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The Effect of Public Goods on Residential Mobility: Comparison all Households and High-Income Groups in Tehran, Iran

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Abstract

Households move in cities for better housing and access to better public goods services, but the public goods are not equally important for households and their spatial distribution is not uniform in the city. In order to investigate in detail, we divided the public goods into two groups: net and gross and modeling the housing residential choice. The main purpose of the study is to measure the impact of this product among all households and high-income groups. Data were collected from Census (2016) and the neighborhood quality survey (2015-2016) of Tehran Municipality. We use agent-based model for investigate the behavior of households. The results showed that the gross public goods are effective in choosing the house of all households in the city. Among the variables in this group, for all households in the city, “access to the public transportation system” has the greatest impact, but this variable does not affect the choice of high-income households. The variable “access to educational space” also has the least impact among all households, but in the high-income group, this variable has the most impact. In the group of net public goods, all variables are effective in choosing the house of all households in the city, and the variable “security” has the greatest impact. Compared to the high-income group, except for “distance to educational space”, other variables do not have a significant effect on housing choice, which indicates the unbalanced spatial distribution of net public goods in the city and the homogeneity of spatial distribution in high-income households. Also, based on the research background, educational space in the high-income group is considered as a measure of neighborhoods quality.

Keywords: Life-Cycle Theory, Public Goods, Agent-based Modeling, Residential Mobility.

JEL Classification: C6, D1, R2.

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1. Introduction

How do households choosing their house? Spatial modeling of housing choice was proposed by Alonso, who assumed households had a specific budget and had to be allocated among deferent needs. To simplify the process, Alonso hypothesized that cities have a single-center structure where households tend to be closer to the city center to spend less time on daily trips. These initial assumptions were developed over the years.

Variables of Housing selection are divided into two groups. The first group was defined as, "household characteristics" group, which is based on the needs of household members in the Alonso model, and the second group is, "housing characteristics", which emphasize in this article. These characteristics range from residential unit variables to qualities variables such as air pollution and the city's public transportation system.

Housing selection studies have presented various categories based on the internal and external characteristics of housing, social and external housing environment, etc. but so far, few studies have categorized the variables of housing environment based on the characteristics of public goods.

The variable of housing selection is divided in two groups; (1) all residents of the city and (2) high income groups. Public goods in this study are divided in two groups of net and gross public goods.

Although there is a pattern of rising land and housing prices from south to north, there is a question that has the distribution of public goods also been in a way that influences the choice of housing for the city's households? And if public goods are effective in the choice of households, can this effect be generalized to a subset of residents such as high-income groups?

2. Materials and Methods

2.1. Housing selection function

Every household try to get highest satisfaction by changing their houses. In this study, we use NSGA-II algorithm for simulation of this choice. Each household has different criteria and preferences in choosing housing according to their demographic, economic and social characteristics. In the form of stated information, a sample of households with different characteristics of neighborhoods is used as representatives of the whole community and an example of stated priorities.

2.2. Simulation of agents (households)

In agent-based models, it is possible for each household to correspond to one agent, the whole community is simulated and for each member, a distinct selection function is defined by "Monte Carlo" simulation method.

3. Data

The most important limitation in selecting research variables for housing selection is access to big data in cities scale. Data sources of this research are census 2016 and data which is collected by Tehran Municipality in the survey of "the quality of Tehran neighborhoods". The survey's data collected from all neighborhoods and households in Tehran.

4. Discussion

Public goods and all households

Gross Public Goods: public transportation system has the greatest impact on the selection of household, which confirms the research background (Hu and Neg, 2019; De Palma et al., 2005; Habib and Miller, 2009).

Also, the higher priority for access to the park is shown compared to the educational space. The results of the model are different from the findings of Hu and Wong (2019), which can be due to the distribution of educational spaces in the city. In Tehran, students can access to educational services at a greater distance as their neighborhood, which in developed countries is rare, and neighborhood's residents are required to use educational services from their neighborhoods. As a result, families move to specific.

Net public goods: neighborhood security is the most influential of the net public goods variables. In this study, instead of measuring "security", the concept of "feeling of security" was measured. The crime rate was assessed with a separate index called "Security Services." The result of such a change in the approach to measuring security is the impact of this index on housing choice, while the index of security services does not affect the choice of housing.

5. Public goods and high-income households

In the High-income group, access to the public transportation system is not important. High-income family groups have a personal vehicle, which results in less importance for the public transportation system, confirmed by the findings of Andrew and Maine (2006) and Hu and Wong (2019). Among other variables, the only variable of access to educational spaces is effective which have two possible explanations. First, the lack of influence of other variables on housing choice of high-income group indicates a balanced distribution of public goods for high-income groups. Second, the reason for the impact of educational space on housing selection can be interpreted based on research background. Pinjari et al. (2009) and Hu and Wong (2019) showed that educational spaces did not prove the assumption of having children and access to educational spaces for high-income groups. It is a sign of the quality of the neighborhood and does not necessarily mean better access to educational space. In Tehran, due to the concentration of educational spaces (especially the possibility of establishing private schools) in the northern neighborhoods of Tehran.

6. Conclusion

In this study, agent-based modeling was used as the latest approach in urban models to allow a more accurate study of public goods on housing selection. The results show that increasing household incomes has consequences such as the possibility of proper access to urban highways, living near the workplace, resulting in a lack of spatial dependence on the transportation system.

The important conclusion is educational space, that has a small impact on the housing choice of all households, but for the high-income group, it has the greatest impact among public goods variables. Schimmer and AxiHeston (2014) and Bio et al. (2006) found completely opposite, they conclude that the educational space is effective for all households but is ineffective for high-income households. The reason for this situation is the possibility of moving the children of these families and providing school services.

However, subsequent research has shown that the position of educational space in choosing a neighborhood does not mean adequate access to educational space, but this space is more concentrated in those neighborhoods of the city where high income groups are concentrated and indicates a higher quality neighborhood.

The reduction of government responsibility in providing educational spaces, and especially among high-income groups who can afford to pay for their children's education, has caused private educational spaces in Tehran to be part of the prestige and higher quality of the neighborhood.

The most important pure public good in choosing a home for households is their understanding of the sense of security is effective but indicators of security (such as police stations, etc.) do not affect the choice of housing.