

Cross-Border Infrastructure: Needs, Facts and Challenges

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G20 Conference, ICRIER

9 August, 2016

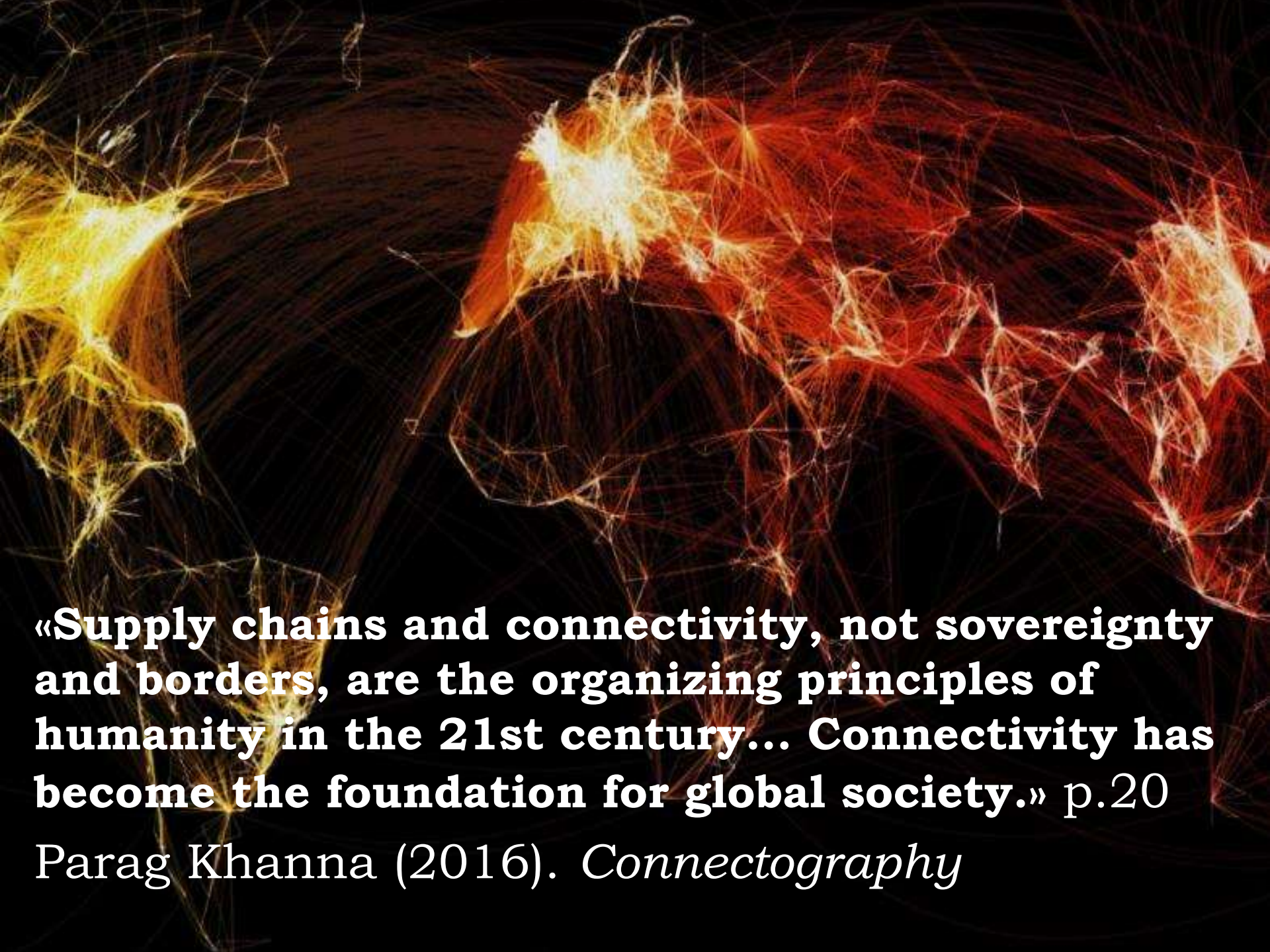


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- I. On the increasing need for cross-border infrastructure
- II. Empirical evidence for trade stimulus from improved cross-border infrastructure
- III. Challenges of cross-border infrastructure projects and lessons learned

I. Increasing need of cross-border infrastructure

- Enhanced global and regional economic integration driven by multitude of free trade agreements and improved IT connectivity
- Today's production based on global and regional value chains
- From moving goods to moving goods and services (including people)
- From B2B to B2C and C2C (international e-commerce flourishing)
- However, most infrastructure investments remain domestic.



