



Massachusetts
Institute of
Technology



MENS
MANUS AND
MACHINA



Singapore-MIT Alliance for Research and Technology

MENS, MANUS, AND MACHINA (M3S)

July 10, 2024

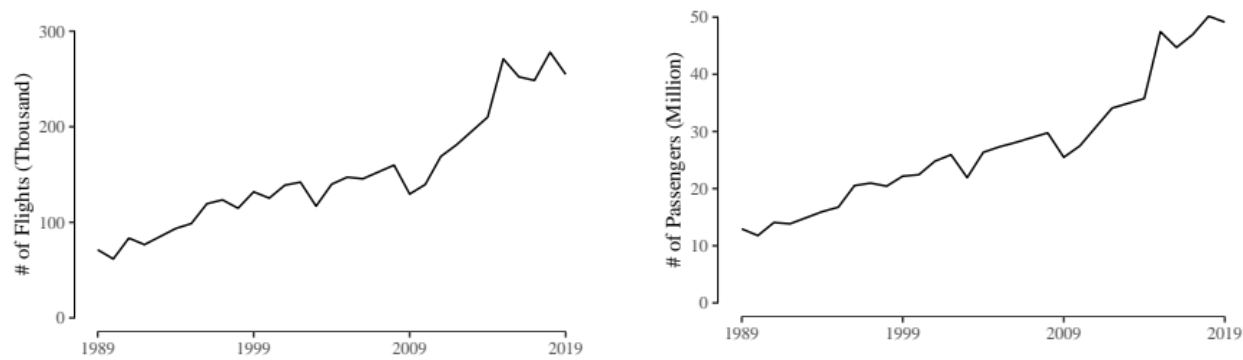


Global Air Network for Knowledge-based Industry

In 2023

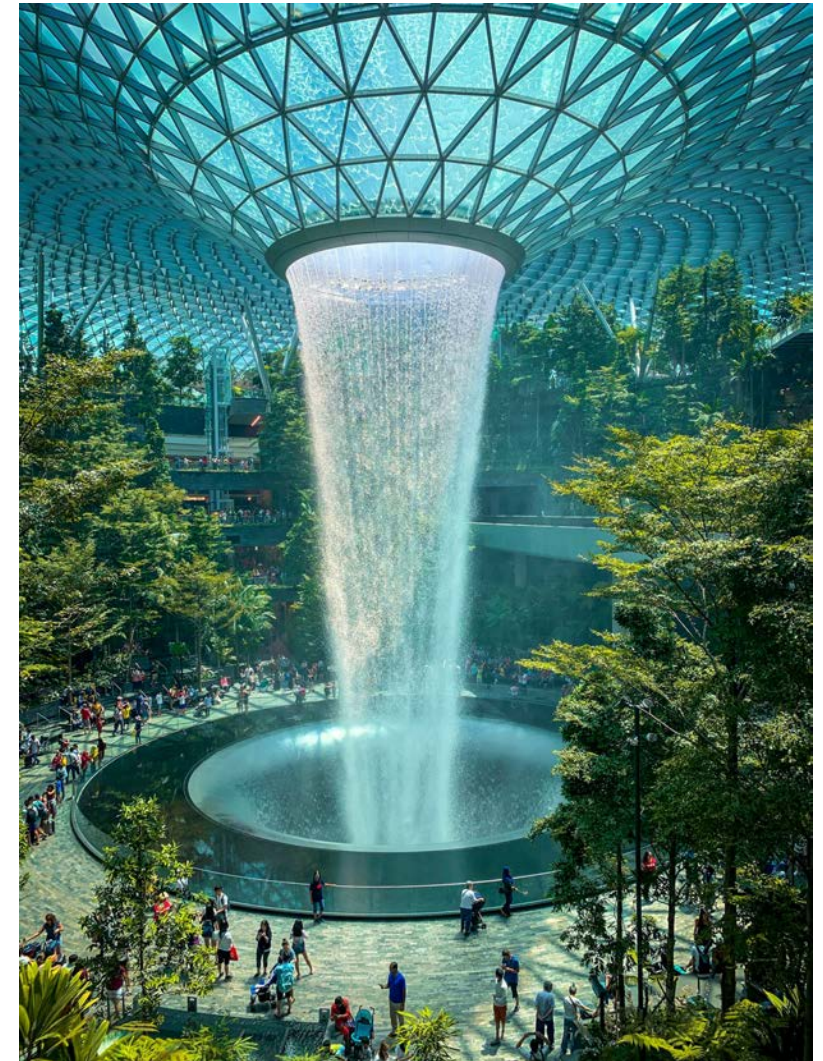
- 42M passengers
- 256K air-crafts
- 1.8M air-freight

