have transport costs shaped the global economic geography? First era of globalization

- Integration initially driven by 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



How have transport costs shaped the global economic geography? First era of globalization

- Railways revolutionized land transport
 - In 1851-1852 boats carried six times as much freight in US as railroads, in 1889 railways five times as much inland waterways
 - Wheat price spread between New York and Iowa fell from 69 % to 19 % between 1870 and 1910
 - 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

How have transport costs shaped the global economic geography? First era of globalization

- The steam boat revolutionized maritime transport
 - 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 %
 - Trade shifted from European – Asian routes to the North Atlantic



How have transport costs shaped the global economic geography? Second era of globalization

- Road transport costs fall, but serve only 23 percent of international transport, institutions and vehicle technology
 - 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

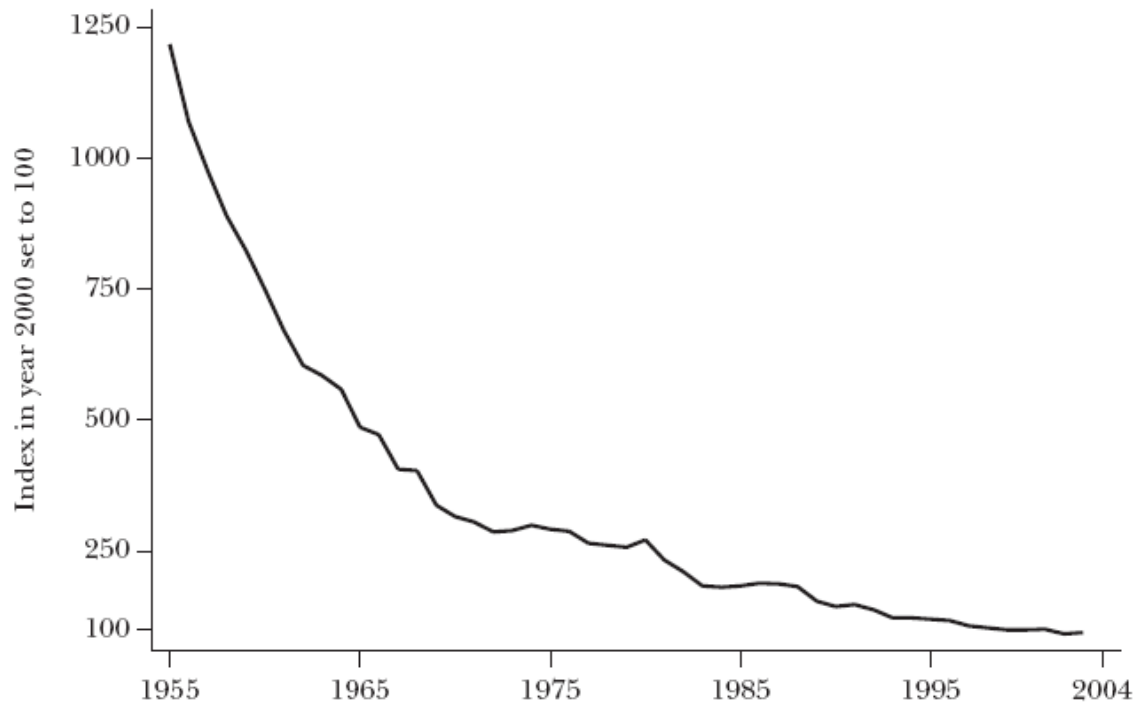


How have transport costs shaped the global economic geography? Second era of globalization

- Air transport costs fell dramatically but before the surge of international trade

