

Economic Geography and aviation: assessing the wider benefits of air connectivity

—
Bert Lenaerts (UHasselt, Belgium)

presenting joint work with
Dr. Florian Allroggen (MIT) & Prof. Robert Malina (UHasselt)



Overview



Market access & Connectivity

How air transport connects the world



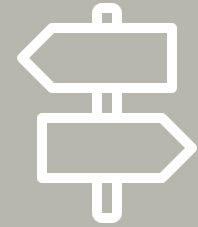
Economic Geography

Spatial organisation of the economy



Economic impact in Europe

Empirical case study

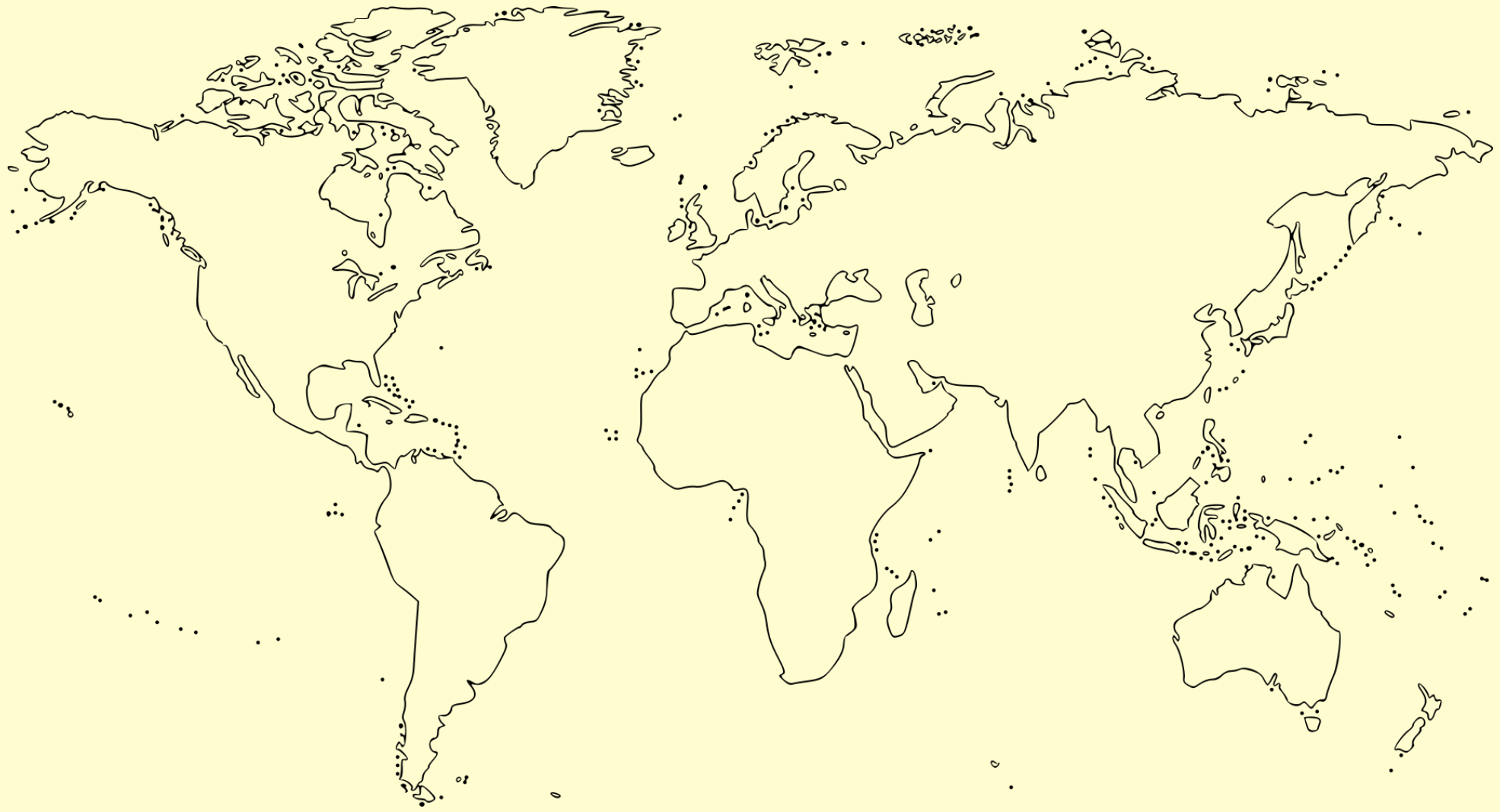


Conclusion

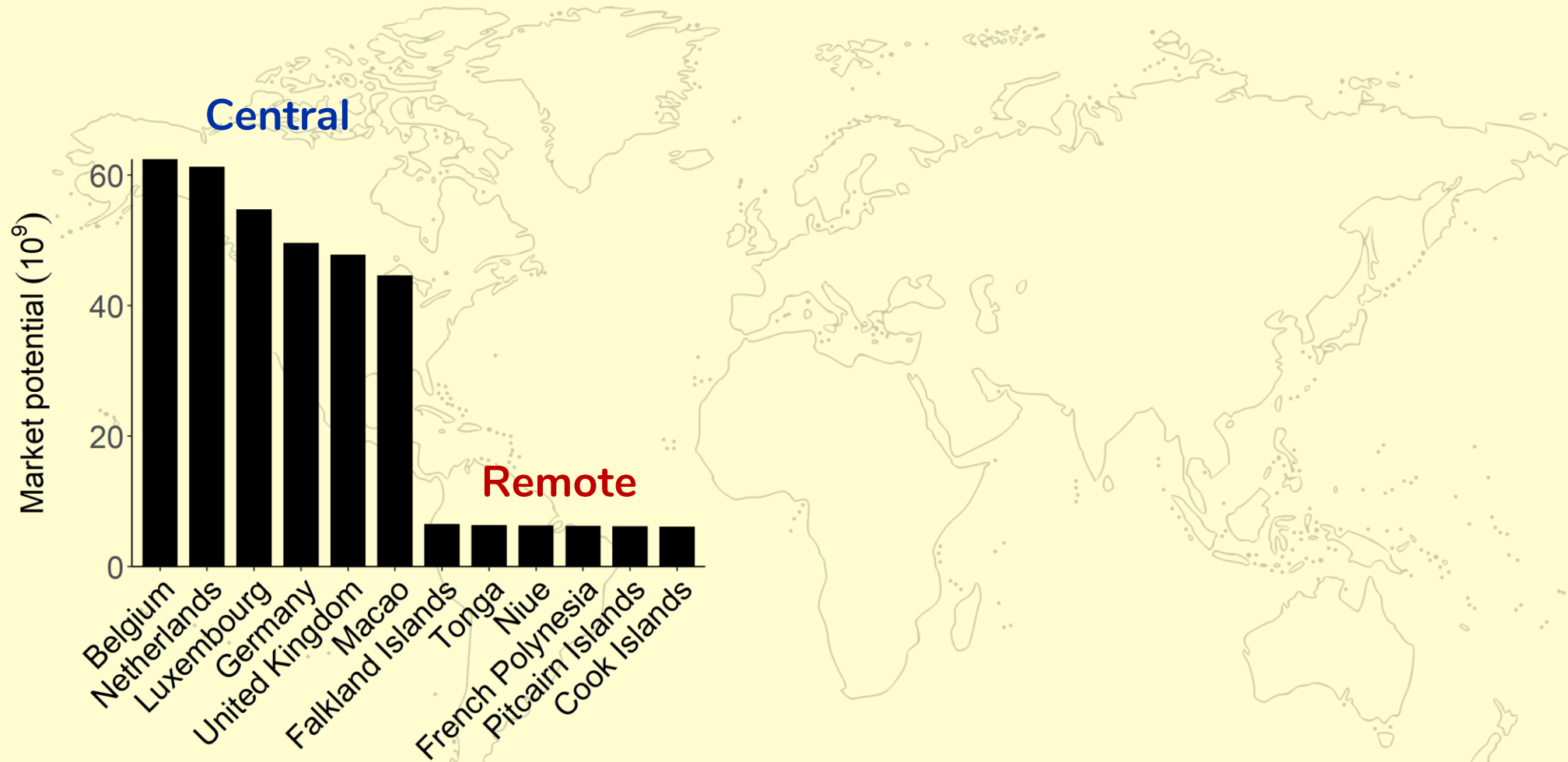
Wrapping up & looking further

Market access & Connectivity

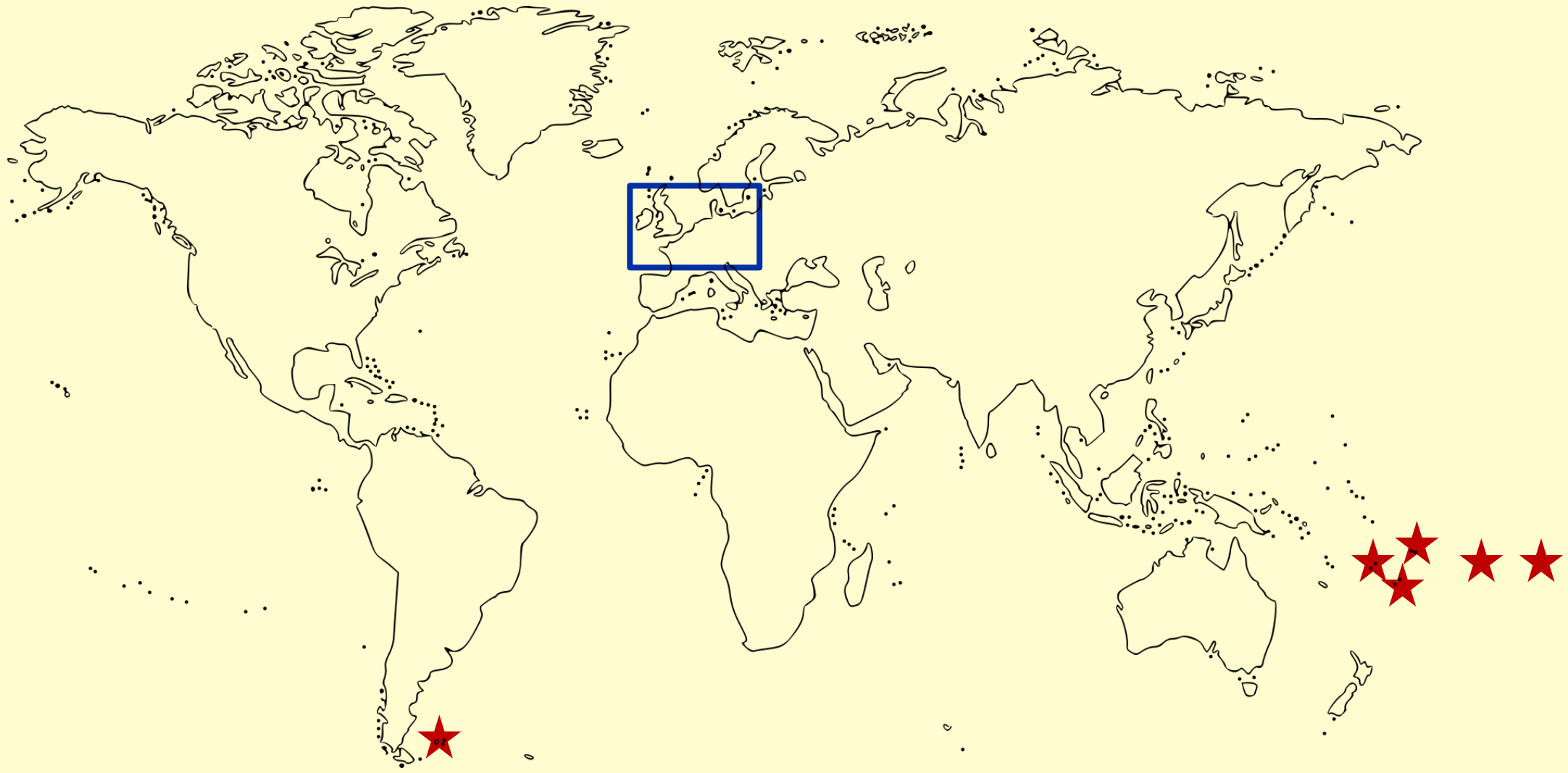
How air transport
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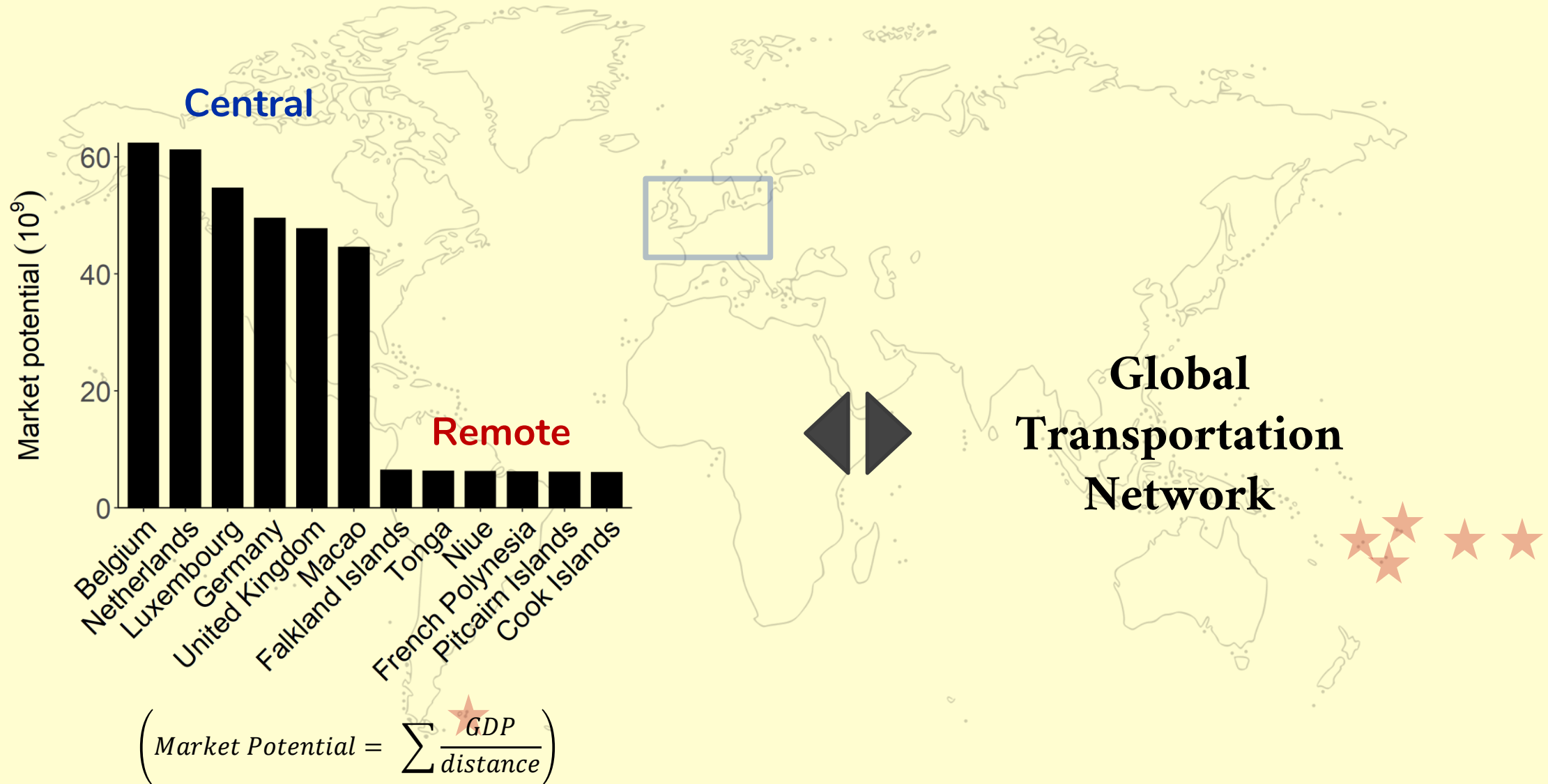
Physical Remoteness