Connect Singapore to 145 cities, 49 countries



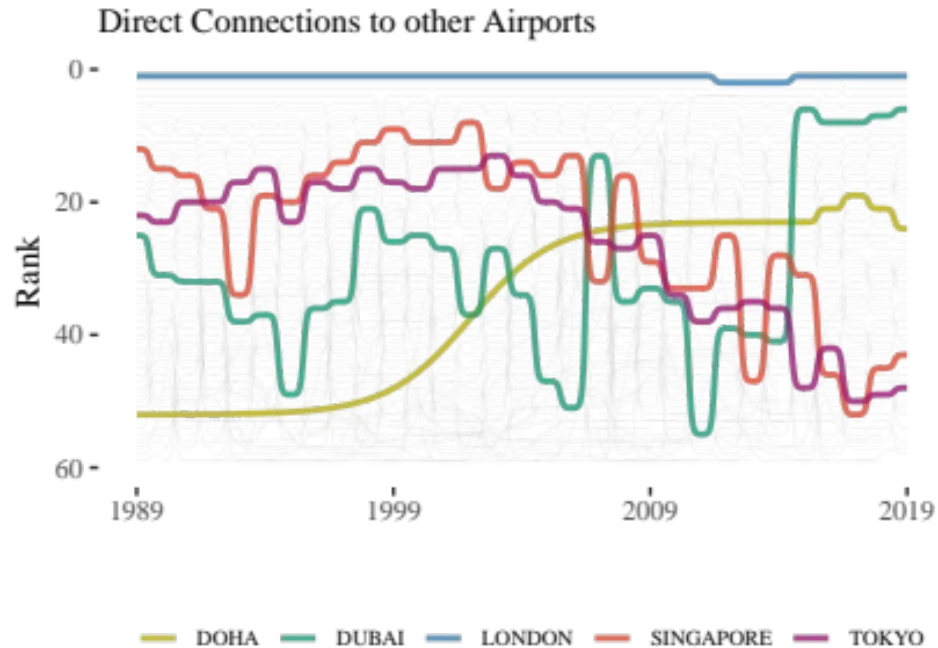
Traffic Flow: Stable Increase Since 1989

Data Source: ICAO



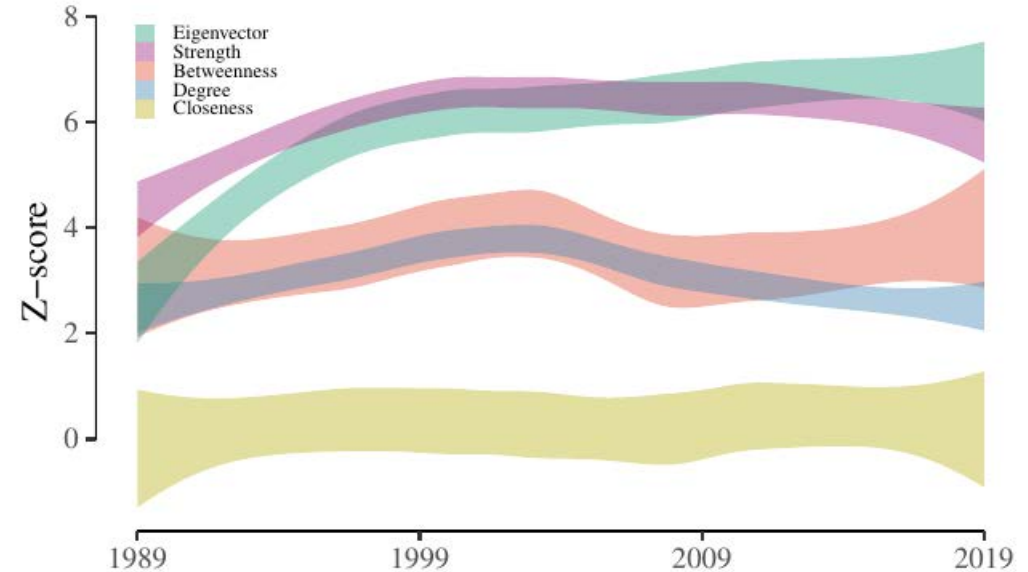
- Photo by Rids- unsplash

Global Air Network for Knowledge-based Industry



Emergence of new hubs: Doha, Dubai

Singapore



Still very **central** in the air traffic network

Eigenvector centrality :
crucial connections to major hubs

How can Singapore's connectivity in the air traffic network support national economic development?