Figure 1

Worldwide Air Revenue per Ton-Kilometer



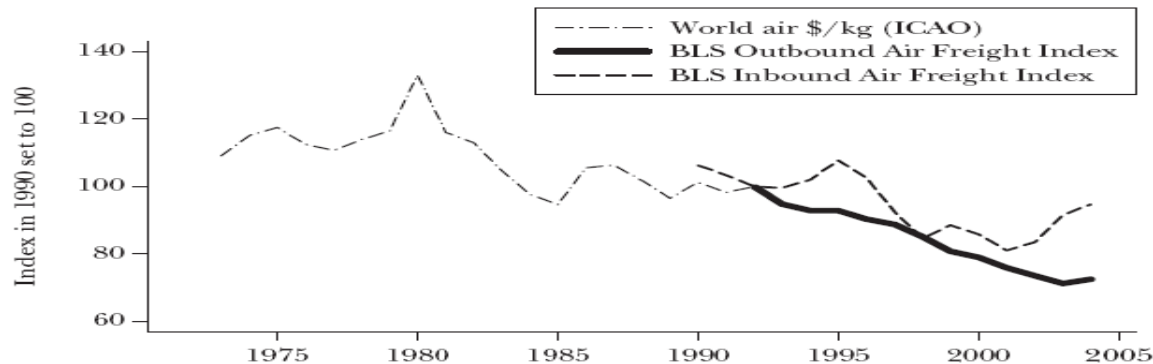
Source: International Air Transport Association, *World Air Transport Statistics*, various years.

How have transport costs shaped the global economic geography? Second era of globalization

- Decrease in air freight still marked but flatter if accounting for changing routes

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.

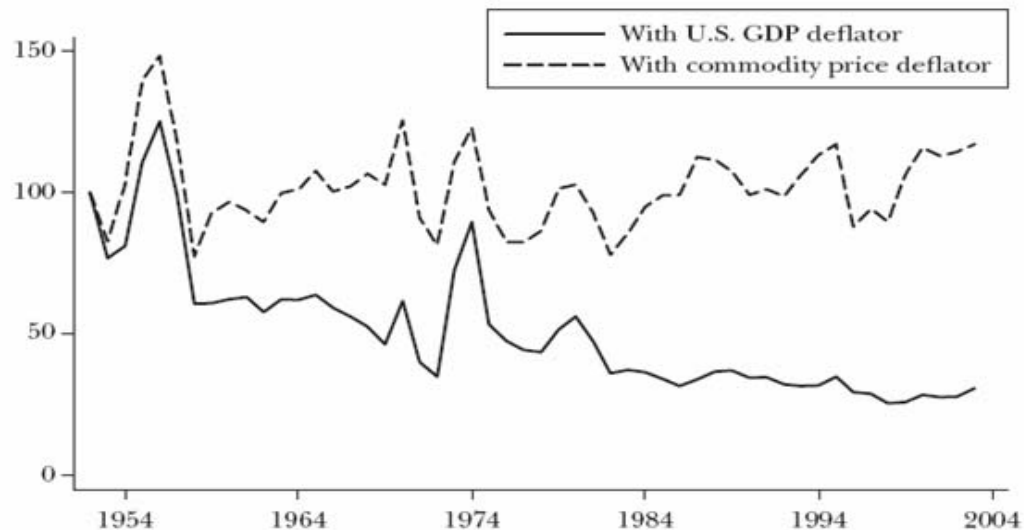
How have transport costs shaped the global economic geography? Second era of globalization

- Cost indices of the most important international transport mode have not decreased

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.

How have transport costs shaped the global economic geography? Second era of globalization

- Cost indices of the most important international transport mode have not decreased

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.

