The Role of Infrastructure/Logistics in Inclusive Growth: Lessons from Latin America

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OUTLINE

- Motivation
- Infrastructure as key component of growth
- State of infrastructure /logistics in CA, and DR
- Role/Impact of Infrastructure/Logistics as instrument for inclusive growth
- Logistics, Infrastructure and Trade Facilitation as the Lexus for Competitiveness and Trade
- Logistics/Trade Facilitation/Infrastructure Platform
- Agenda for Progress

Link between Infrastructure and Growth

- A large number of empirical studies show a strong linkage between infrastructure investment and economic growth *and poverty impact*.
- Overall, of the 140 specifications from 64 papers considered, the majority of the empirical literature finds a positive and significant link between infrastructure and development outcomes. Developing country data lead to positive results slightly more often than those exercises using data from developed economies. A small fraction of the literature (6 percent) finds a negative relationship.
- Critical for inclusive growth
- Yet investment in infrastructure in Central America quite low about 2% of GDP versus benchmarks of 5%

Figure 1. Infrastructure Stocks vs. Economic Growth

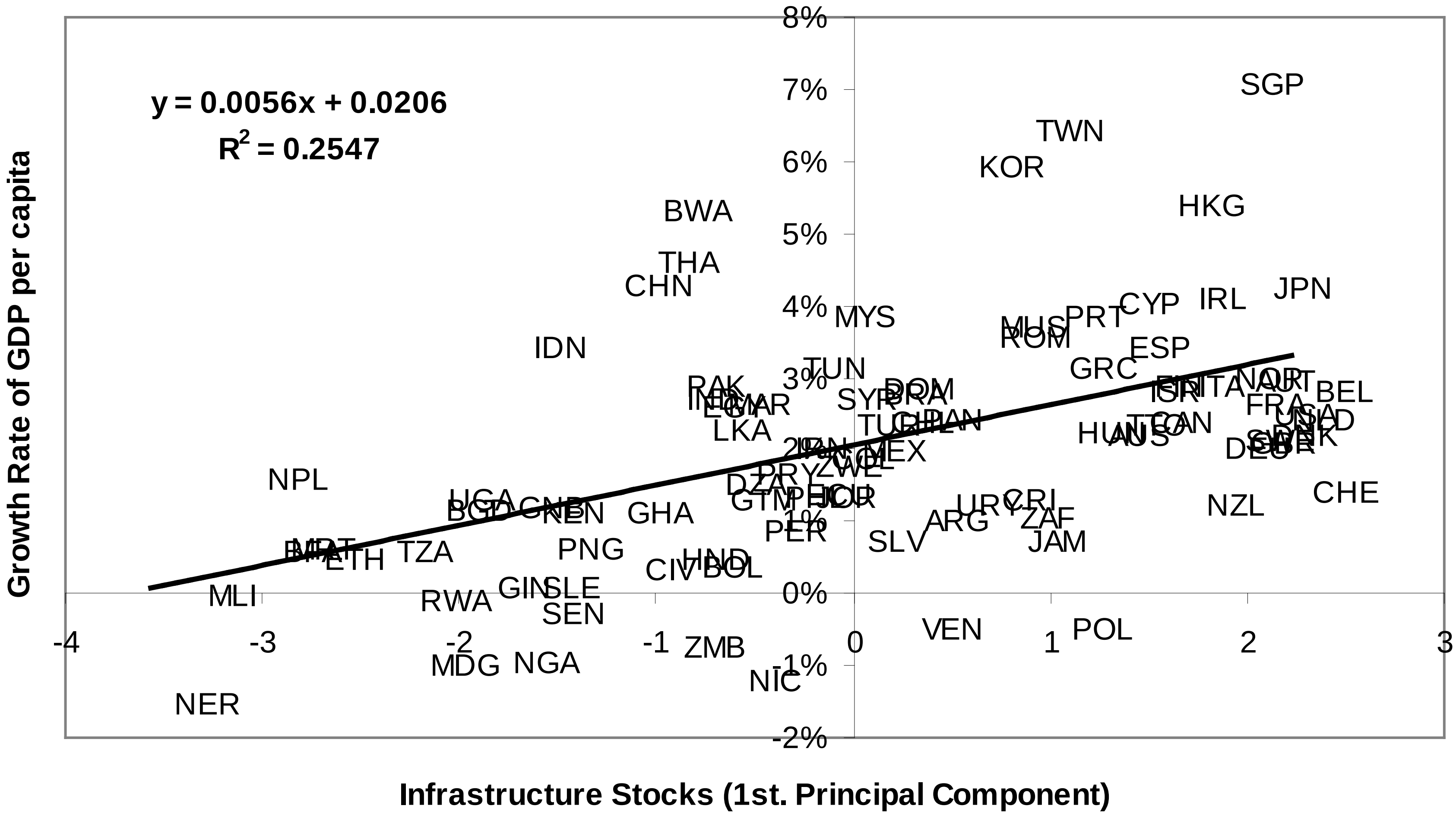
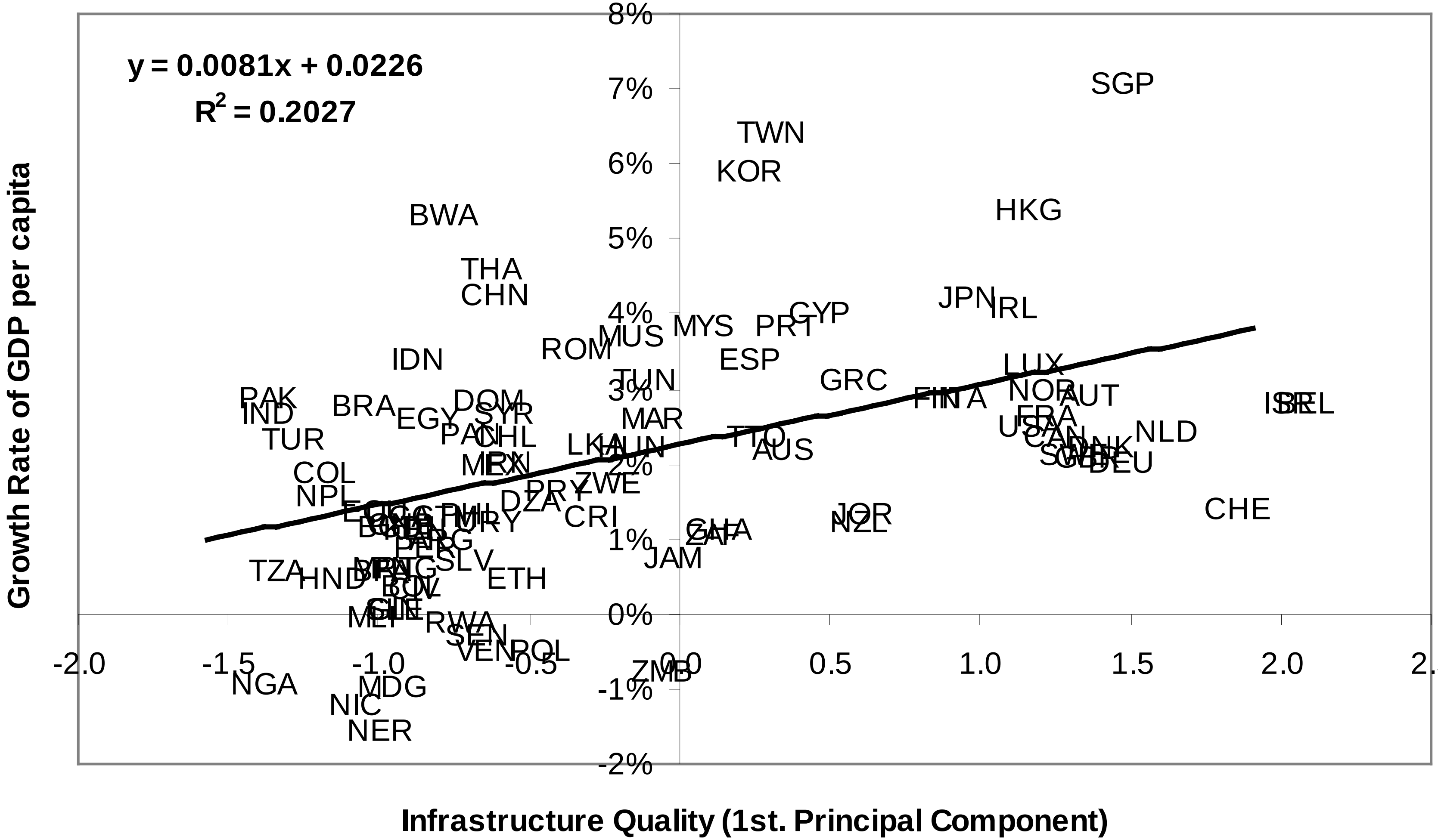
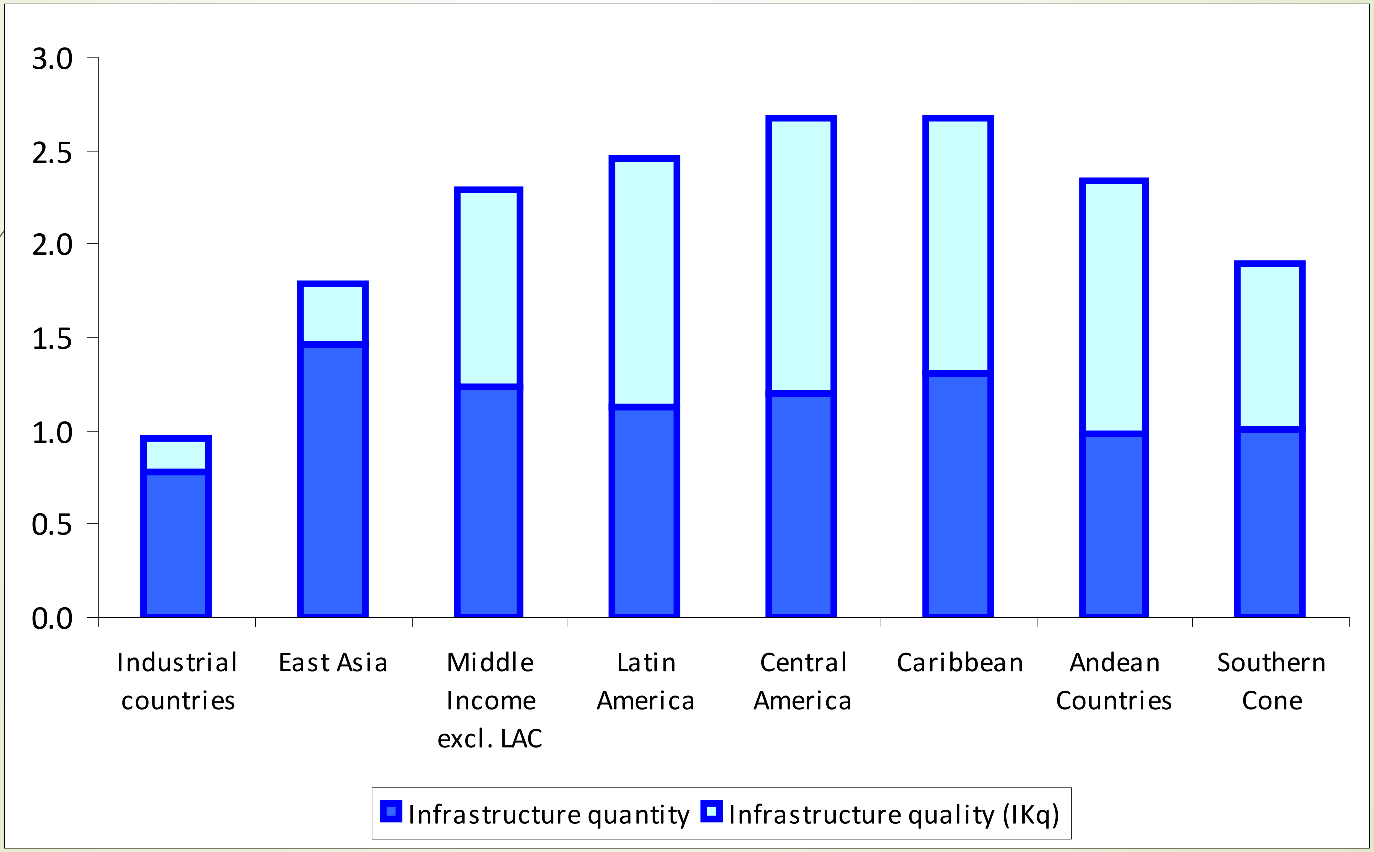


Figure 2. Infrastructure Quality vs. Economic Growth



Increases in GDP per capita (percentage points) due to investments and improvemenst in infraestructure (2001-5 vs. 1991-5)