Global Air Network for Knowledge-based Industry

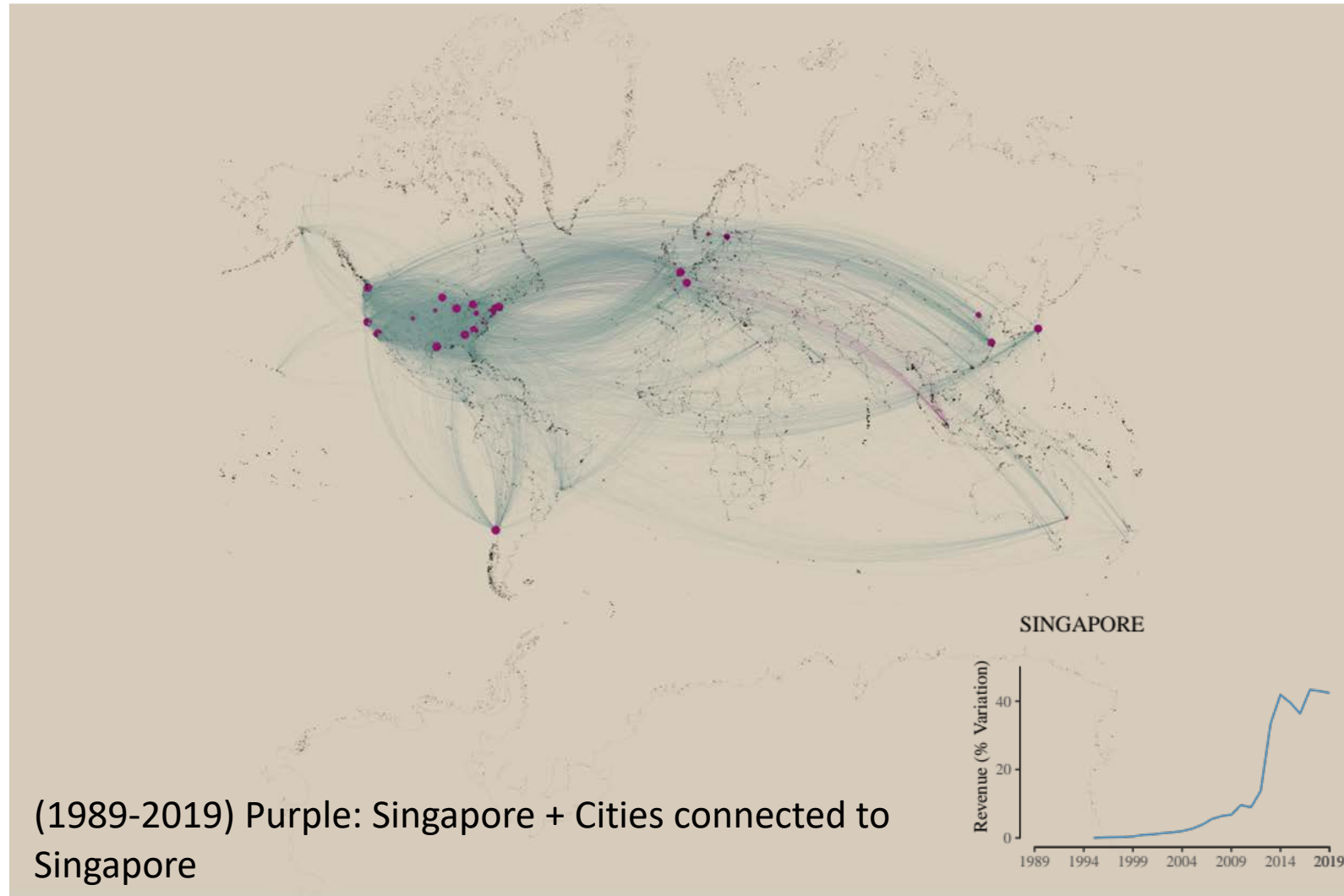
Global Business Connections

Data: ORBIS

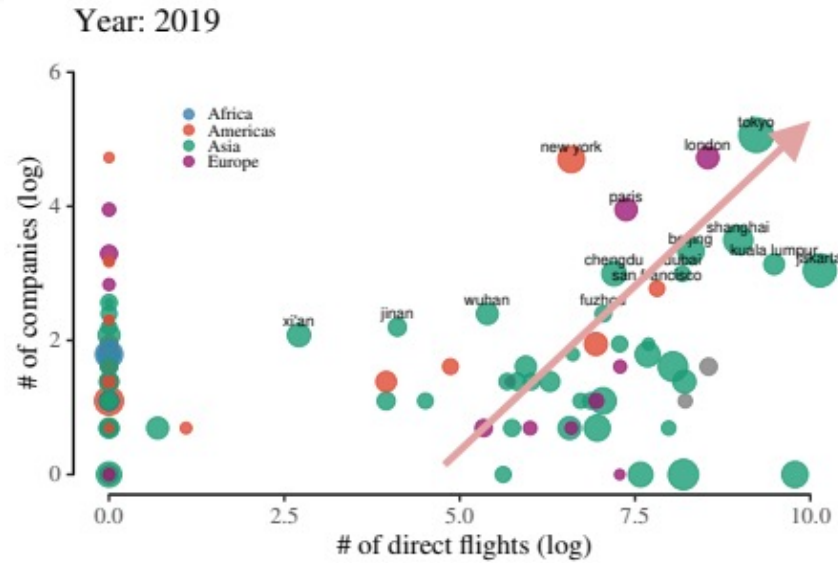
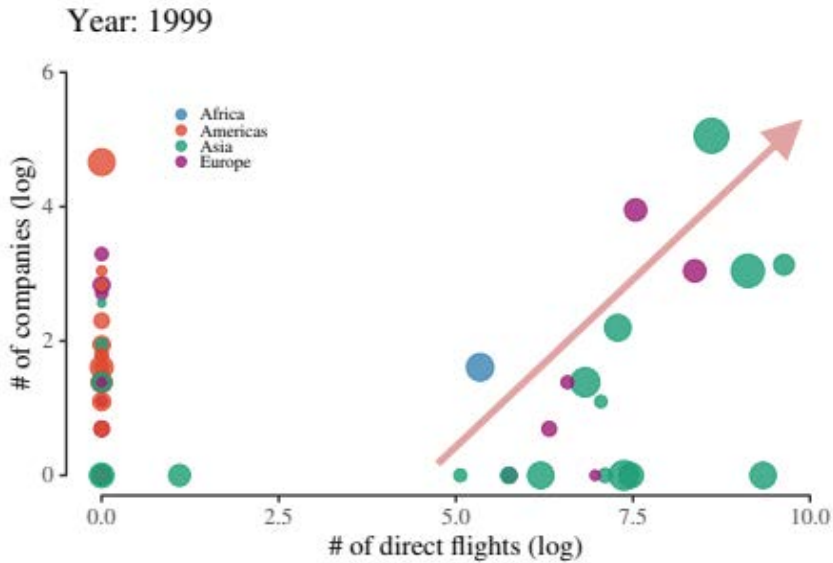
- 400M companies
- 30 years

Network-based Approach

- Nodes: cities
 - Links: MNC business relations
-
- Increase in the number of MNC locations worldwide
 - Growth in revenues
 - Intensification of business relations Singapore-Asian cities



Global Air Network for Knowledge-based Industry



	Branches	Subsidiaries
Intercept	-97.39*** (0.08)	-62.85*** (0.05)
Singapore Indicator	-4.09*** (0.25)	-1.46*** (0.02)
Singapore Indicator x Flights	0.39*** (0.03)	0.10*** (0.00)
Island Indicator	4.14*** (0.02)	2.03*** (0.01)
Island Indicator x Flights	-0.58*** (0.00)	-0.22*** (0.00)
Contiguous Indicator	-5.62*** (0.26)	-1.10*** (0.03)
Contiguous Indicator x Flights	0.21*** (0.02)	0.04*** (0.00)
log Avg Annual Flights 2018-2022	0.35*** (0.00)	0.16*** (0.00)
Observations	972	4349
Pseudo R ²	0.85	0.66
Residual Std. Error	2534.94 (df=959)	2976.85 (df=4336)
Note:	*p<0.1; **p<0.05; ***p<0.01	

