The relationship between the spatial distributions of local population and land prices

Haruka Tokoi[1], Kiichiro Kumagai[2]*

[1] *Setsunan University*

[2] *Sestsunan University*

In Japan, population had continued increasing since 1950 due to rapid economic growth. After peaking in 2008, the population began to decline. The population is about 124.5 million in 2023, and it is predicted to fall below 100 million by 2053. The ongoing decline in population will make it difficult to maintain the quality of public services, and it may lead to further urban deterioration. The Ministry of Land, Infrastructure, Transport and Tourism (MLIT) has implemented measures such as the "Compact Plus Network", which aims to concentrate urban functions and residences within designated attraction districts. However, “Urban spongification”, in which vacant land and vacant houses randomly occur in the central city area, is recognized as one of the problems for urban management. The decline of local communities, deterioration of public safety and landscape as well as falling land prices caused by “Urban spongification” may hinder the population concentration. Monitoring the spatial distribution of the population in urbanized areas is currently necessary. We therefore have focused on the spatial distributions of local population in urban areas. We then have developed an analysis method composed of a spatial autocorrelation analysis using the local population data. The method allows the visualization of the extent of the low-density population to provide a detailed understanding of the spatial distributions of the local population. The relationship between population density and land price is popularly considered to represent one of the features of urbanization. The relationship between the spatial distributions of population and land price, however, has not been clarified yet. The purpose of this study is to identify the relationship between the spatial distributions of local population and land prices. Osaka Prefecture and Kagawa Prefecture were selected as the study areas: an urbanized area and a provincial area, respectively. We applied the basic unit block population data generated through National Census and land price data obtained by MLIT in 1995, 2005, 2010, and 2015, to the analysis. The spatial analysis method consists of a spatial autocorrelation analysis based on G statistics and an overlay analysis. We also defined the Ambiguity of Spatial scale in a densely Populated area (ASP): a size of relatively lower-density population distributions, through the application of the spatial analysis method. In this study, we adopted single and multiple regression analyses. The results of the single regression analysis showed that the larger ASP provided a positive impact on nearby land prices in Osaka, while land prices were given a positive impact as the ASP became smaller in Kagawa. For multiple regression analysis, Ordinary Least Square estimation (OLS) was performed with ASP, official land price, distance from railway station, zoning, building restrictions and other factors. It was confirmed that a large area of lower population density provided a positive impact on nearby land prices in Osaka. On the other hand, in Kagawa, the large ASP gave a positive impact to nearby land prices in 1995 and 2000, while it provided a negative impact on nearby land prices after 2005.

Keywords: Spatial autocorrelation analysis, Population decline, OLS