Logistics/Infrastructure/Trade Facilitation Framework

- Critical for enhancing competitiveness/productivity
- Critical for trade/export based growth strategy
- Critical for mainstreaming SMEs into the export and value chain
- Critical for poverty alleviation, and for inclusive growth (low income users and small producers)

- Need a comprehensive and integrated approach

Problematic of Central América,RD

Overall Central American, DR Countries Have:

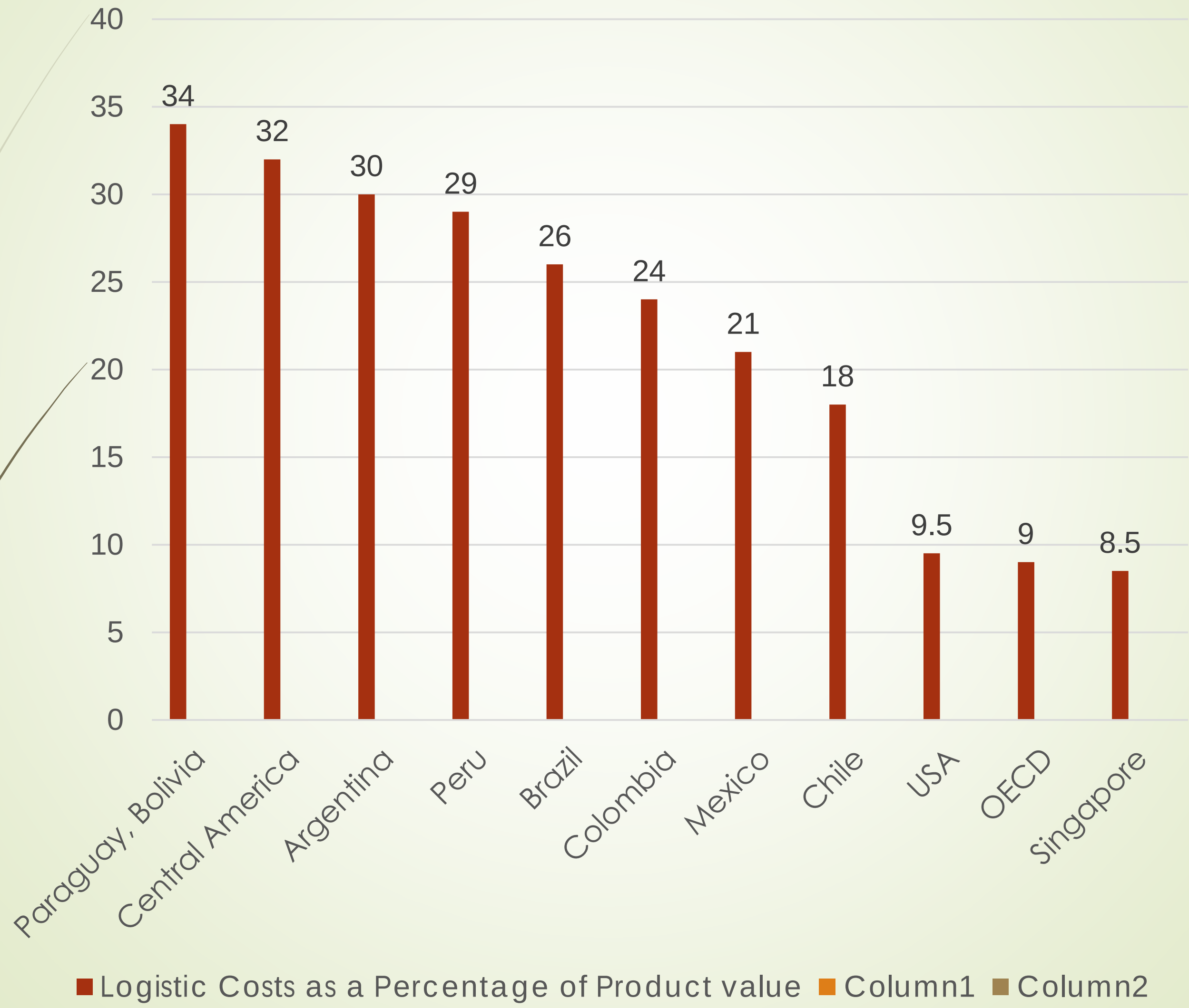
- Large gaps in infrastructure
- Deficient infrastructure service
- High Logistic costs
- Small Investments in Infrastructure and in Maintenance and Rehabilitation

- Limited inclusive growth
- Evidence follows

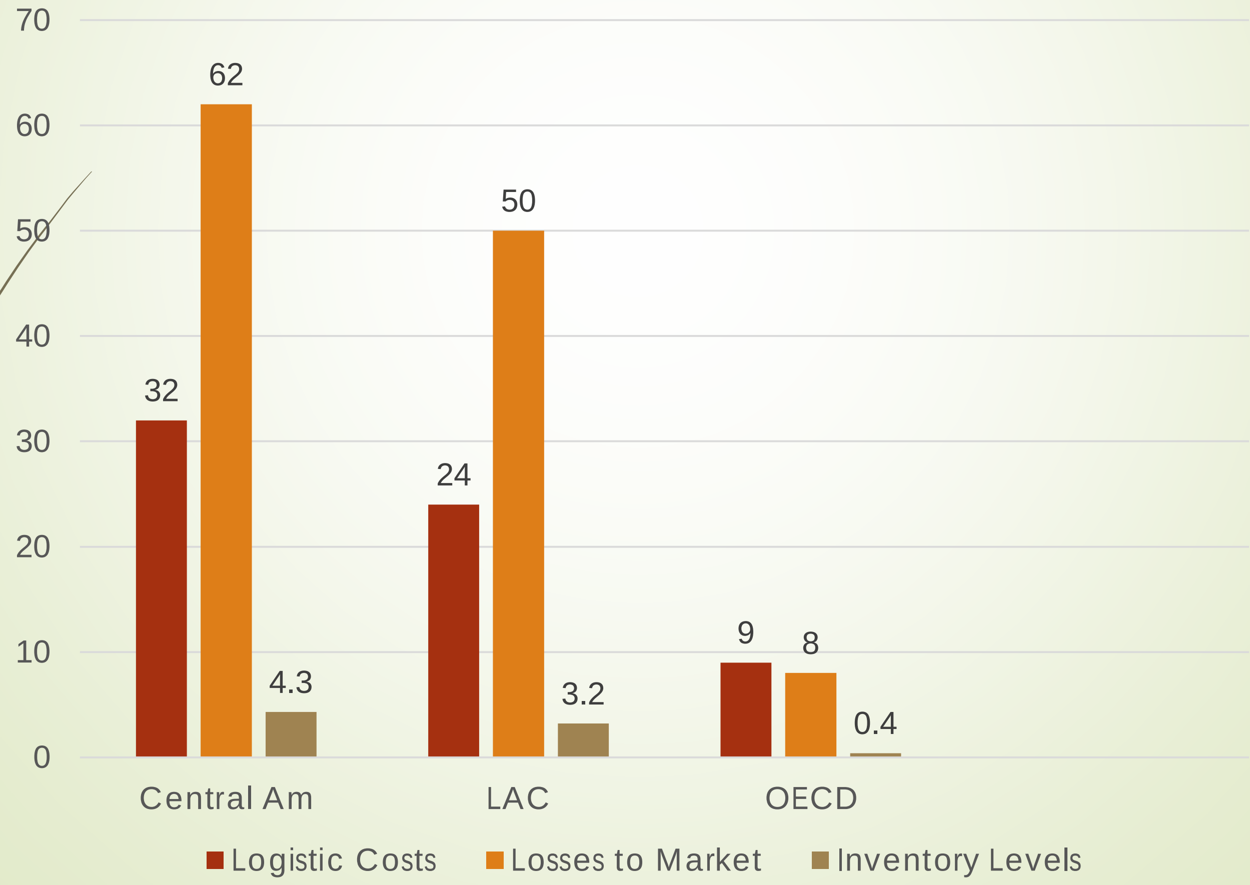
Key Facts and Red Flags in Central America: A Logistic/Infrastructure Quagmire

- Logistics is a key component for competitiveness in countries with and export-led growth strategy
- Large gaps in infrastructure needs
- Logistic costs in CA: over 35% of Product Value (48% for SMEs)
- Investment in infrastructure less than 2 % of GDP
- Serious fiscal space constraints for investment in infrastructure and PPP predicament, while public works plagued by costs overruns (80% incidence at 75% costs increases) and delays (78% with average delays 11 months)
- Energy: 20c/KW and shortages-20% Interruptions and sales lost due to power outages 5%, and poorly targeted subsidies
- Average speed of Trucks in CA 11-18 Km/h (in USA 90 Km/h)
- Fuel costs, 60 % vs 25% in USA of variable costs trucking
- Trucking sector- informality reigns
- Quality of roads: 80% of network are tertiary roads
- Border crossing time: over 10 hours; delays increase transport costs by 5 to 10%; days to import and export: 19 and 17
- Port efficiency below average in LAC (Panama exception), and low connectivity:
- Near 50% of production of perishables do not reach markets (small producers): poor cold facilities, packaging and bad roads
- Security Costs: 3.7% of product value
- Slow growth, Volatile and fragile and not diversified Trade trends
- Limited sub-regional (CA) integration: small countries curse-pride and control
- SMEs largely not mainstreamed in to the export/value chain; scale, associativity issues
- Poor Human capital; Secondary Education Degree, and quality
- Very Low FDI (exc Panama, Costa Rica)
- Very Low Productivity, below 50% Production Frontier
- Low Savings and low Tax Collection
- Impact: Very large on: trade employment demand poverty... etc

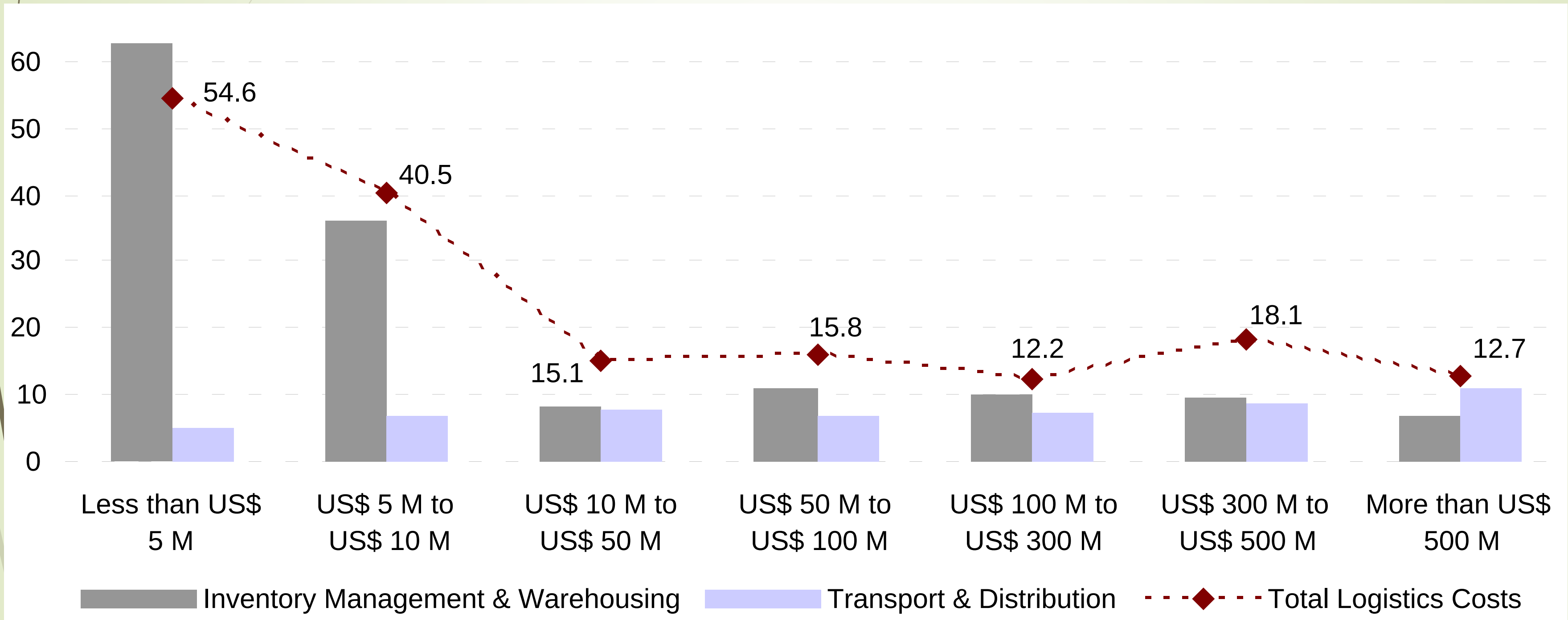
Logistic Costs as a Percentage of Product Value (Source: Guasch 2014)