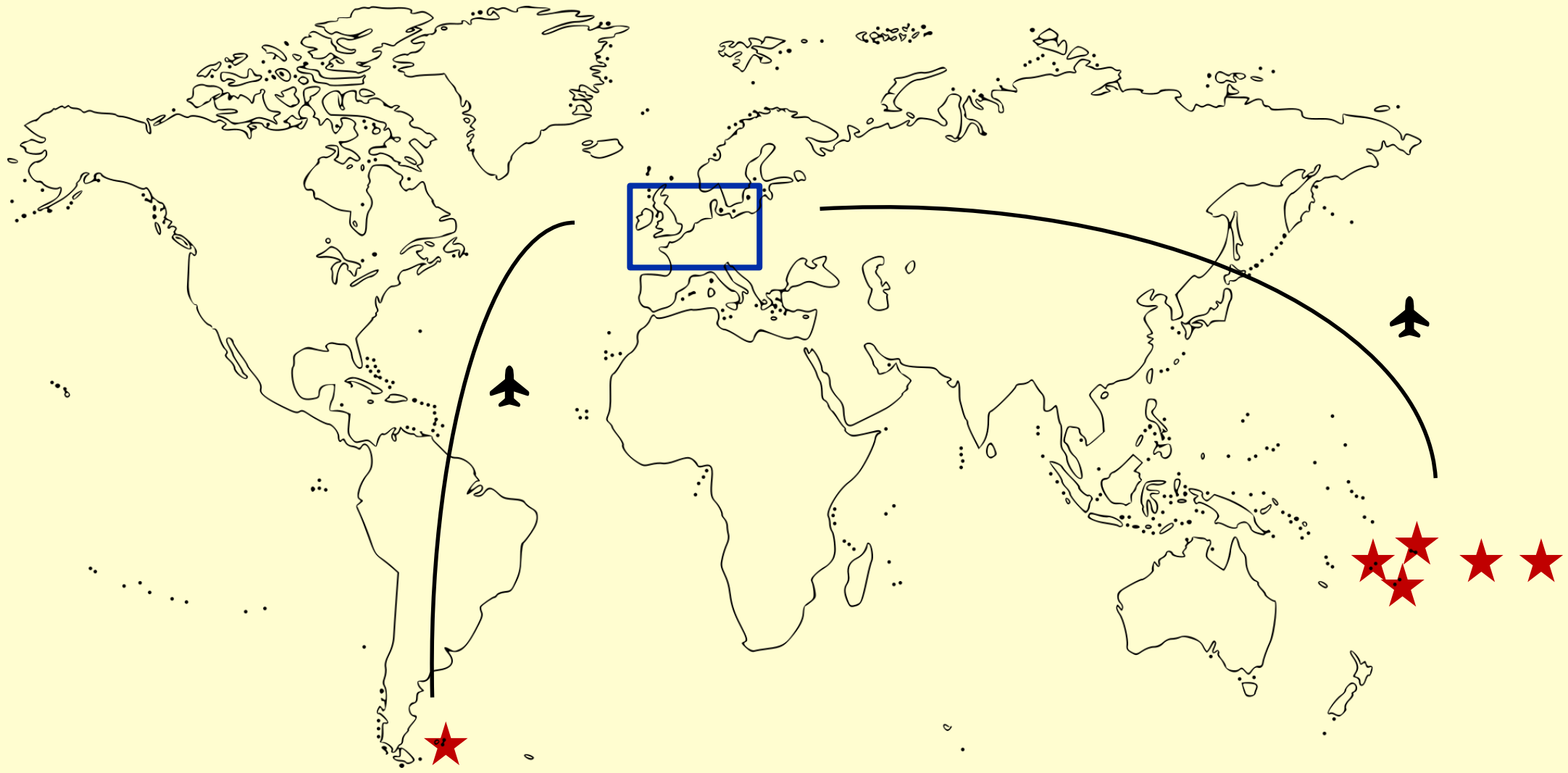


$$\left(\text{Market Potential} = \sum \frac{GDP}{\text{distance}} \right)$$



Physical Remoteness





Interaction

1

Pull by opportunities at remote markets



Remote Markets

Consumers, Producers,
Suppliers, Workers

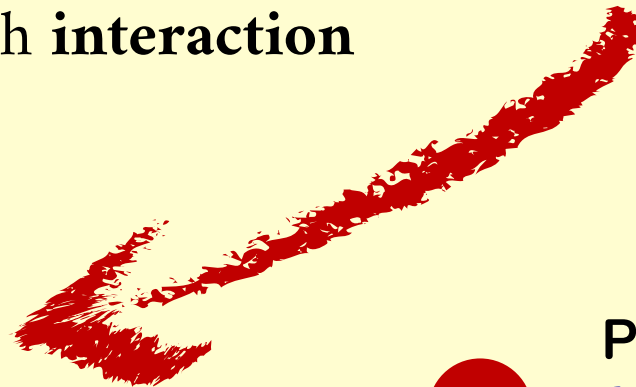
Value created
through **interaction**

Home region

Consumers, Producers,
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2

Push by cost of overcoming frictions (distance and geography)



Interaction

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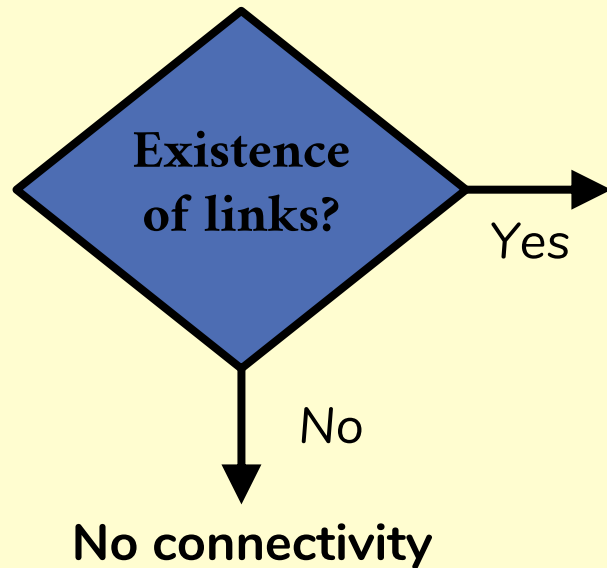
Transport Component

2

Push by cost of overcoming **frictions** (distance and geography)

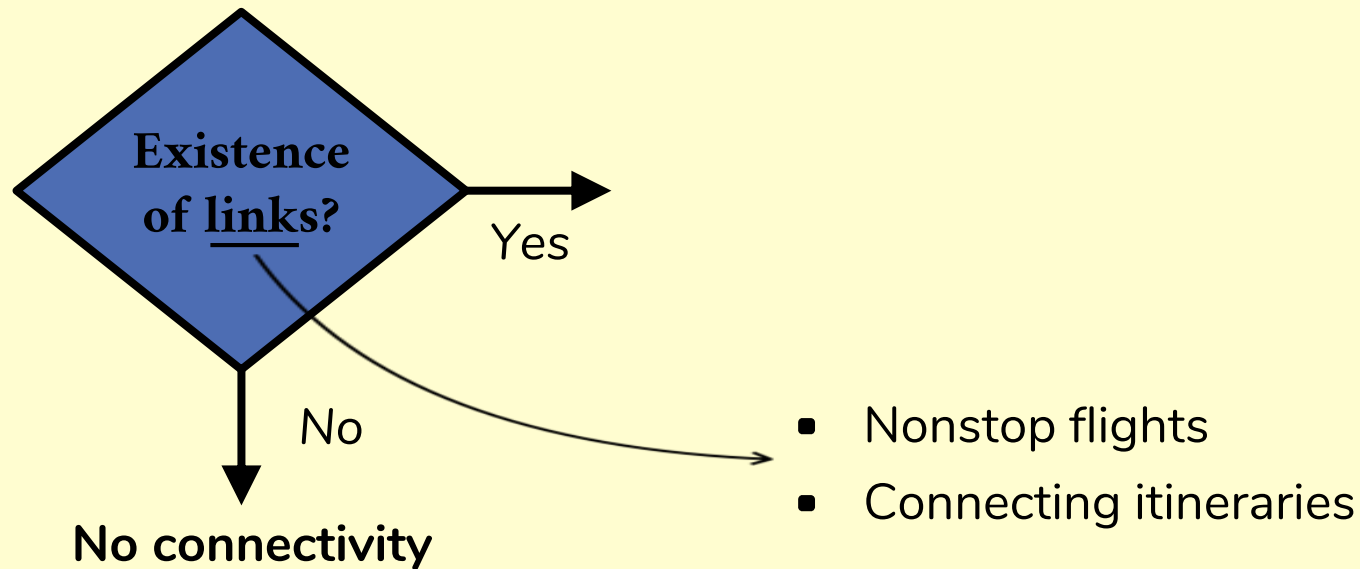
Global Connectivity Index (GCI) (by Allroggen, Wittman and Malina, 2015)

For each airport, we analyse:



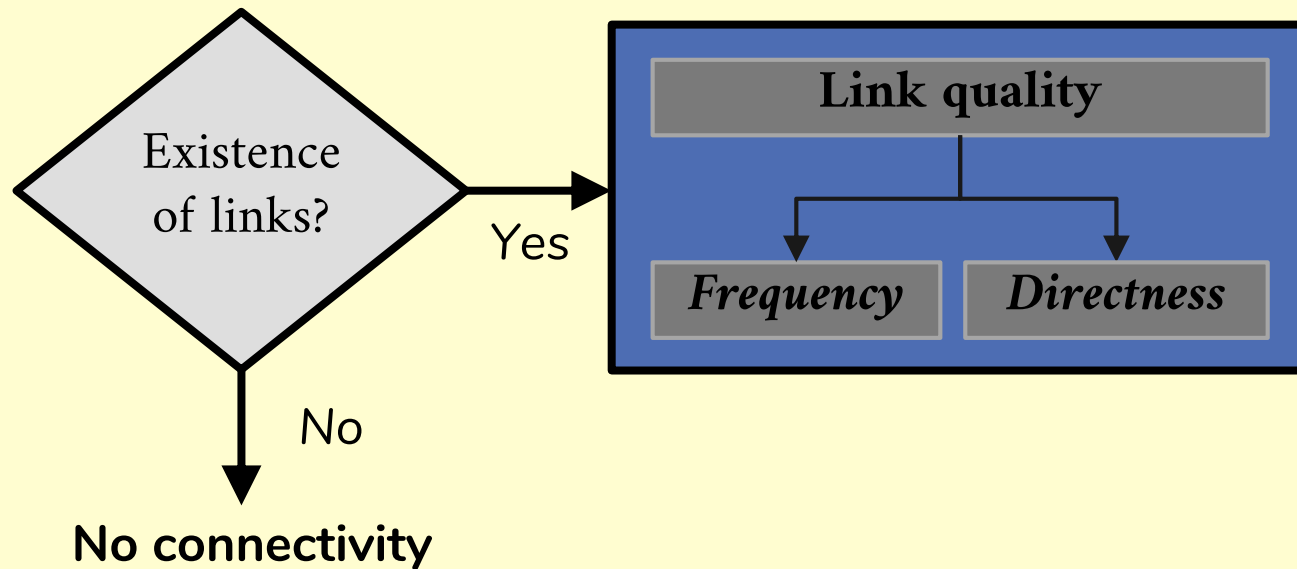
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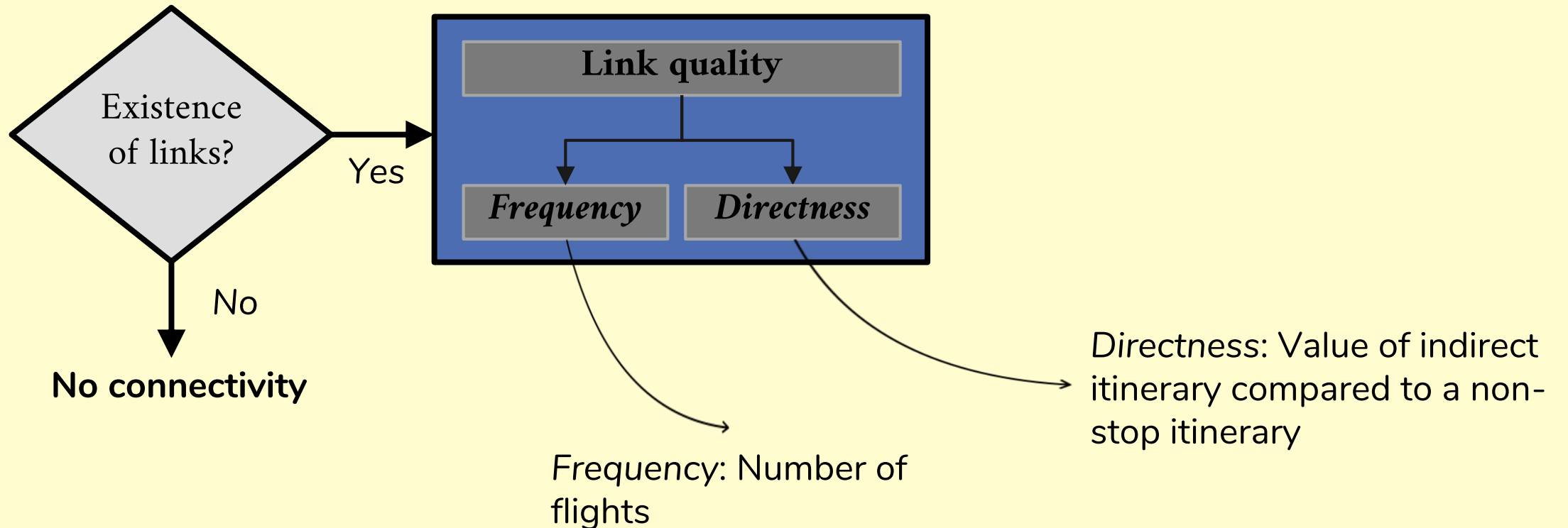
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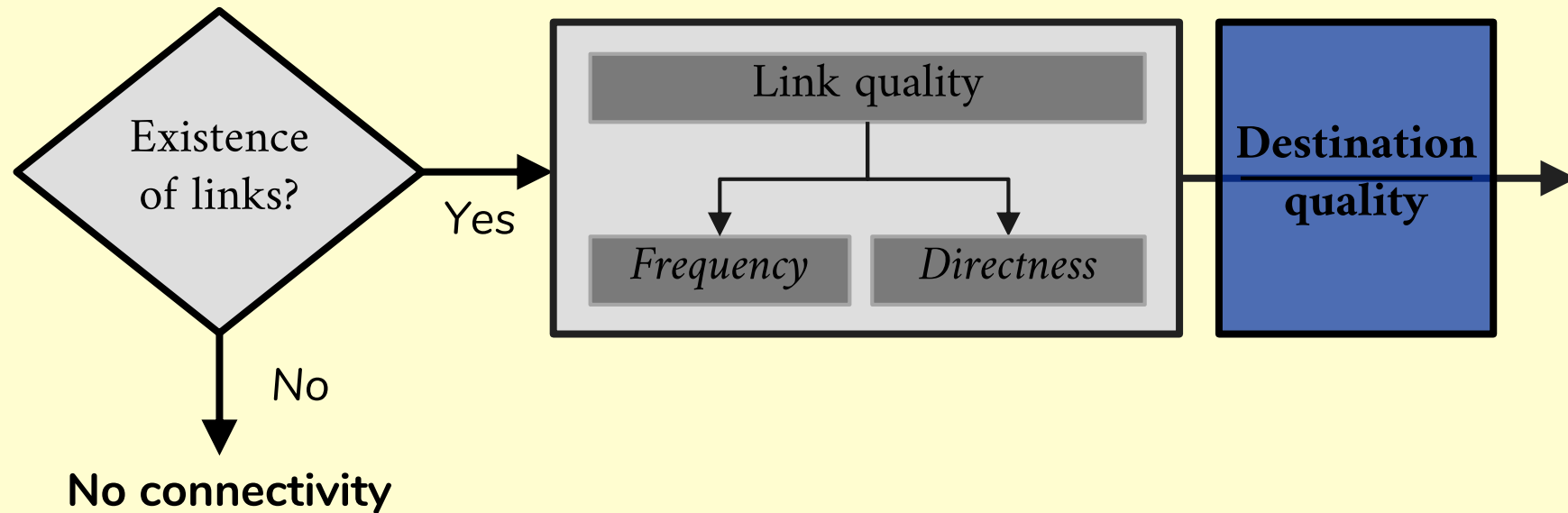
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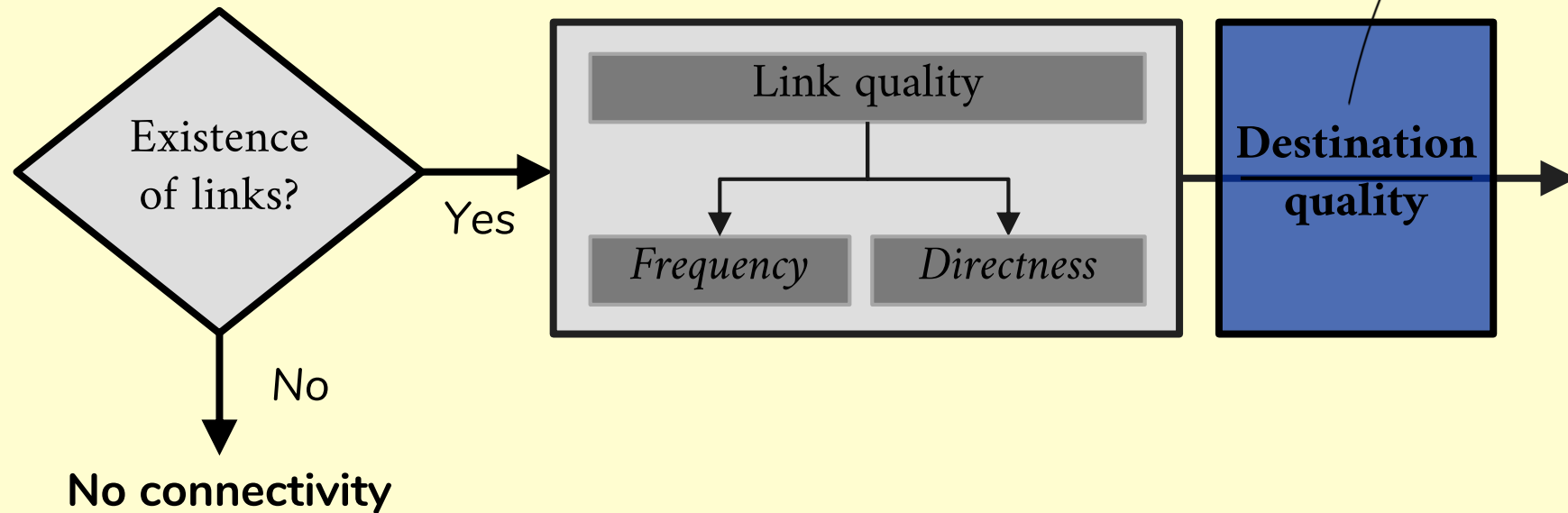
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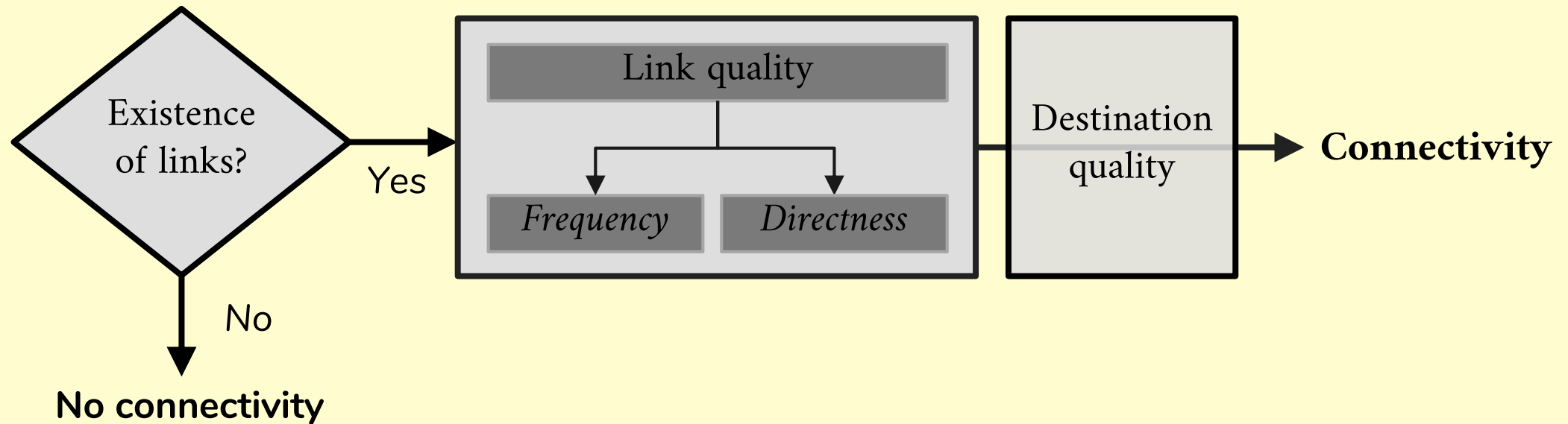
For each airport, we analyse:



- Wealth-adjusted population
- Distance-decay

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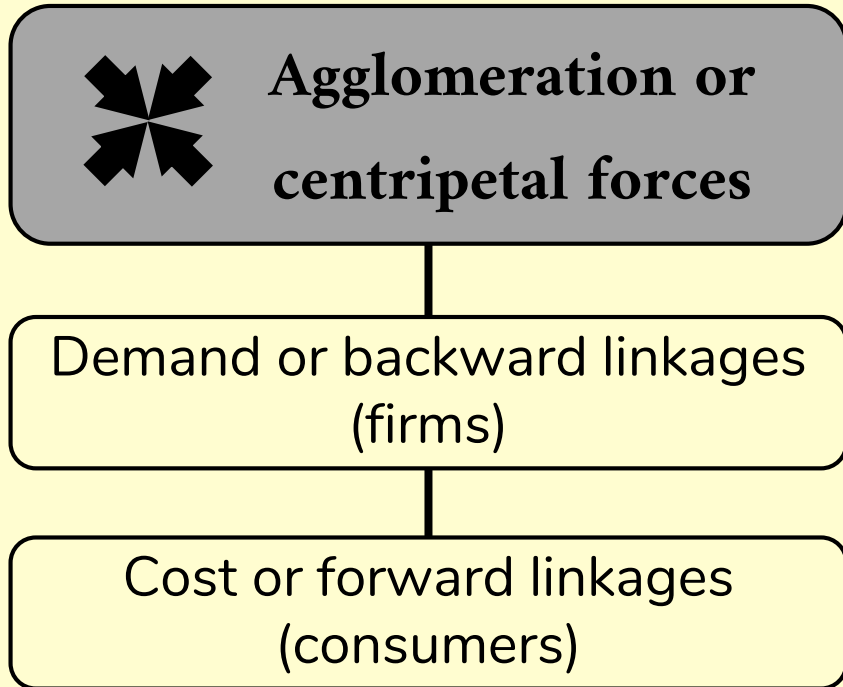
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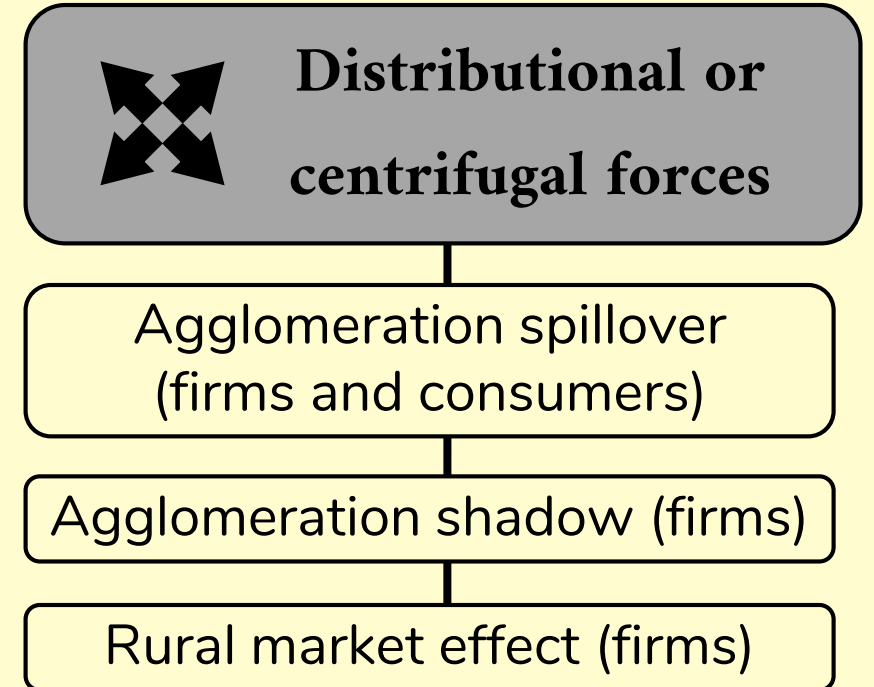
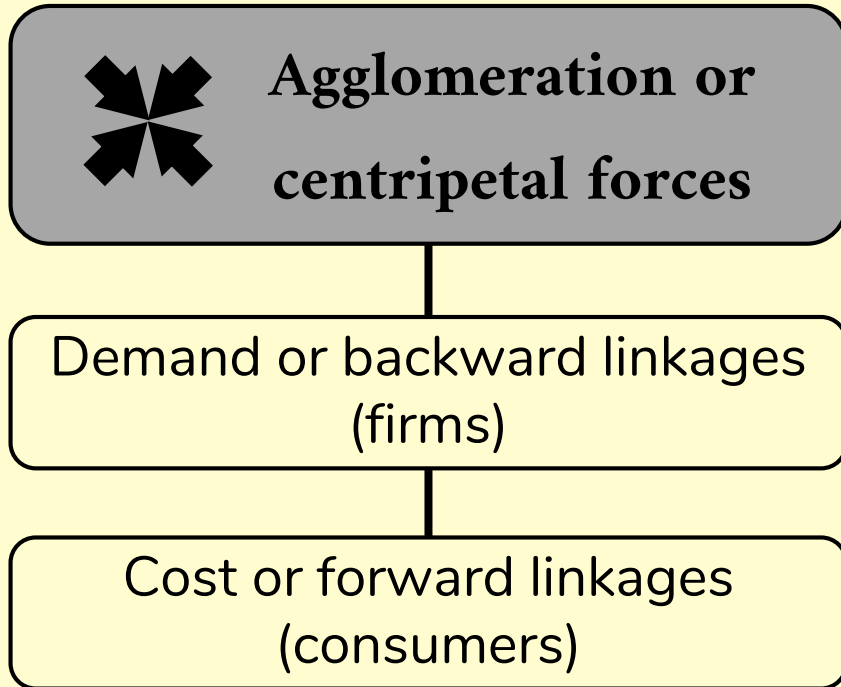
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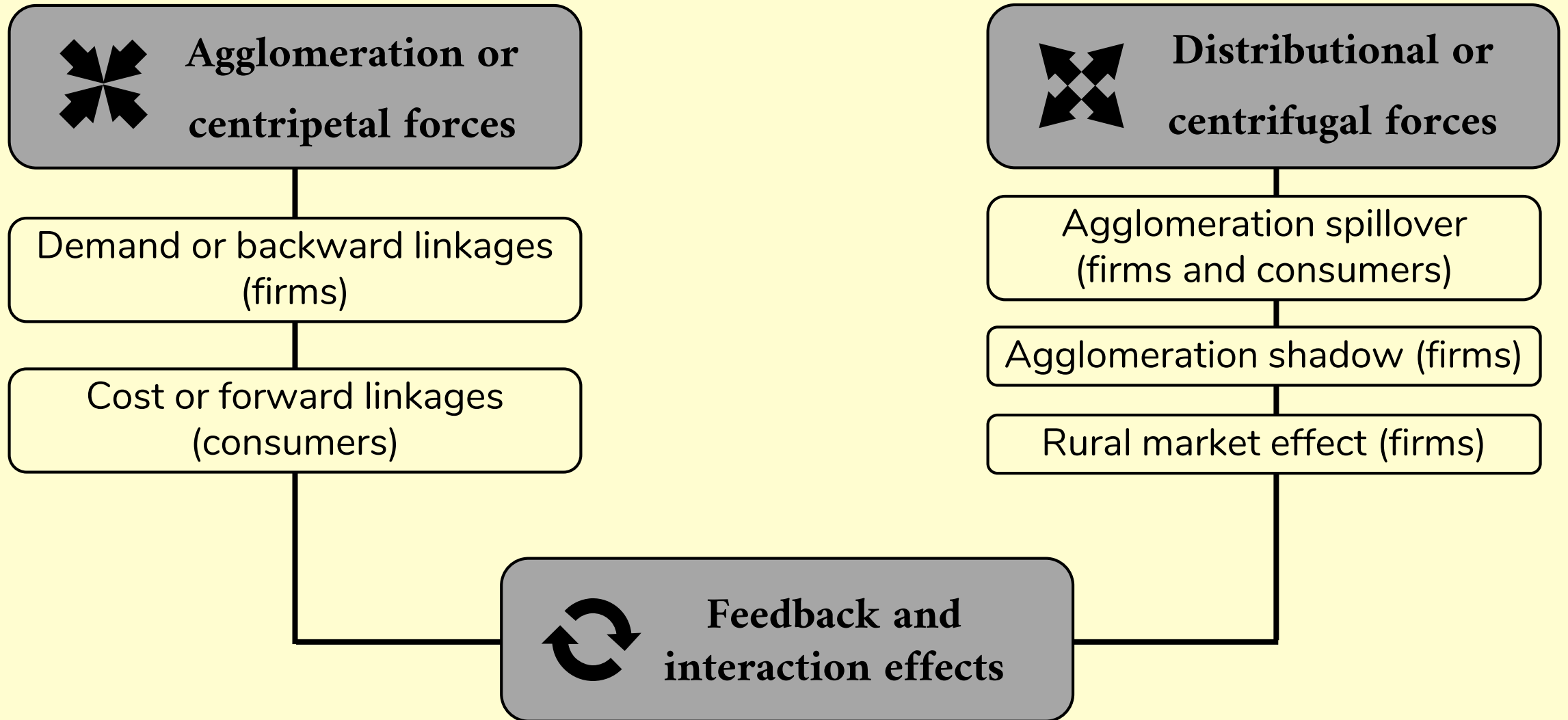
Spatial-Economic Restructuring



