Assessing the long-term impact of air liberalization on international air passenger demand

A new model up to 2050

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Introduction

- Part of the work for the ITF Transport Outlook
  - Long-term trends (2030-2050)
  - Analysis of policies on a global scale
  - Scenario-based analysis
Geographical approach

- World divided into 310 regions
- Synthetic network between the regions
Modelling approach

**Origin-destination demand**
- Gravitational model

**Socio-economic variables**
- GDP, trade, population

**Cultural proximity variables**
- Language, emigration

**Supply**
- Min travel time, min number of transfers

**Route choice**
- Logit model

**Route characteristics**
- Reconstructed from air network
Calibration

- Route choice model
  - MIDT route choice data for years 2014-2015
  - Maximum-likelihood estimation
  - Coefficients very significant but overall fit not very good

- Origin-destination demand model
  - Historical on-flight passenger volumes
  - Estimation: minimize differences between observed and estimated on-flight demand on all links

- Average error on link: 12%
Air liberalization

- Decrease in price
  - Competition
  - Low cost carriers

- Increased connectivity

Transport demand
Competition

- Herfindahl–Hirschman Index (h-index) between pairs of region
  - With frequency
  - Alliance level
- Includes indirect frequencies
  - Weighted for quality of service
Prices in the models

**Average price as a function of distance for direct intra-Asia flights in the database**

- **In monopolistic environment**
  - Network carrier

- **In competitive environment**
  - Low cost carrier

### Route choice
- Nested logit model

### Kilometric price
- Number of transfers
- Competition (h-index)
- Low-cost carrier

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## Prices in the models

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### Competition
- H-index
- LCC

### Kilometric price
- Number of transfers
- Competition (h-index)
- Low-cost carrier
Link creation

- Binomial model
  - Economic mass
  - Distance
  - Competition levels

GDP mass necessary for link creation as a function of distance

- In monopolistic environment
- In competitive environment

Graph showing the minimum GDP product (log-scale) as a function of distance (km) for two different environments.
Network development scenarios

Static network
- No evolution of price
- No new link created

Dynamic network
- Competition
- Strong penetration of low-cost carriers
- Free network evolution

Intermediate
- No exogenous increase in competition
- Controlled network evolution
Result overview

**Static network**

- **2010-30**: 2.7%
- **2010-50**: 2.6%

**Intermediate**

- **2010-30**: 4.3%
- **2010-50**: 3.9%

**Dynamic network**

- **2010-30**: 5.7%
- **2010-50**: 4.7%

**International revenue passenger kilometres**

*Annual growth rate (CAGR)*
Conclusion

Coherent global framework

Network evolution model based on scenarios

Analysis of policies globally

« Large » model

Redefinition of key levers

Is the necessary growth possible?
Thank you for your attention