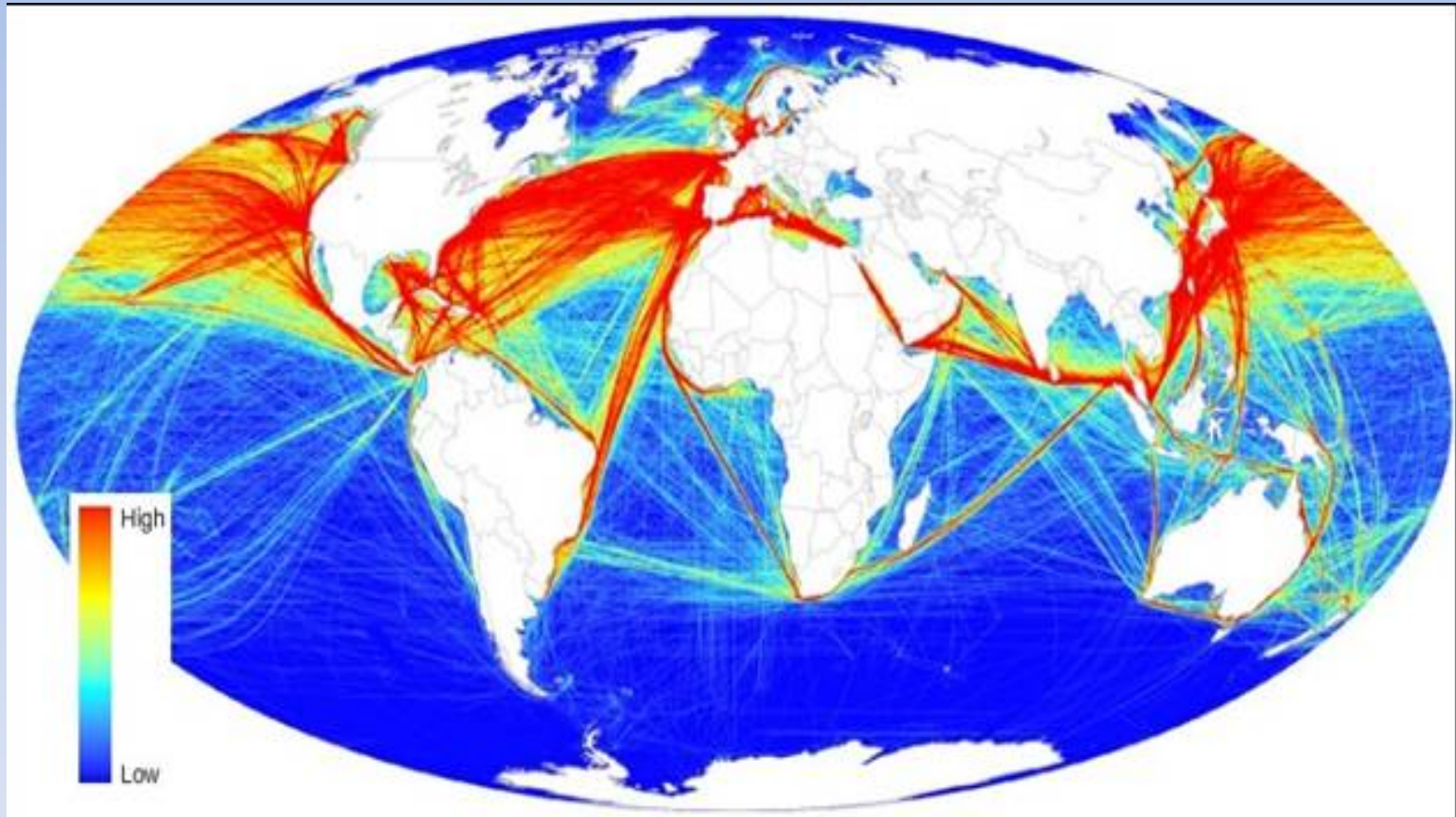
How have transport costs shaped the global economic geography? Second era of globalization

- Freight for railways has not decreased much and depends competition with road sector on submarkets
- Inland waterways have dramatically lost importance



How have transport costs shaped the global economic geography? Second era of globalization