«Supply chains and connectivity, not sovereignty and borders, are the organizing principles of humanity in the 21st century... Connectivity has become the foundation for global society.» p.20

Parag Khanna (2016). *Connectography*

II. Facts about cross-border infrastructure

Two broad categories:

- **“Soft”** cross-border infrastructure:
 - Improved coordination between customs
 - Streamline border procedures
- **“Hard”** cross-border infrastructure:
 - Improve physical *connectivity* (cross-border roads, railways, etc.) of transportation links
 - Enhance IT connectivity
 - Improve connectivity for energy transmission

II. Cross-border infrastructure *far below* potential

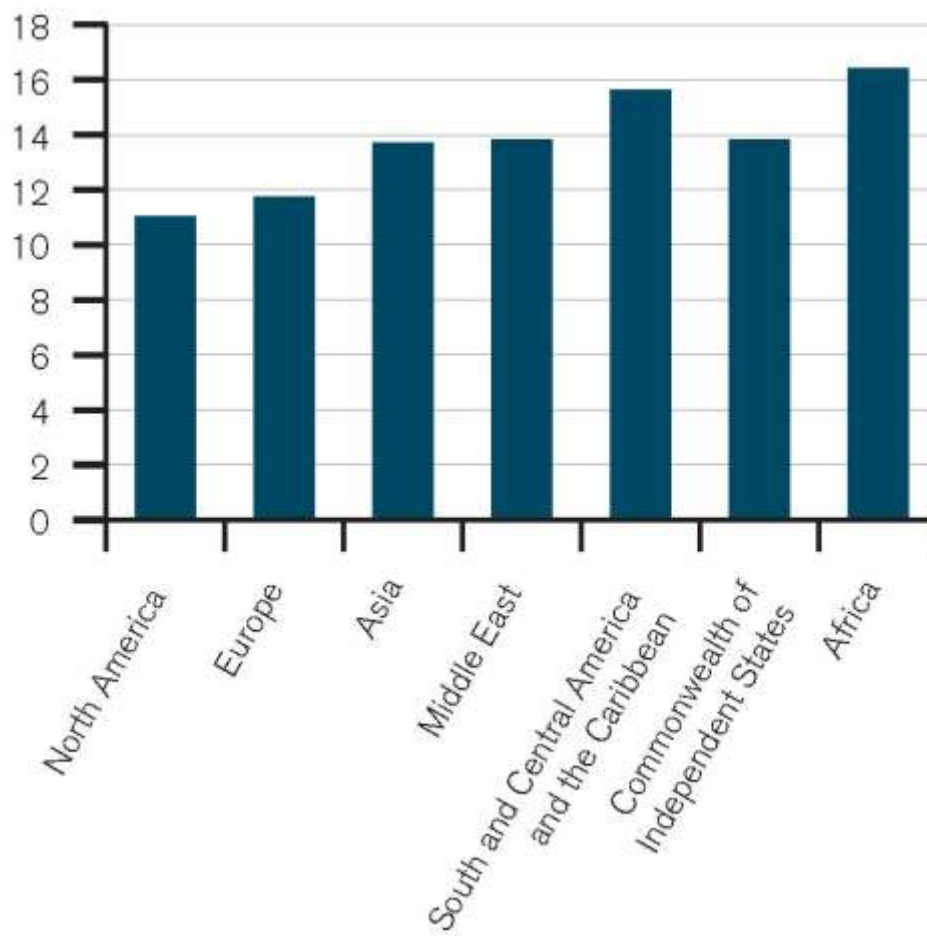
Various empirical studies show opportunities in upgrading cross-border infrastructure:

- Helble et al. (2009): APEC trade would increase by 7.5 %, if all APEC countries reach regional average of customs efficiency.
- Zaki (2014): 16 % more trade in Asia (especially in developing countries) with trade facilitation reform.
- WTO (2015): WTO TFA implementation globally would reduce trade costs by about 14.5%.

Benefits for trade (imports and exports) and economic growth, which will trigger further demand for better connectivity.