Deteriorating and Insufficient Infrastructure leads to Uncompetitive Industries/Sectots: Logistic Indicators: Central America, Latin America, and OECD (Source Guasch 2014)



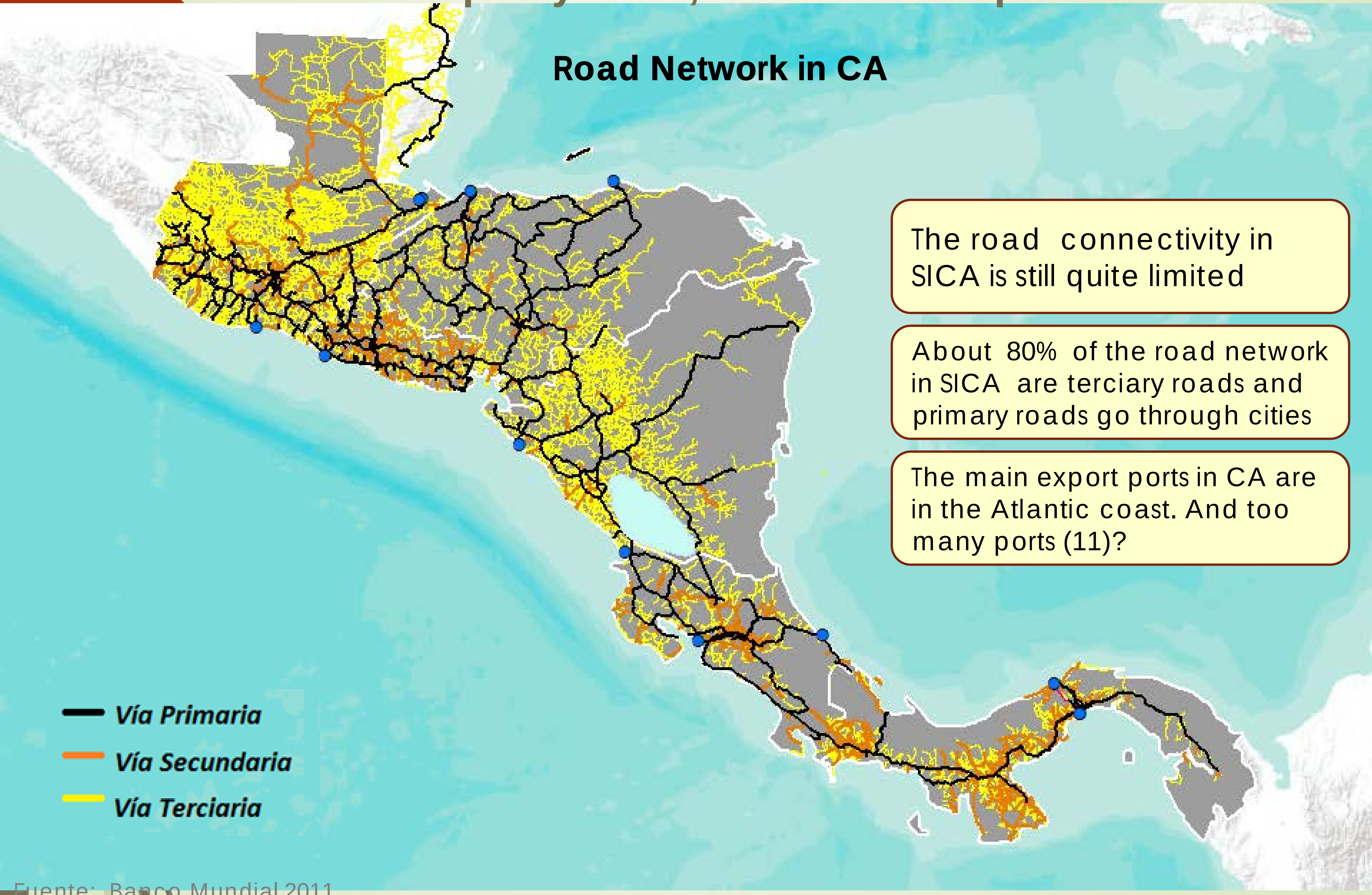
Latin America: Average Logistics Costs by Component as % of Sales, depending on the Total Volume of a Company's Sales: ***SMEs most affected***



Note: "Total Logistics Costs" as a share of Sales does not always equal the sum of the two separate cost component shares, because not all firms in the sample reported on all logistics cost components.

Source: Benchmarking 2007: Estado de la Logística en America Latina Anexo a la Presentación de Maria Rey LogisticSummit 2010, Guasch 2012

Limited Connectivity particularly in the Atlántic side due to the lack of quality roads, and number of ports



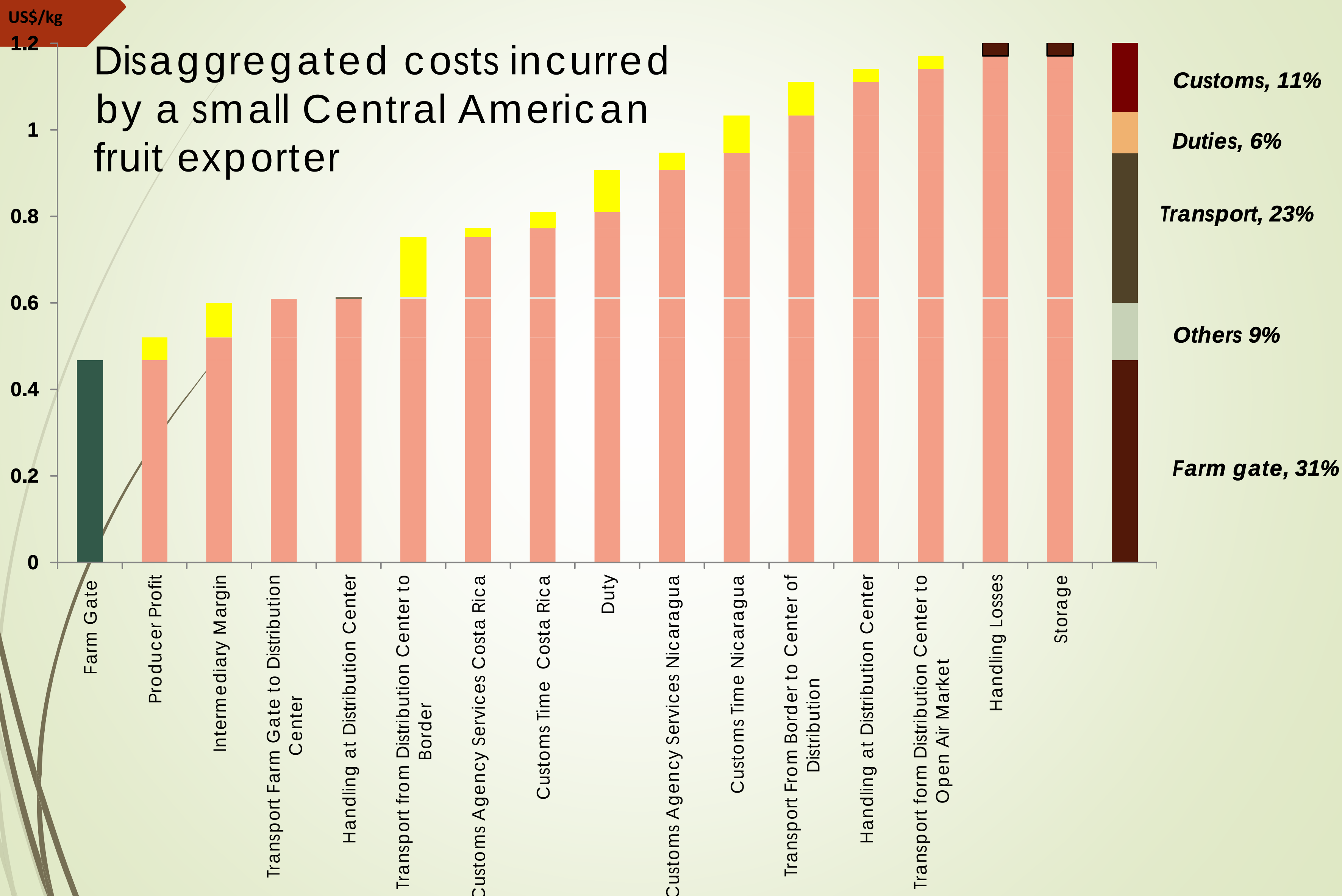
The road connectivity in SICA is still quite limited

About 80% of the road network in SICA are terciary roads and primary roads go through cities

The main export ports in CA are in the Atlantic coast. And too many ports (11)?

Fuente: Banco Mundial 2011

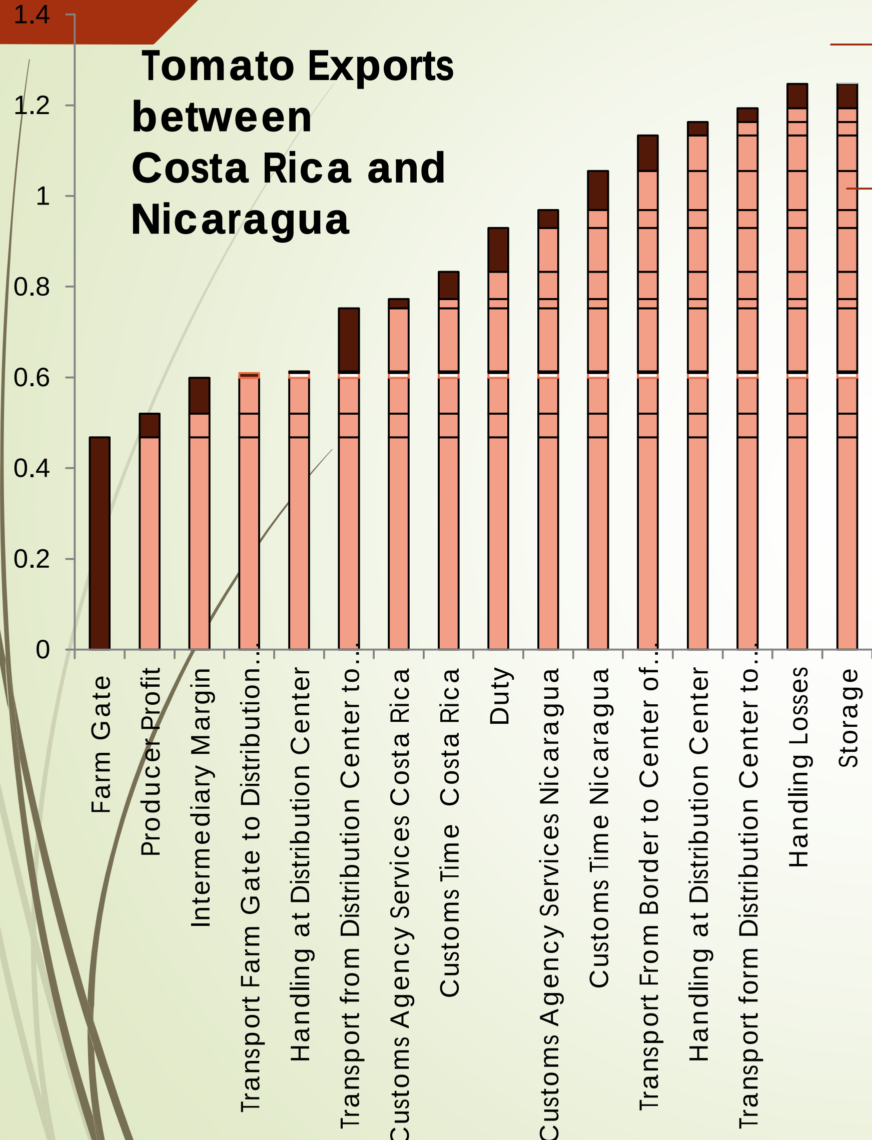
Local exporting producers are punished by logistics costs