Intensity of shipping routes 2007



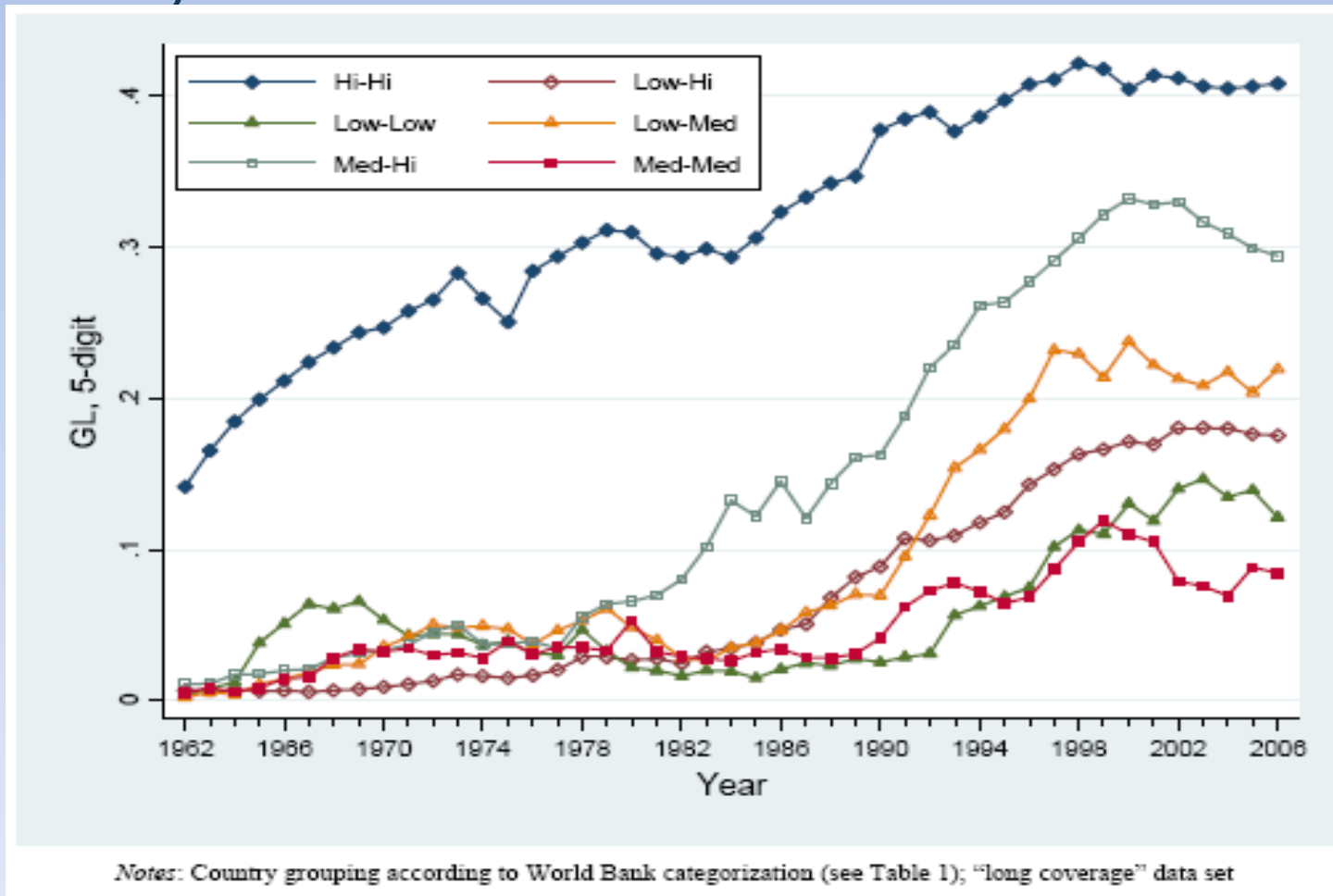
How have transport costs shaped the global economic geography? Second era of globalization

- Trade friction of transport has nevertheless fallen globally
- Reduced trade friction is due to changed character in trade
- Overall increase in value-weight ratio of international trade
- Decrease of the ratio for air, increase for maritime sector