Preliminary Insights: Correlation Air Traffic- Economic Outcomes

Country-Level : number of headquarter-subsiary relationships is positively associated with the number of flights between two countries

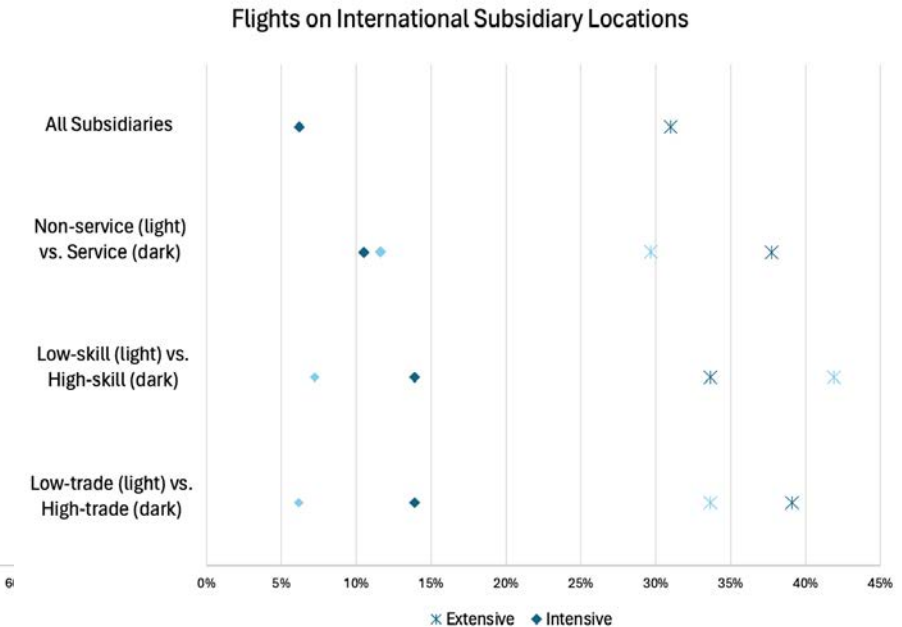
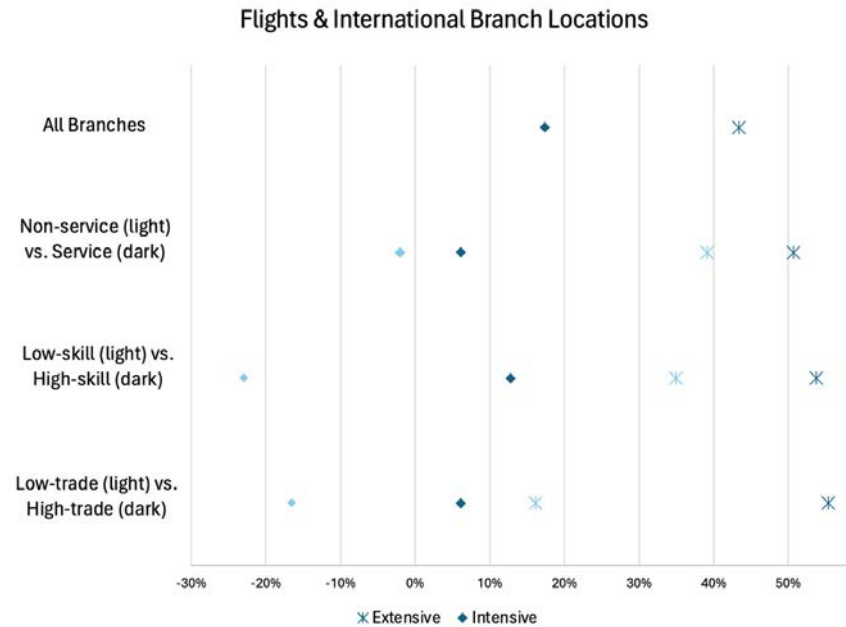
City-Level : number of headquarter-subsiary relationships is positively associated with the number of flights between Singapore and the other city

Global Air Network for Knowledge-based Industry

Industry-based classification
Eckert et al. (2022)