II. Cross-border infrastructure *far below* potential

Estimated reductions in *ad valorem* tariff equivalent trade costs due to TFA implementation by region



Source: WTO (2015)

II. Case Study Pacific: Connectivity, Trade Costs and Trade Flows

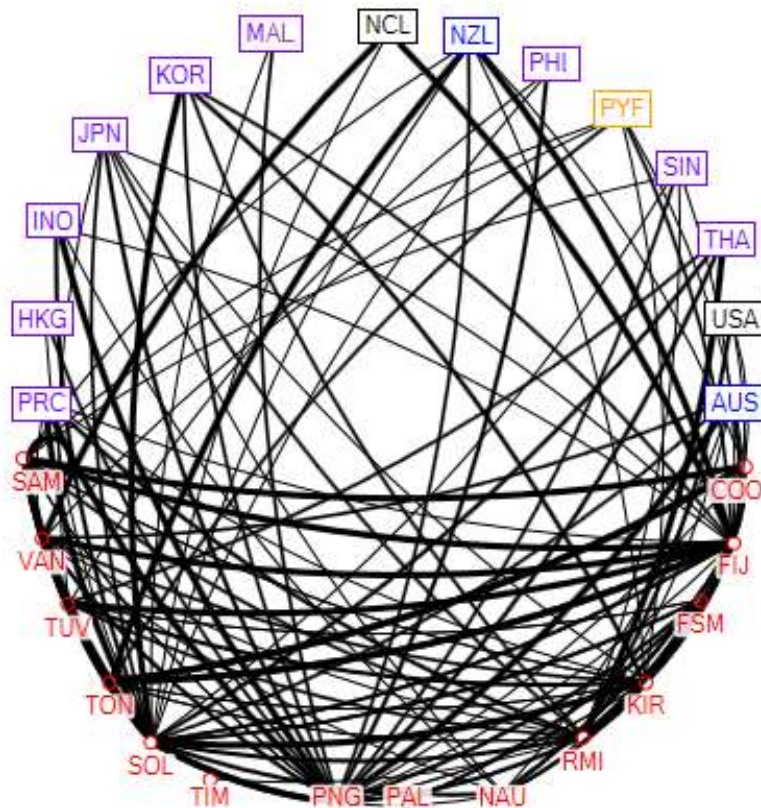
Country	Population (2013)	Land area (sq. km)	GDP (in millions current US\$, 2013)	GDP per capita (current US\$, 2013)	Annual real GDP growth rate per cap. (2004-2013)
Group 1					
Cook Islands	15,225	240	327	21,490	2.58
Fiji	863,073	18,270	4,015	4,652	1.96
FSM	102,908	3,170	315	3,057	-0.06
Palau	17,862	460	246	13,761	-0.11
Samoa	187,372	2,830	682	3,641	1.20
Tonga	103,347	720	477	4,619	0.53
Vanuatu	271,089	12,190	800	2,951	1.71
Group 2					
Papua New Guinea	7,570,686	452,860	15,468	2,043	3.55
Solomon Islands	626,247	27,990	1,164	1,858	3.35
Timor-Leste	1,306,000	14,870	1,388	1,063	5.50
Group 3					
Kiribati	111,117	810	170	1,528	-0.45
Marshall Islands	54,550	180	182	3,333	0.77
Nauru	10,660	21	80	7,502	-7.18
Tuvalu	11,099	30	38	3,434	0.79

Notes: FSM = Federated States of Micronesia. GDP for Timor-Leste excludes oil and United Nations operations. GDP per capita growth for the Cook Islands from 2006 to 2013.

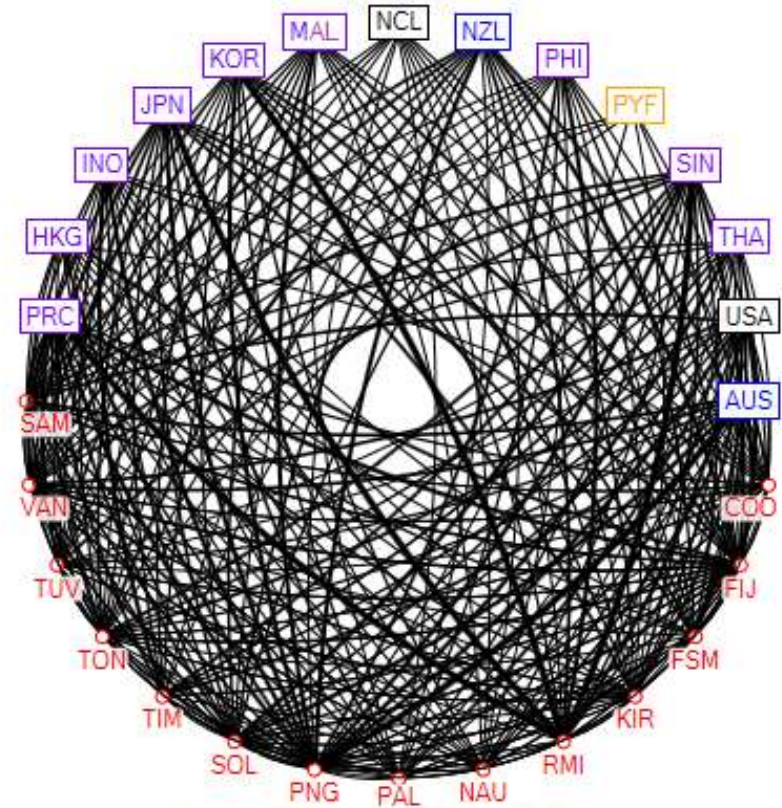
Sources: Asian Development Outlook Database, ADB.