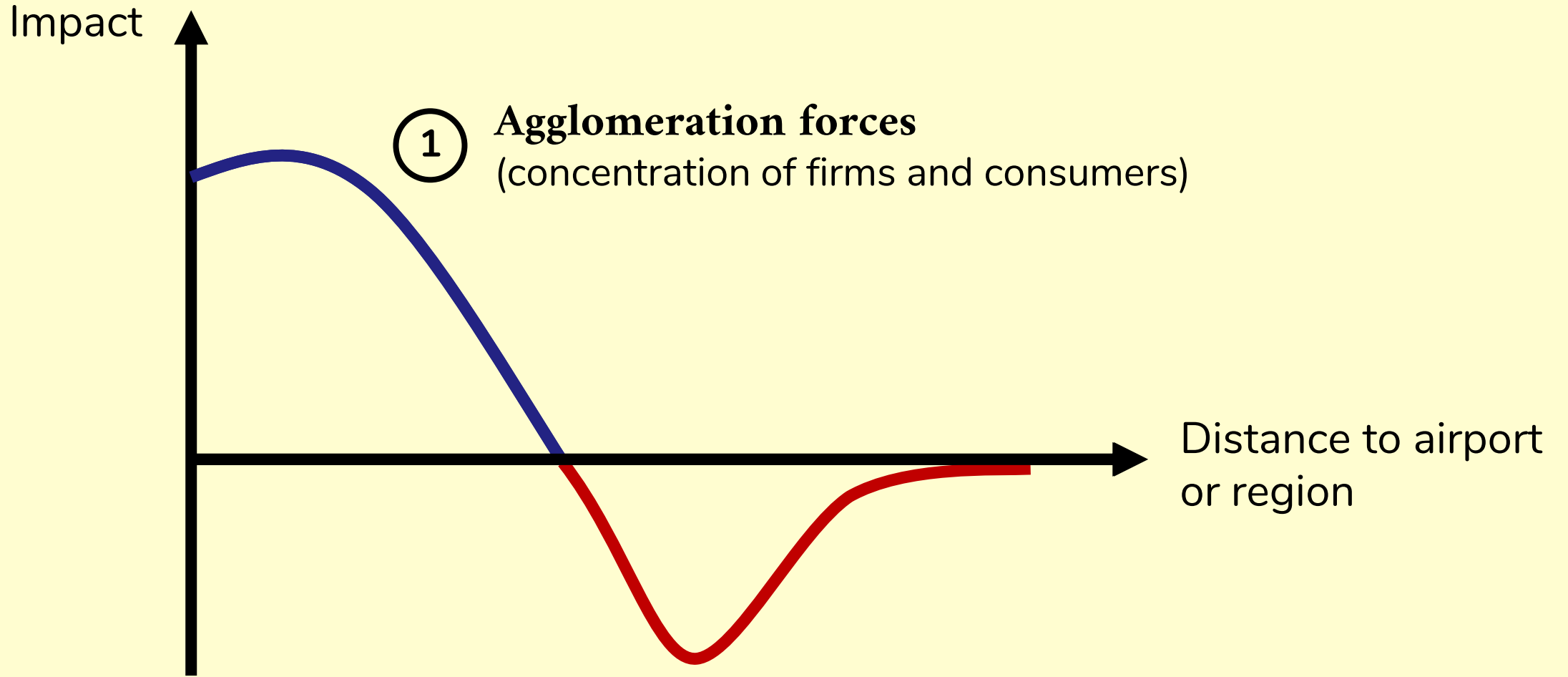
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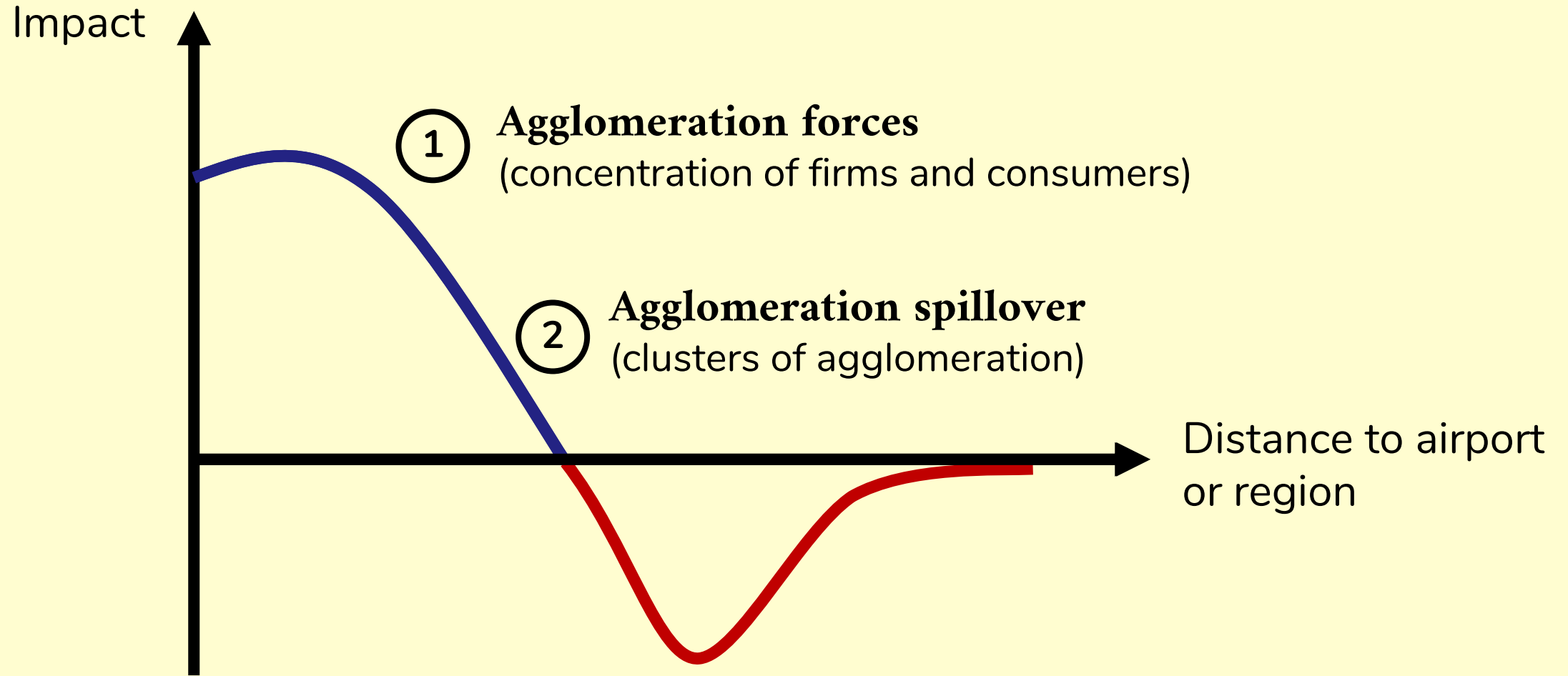
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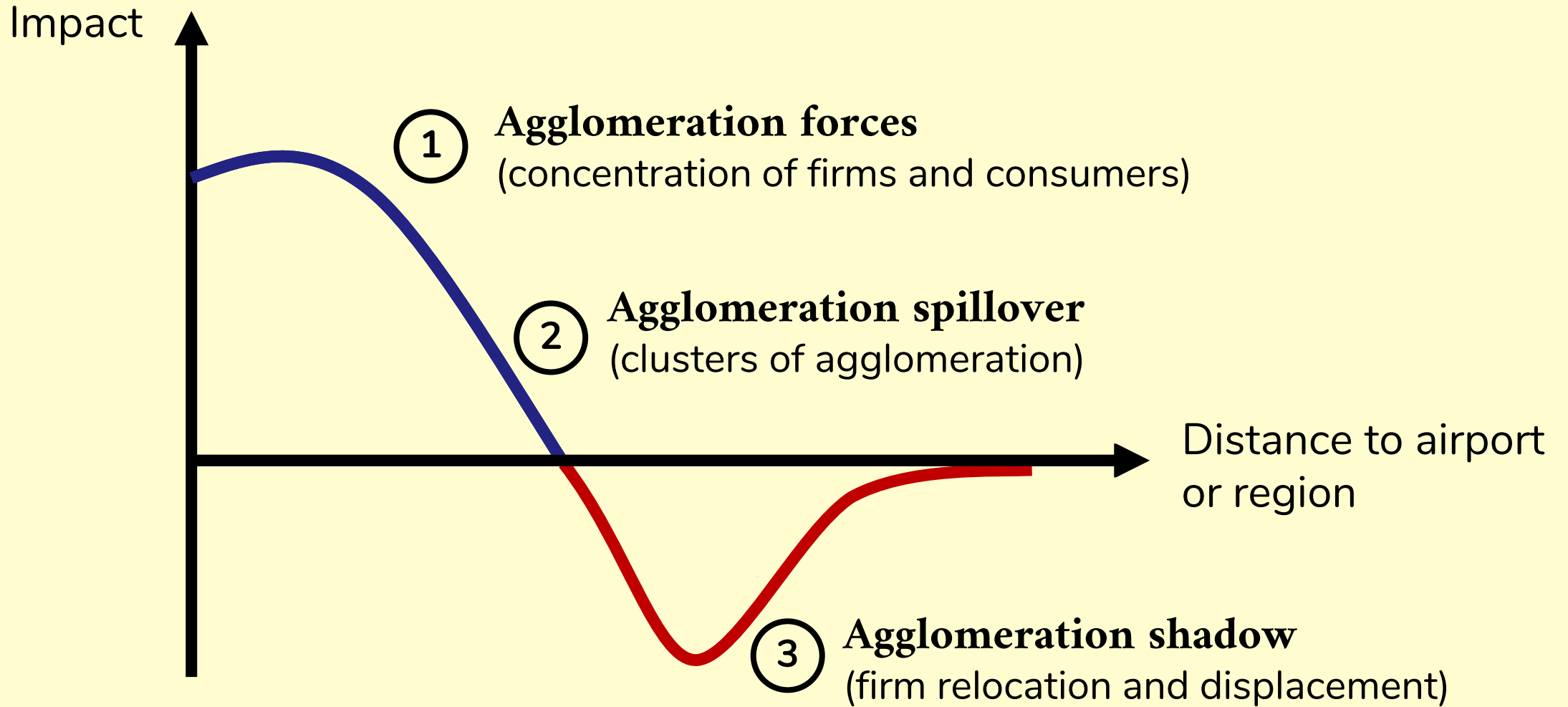
Hypothesised spatial decomposition