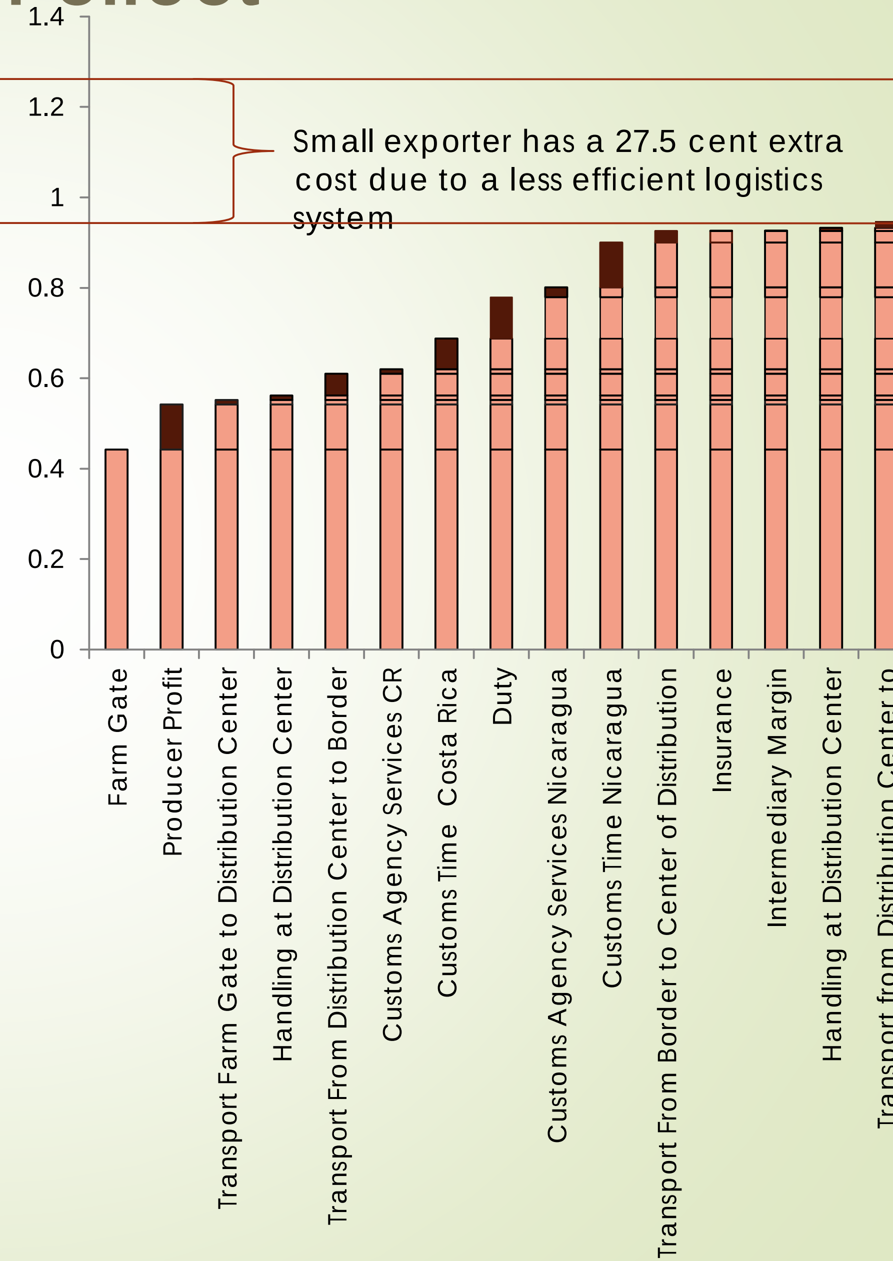


Source: World Bank (2010)

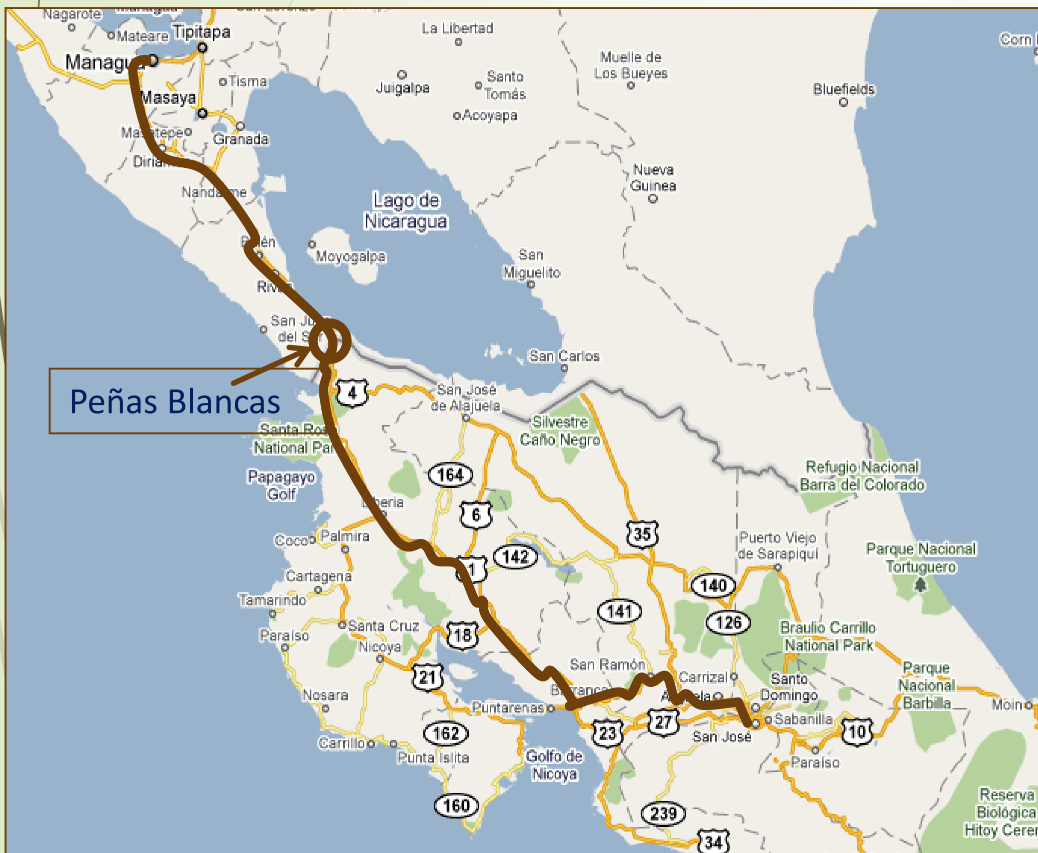
Supply Chain Analysis – Trade CR/Nicaragua
Small producer effect

Tomato Exports between Costa Rica and Nicaragua





Tomatoes from Costa Rica to Nicaragua



Small Exporter	Large Exporter
Final Market	
Mercado al Aire libre Roberto Huembes	Supermercado Managua
Distance to Market	
445 km	525 km
Producer Margin	
.05 US$/kg	.10 US$/kg
Logistics Expenses	
.26 US$/kg	.15 US$/kg
Additional Expenses related to border congestion at Peñas Blancas	
.15 US$/kg	.14 US$/kg

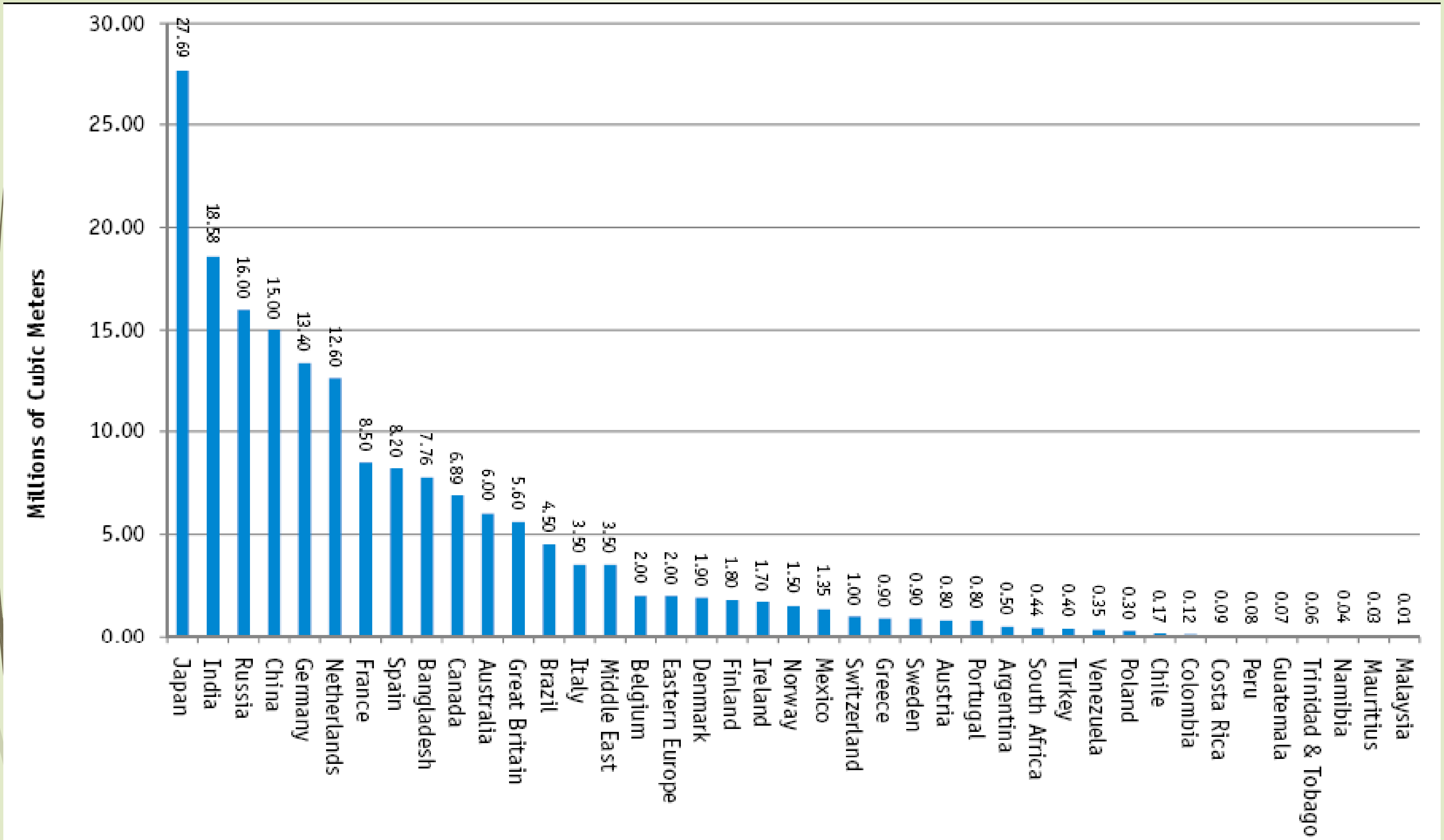
Benchmarking the Logistic Performance through the World Bank ***Logistics Perception Index 2014 – also shows weaknesses in CA countries infrastructure/logistic performance***

	LPI GENERAL	CUSTOMS	INFRAES-TRUCTURE	EASE OF DISPATCH-IMPORT EXPORT	LOGISTIC SERVICES	TRAZABILITY	LOGISTIC COSTS INTERNAL	RELIABILITY
Argentina	45	51	47	49	44	46	93	46
Panamá	54	48	48	58	61	49	26	49
México	56	60	53	53	57	48	101	51
El Salvador	66	75	68	61	78	61	74	73
Costa Rica	**72**	64	67	82	89	78	48	90
Honduras	80	65	79	93	91	91	86	93
Guatemala	75	87	104	73	79	90	65	64
Rep. Dominicana	96	82	97	107	108	107	54	91

