TRANSPORT INFRASTRUCTURE INSIDE AND ACROSS URBAN REGIONS:
Models and Assessment Methods

1. NETWORKS AND THE SPATIAL ORGANISATION OF ECONOMIES
2. TRANSPORT NETWORKS AND AGGLOMERATION ECONOMIES
3. TRANSPORT INFRASTRUCTURE AND NEW GROWTH THEORY
4. NETWORKS AND ACCESSIBILITY
5. EMPIRICAL RESULTS FROM ACCESSIBILITY-BASED STUDIES

Börje Johansson, JIBS & KTH
SPATIAL ORGANISATION

- ZONE
- CITY
- FUNCTIONAL URBAN REGION
- SET OF REGIONS (FURS)

TRANSPORT NETWORKS:

- CAPITAL VALUES vs TANGIBLE PROPERTIES
- CONNECTIVITY, TIME DISTANCES, FREQUENCIES
<table>
<thead>
<tr>
<th>Classification of time distances between zones</th>
<th>Time interval in minutes</th>
<th>Average travel time in minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between zones in the same city (local)</td>
<td>0 - 15</td>
<td>8 - 12</td>
</tr>
<tr>
<td>From a zone in a city to zones in other parts of the FUR (regional)</td>
<td>15 - 50</td>
<td>25 - 35</td>
</tr>
<tr>
<td>From a city in a FUR to a city in another FUR (inter-regional)</td>
<td>More than 60</td>
<td>More than 60</td>
</tr>
</tbody>
</table>
Econometric approaches

Cross-section analysis: Multi-sector information
Multi-regional information

Panel data:
Combined time-series and cross-sectional analysis.

Time-series analysis for one sector and one region

Physical measures of infrastructure properties
Summarizing across transport systems
Different types of infrastructure

Pecuniary measure like capital value
Aggregate value for the entire transport system
Different types of infrastructure

Approaches to estimate infrastructure productivity
NETWORKS AND ACCESSIBILITY

- INTRA-URBAN
- INTRA-REGIONAL
- EXTRA-REGIONAL

TYPE OF URBAN AREA AND TYPE OF REGION

- CENTRAL (LARGEST) CITY OF A REGION
- OTHER URBAN AREAS IN LARGE FURS
- OTHER URBAN AREAS IN SMALL FURS
HOUSEHOLD ACCESSIBILITY

ACCESSIBILITY

• TO JOBS

• TO HOUSEHOLD SERVICES

• TO WAGE SUM (GRP)

• ATTRACTION OF HOUSEHOLDS, BETTER LABOUR-MARKET MATCHING. HIGHER LABOUR-MARKET PARTICIPATION

• ATTRACTION OF HOUSEHOLDS, WELFARE INCREASING

• ATTRACTION OF HOUSEHOLD, ECONOMIC OPPORTUNITIES, PRODUCTIVITY AND WAGE LEVELS
ACCESSIBILITY OF FIRMS

- TO LABOUR SUPPLY
- TO KNOWLEDGE LABOUR
- TO WAGE SUM OF HOUSEHOLDS IN RESIDENTIAL AREAS
- TO WAGE SUM IN FIRMS IN WORKPLACE AREAS
- ATTRACTION OF FIRMS, LABOUR-MARKET MATCHING
- ATTRACTING FIRMS IN KNOWLEDGE-INTENSIVE SECTORS, ADVANCED SERVICES ETC. INCREASES REGIONAL PRODUCTIVITY
- REFLECTS THE SIZE OR MARKET DEMAND FOR HOUSEHOLD SERVICES. HOME-MARKET PRODUCTIVITY EFFECT
- REFLECTS THE SIZE OF MARKET DEMAND FOR INPUT DELIVERIES, ESPECIALLY PRODUCER SERVICES. HOME-MARKET PRODUCTIVITY EFFECT
SIMPLE REGRESSIONS BASED ON ACCESSIBILITY INFORMATION

- COMMUTING OUT OF URBAN AREAS
- COMMUTING INTO URBAN AREAS
- GROWTH OF JOBS IN RESPONSE TO WAGE-SUM ACCESSIBILITY
- GROWTH OF HOUSEHOLD SERVICE SUPPLY IN RESPONSE TO WAGE-SUM ACCESSIBILITY
- GROWTH OF PRODUCER SERVICE SUPPLY IN RESPONSE TO WAGE-SUM ACCESSIBILITY

STRATEGY:

PREDICT CHANGES (1) WITH ESTABLISHED ACCESSIBILITY, AND (2) WITH NEW ACCESSIBILITY OBTAINED THROUGH CHANGES IN TRANSPORT NETWORKS. CALCULATE DIFFERENCE BETWEEN TWO TRAJECTORIES!
SIMULTANEOUS CHANGE OF LABOUR SUPPLY AND JOBS

PREDICTING URBAN CHANGE

(1) PREDICTION WITH UNCHANGED ACCESSIBILITY, (2) PREDICTION WITH NEW ACCESSIBILITY PATTERN, (3) CALCULATE DIFFERENCES FOR EACH URBAN AREA, AND MAKE A SUMMATION TO OBTAIN RESULTS FOR THE FUR
ACCESSIBILITY

- Accessibility measures react to capacity tensions that affect time distances.
- Time distance information have implications for the identification of regional boundaries.

- Central cities impose **Christaller shadows** on each other.
- A central city responds primarily to its own internal accessibility.
- All urban areas respond positively to their intra-regional accessibility.