Special issue on Housing and transportation: Affordability, accessibility, and equity

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1. Introduction

Urban growth is one of the biggest challenges for humankind in the twenty-first century. Rapid urbanization, especially in the less developed countries, has generated a dramatically high demand in the cities for housing, transportation, and employment relative to the lagging supply. While this phenomenon has led to huge opportunities for economic growth and agglomeration economies, it causes widespread side effects, such as high housing prices, excessive energy dependency, congestion, safety, unemployment, social exclusion, and various environmental degradations. Given the scarcities of land resources, fossil fuel reserves, and other raw materials, the living expenses in cities have constantly risen over the last century and tend to increase despite technological innovations. The negative externalities are detrimental to equal access to basic services (job, education, health, living substances, etc.). Unaffordability and disparities stand out for the low-income and socially disadvantaged groups, who are vulnerable to increased costs and thus involuntary to adapt living styles. This city disease is one of the core issues of liveability in urban areas. To adequately understand the effects of urban growth, housing and transportation studies need to address the basic household needs and access to essential housing and transportation (H + T) services. Therefore, this special issue solicits contributions that shed light on H + T affordability, accessibility, and equity.

2. Papers in this special issue

After the launch of a call for papers in Transport Policy, we received a large number of submissions. After a rigorous, double-blind peer-review process, eleven papers were accepted for inclusion in this special issue, which have addressed different aspects identified in the call. Amongst, five looked into the effects of various travel contexts, travel patterns, and transport strategies on transportation accessibility and/or equity, while the other six investigated H + T interactions and accessibility effects on, particularly, the low-income groups. The common theme of most papers is accessibility, a central concept used to measure the quality of mobility in a spatial context. These papers involve policy discussions and case studies in both developed and developing countries from five continents. We provide an overview of these accepted papers below.

2.1. Focus on transportation aspects

Chen et al. (2022) examined the effects of COVID-19 related countermeasures implemented in the public transportation on individuals’ travel decisions and explored the extent to which policy countermeasures influence different groups of people on the use of public transport. An error component latent class choice model was estimated using the data collected in the Netherlands. Results show that the restrictions policy lifted by the Dutch central government have a significant effect on individuals’ transportation mode choices during the pandemic. The related measures adopted by the public transport sector, by contrast, present different effects on different people. Compared with other private modes, public transport is generally identified as a riskier option, and the average willingness to travel descends. The findings of this study are helpful for the authorities in designing and promoting effective policies in the context of pandemics.

Fu et al. (2022) proposed a new method for measuring space-time accessibility for individuals’ joint activities in a transit network with consideration of travel time uncertainty. Individuals’ joint space-time accessibility (JSTA) was measured based on reliable alighting locations, travel time budget, and points of interest. Massive smart card data from a metro network in Nanjing, China were used to show the merits of the proposed JSTA measure. The results show that there is a significant difference between the space-time accessibility to independent activity and that to joint activity under various on-time arrival probabilities. The proposed JSTA measure can be used to help policymakers to evaluate transit network development and land use planning in urban areas.

Sen et al. (2022) analyzed a hypothetical usage-based pricing scheme together with 2009–2012 Household Travel Survey data of commuters residing in South East Queensland (SEQ), Australia. The results indicate that usage-based road pricing will lead to both horizontal and vertical inequity for some commuters. A greater percentage of these commuters are already transport and socio-economically disadvantaged. To ensure that these social costs do not outweigh the benefits, improving the quality of urban transport systems and their integration with urban form and land use, will be required. Policymakers should incorporate some form of spatial and/or temporal variability within usage-based road pricing in the studied, and similar, urban contexts.

Wang et al. (2022) analyzed the activity duration-related charging behavioral responses of private electric vehicle travelers to charging services. The charging services concern the operating policies related to the spatial allocation of charging opportunities and charging pricing. Considering the trade-offs between travel and activity duration-related charging choices, a boundedly rational dynamic user equilibrium (BR-DUE) model is proposed to evaluate the two operating policies (i.e., spatial allocation of charging spots and pricing). The case study of the Eindhoven network demonstrates that the operating policies if appropriately set up can improve the accessibility to charging services with improved charging service rate and decreased queuing time.