Fuente: Connecting to Compete – The World Bank

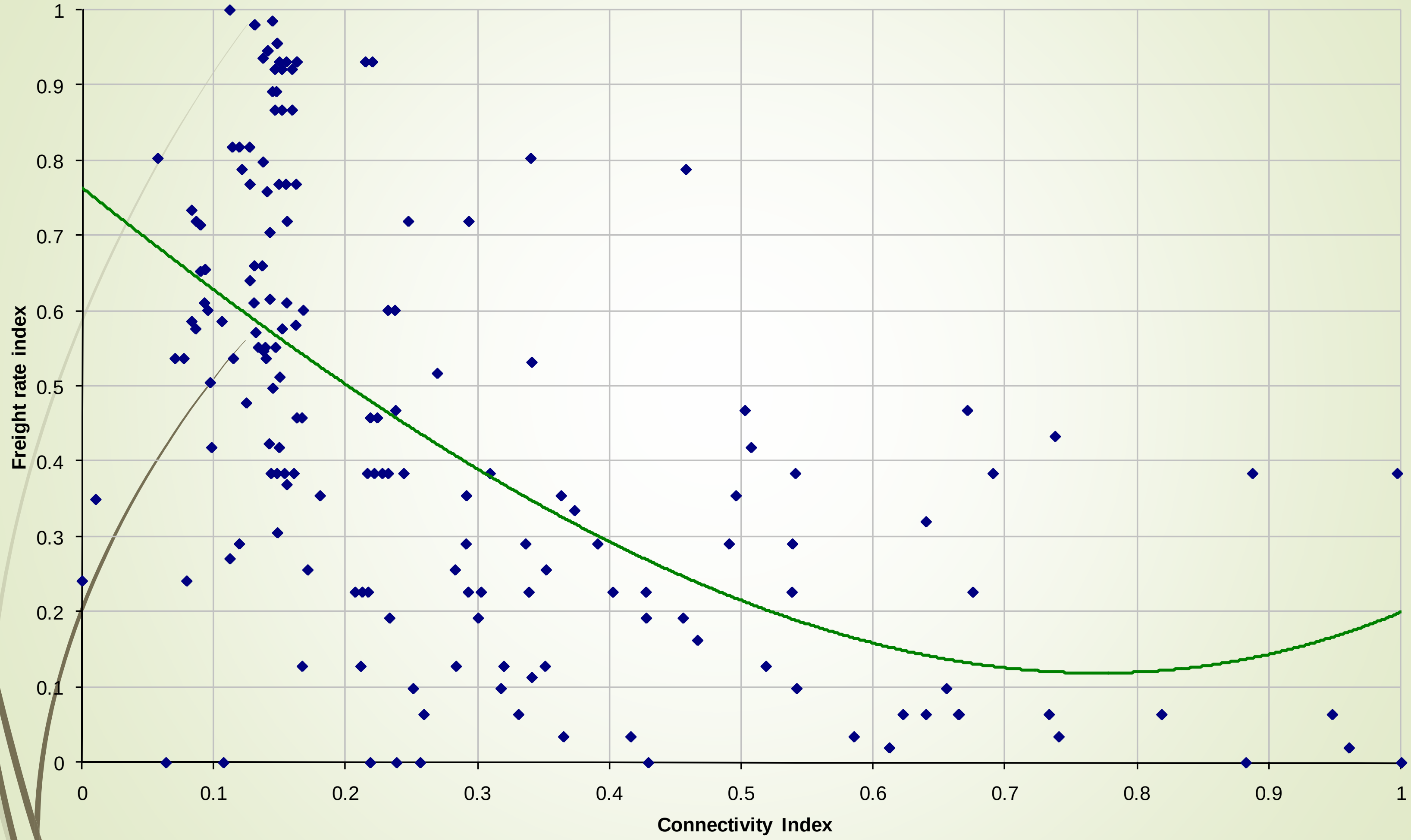
El Logistics Perception Index (LPI) ha sido estimado sobre la base de la opinión de los operadores internacionales de carga; estima un "score" y un rango, para un índice principal y para 7 subíndices, en 150 países

Global PRW Capacity in 2008



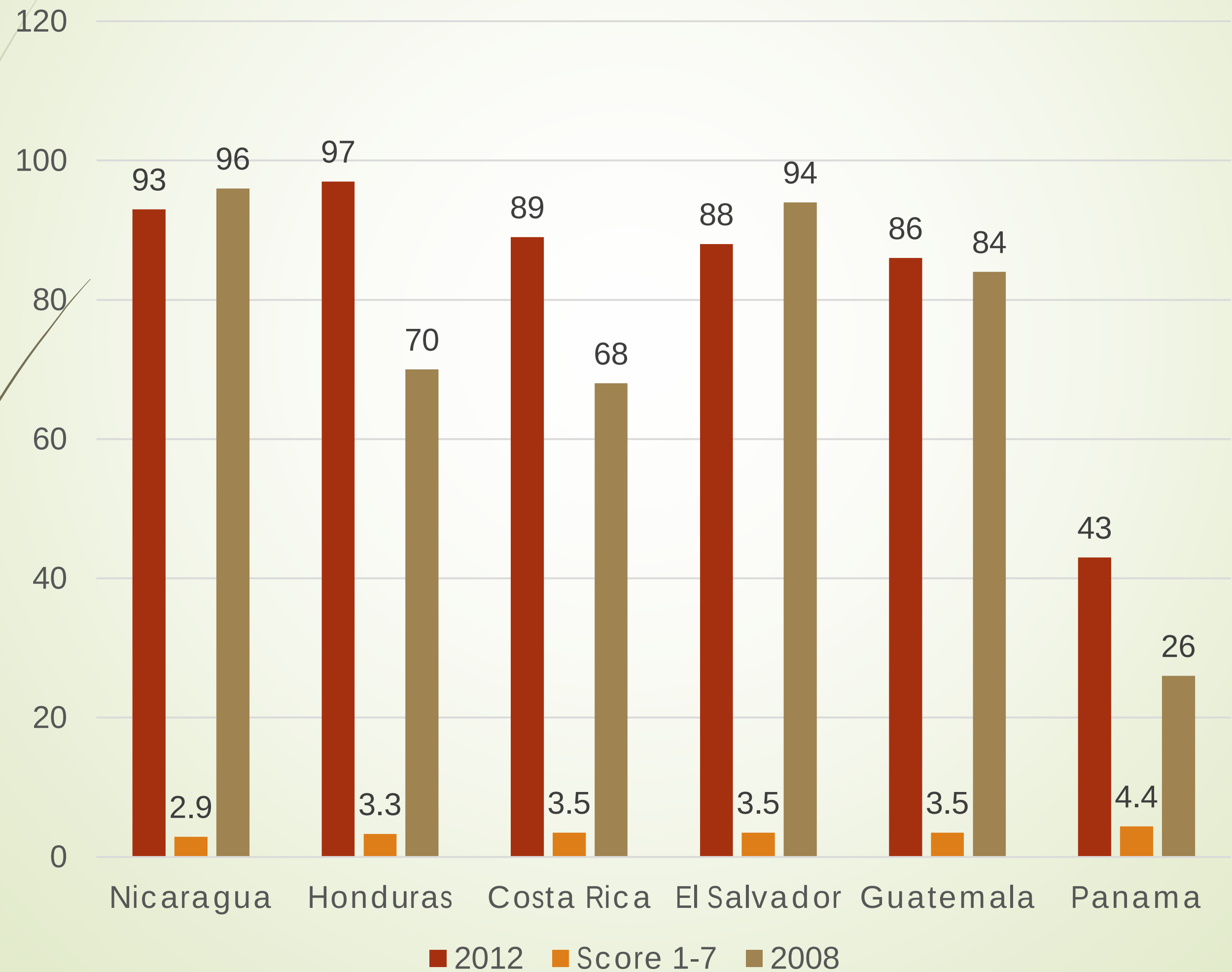
Source: IARW

Relation between Freight Rates and Connectivity, Container Shipping **(doubling the connectivity index, reduces freight rates by 15%)**



Source: Wilmsmeier (2008)

Transport and Communications Infrastructure (SubIndex ETI) Countries- Ranking out of 132 countries-A serious concern



Quality of road network a concern for users

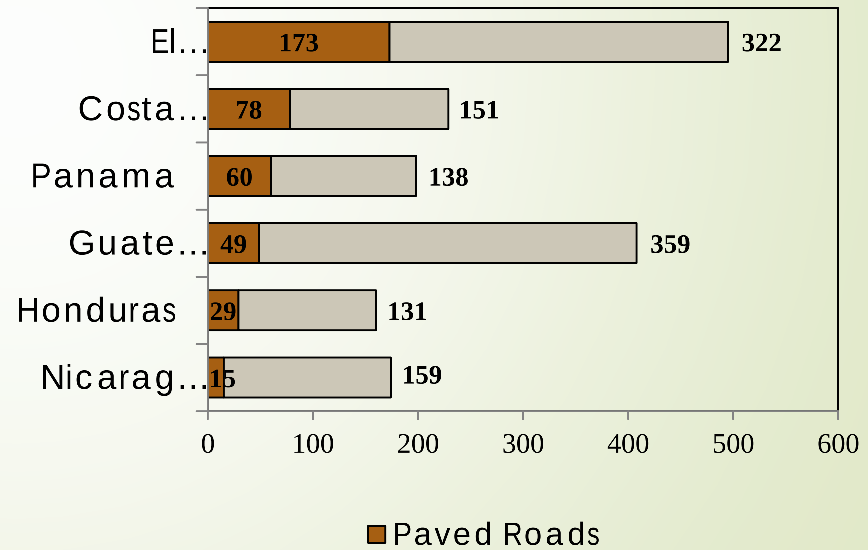
PERCEPTION → REALITY

Perception of Quality of Roads
WCI's Infrastructure Pillar

	Score
El Salvador	4.8
Panama	4.2
Guatemala	3.9
Honduras	3.4
Nicaragua	3.3
Costa Rica	2.5

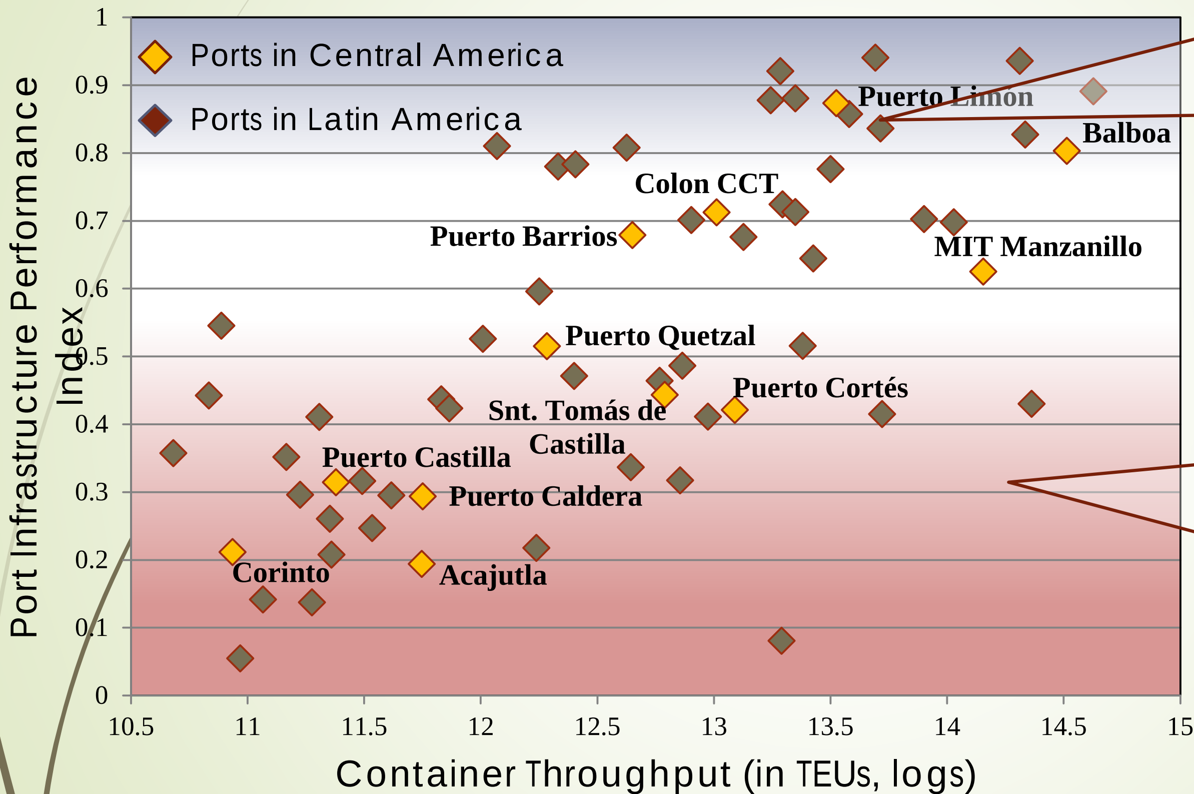
Source: World Economic Forum

Density of road network
Meters per km², 2011



Source: , Optimal Path Analysis.

Ports Stochastic Frontier Analysis – Infrastructure Performance Index:



Limón is able to handle a large amount of throughput based on limited infrastructure stock.

Some container ports must improve operational efficiency in order to attract more cargo (in the red zone..

