Economic Impact Modelling

Workshop on European Aviation Modelling Capabilities
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Issues and Objective

Integrated (European) aviation modelling capabilities:
Focus on negative externalities
→ Noise
→ GHG
→ LAQ

Positive impacts (trade-offs) of measures, trends and technologies in the air transport sector neither fully nor systematically modelled and monitored
→ Employment and gross value added within the sector’s value chain
→ Provision of connectivity, accessibility and travel time savings
→ (Regional) economic growth and resulting employment and gross value added

Where do we stand?
Agenda

• Issues and Objective

• Economic assessment of measures, trends and technologies in the air transport sector: Existing modelling approaches and gaps
  • Input-Output analyses (IO)
  • Computable general equilibrium modelling (CGE)
  • Cost-benefit-analyses (CBA)

• Summary
Economic assessment: Input-Output-Analyses

- Estimation of sector-specific **direct, indirect and induced demand effects**: Employment, Gross value added, Wages...

- I-O-model represents the current interdependencies between different branches of a national economy or different regional economies

- Input: National account data (**input-output tables**), available for many countries
Economic assessment: Input-Output-Analyses

- Analyses of **direct interdependencies between sectors**: „How many jobs are generated in air transport and with its suppliers?“
- Assessment of „**static correlations**“ („1,000 jobs per 1 Mio. pax“-rule) and of the effects of e.g. policy measures („Will movement caps result in job losses?“)
- Application in **toolsuites** like AIM-OS, TEAM_Play and by many researchers and **consultants**

- I-O-modelling **does not depict the full spectrum of dependency relations** in a market economy

Sources: http://centreforaviation.com/images/stories/2015/Feb/02/3Direct_Jobs_by_Employment_Type.png
Economic assessment: Input-Output-Analyses

- No consideration of specific economic effects stemming from (air) transport, e.g. "catalytic effects"
Economic assessment: Input-Output-Analyses

- "Catalytic effects" only tackled on a case-by-case basis, mainly in specific studies by consultants.

Source: Economic Impact of European airports report

Sources: Centreforaviation.com, wikipedia, openclipart.org
Agenda

• Issues and Objective

• **Economic assessment of measures, trends and technologies in the air transport sector: Existing modelling approaches and gaps**
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  • **Computable general equilibrium modelling (CGE)**
  • Cost-benefit- Analyses (CBA)

• Summary
Economic assessment: CGE modelling

- **Computable general equilibrium models (CGE)**
- Estimations of how an economy reacts to changes in policy, technology or other external factors
- Give a more important role to prices compared to I-O-models where e.g. a fixed amount of labor is assumed to produce a ton of iron
- In contrast, a CGE model would normally allow e.g. wage levels to (negatively) affect labor demands.
- Input: Equations describing model variables and detailed databases with tables of transaction values and elasticities

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Economic assessment: Cost-Benefit-Analyses (CBA)

- Monetization of costs and benefits associated with e.g. a policy measure or an investment
- Allows for comparisons between different options
- Decision criterion: Net present value
- Application e.g. in road and rail infrastructure investments

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Summary

• (Air) transport does not only cause jobs/GVA within its value chain, but also in other sectors (like e.g. investments in education)

• Wide range of economic effects, difficult to measure

• Different modelling approaches tackling different aspects, with different advantages and drawbacks; only I-O-modelling included in aviation tool suites

• Sometimes mis-application of modelling approaches, e.g. use of I-O-analysis for welfare analyses

• Regional perspectives and catalytic/cluster effects are usually neglected
## Summary

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Macroeconomic modelling approaches</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>I-O</td>
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<tr>
<td>Capability (Gaps) / Quality</td>
<td>Quantifying the connections between economic sectors No consideration of catalytic effects No welfare analysis, no substitution effects considered Dynamic I-O-models available but not yet part of aviation toolsuites</td>
</tr>
<tr>
<td>Durability / updates</td>
<td>Regular data updates</td>
</tr>
<tr>
<td>Access</td>
<td>I-O-data open source Working connections to toolsuites Public access possible (e.g. AIM-OS)</td>
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</tbody>
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Thank you!

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