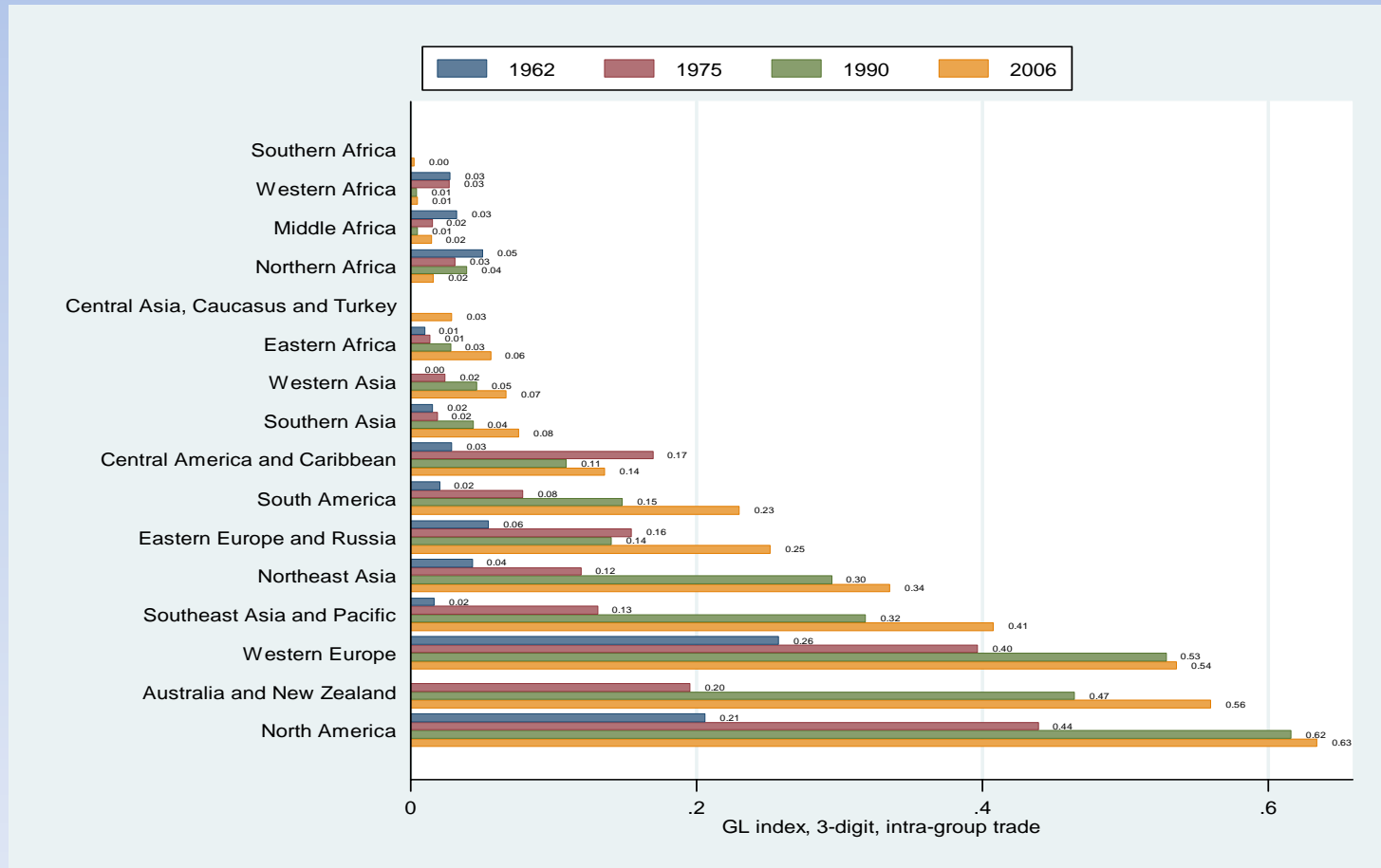
How have transport costs shaped the global economic geography? Second era of globalization

- The importance of intra-industry trade increased enormously



How have transport costs shaped the global economic geography? Second era of globalization