Input Variables: Total area of the port; Length of container berths; Number of ship-to-shore gantries and cranes

Output Variable: Annual container throughput in TEUs

Quality of ports in CA is highly heterogeneous

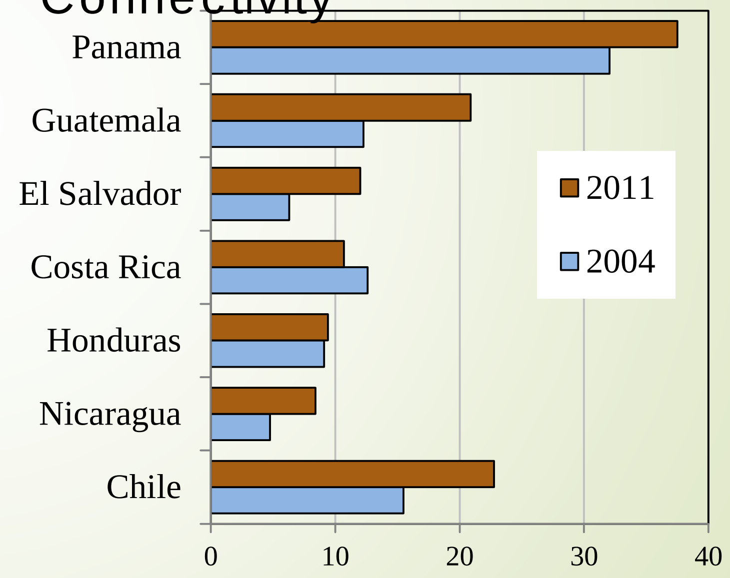
PERCEPTION → REALITY

Percepctión of Ports Quality
WCI's Infrastructure Pillar

	Score
Panama	6.4
Honduras	5.1
Guatemala	4.3
El Salvador	3.8
Nicaragua	2.7
Costa Rica	2.3

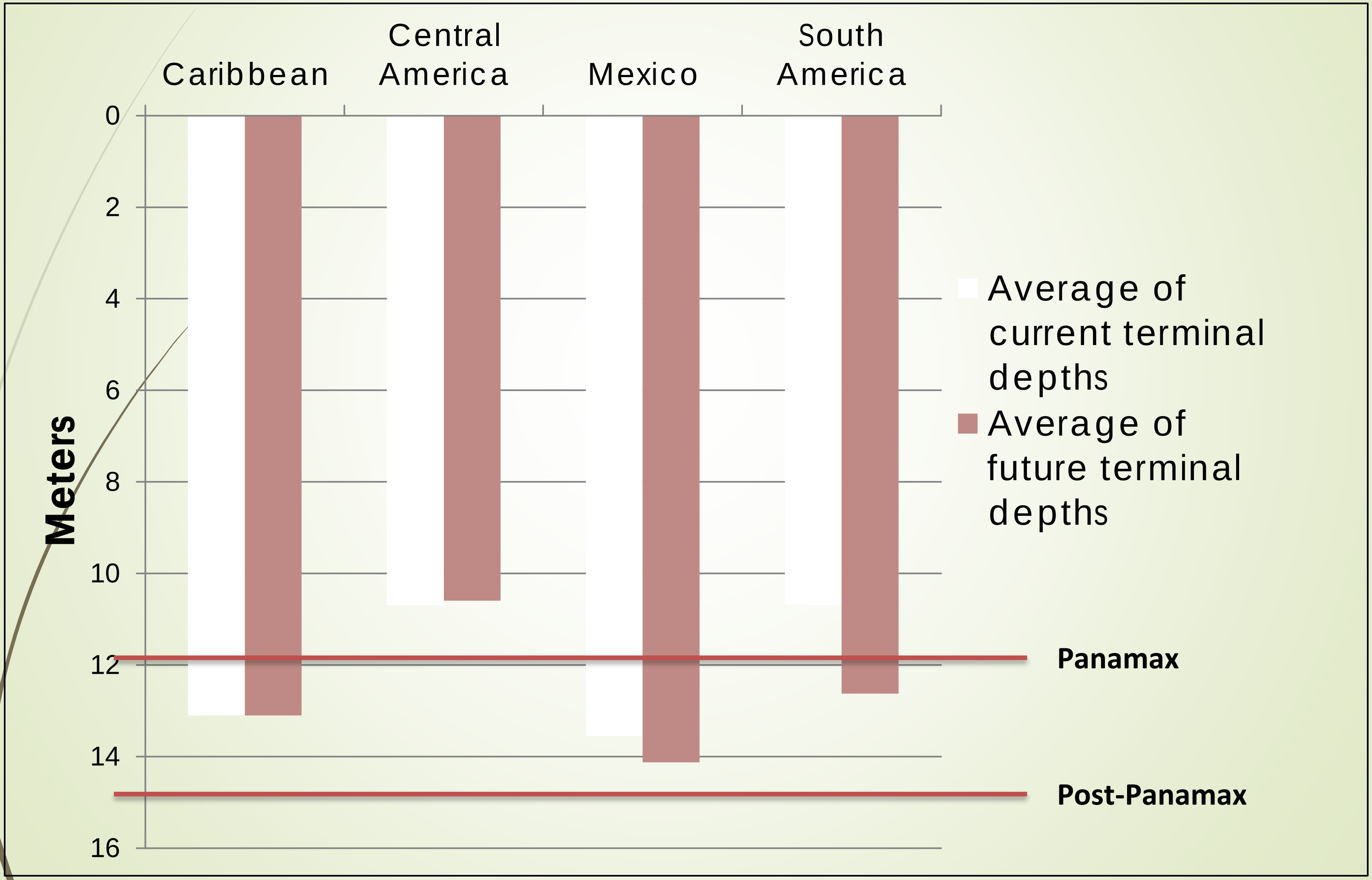
Source: World Economic Forum

Index of Maritime Connectivity



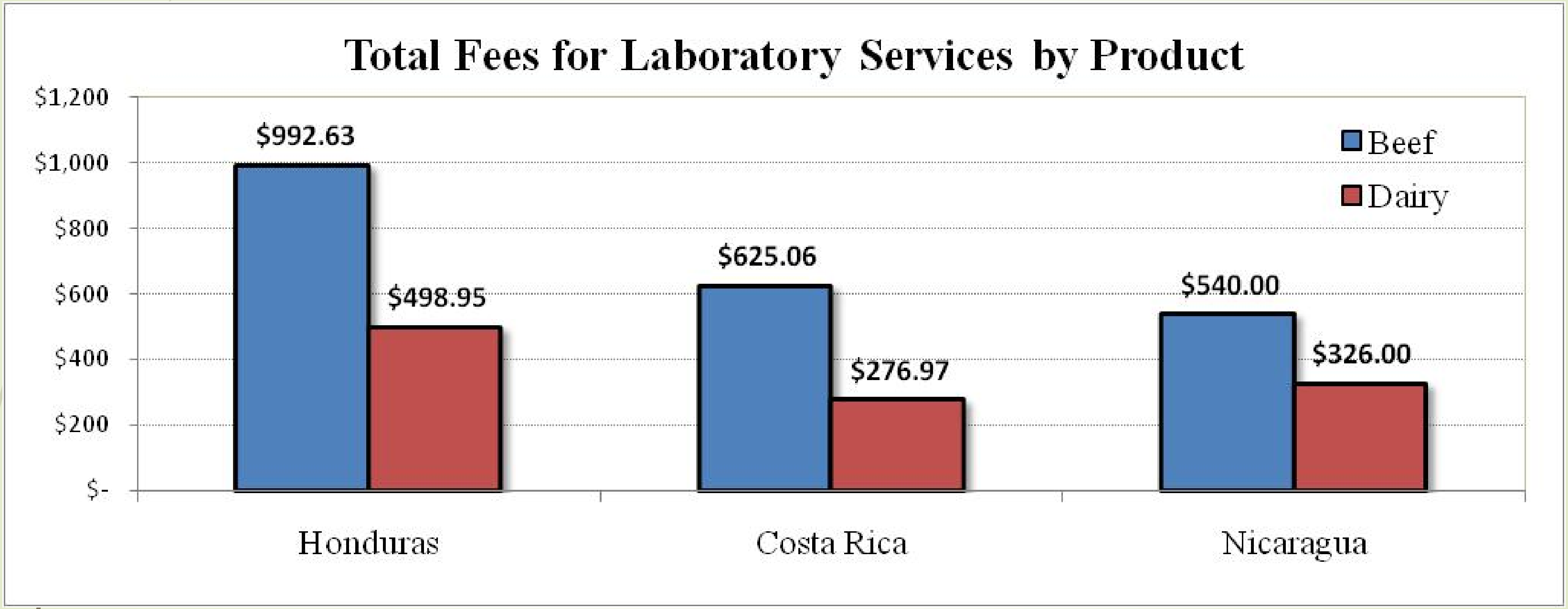
Source: UNCTAD

The impacts will be huge, of deepening … and of *not* deepening



Source: World Bank (2012)

SPS procedures are expensive…



And can account for up to 40% of overall export time (beef from Honduras)…

Consequences of Poor/Infrastructure and High Logistic Costs in CA

- Reduced Competitiveness/Productivity overall/Trade/inclusive growth
  - Higher final product costs
  - High levels of inventories
  - High percentage of goods not reaching markets
  - High rate of spoiled goods
  - Lower trade
  - Lower connectivity
  - Reduced ability/capacity to export
  - Stunting the development of new products and new exports
  - Less revenues/profits for producers
  - Increases in poverty

Impact of Infrastructure/Logistics on (inclusive) Growth, Poverty/Inequality and Job Creation

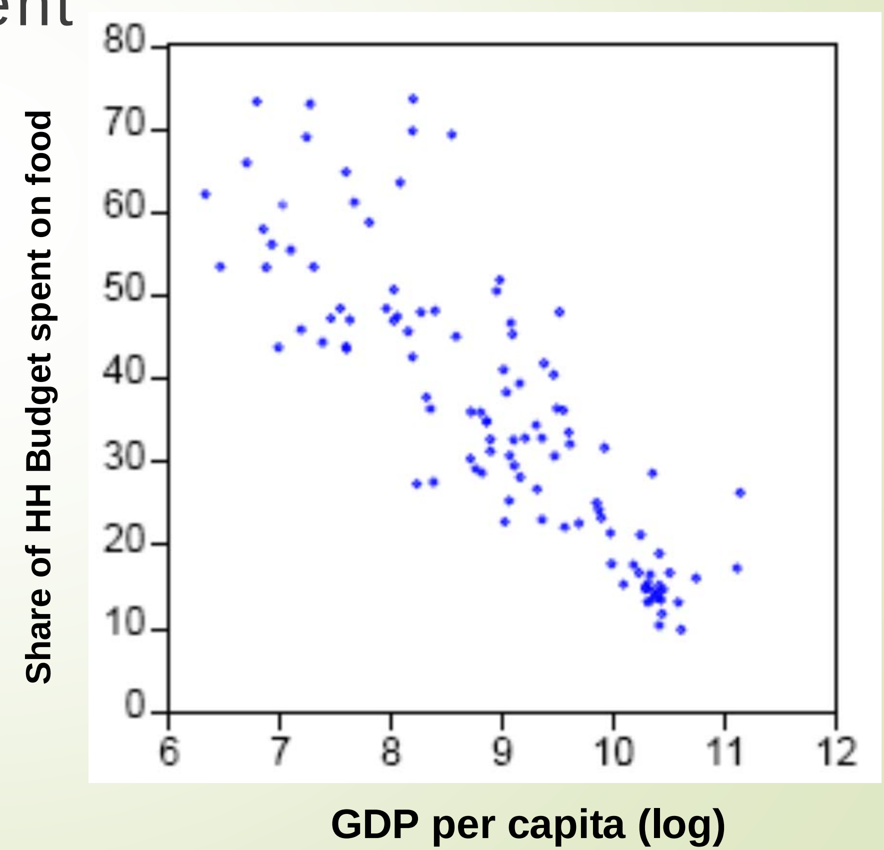
- Via Access to services significantly increases household earnings
- Via productivity increases in their economic undertakings
- Via cost reductions
- Via opening opportunities for economic activities
- Via accesing markets and market information (domestic and foreign)
- Small producers much more affected by poor infrastructure/and logistics

- Infrastructure does create jobs

Logistics costs affect the poor

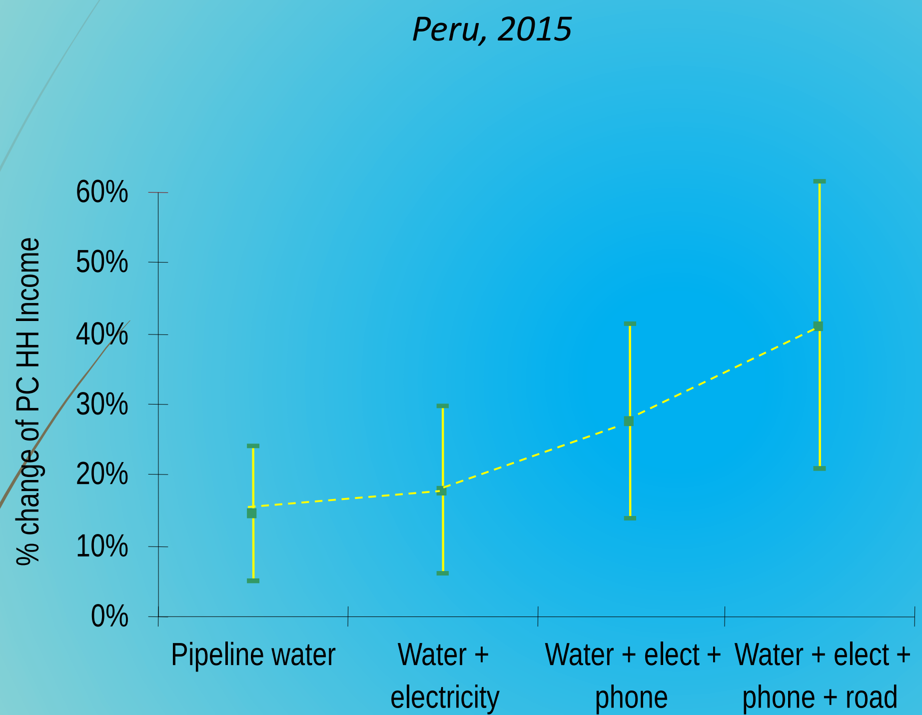
- Logistics costs are 2 to 10 times higher than import tariffs for basic goods.