Zhou et al. (2022) proposed a novel control strategy by providing

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passengers with real-time information in terms of waiting time and in-vehicle congestion levels. They also proposed a bus traffic propagation model to simulate the bus movements, through which several system performance metrics can be evaluated for different bus bunching control measures. The numerical results show that providing in-vehicle congestion information is as effective as the schedule-based and headway-based control methods in achieving mitigation of bus bunching. The novel control strategy serves as a supplement to the existing control measures in mitigating the standard bus bunching problems.

2.2. Focus on H + T interactions

Bohman (2021) applied difference-in-difference estimates of hedonic price models to study the distribution of effects around the new stations provided by a railway tunnel in Malmö, Sweden. The study finds that the lower-price segments are the most affected by improved accessibility. Accessibility is therefore interpreted as highly important for households in the lower-price segments. From a housing accessibility perspective, this is described as a double-edged sword. On the one hand, the owners of the apartments in these neighborhoods, who benefit from the price increase, are typically low-income households. On the other hand, low-income households who are not owners may find the area prohibitively expensive due to price increases.

Kim and Li (2021) provided an analysis of how parcel-level residential land use intensification takes place under the influence of public transit expansion, with explicit attention to the interactions between current and planned land use changes, in a five-county Southern California region. The analysis using a generalized structural equation modeling approach shows that residential properties are more likely to be densified in transit-rich areas. This tendency is detected not only in the existing high-quality transit areas but also in locations where transit services will be available in the future. It is also found that relaxing zoning restrictions increases the probability of parcel-level densification, and the resultant density increase can induce further zoning or plan changes in nearby areas.

Li et al. (2021) used the Xiamen household travel survey of 2015 to examine the commuting distances and commuting times of distinctive types of workers in the city. The results reveal differences in commuting behaviors among distinctive socioeconomic groups, namely blue-collar, pink-collar, or white-collar local or migrant workers. For residents, blue-collar workers have the longest commute distance, while pink-collar workers have the shortest commute distance. Migrant workers in general commute over shorter distances than local workers to reach their workplaces. However, planning practices have attempted to demolish their affordable rental housing in urban villages, which will increase their commuting times and costs and exacerbate socio-spatial inequality. These findings can be of practical use when offering alternative housing for migrants in urban redevelopment.

Jin et al. (2022) applied the gradient boosting regression trees (GBRT) method to investigate the complicated relationships between public transit accessibility and housing prices across price segments. The results show that for low- and median-priced houses, the travel time by public transit to the central business district contributes the most to housing prices while for high-priced houses, the systemwide metro accessibility contributes the most. Public transit accessibility has significant nonlinear and threshold effects on housing prices. The differences in transit’s value-added effects across price segments may bring about inequity in accessibility across different income groups. Relevant policies on how to reduce such an inequity issue are finally discussed.

Tiznado-Aitken et al. (2022) addressed spatial and socioeconomic distributional considerations that potentially underestimate the simultaneous impact of transport and housing costs on lower-income family budgets. Considering different types of households in Santiago, Chile, they estimated $H + TA$ (housing and transportation affordability) costs using spatial clusters and probability distribution functions, analyzing the “degree of choice” that socially disadvantaged groups have given their financial constraints. The results show that families with children, the elderly, and immigrants are among the most limited in their $H + T$ choices. These findings bring into question current inter-sectoral policies to alleviate the “cost pressure” of Santiago’s lower- and middle-income households.

Finally, Van Heerden et al. (2022) argued that the existing accessibility measurements should be expanded and there is a need for a nuanced view on accessibility for improved urban planning practices. Such a view is presented by simultaneously considering various categories of supply (employment, housing, transportation, health, education, police), multiple modes of transport (walking, private vehicle, numerous transit modes), two cost thresholds (distance-based and monetary cost), level of access (percentage of facilities that can be reached), while distinguishing between the socio-economic profiles of regions in the city on the demand side. This view improves the understanding of affordability and equity in the study of accessibility.

3. Conclusions

The above eleven papers accepted in this special issue have wide coverage of recent advances in transportation as well as $H + T$ studies related to affordability, accessibility, and equity. However, they are exhaustive and we hope that this special issue will stimulate new research initiatives in this important field. Last but not least, we would like to appreciate the Editor-in-Chief Hai-Jun Huang, Special Issue Editors Kun Wang and Ashish Verma, and all the authors and reviewers for their support and contributions to this special issue.

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