Wider Economic Impacts of Transport Infrastructure Investments – Relevant or Negligible?

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Treatment of WEI in the BVWP assessment

Dupuit’s utilité relative as the basis of WEI measurement

Modern approaches to measure WEI

Conclusions and recommendations
Moving back to orthodox neo-classics

Full employment in all regions $\Rightarrow$ WEI negligible

No consideration of endogenous growth theory or new geographic economy

Failures with empirical estimations
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Conclusions and recommendations
Measurement of direct benefits using Marshall’s surpluses

Benefit = change of consumer’s and producer’s surpluses

Impact of investment
Dupuit measure of benefit: cost/price change of the product (stone), not of transport – basics of WEI
„Breaking the bread only for those who can buy it leaves to social economy the trouble of supplying it to those who cannot afford to give anything for exchange."

J. Dupuit, 1848.
“Mr. Dupuit and the marginalists“

“engineers do economics while others talk about it“ (A. Caquot)

understanding of monopolistic competition and contestability

understanding of the importance of product differentiation and price discrimination

re-rediscovey of secret origins of modern transport economics by Boiteux, Lancaster, Baumol/Panzar/Willig, Laffont/Tirole
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Conclusions and recommendations
<table>
<thead>
<tr>
<th>Benefit and Impact types</th>
<th>Welfare Economic Benefits (WEB)</th>
<th>Overlapping of WEB and GI</th>
<th>GDP Impacts (GI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional economic appraisal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VOC savings</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VTTS: Leisure</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VTTS: Commuting</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VTTS: Business</td>
<td>✓</td>
<td></td>
<td>WB3, GI6</td>
</tr>
<tr>
<td>Accident cost savings (safety)</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental impacts reduction</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wider Economic Benefits</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WB1: Agglomeration economies</td>
<td>✓</td>
<td></td>
<td>GI4</td>
</tr>
<tr>
<td>WB2: Increased competition</td>
<td></td>
<td></td>
<td>GI5</td>
</tr>
<tr>
<td>WB3: Increased output in imperfectly competitive markets</td>
<td>✓</td>
<td></td>
<td>GI6</td>
</tr>
<tr>
<td>WB4: Welfare benefits arising from improved labour supply</td>
<td>✓</td>
<td></td>
<td>GI1, GI2 &amp; GI3</td>
</tr>
<tr>
<td>Wider Economic Benefits and GDP Impacts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GI1: More people choose to work</td>
<td></td>
<td></td>
<td>WB4</td>
</tr>
<tr>
<td>GI2: Some people choose to work longer hours</td>
<td></td>
<td></td>
<td>WB4</td>
</tr>
<tr>
<td>GI3: Move to higher productive jobs</td>
<td></td>
<td></td>
<td>WB4</td>
</tr>
<tr>
<td>GI4: Agglomeration economies</td>
<td></td>
<td></td>
<td>WB1</td>
</tr>
<tr>
<td>GI5: Imperfect competition</td>
<td></td>
<td></td>
<td>WB2, WB3</td>
</tr>
<tr>
<td>GI6: Business time savings and reliability</td>
<td></td>
<td></td>
<td>VTTS Business</td>
</tr>
</tbody>
</table>
Agglomeration economies, WB1

\[ WB1 = \sum_{i,j} \left( \varepsilon_{i,j} \times \frac{\Delta ED_j}{ED_j} \right) \times GDP_{i,j} \times E_{i,j} \]

where

i: industries  

j: locations  

ED: effective employment density  

\( \varepsilon \): elasticity of productivity with respect to effective employment density  

GDP: output per employed person  

E: number of jobs
Macro-economic models
- Endogenous growth models
- Econometric models

Regional economic models
- LUTI models
- SCGE, new economic geography
- Econometric models
- Potential factor models

SDM, system dynamic models

IAM, integrated assessment models
WEI of HSR Stuttgart-Ulm

regional impacts:
dark blue: high
Light blue: low
(in % of GDP)

sector impacts:
areas of red circles light.: industry
light-med: trade, transport, tourism
med-dark: commercial services
dark: public services
TEN-T and the status of CNC Infrastructure planning
TEN-T and the status of CNC

Annual TEN-T Investments per Corridor

Source: EC/Fraunhofer-ISI
<table>
<thead>
<tr>
<th>Programme</th>
<th>Objective</th>
<th>Funding Objective</th>
<th>Planned budget EUR million</th>
<th>Decided budget EUR million</th>
<th>No of co-funded projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAP</td>
<td>FOB1</td>
<td>Cross-border, bottlenecks, missing links</td>
<td>6,000</td>
<td>7,147</td>
<td>99</td>
</tr>
<tr>
<td></td>
<td>FOB2</td>
<td>Decarbonised and innovative transport</td>
<td>250</td>
<td>146</td>
<td>28</td>
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<tr>
<td></td>
<td>FOB3</td>
<td>Integrated, interconnected, interoperable transp.</td>
<td>750</td>
<td>799</td>
<td>67</td>
</tr>
<tr>
<td></td>
<td>FOB4</td>
<td>Cohesion countries – ring-fenced budget</td>
<td>4,000</td>
<td>4,739</td>
<td>48</td>
</tr>
<tr>
<td>AWP</td>
<td>FOB1-3</td>
<td>Cross-border, bottlenecks, innovation, interoperability, etc.</td>
<td>930</td>
<td>186</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total call</strong></td>
<td><strong>11,930</strong></td>
<td><strong>13,017</strong></td>
<td><strong>276</strong></td>
</tr>
</tbody>
</table>
Economic impacts of non-completion of core TEN-T compared with REF

Source: Fraunhofer-ISI
IAM Trimode

**TRANSPORT MODEL**

**PASSENGER MODEL**
- Generation
- Distribution
- Mode split

**FREIGHT MODEL**
- Generation
- Distribution
- Mode/logistics split

**NETWORK MODEL**
- Network development
- Route choice
- Congestion & delays

**ECONOMY MODEL**
- Economic growth
- Population
- Employment
- Trade

**ENERGY MODEL**
- Fuel cost & consumption
- CO2 emissions
- Polluting emissions
- Vehicle fleet development
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Conclusions and recommendations
WEI relevant for large projects and infrastructure investment programmes

Innovation, education and network infrastructures relevant for the trajectory of future growth

No unique approach for measuring WEI existing

Launching independent WEI study and establishing scientific committee of international experts
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