II. Case Study Pacific: Shipping Connections vs. Trade Flows

Node Diagrams of Direct Shipping Connections and Trade Flows between Asia and the Pacific and within the Pacific



Ships Traveling To and Within the Pacific DMCs, 2013
(Thicker lines = more ships)



**Average Trade Flows (Imports)
To and Within the Pacific DMCs 2010-2012**
(Thicker lines = more trade)

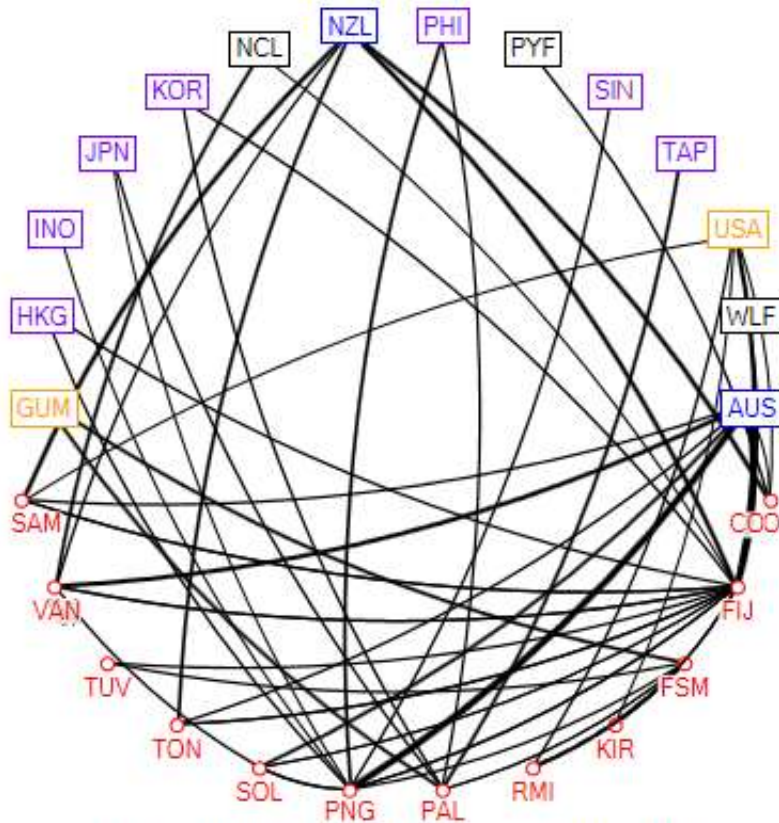
Pacific DMC = Pacific developing member country.

Note: Only those 14 economies with the most shipping connections to the Pacific DMCs are included.