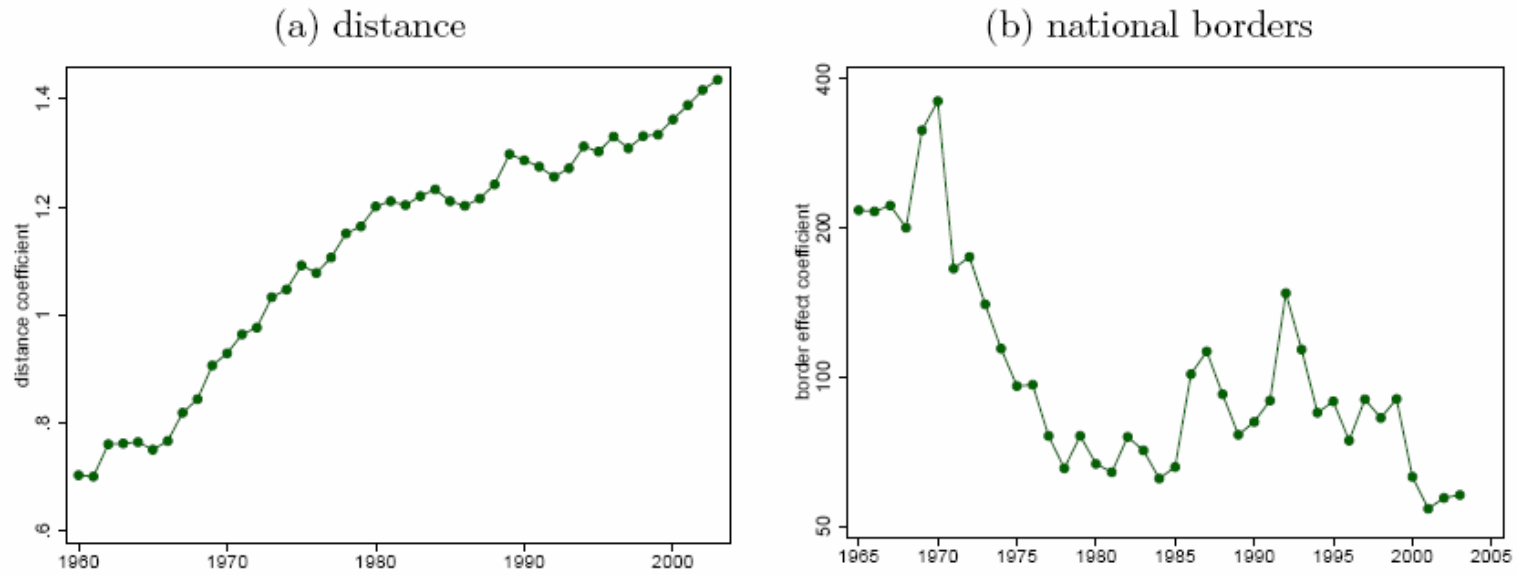
- Integration into intra-industry trade is geographically selective



How have transport costs shaped the global economic geography? Second era of globalization

- The loss of transport-related trade friction diverges on long and short distances

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



Theory: How do transport costs drive economic geography?

- Productivity increasing agglomeration effects derive from
 - Sharing facilities
 - Sharing varieties
 - Sharing knowledge
- Lower transport costs facilitates sharing facilities, varieties and knowledge



Theory: How do transport costs drive economic geography?

- Sharing facilities
 - Average user costs decrease with usage for indivisible public services
 - Health
 - Education
 - Extension Services etc.
 - Lower transport costs increase the catchment areas and lower average costs.



Theory: How do transport costs drive economic geography?

- Sharing varieties
 - The number of varieties in differentiated consumer and intermediate goods increase with local demand.
 - A higher number of varieties in consumer goods provides higher welfare for those who 'love variety'.
 - A higher number of varieties in consumer goods provides higher productivity for firms which demand specialized inputs.