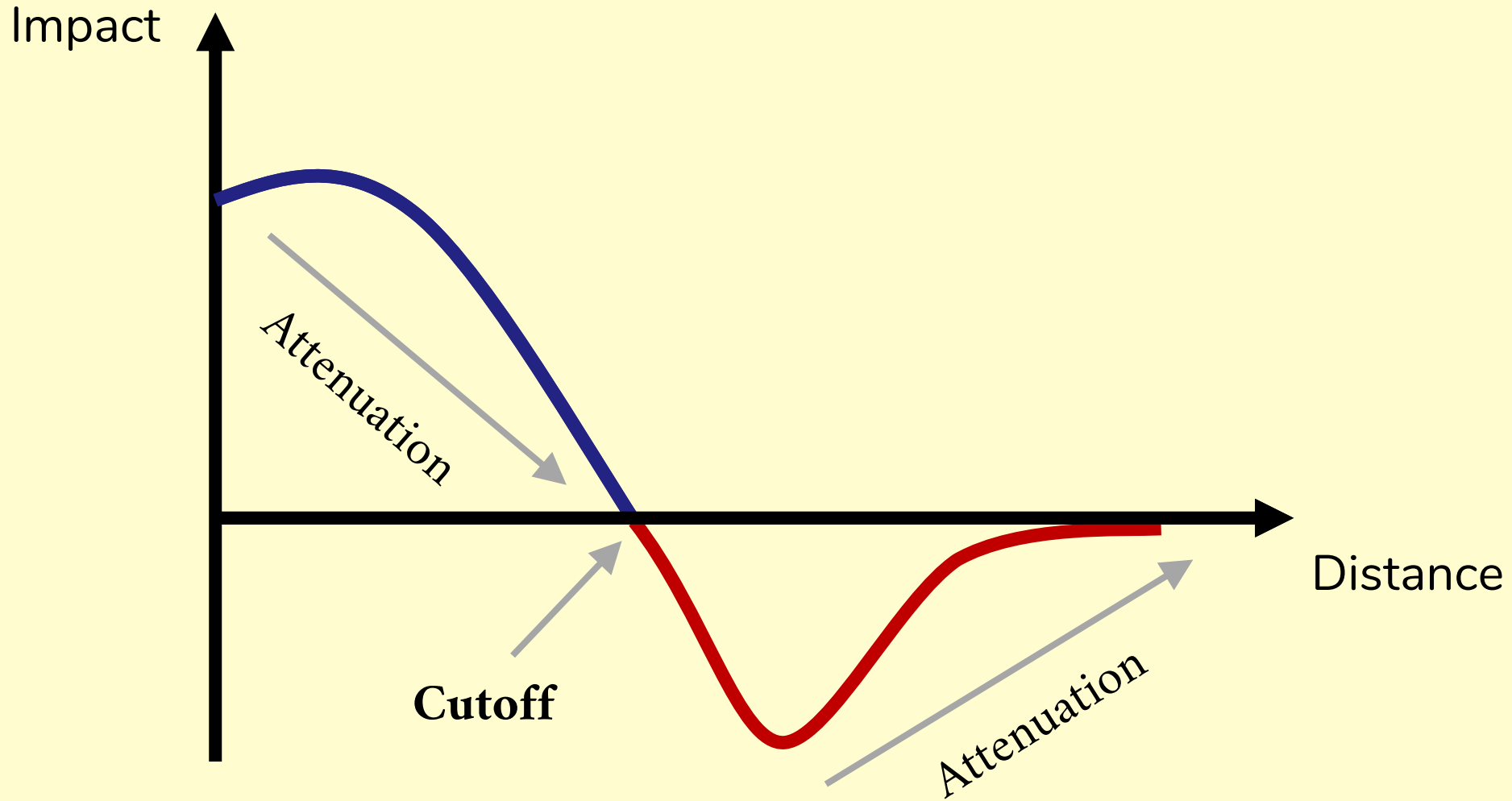
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Economic impact in Europe

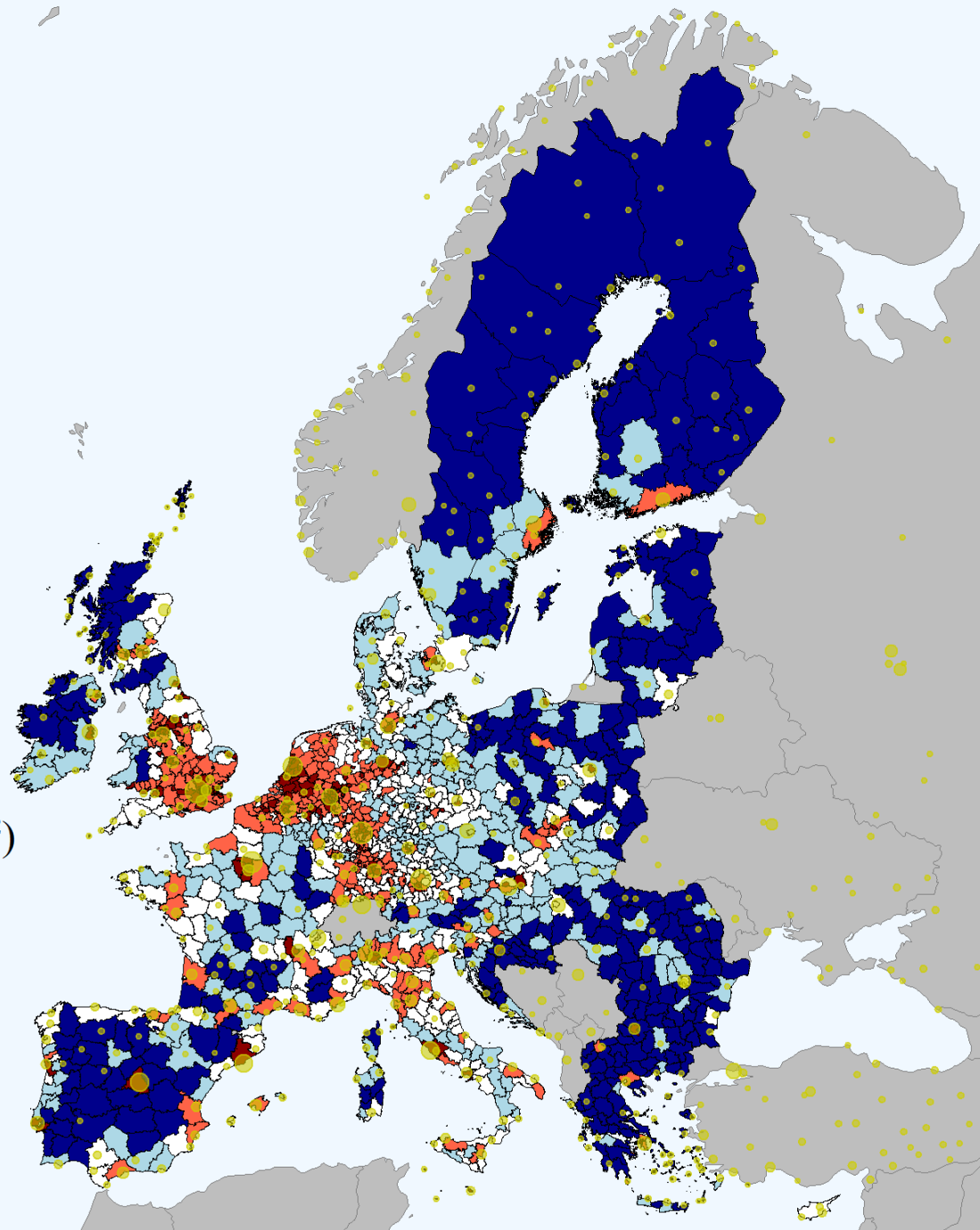
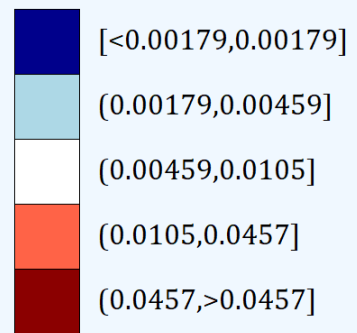
Empirical case study

Canarias (ES),
Azores (PT) and
Madeira (PT)

Connectivity (10^3)

- 30
- 60
- 90
- 120

Density (10^3 jobs/km²)



Empirical model

$$\text{Employment} \sim W \cdot \text{Connectivity} + \\ W \cdot \text{Employment}$$

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Empirical model

$$\begin{aligned} \text{Employment} \sim & W \cdot \text{Connectivity} + \\ & W \cdot \text{Employment} + \left. \vphantom{W \cdot \text{Connectivity}} \right\} W = \text{weight matrix capturing neighbourhoodship} \\ & \text{Population} + \text{Area} + \\ & \text{Country- and Year-fixed effects} + \\ & \text{Error term} \end{aligned}$$

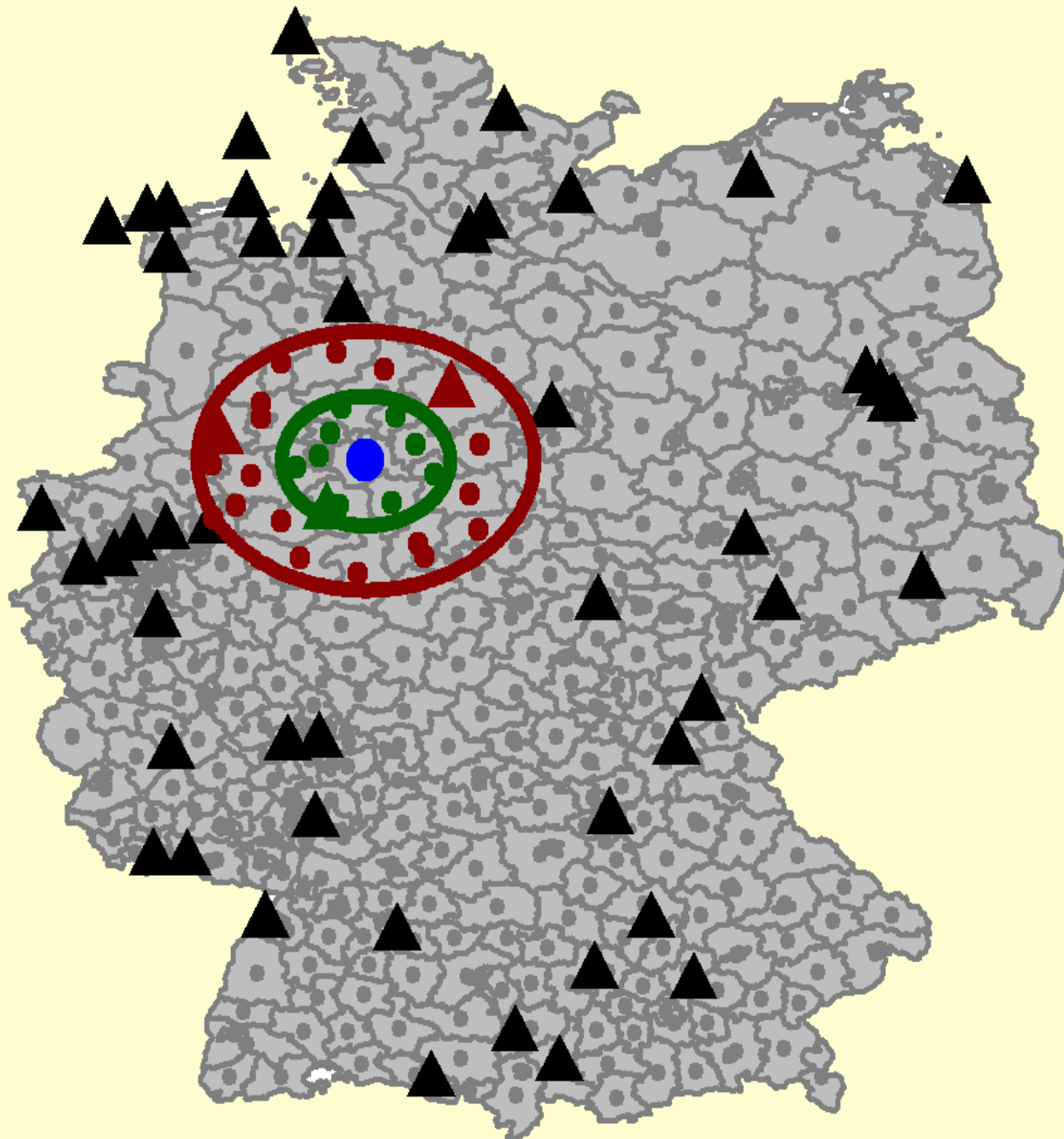
Empirical model

Economic data

- Eurostat
- 29 EU countries
- 1345 NUTS regions
- 643 origin airports
- Service employment (K-N in NACE)
- 13 years (2000-2012)