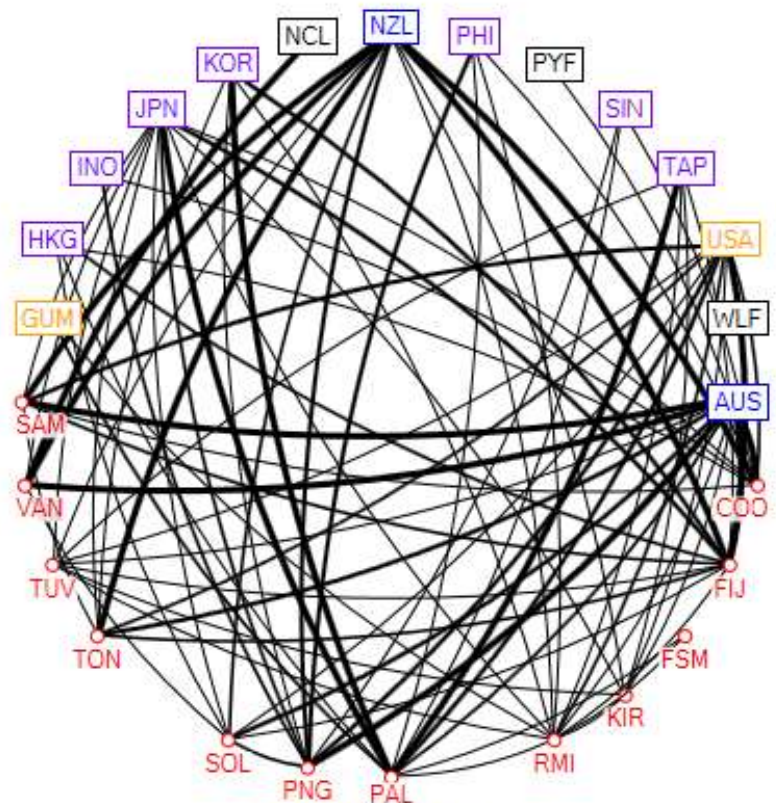
Source: Helble (2016).

II. Case Study Pacific: Flight Connections vs. Tourism Flows

Node Diagrams of Direct Flight Connections and Tourism Flows between Asia and the Pacific and within the Pacific



Flight Routes To and Within the Pacific DMCs
(Thicker lines = more frequently flown routes)



**Average Tourist Flows
To And Within the Pacific DMCs, 2010-2012**
(Thicker lines = more tourists)

Pacific DMC = Pacific developing member country.

Note: Only economies with at least one flight connection to one of the Pacific DMCs are included in the diagram.

Source: Helble (2016).

II. Case Study Pacific: Gravity Equation Approach

Methodology:

- General gravity model formulation (Head and Mayer, 2014):

$$X_{ni} = GS_iM_n\theta_{ni}$$

X_{ni} : Trade/Tourist flows to the destination market n from i

S_i : Demand in economy i

M_n : Characteristics of the destination market n

θ_{ni} : Bilateral travel costs between n and i

G : Constant

- Poisson ML estimator (Sanot and Tenreyro, 2006)

II. Case Study Pacific: Gravity Equation Results for Trade Flows

	(1)
Variables	Log(Trade)
Log (Distance)	-1.36***
	(0.343)
Common official language	0.73*
	(0.422)
Common other language	-0.78**
	(0.355)
Ever in colonial relationship	0.68
	(0.535)
Common colonizer	0.56*
	(0.302)
Direct shipping connection	
Log (Frequency)	
Observations	1,126
R-squared	0.60
Origin and Destination FE	Yes
Estimation Technique	OLS

Notes: Robust standard errors are in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' calculations

II. Case Study Pacific: Gravity Equation Results for Tourism

	(1)
Variables	Log(Tourist)
Log (Distance)	-2.48***
	(0.487)
Common official language	0.40
	(0.572)
Common other language	0.41
	(0.330)
Ever in colonial relationship	0.99***
	(0.351)
Common colonizer	0.61
	(0.566)
Direct flight connection	
Log (Frequency)	
Observations	171
R-squared	0.91
Origin and destination FE	Yes
Estimation technique	OLS

Notes: Robust standard errors are in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' calculations

II. Case Study Pacific: Conclusions

Summary:

- Pacific countries face a disadvantage when engaging in international trade, even when controlling for remoteness.
- Gravity estimates show that a direct transportation link with trading partners more than doubles trade and tourism flows.
- Higher frequency in transportation less important in tourism than in goods trade.
- Not every new connection will have the same effect. Coordinated hub and spoke arrangement needed.

III. Particularities of cross-border infrastructure

«Connective infrastructure across sovereign borders acquire special properties. ... They become common utilities that are co-governed across boundaries.

Such connective infrastructures thus have ... a legitimacy that derives from having been jointly approved and built that make them more physically real than law or diplomacy.»

Parag Khanna (2016). *Connectography*

III. Particularities of cross-border infrastructure

Cross-border infrastructure projects are more complex:

- Different laws and regulations
- Politically more sensitive
- Economic gains might accrue asymmetrically
- More complex financing and procurement

Cross-border infrastructure projects hold opportunities:

- Typically larger pay-offs
- More transparent procurement process
- Stepping stone into two or more markets

III. Lessons learned from cross-border infrastructure projects

1. Clear rationale: Project to be motivated by long-run cross-border benefits that promote regional integration.
2. Distribution analysis to ensure win-win outcomes (possibly compensation mechanism necessary).
3. Need for flexibility in preparation and implementation to cope with political swings.
4. Harmonization of regulation needed.
5. ADB important role in enhancing transparency, mitigating investment risks and be a «honest moderator».