- These basic goods represent 20 to 30 % of household income
  - For the poor may represent up to 70



Source: Dessus, et al, World Bank (2008); data from househo

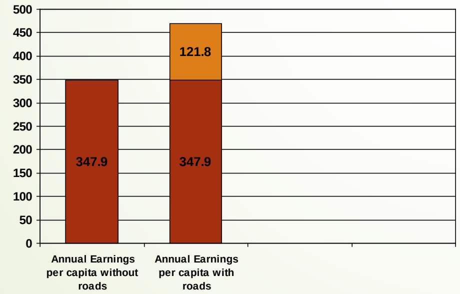
Poverty: Increases in Household Earnings from Access to Infrastructure Services: Complementarities of infrastructure



Source: Escobal and Torero, 2015.

- **Infrastructure does have a strong impact on household's welfare**
- **There exists complementarities in the provision of different types of infrastructure**

Increase in Earnings of Households benefiting from rural roads (in $US annual)



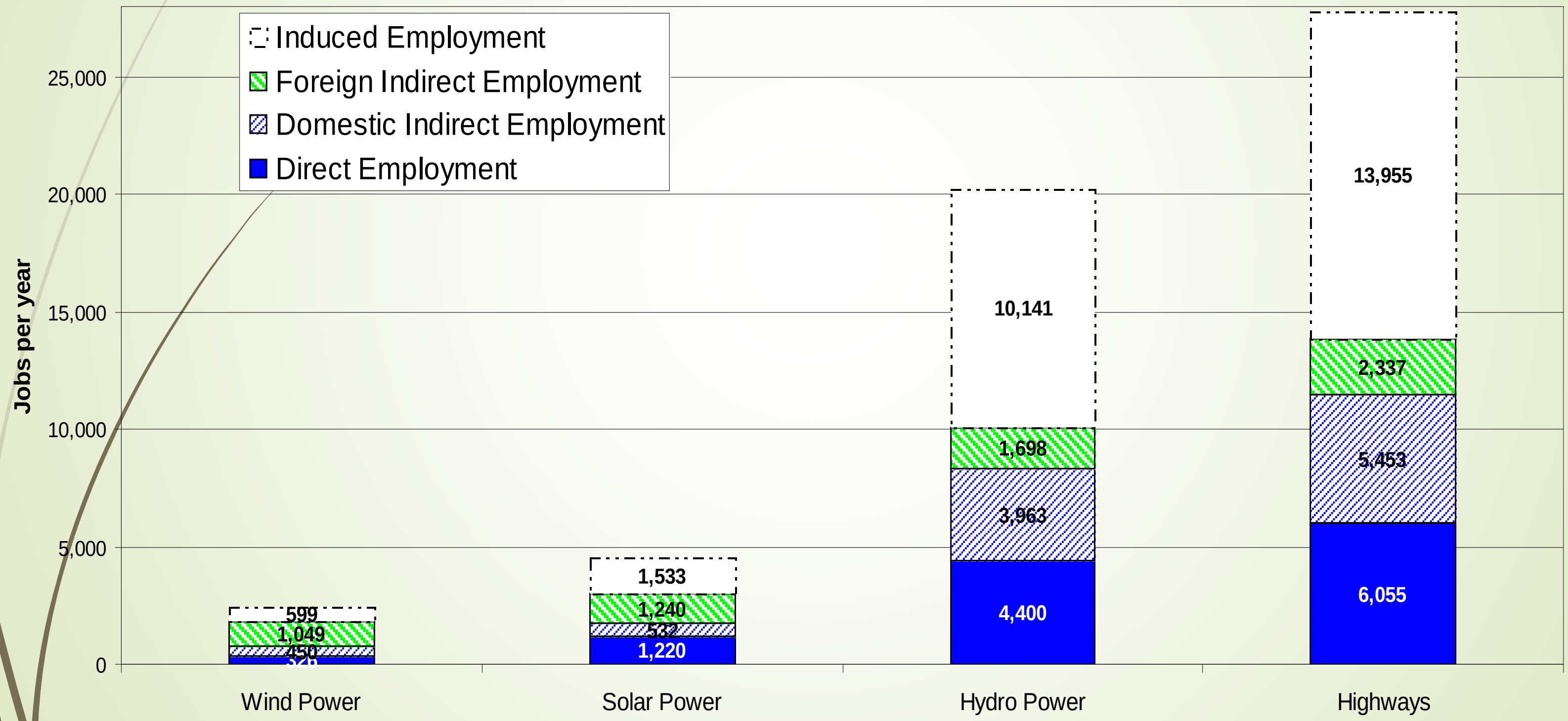
Source: ENDES-INEI (2012)

Bringing logistics costs down (10% point creates demand and employment

Sector	Growth in Demand	Growth in Employment
Agro-Industry	9%	7%
Furniture	10%	12%
Textiles	6%	7%
Leather/Shoes	12%	10%
Mining	7%	2%

Source: Guasch, (2012)

Job Creation Impact of Infrastructure Investments by type for 100+ US$ Millions



Sources: Authors calculations, World Bank project documents, RDEL (2009) and USDOT.

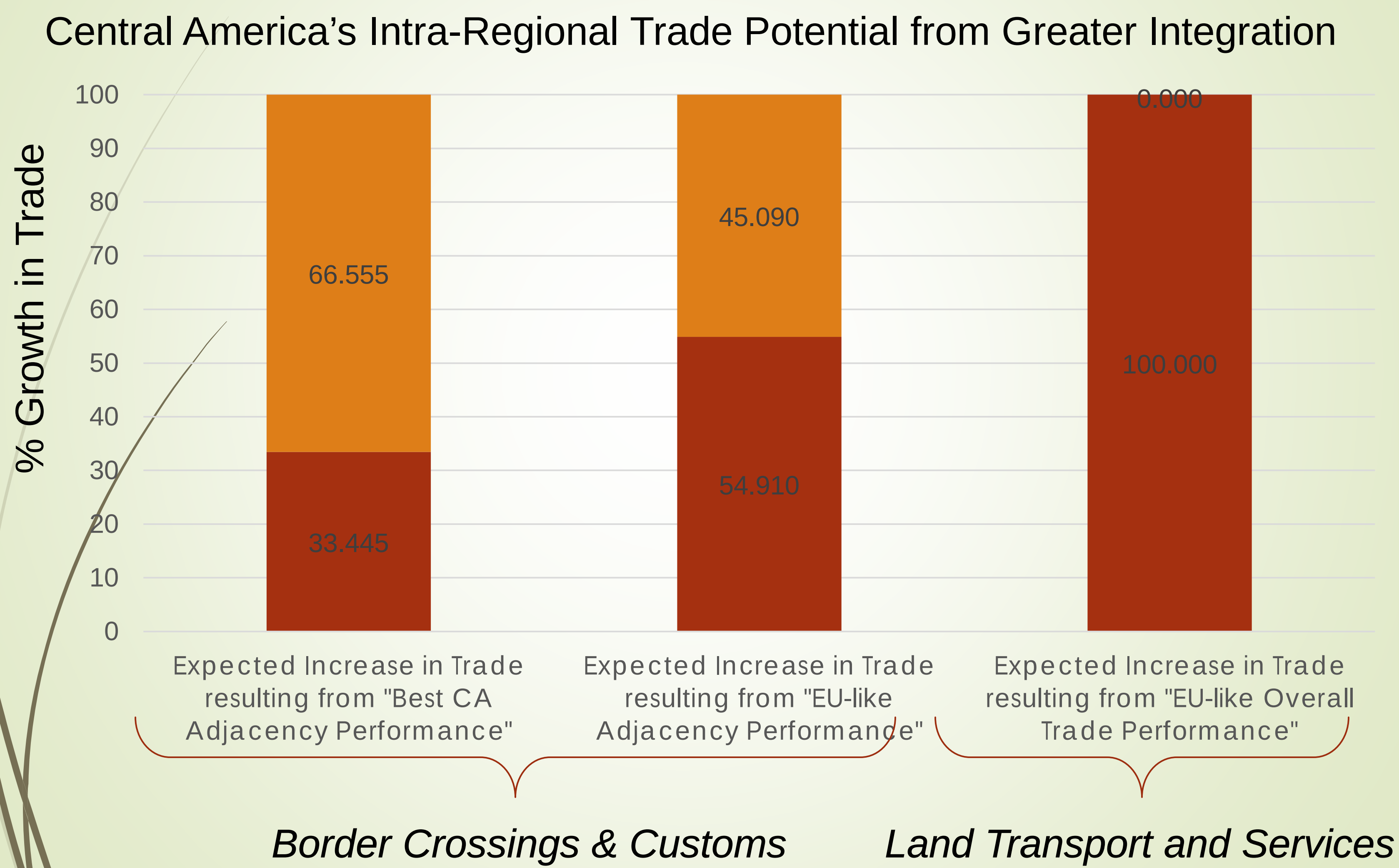
Job Creation per Infrastructure Project

	Qualified workers	Non-qualified workers	Domestic inputs (mainly material)	Foreign inputs (mainly equipment)	Others	Total	Annual Direct Employment (per US$1B/yr) [*]
Transport							
Colombia - Access to neigborhoods (streets)	15%	6%	49%	16%	14%	100%	22,500
Colombia - Feeder routes for Transmilenio	43%		27%	23%	6%	99%	35,833
Brazil - Roads	3%	9%	22%	63%	3%	100%	16,577
Argentina- Rosario - highways	1.3%	0.3%	60%	38%	0%	100%	1,650
Water and Sanitation							
Honduras - Improvement on water captation	28%	12%	40%	20%		100%	43,333
Honduras - Rehabilatation of water networks	30%	20%	40%	10%		100%	58,333
Honduras - Expansion of water networks	20%	30%	40%	10%		100%	66,667
Honduras - New treatment plant	10%	10%	80%	0%		100%	25,000
Colombia - Expansion of WSS networks	8%	56%	32%	4%		100%	100,000
Brazil - Rain Drainage networks	8%	16%	48%	28%	0%	100%	34,001
Brazil - Sewerage	4%	11%	68%	17%	0%	100%	21,746
Energy							
US - Solar PV	3%-5%		95%-97%			100%	2,700
US - Wind Power	4%-6%		94%-96%			100%	3,400
US - Biomass	1%-2%		98%-99%			100%	700
US - Coal-fired	1%-2%		98%-99%			100%	750
US - Natural gas-fired	2%-4%		96%-98%			100%	1,700
Brazil - Hydropower	5%-10%		90%-95%			100%	4,500
Peru - Rural Electrification	14%	7%	26%	53%	0%	100%	23,000

[*] These estimates were based on an hourly wage of $3 for non qualified workers and $6/hr for qualified one for 2,000 working hours a year.

Assuming an average of 40K direct and indirect jobs per $1B spent, no crowding-out, and a multiplier of 2, an additional US$25B/yr may create 2M total jobs per year; a very small fraction of the total number of unemployed people in LAC (~30M for 2009).