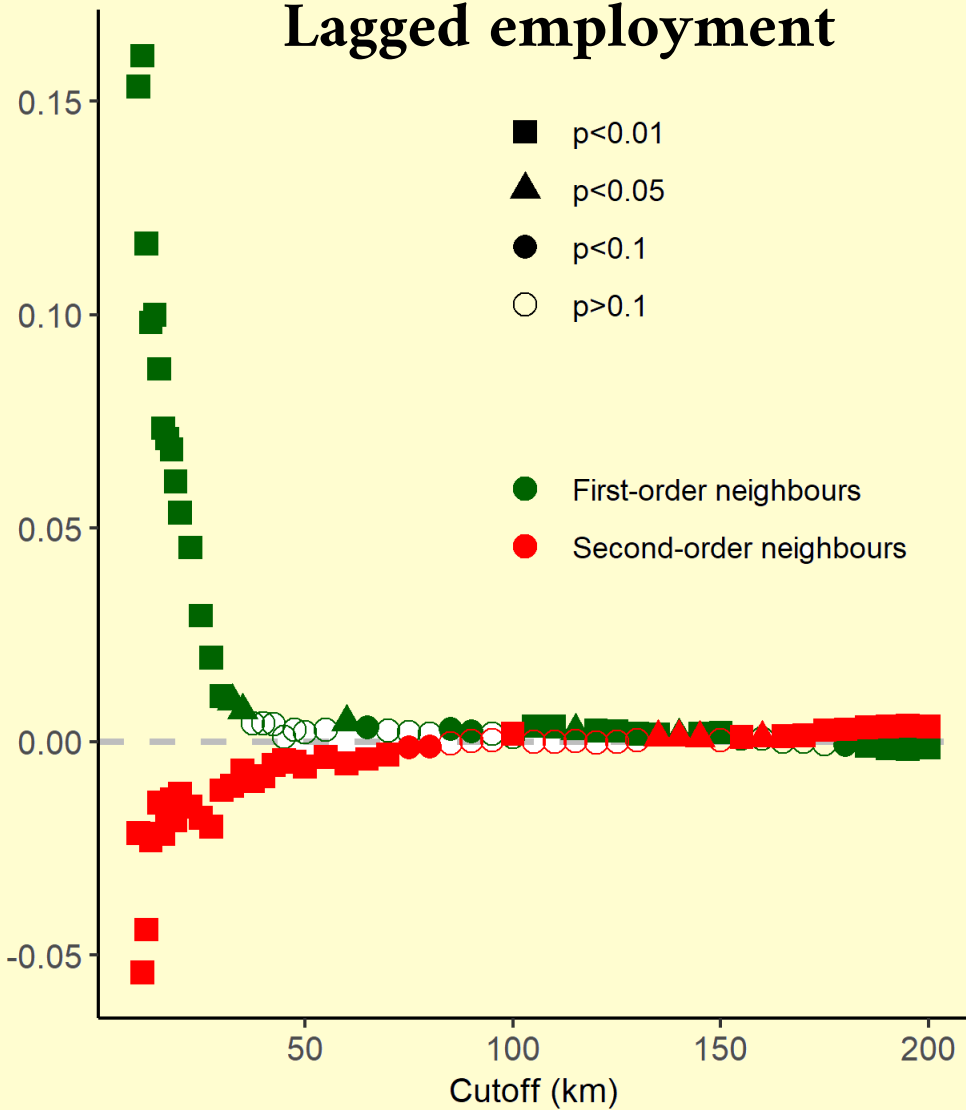
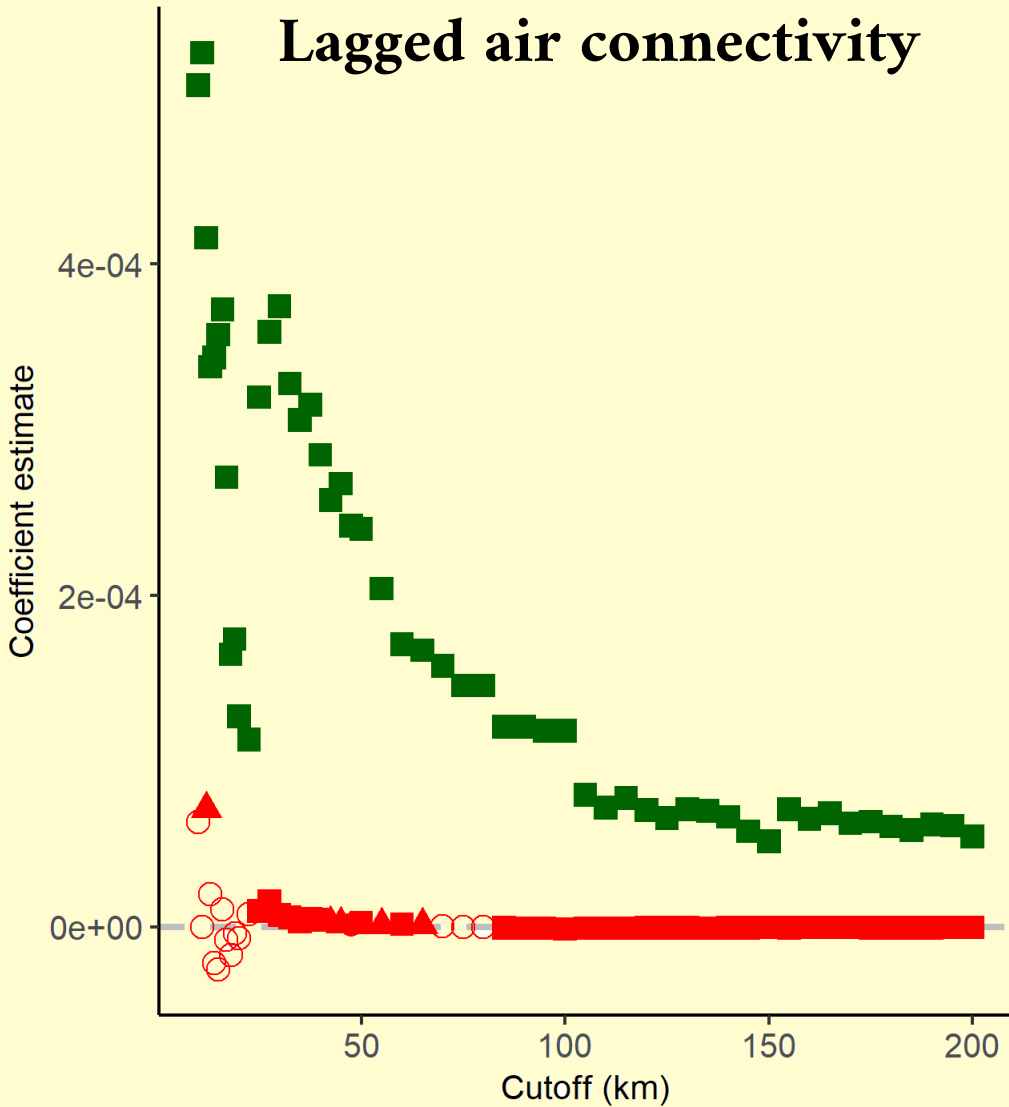
Connectivity data

- OAG flight data
- 4600 hub and destination airports
- All airlines
- Global Connectivity Index
- 13 years (2000-2012)

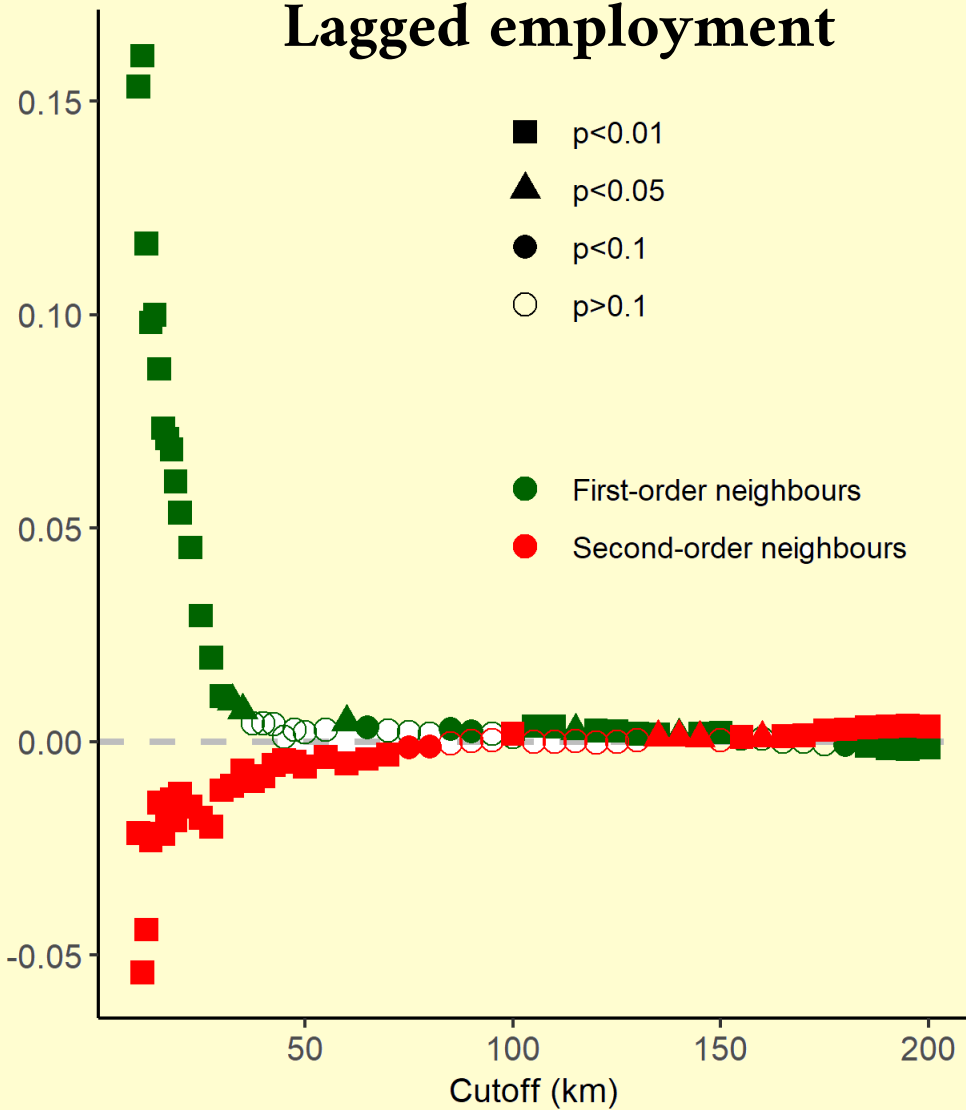
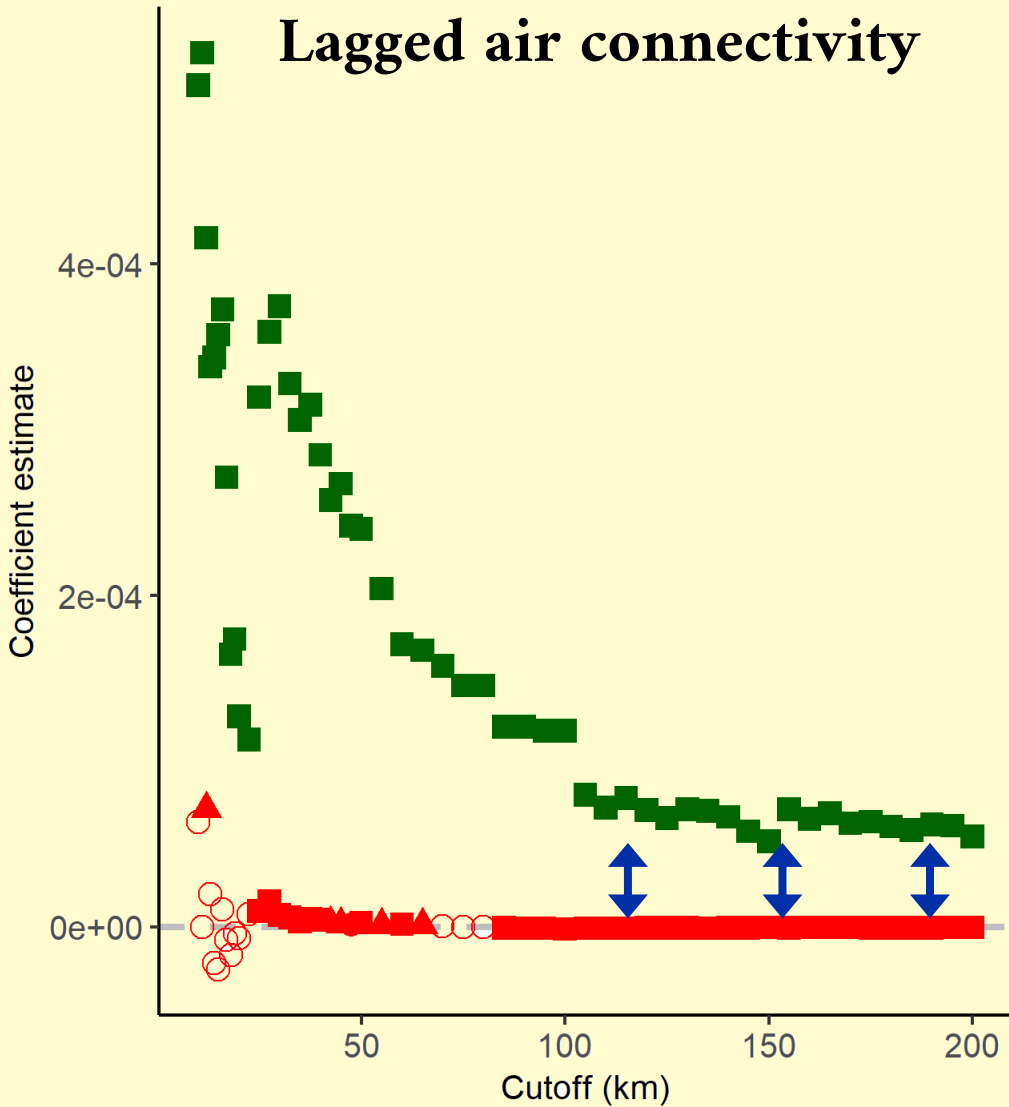


- Centre NUTS 3 region
- ▲ Airport
- First-order neighbours
- Second-order neighbours