Theory: How do transport costs drive economic geography?

- Sharing facilities
 - Lower transport costs reduce the protection of firms outside the agglomeration serving non-local demand.
 - Induce a shift of employment towards the agglomeration.
 - Reduce congestion.



Theory: How do transport costs drive economic geography?

- Sharing knowledge
 - Knowledge production and decision making relies on face-to-face communication
 - Despite the IT revolution knowledge producing agglomerations have not eroded, demand for business and conference travel does not go down
 - Lower transport costs allow for a larger network to connect to a knowledge producing agglomeration



Policy Challenges

- Economic geography literature is not very informative for policies due to the 'iceberg type' transport cost assumption
- Challenges follow from technical characteristics of inputs (infrastructure) of the transport sector and the network character of operations and logistics
- Challenges for future reductions of transport costs follow from external costs of transport



Policy Challenges: Infrastructure

- Indivisibility of infrastructure facilities lead to increasing returns in the provision of their services
 - Decreasing costs per user with increasing demand
 - Coordination device: big push?
 - External spillovers from completing networks
- ⇒ Underinvestment bias from decentralized decisions



Policy Challenges: Infrastructure

- Political economy bias
 - Underfunding of maintenance
 - estimated loss of \$45 bn. in 1970-1989 in road asset value in Sub-Saharan Africa (only construction value)
 - could have been avoided by spending \$12 bn. in maintenance
 - costs are much higher including speed losses, vehicle maintenance costs and negative impact on spatial transformation



Policy Challenges: Infrastructure

- Political economy bias
 - Underinvestment bias in international infrastructure
 - Policy makers are rewarded by national support
 - Part of the benefits accrue to foreigners
- ⇒ International coordination to be based on expected reciprocity