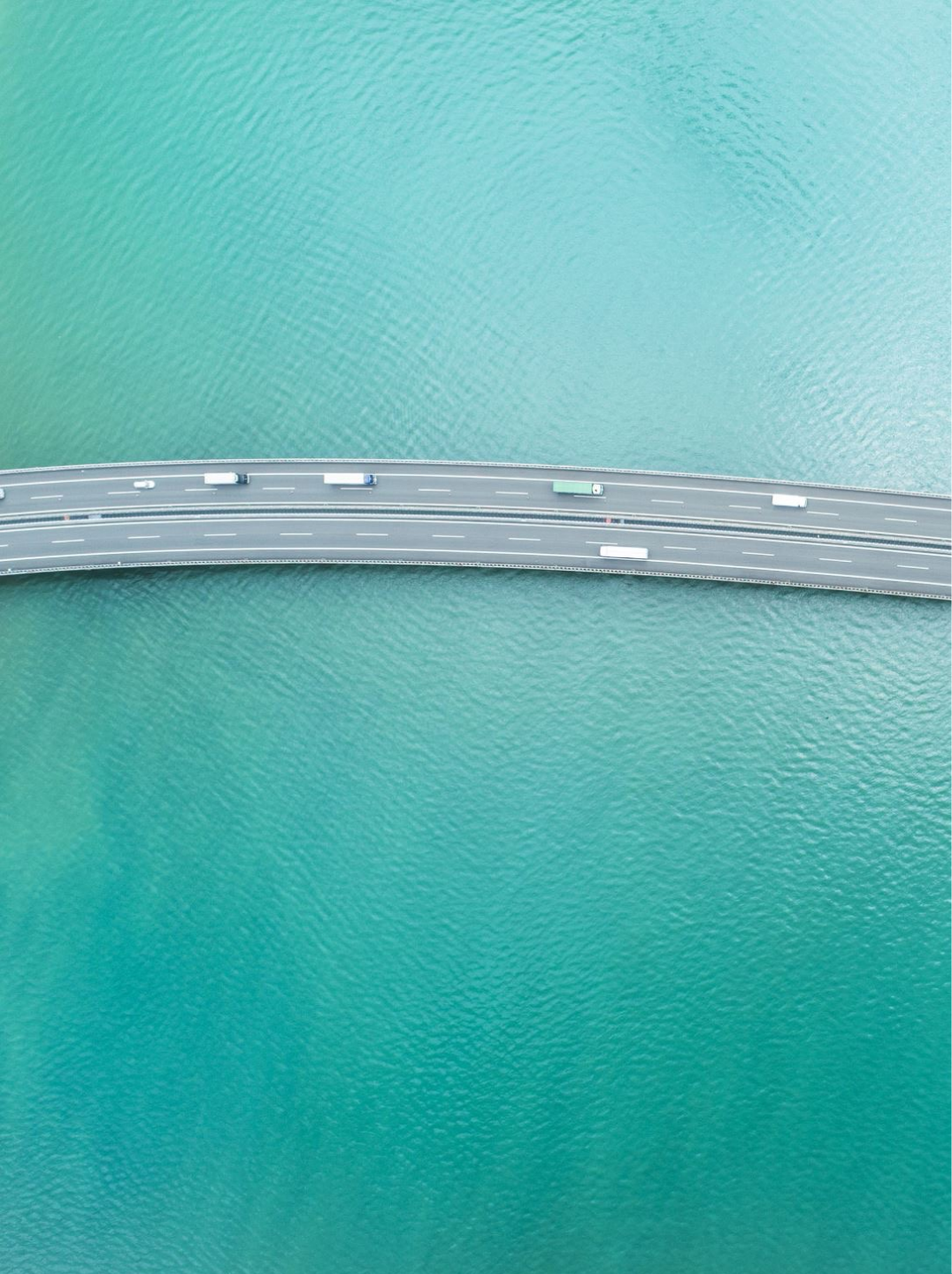
- A) Service VS non-service
- B) High-skill vs. low-skill
- C) High-trade vs. low-trade

Gravity model:
Extensive Margins → Likelihood
Intensive Margins → # of MNCs



Flight connectivity significantly impacts headquarter-subsubsidiary(/branch) location choice

The effect is strongest for companies in **high-skilled, highly tradable** service industries



Thank You