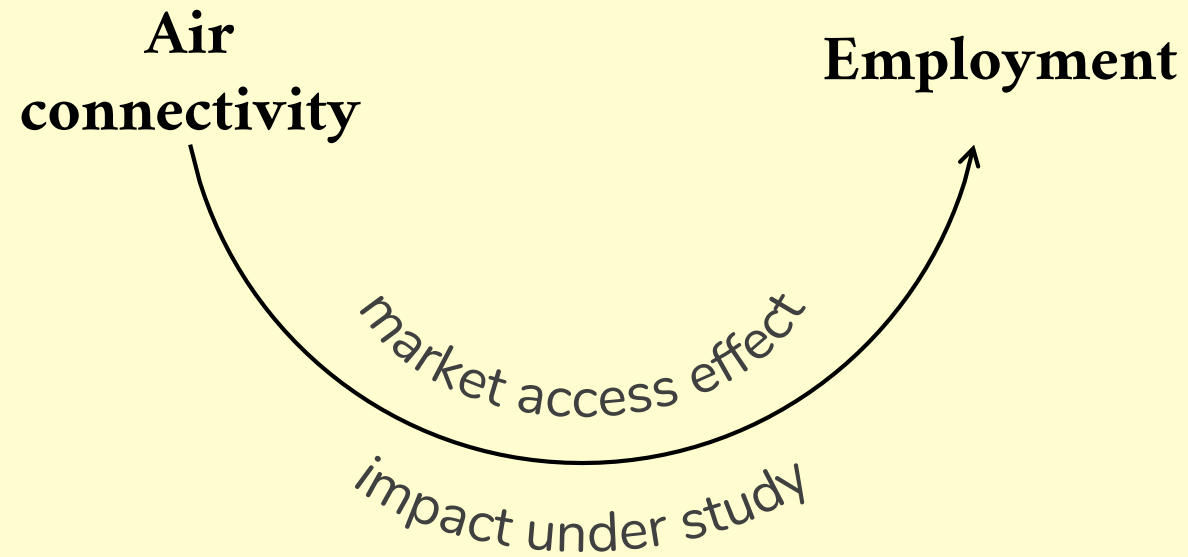
Marginal effects



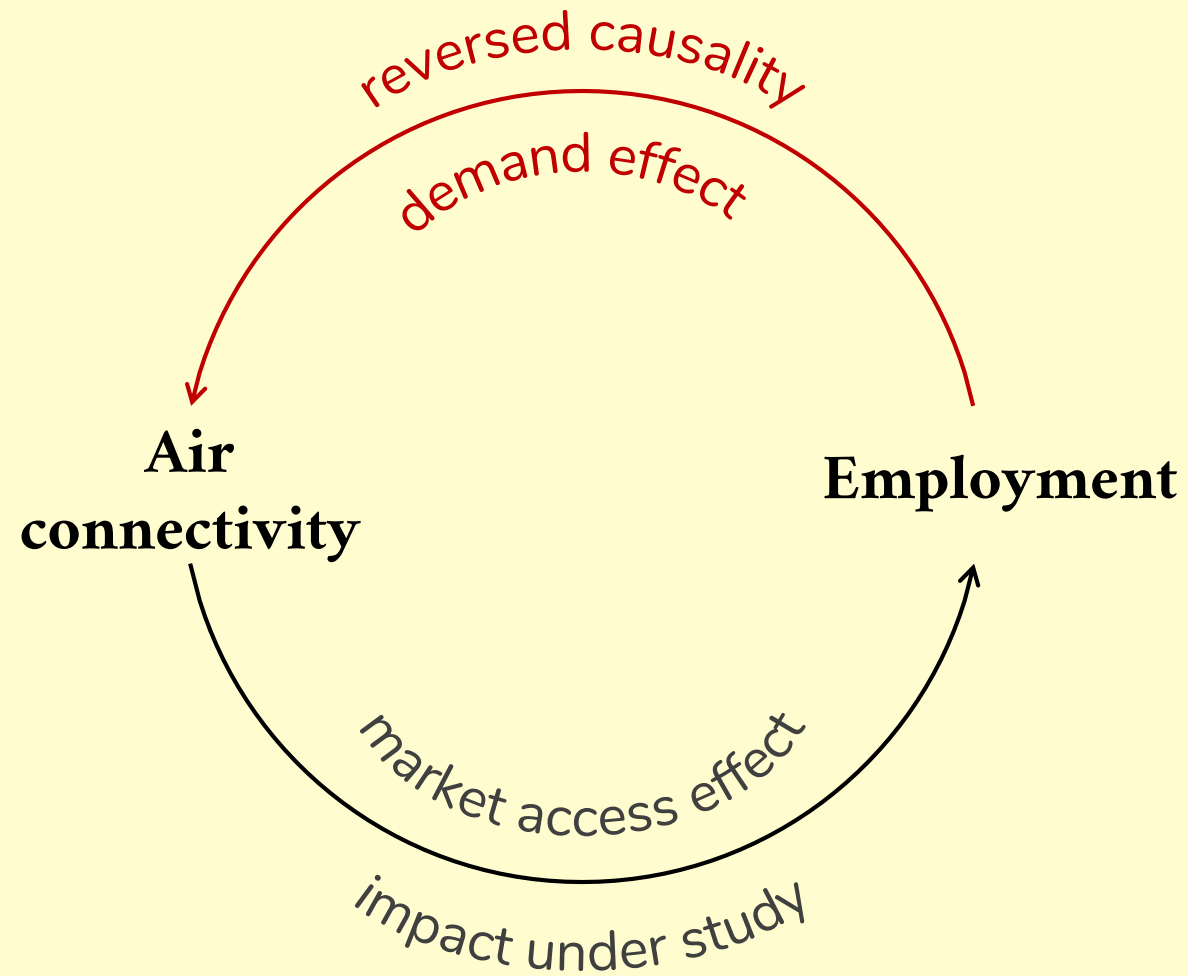
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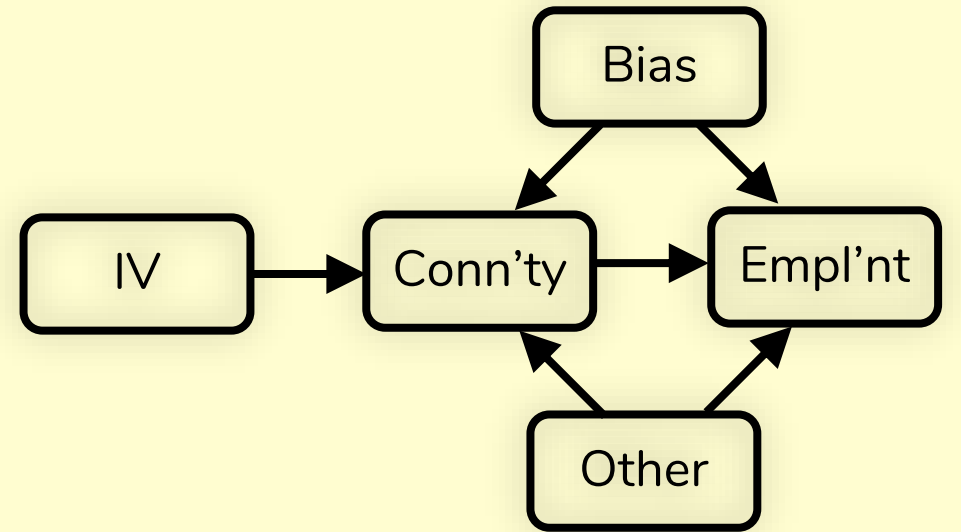
Separating two correlated effects



Separating two correlated effects

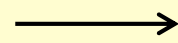


Instrumental variables (IV)

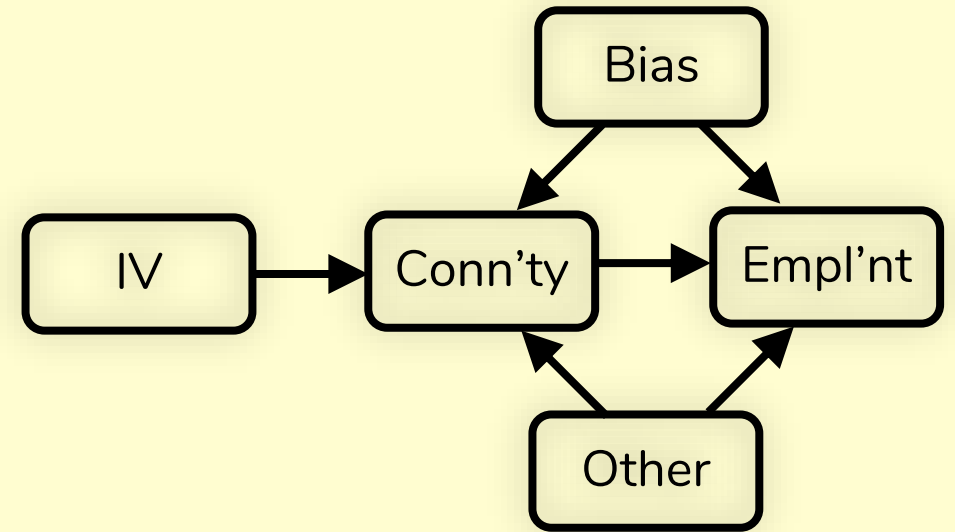


Instrumental variables (IV)

Share of flights to
major tourist
destinations and
megacities

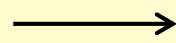


Direct connectivity



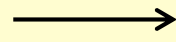
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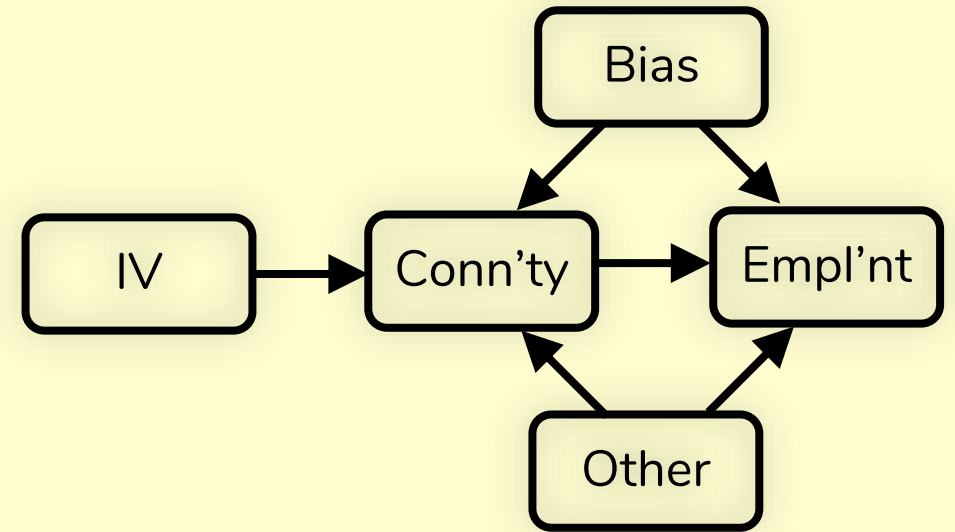


Direct connectivity

Share of flights to megahubs

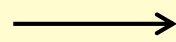


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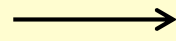
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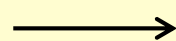
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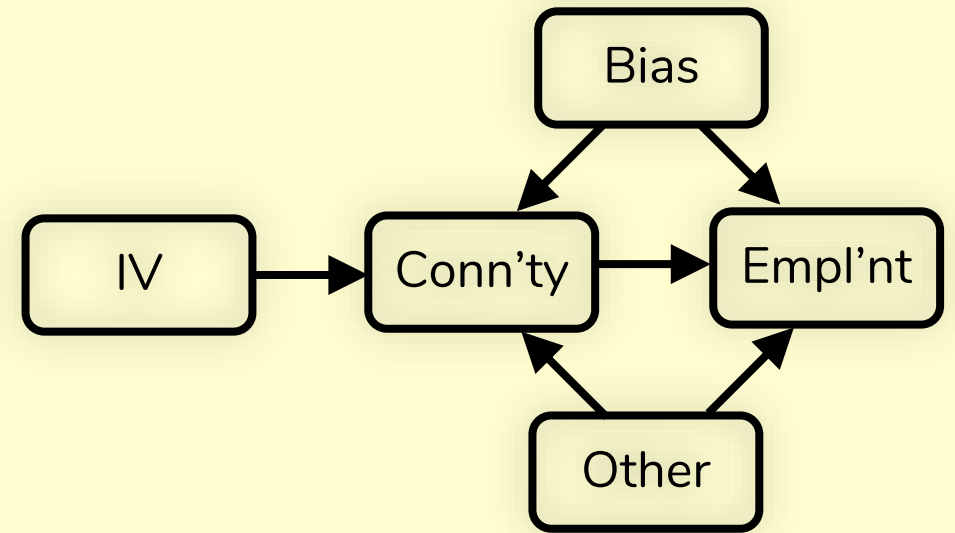


Indirect connectivity

Discontinuity at 10,000 km (Campante and Yanigazawa-Drott, 2018)

