Land use changes:
Trends and Projections
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Urban form and commuting in large Chinese cities

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Transport and urban development are closely related. The interaction opportunities offered by different kinds of transport allow cities to grow, while the patterns and densities in which urban functions develop partially determine the need for transport. Studies on cities in Europe and the United States have demonstrated this impact of urban form on travel behaviour. Based on these findings, policies steering the shape of cities have been proposed to reduce urban transport emissions and limit congestion. Such policies can also be relevant for the rapidly growing and motorising Chinese cities that are expected to receive an additional 350 million inhabitants between 2005 and 2025. Yet, empirical evidence on the relationships between urban form and car usage is scarce for the specific Chinese context that is characterised by high densities, fast development and strong government steering.

Using novel crowd-sourced datasets we study the impact of several urban form variables (city size, urban density, land-use mix, polycentricity and spatial clustering) on the cost of commuting expressed in time and distance for 30 cities with more than three million inhabitants. These cities are geographically dispersed throughout the most densely urbanised parts of China. The focus is on commuting because this is an important part of people’s travel patterns and because it is a common theme in transport policy due to its regular spatial as well as temporal patterns and the relation with people’s choices on where to live and work. Data on commuting behaviour are derived from a large-scale survey by Baidu (the Chinese equivalent of the Google search engine) among a population of over 3 million of their users in 300 Chinese cities. For the calculation of the urban form metrics, two datasets are used: a crowd-sourced database on development density and land-use mix and a dataset on population based on Chinese population census data. To capture some of the socioeconomic variation between the cities we include a proxy for local income as more prosperous cities usually have longer commuting distances (although not necessarily longer commuting times).

The results show that city size and spatial clustering are important determinants of commuting: large cities without clear clusters of businesses and other facilities have longer average commuting times and distances. Increased prosperity also adds to longer and lengthier commutes. The analysis also indicates that commuting behaviour in the selected Chinese cities responds differently to some urban form characteristics than was expected from earlier studies on cities in Europe and the US. The main differences are that we did not find a significant impact of average population density and that we find a much stronger effect of city size on commuting. These differences may be explained by the incomparability of the average densities and urban growth rates. Spatial planning measures that maintain or reinforce high-density clusters can help limiting commuting distance and time. Current sprawling urban development may have long-term, negative consequences for the accessibility and liveability of Chinese cities and could hamper their economic potential.

Session: Metropolization: Challenges and Risks

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