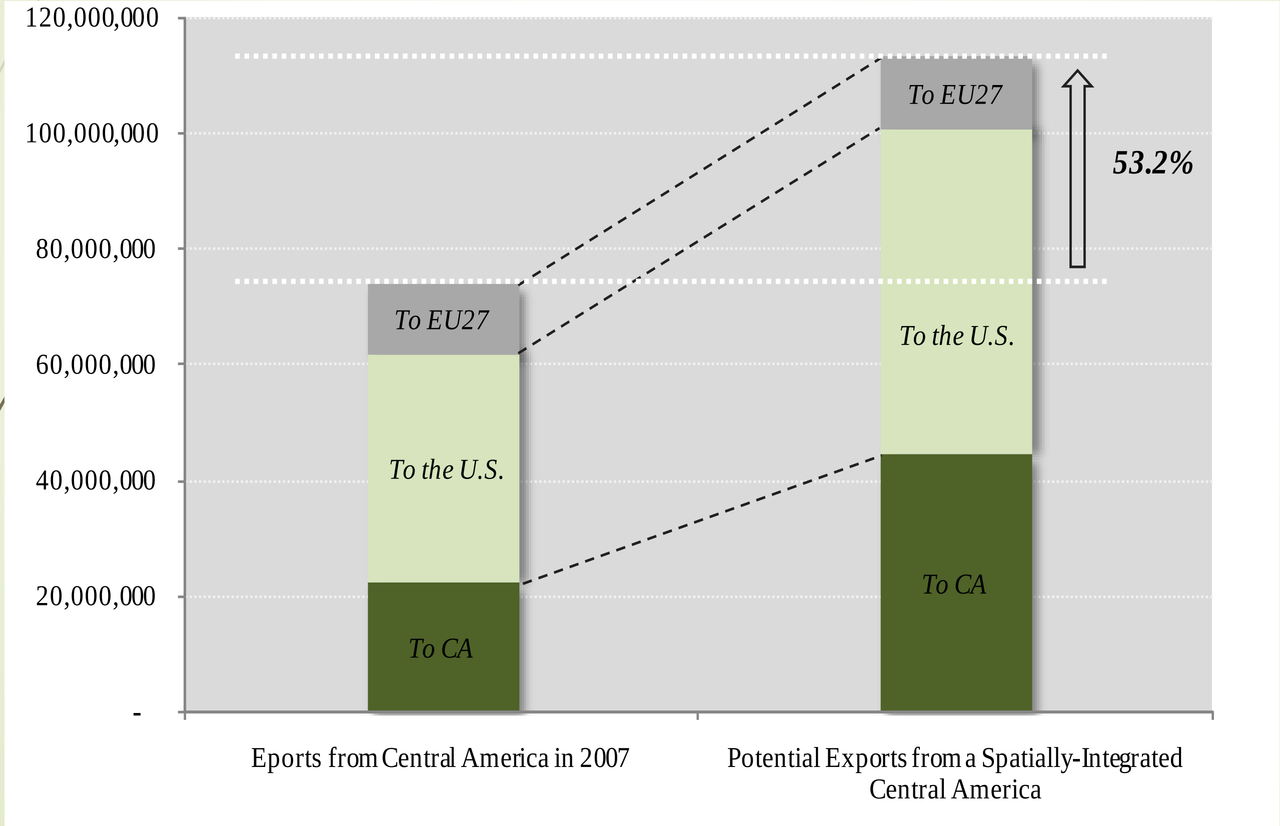
Better logistics means more intra-regional trade



Source: World Bank (2010)

…and more extra-regional trade

Central America's Extra-Regional Trade Potential from Greater Integration



Source: World Bank (2013)

The Economics of Logistics: Evidence of Impact

Logistics Component	Trade, Income and /or Productivity	Transport Cost / Transit Times / Reduction in prices of goods
Macro-Analysis on Logistics / Trade Infrastructure	Reducing logistics costs can positively impact the share of trade in GDP. Improving infrastructure produces large real income gains and reduces Gini.	Each day saved worth 0.8 ad valorem tariff . A day is equal to 1 percent of trade.
Road Corridors / Trucking Services	Consumer Surpluses from improved access. Expanding hinterlands for rural producers. Large elasticities for intra-regional trade.	Largest share of logistics costs for most goods & time loss for small shippers Competition in trucking, maintenance of travel speeds (ROW) required to reap benefits of improved roads
Port Efficiency Ocean Shipping	Port efficiency reduces maritime transport costs.	Freight rates decrease when countries are connected by direct shipping service and with broader competition
Air Shipping/ Airports	Open Skies agreements reduce airport costs and increases trade.	Improving infrastructure and regulations reduces costs.
Border Crossings / Customs	Without borders, trade responds to "gravitational pull" of neighboring economies--by product and overall.	Delays in customs increase costs while direct land access reduces costs Distance increases transport costs. Unified procedures & compatible IT systems reduce times. Delays in transit have a negative impact on trade
Storage, Warehousing	Financial burden of high inventory typically > 3 of GDP.	Third party access to storage critical for independent shippers. Lower inventory holdings reduce production costs.

Components of a Successful Strategy

- Macro Framework
- Trade Policy and Access to Markets
  - Tariff Regime, and Non-Tariff Barriers
  - Access to Markets-Free Trade Treaties
- Exportable/Production Supply (export led growth strategy)
  - Basquet of Products
  - Quality and Standards
  - Human Capital
  - Innovation and Knowledge Transfer
  - Clusters and value chains
- **Logistic and Trade Facilitation**
  - **Hardware: Infrastructure**
  - **Software: Associated Services and Trade Procedures**
- Social/Productive Inclusion: Knowledge Transfer
  - Articulation
  - CITEs
- Financial Services and Instruments
- Institutions: Export/Trade Facilitation, Quality Agency, Innovation Agency, PPP Unit, Competitiveness Council
- Overall Investment Climate
- Objective: Growth (inclusive), productivity increases, and mainstreaming SMEs, into the productive chains and export chain

Infrastructure/Logistic Platform

- Hardware
  - Export corridors, Highways, Railways and Feeder Roads
  - Network of service sites, and Silos
  - Ports, Associated Services and Accesses
  - Airports Associated Services and Accesses
  - Connectivity, Logistic terminals-dry ports, network
  - Hub Markets/Warehousing
- Software
  - Single windows
  - Dedicated and Privileged lines
  - Inspections, Licensing and Certification Platform
  - Customs Procedures
  - Digitalization of Certificates of Origin
  - Associativity-Scale/logistic operators market
  - Warehousing and Consolidation Practices
  - Cool Chain/Services, and Packaging
  - Multimodality and Connectivity Framework
  - Border Crossing
  - Transport services
  - Insurance services

Agenda for inclusive growth

- Lessons learned
  - Diagnostic map
  - Access to essential services and markets
  - Improving logistics
  - Mainstreaming SMEs
  - Energy/electricity focus
  - CITEs
  - Easy Export
  - PPP Program

INTERVENTIONS: A Mixture of Active and Passive Policies

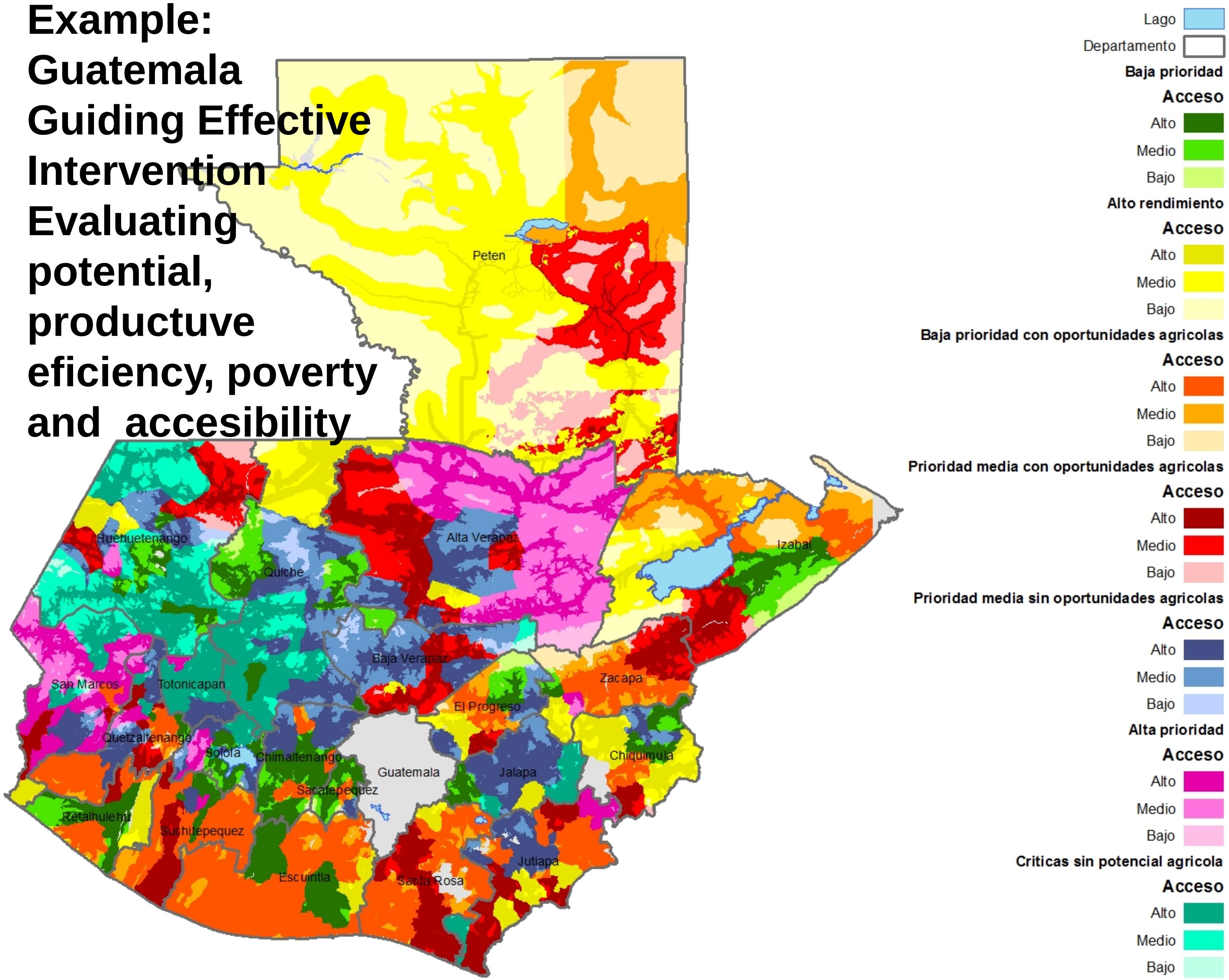
- Passive policies: cleaning the wrinkles-IC type
- Active policies and instruments/interventions
- Institutionality
- Coordination and Oversight

I. Mapping to select most effective type of interventions and to prioritize them

- In terms of four variables and done at very local levels (municipalities)

- - productive potential
- - efficiency of production
- - access to markets
- -poverty levels

Example: Guatemala Guiding Effective Intervention Evaluating potential, productuve eficiency, poverty and accesibility



II. Providing Access to essential services

- Such as water, electricity, communications and transport
- Pricing guided by affordability (trough social tariffs when appropriate and necessary)
- Cross subsidies as a second best (implementability and information issues)

IIIa. Improving logistic services

- Overall but with special focus of SMEs and agricultural production)
  - Network of silos with cold capacity and mobile units with cold service (can be done as PPP and self-financing)
  - Selective focus of key rural and feeder roads and key corridors
  - Develop, Improve and rehabilitate storage and consolidation centers (centros de acopio)
  - Associativity (scale) initiatives
  - In situ services provision and licenses/permits
  - Improving port (and access to) efficiency
  - Logistic terminals
  - Customs and cross border crossings

IIIb.Focus on Cold Chain

- **Cold Chain**
- Implement program of network of silos with cold capacity (as a public-private partnership or with sunset clauses)
- Implement program of warehousing with cold capacity at exit points, such as ports and airports (as a public-private partnership or with sunset clauses)
- Incentive program for trucks/containers with cooling capacity

IV. Mainstream SMEs into the production and value chain

- Basquet of Products
- Quality and Standards
- Human Capital
- Innovation and Knowledge Transfer
- Clusters and value chains
- Financial Services
- Procurement

V. Energy Sector

- **Investments in infrastructure to expand power generation and efficiency in distribution-reduction of losses, and revisit pricing and subsidies policy, and advance and make effective (SIEPAC) project, connecting Guatemala with Panama to create a true regional integrated energy market**
- **Revisit propely targeted social tariffs and avoid leakages**
- **Can be done via PPPs**

VI. CITEs

- Centers of technology and knowledge transfer, mostly oriented to serve SMEs
- In situ
- Offer services, knowledge and technology transfer, conformity to standards, testing, assist in articulation and export
- And training
- Highly focused: leather and shoes, furniture and wood, art craft, metal-mechanic, textile, fruits, packaging, agro industry, software, logistic, new products
- Privately run
- Capital equipment grant, operating costs through user fees
- Spain (pioneer), Peru, Croatia, Slovenia, Georgia, Colombia, Mexico, etc

VII. Easy Export Initiative

- Export by post
- From any part of the country
- Avoids all intermediation and logistic costs
- Filing one page trough internet
- Limits in value to 5,000 US$
- Limits in size 30 to 50 Kilos
- But unlimited sends
- Insurance available
- Extraordinary impact on micro and SMEs

VIII. Responsible and Apropriate PPP Program

- Accounting for transparency
- A core set of elements in place
- Accounting fro fiscal implications
- Focus in financially sustainable projects
- Selection based on impact and feasibility