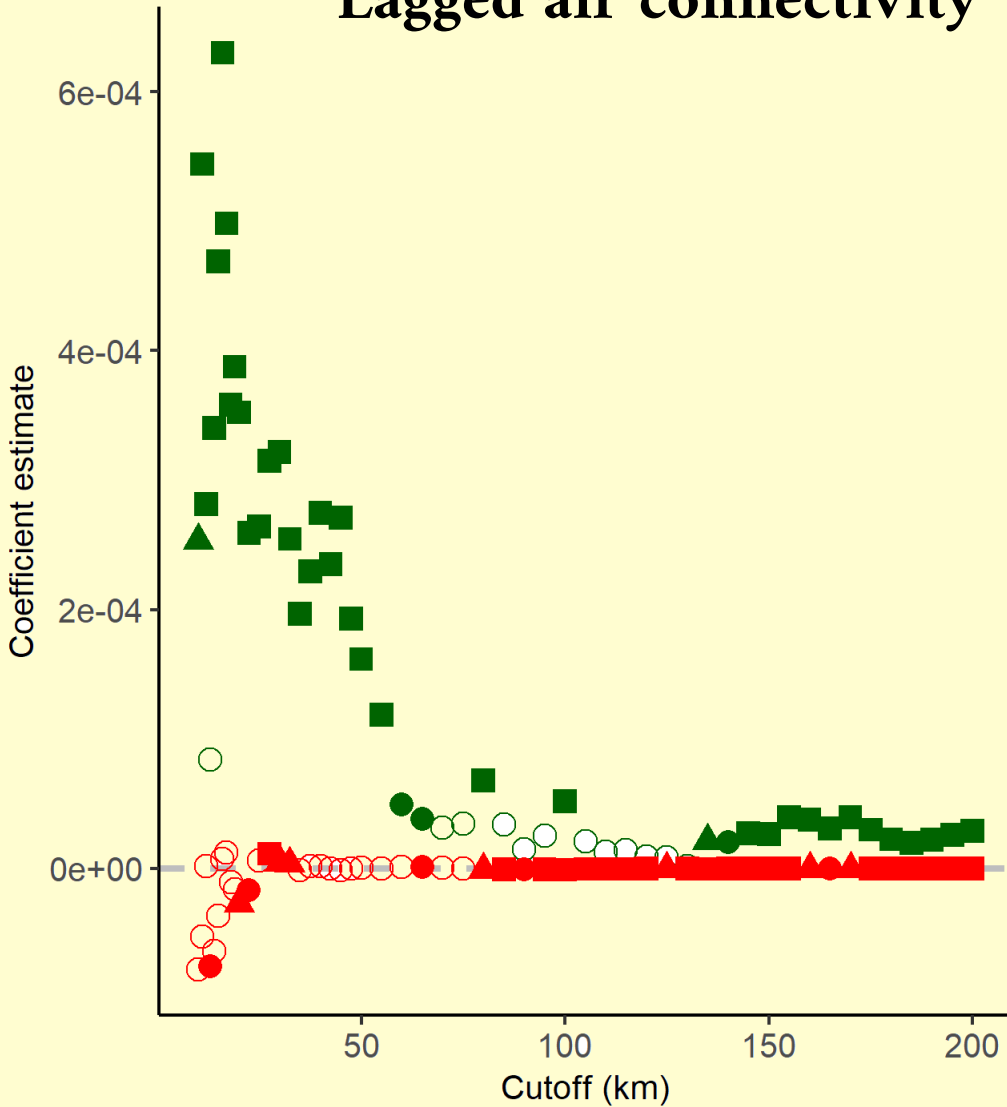


Total connectivity

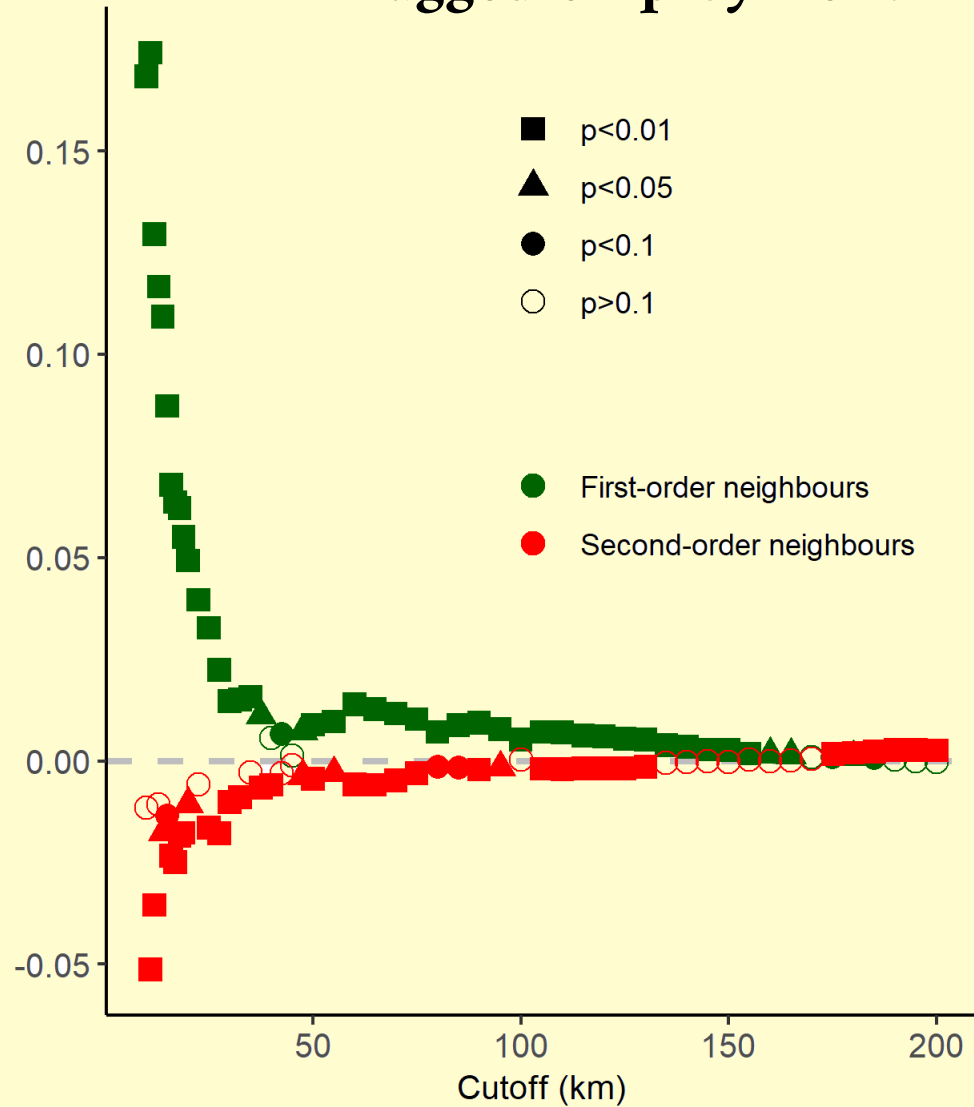


Marginal effects

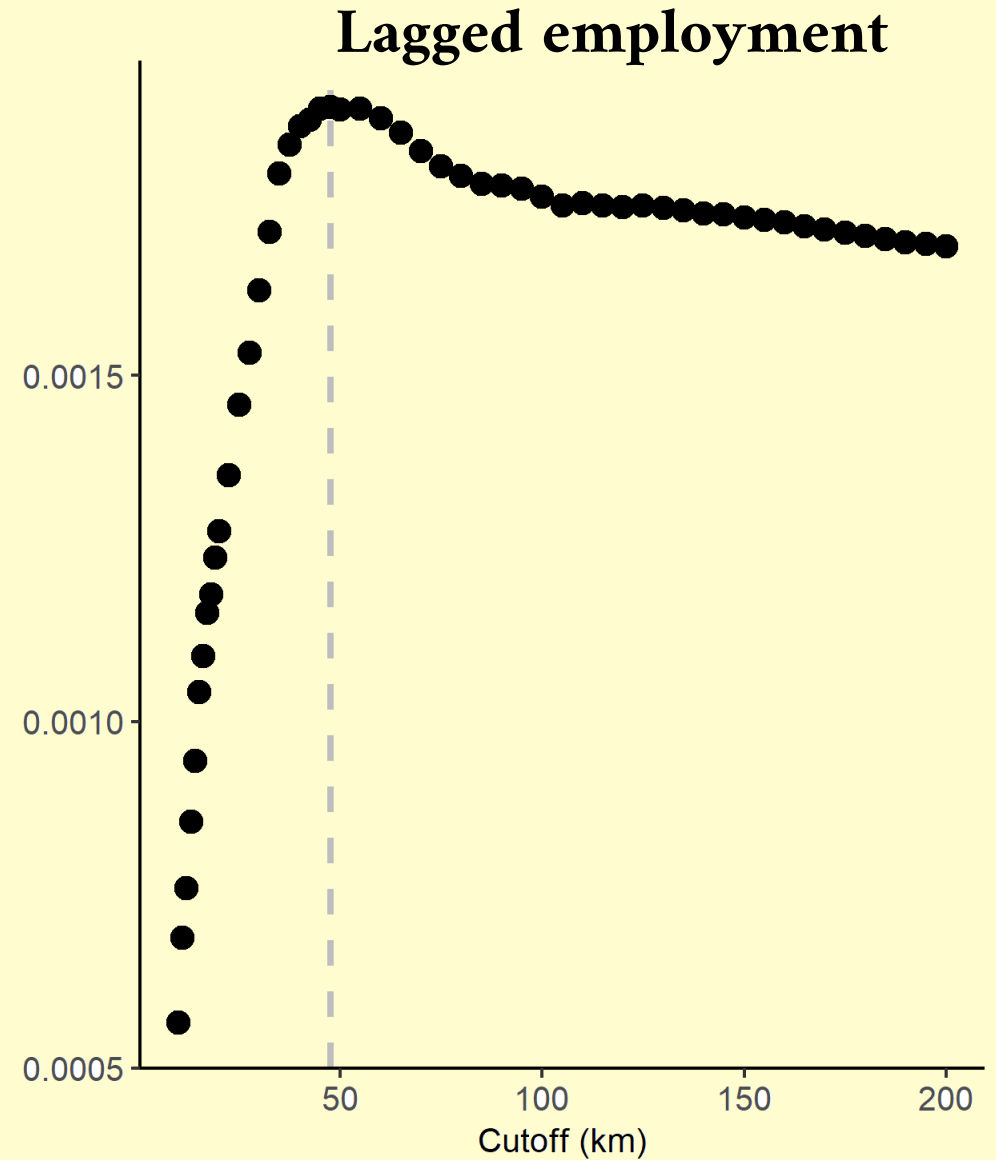
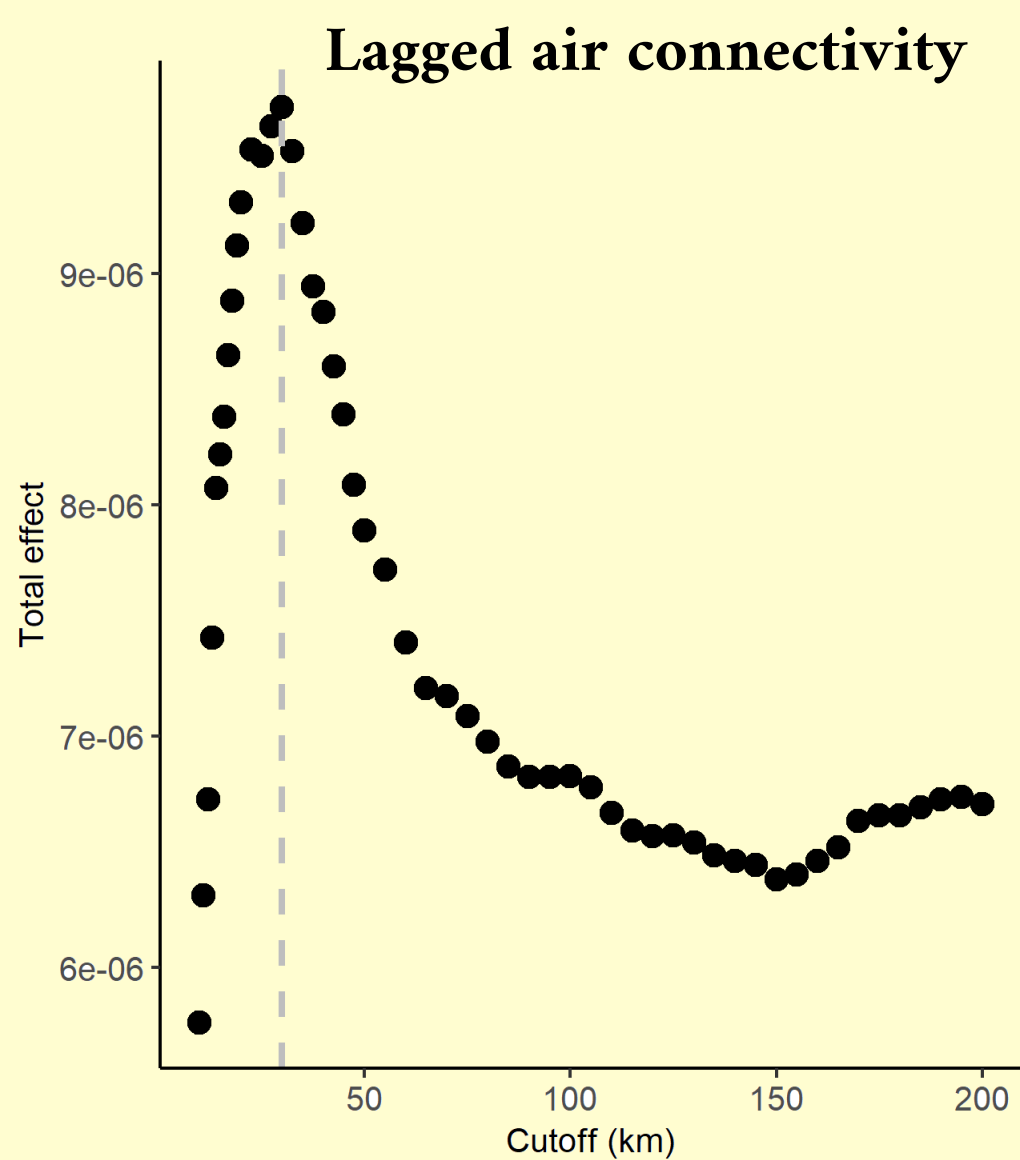
Lagged air connectivity



Lagged employment



Total effects

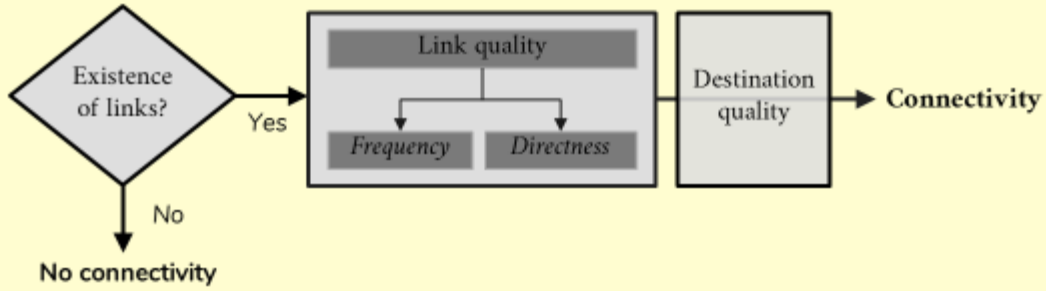


Conclusion

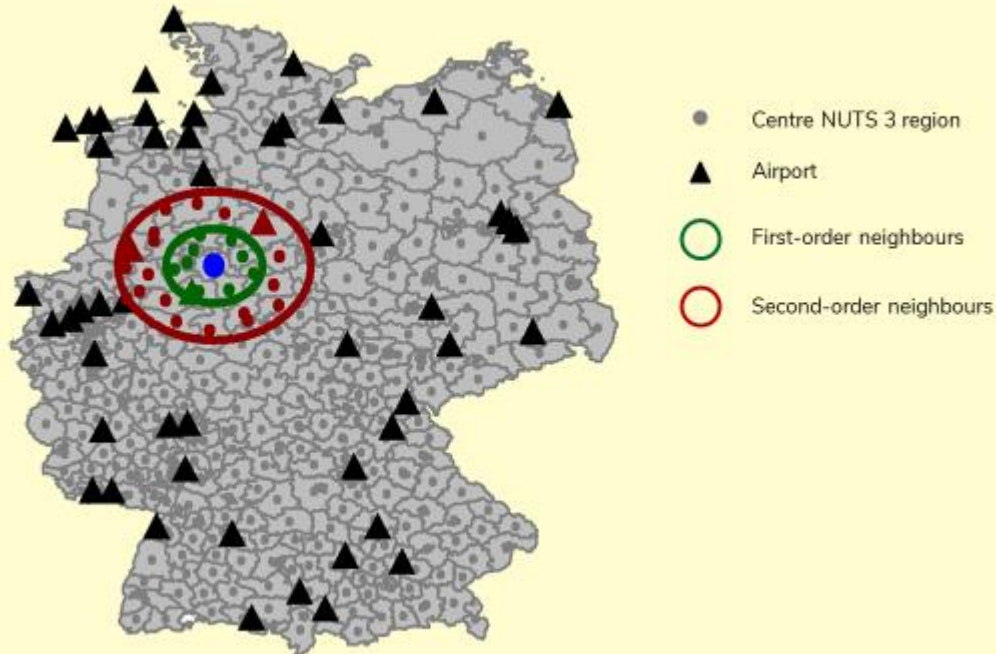
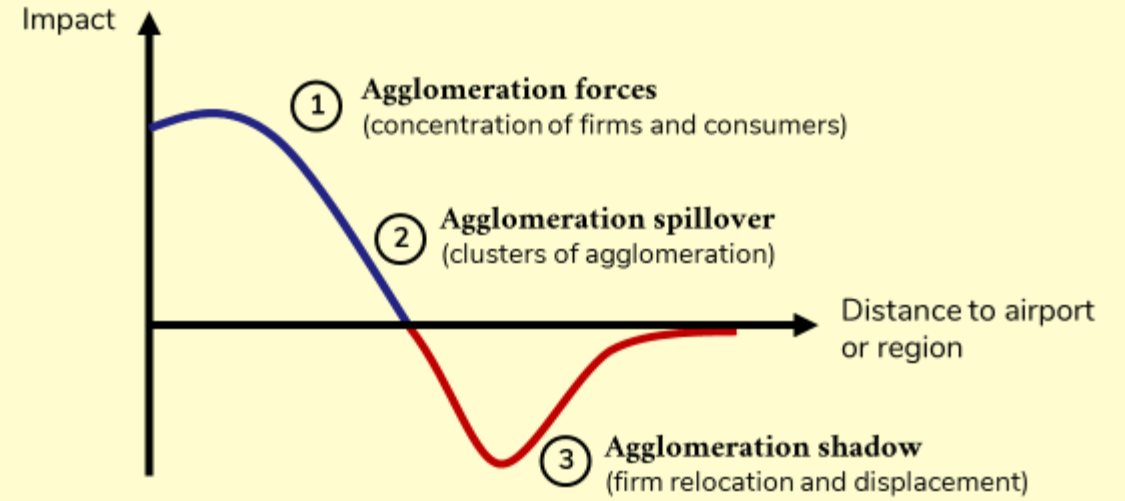
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For each airport, we analyse:



Hypothesised spatial decomposition



Marginal effects