Thank you very much for your attention

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Data

Bilateral connectivity data:

Shipping Data:

- Sea-web (based on AIS signals)
- All connections between Pacific DMCs and ROW in 2013
- 1148 direct links

		Origin			
		Pacific DMC	Other Pacific	Asia	ROW
Destination	Pacific DMC	196 (821)	126 (428)	210 (428)	140 (21)
	Other Pacific	126 (474)			
	Asia	210 (426)			
	ROW	140 (45)			

Pacific DMC = Pacific developing member country, ROW = rest of world.

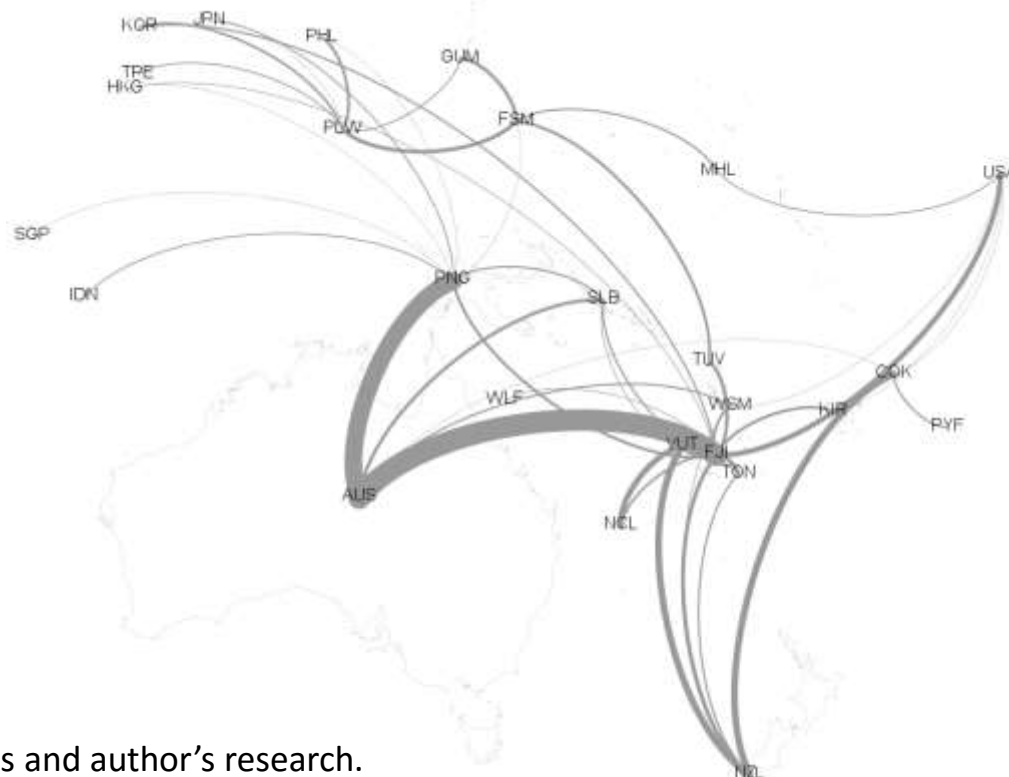
Note: Frequency of voyages are in parentheses.

Source: Sea-web, and author's calculations.

Data

Flight Connectivity Data:

- Openflights (openflights.org)
- All connections between Pacific DMCs and ROW in 2013
- 57 direct connections (22 within, 35 with outside)



Data

Bilateral trade and tourism data:

Trade Data:

- UN COMTRADE
- 3-year average: 2011-2013
- Import data improved by mirror statistics
- 1126 positive observations

Tourism Data:

- UNWTO (outbound tourist)
- 3-year average: 2011-2013
- 645 positive observations

I. Increasing need of cross-border infrastructure

«The global connectivity revolution has begun. Already we have installed a far greater volume of lines connecting people than dividing them: Our infrastructural matrix today includes approximately 64 million kilometers of highways ... By contrast, we have only 250,000 kilometers of international borders. ...

The interstate puzzle thus gives way to a lattice of infrastructure circuitry. The world is starting to look a lot like the internet.» p. 11

Parag Khanna (2016). *Connectography*