Impact of Transport Infrastructure on Land Use Change in Medium-sized Cities

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Introduction (1/5)

Interaction between Transport and Land Use

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Introduction (2/5)

- Transport Infrastructure: Freeway
- Land Use Change: Population Distribution, Land Use Pattern, Industry Development
- Medium-Sized City:
  - Yilan County (0.46 million)
  - Nantou County (0.53 million)
  - Pingtung County (0.89 million)

Introduction (3/5)

- Does freeway have impacts on population distribution?
Introduction (4/5)

Does freeway have impacts on land use pattern?

Introduction (4/5)

Does freeway have impacts on industry development?
**Background (1/2)**

- Freeway: bridge rural and urban areas
  - **No.3**
    - Completed in 2004
    - 431.5 km
  - **No.5**
    - Completed in 2006
    - 54.3 km
    - 12.9 km long Hsuehshan Tunnel

**Background (2/2)**

- Peri-urban area
  - Be adjacent to metropolitan areas
  - Connect neighboring metropolitan area via a single freeway
  - Yilan, Nantou and Pingtung sharing similar socio-economic characteristics are selected as the study areas.
**Questions**

Will air go from **big balloon** to **small balloon**?

or

Will air go from **small balloon** to **big balloon**?

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**Results (1/11)**

- **Similar baby bust** between the peri-urban areas and the whole Taiwan
- **Much higher aging society in** “Agricultural County” (our study area)
**Results (2/11)**

- Whether freeway attracts immigration and industrial investment or accelerates the migration process

![Graph showing population growth rates and high accessibility areas.](image)

**Results (3/11)**

- Low and High Accessibility Area

![Map showing low and high accessibility areas.](image)
Results (4/11)

Impact on population distribution

![Graph showing population distribution](image)

Note: The year D refers to 2002, 2003 and 2005, respectively, for the freeway interchanges in Nantou, Pingtung and Yilan.

Results (5/11)

Impact on population distribution

- The freeway interchanges offering transport service in year D positively impact the residential population in high accessibility areas.
- In comparison, the proportion of the residential population decreases gradually in low accessibility areas.
- Freeway is thus not the major cause of outward migration in peri-urban areas.
Results (6/11)

Impact on industrial structure (Yilan)

(A) Yilan - High Accessibility

(B) Yilan - Low Accessibility

Note: The year D refers to 2005 for the freeway interchanges in Yilan.

Results (6/11)

Impact on industrial structure (HA)

Note: The year D refers to 2002 and 2003, respectively, for the freeway in Nantou and Pingtung.
Results (8/11)

Impact on industrial structure

- Secondary industry - consistent percentage
- the percentage of the employment of primary industry decreases considerably, while that of the tertiary industrial increases markedly.
- Only a small impact on the employment structures in low accessibility areas.

Results (9/11)

Impact on land use pattern

Changes of land use in Yilan

<table>
<thead>
<tr>
<th>Year</th>
<th>Resident</th>
<th>Agriculture</th>
<th>Industry</th>
<th>Commerce</th>
<th>Others</th>
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<td>LA</td>
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</tbody>
</table>

Unit: ha

Note: HA represents high accessibility area, while LA represents low accessibility area.

Before D - - - - - - - - - - - - - - - -
Since D

- The trends of land use changes in Nantou and Pingtung are similar to Yilan for all patterns.
### Results (10/11)

#### Impact on land use pattern (Nantou & Pingtung)

<table>
<thead>
<tr>
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**Unit:** ha

#### Results (11/11)

#### Impact on land use pattern

- The variations of all land use patterns are unremarkable prior to the interchanges become operational in both high and low accessibility areas.
- Significant changes have resulted from the land readjustment in zoning plan which may be produced considering the introduction of freeway interchanges.
Conclusions (1/2)

- The relationship between land use development and accessibility to freeway confirms the bid-rent theory in peri-urban areas.
- The spatio-temporal allocation of public facilities should be adjusted according to the redistribution of population.
- Policies encouraging tourism related industries should be developed to stimulate the local economy because freeway interchanges make the tertiary industries more attractive in high accessibility areas.

Conclusions (2/2)

- A trade-off consideration, in low accessibility areas, between reserving agricultural industries and transforming into tertiary industries should be determined.
Thank You Very Much!