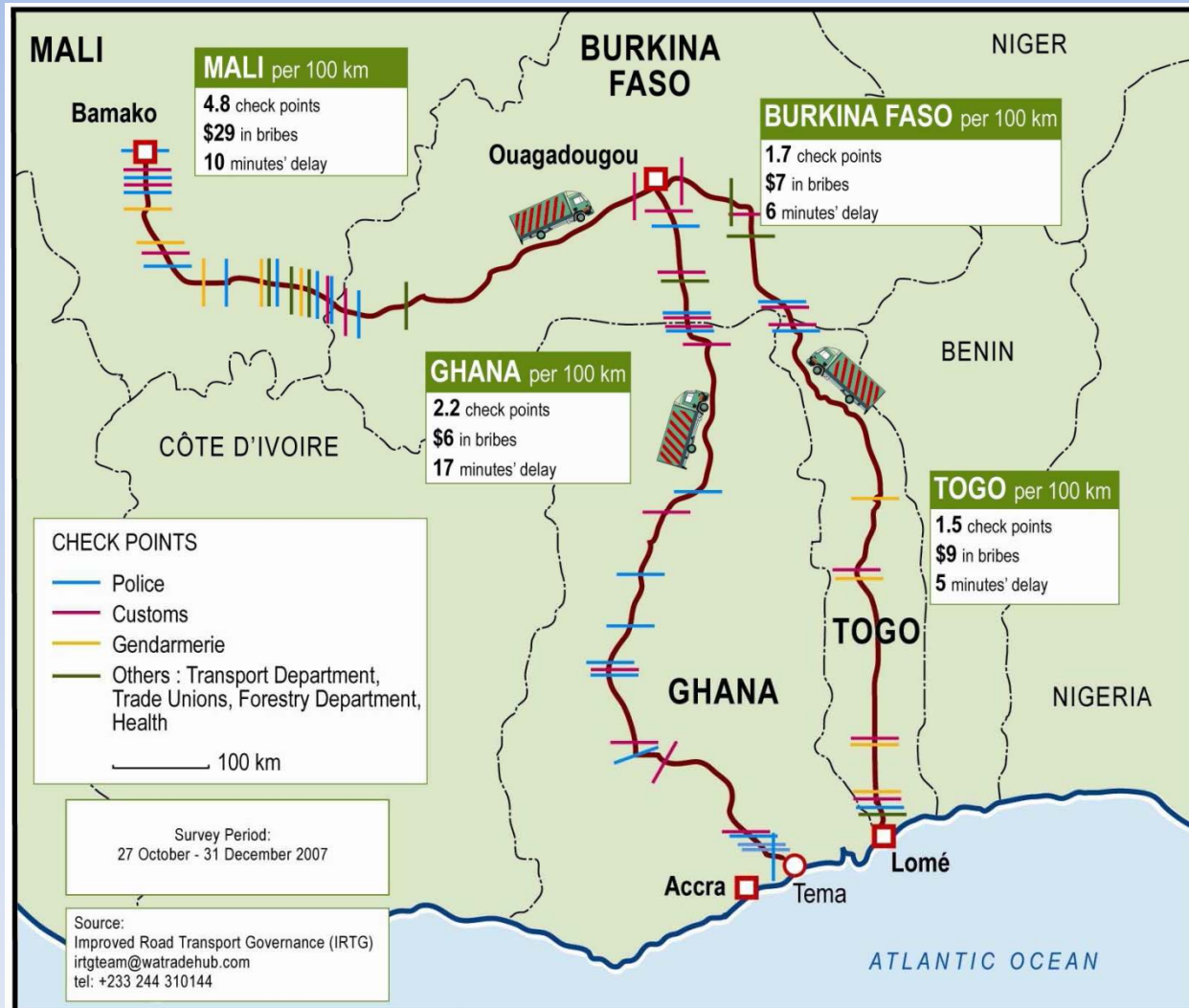
Policy Challenges: Infrastructure

- Size advantages of port and airport facilities require international coordination
 - Joint use of facilities: credibility of international regulation
 - Jointly organized hub and spoke system
 - Capacity of containerships increased by 10 percent annually between 2000 and 2004
 - 12000 TEU vessel has a cost advantage of 11 % relative to 8000 TEU and 23 % relative to 4000 TEU vessel, with high loading factor



Policy Challenges: Infrastructure

- Transport costs remain high due to rent seeking



Policy challenges: Operations

- High mark-ups in the trucking industry
 - in SSA mark-ups between 62 % (South Africa) and 163 % (Central Africa), with outlier on Lusaka – Johannesburg corridor



Policy challenges: Border crossing

- Days to export between 46 and 78 days for SSA
- Days to import between 54 and 102 days for SSA



Importance of transport costs for international trade

- High responsiveness of trade to transport costs: a 10% increase in transport costs leads to a 20% reduction in trade volumes on average
- High transport costs reduces competitiveness in two ways:
 - Net domestic export prices are reduced
 - Gross imported input prices are higher



Importance of transport costs for international trade

- Improved access to international markets by lowering transport costs by 10% raises national income by 2.5%
- Reduced international transport costs increases Foreign Direct Investment and knowledge transfer due to 'insourcing'
- Lower international transport costs enhance agglomeration economies



Importance of trade costs for international trade

- Reducing congestion by increasing international infrastructure capacity from median values to the top 25th percentile would
 - reduce cif/fob ratios from 1.28 to 1.12
 - increase trade volumes by 68%



Summary of Policy Challenges: What can transport policy do?

- Overcome the underinvestment bias in international infrastructure investment
- Reduce infrastructure rents by regulation
- Reduce rents in transport operations by competition policy
- Facilitate trade by more efficient border crossing
- Support new technologies to reduce external costs



Conclusion

- The geographic concentration of economic mass is a constituent element of the development process
- Falling transport costs are a central driver of this process
- Falling transport costs have shaped the global economic geography in two very different waves
- Technical characteristics of the transport sector exclude that technical progress and investment in input production translates into lower transport costs by market forces alone
- Institutional change is particularly required to reduce international transport costs



Thank you!

