

## Spatial clustering for property valuation with hedonic pricing

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Many real estate studies have pointed out the importance of market segmentation in formulating the hedonic price function for property valuation or understanding market structures. While previous studies have suggested certain segmentation criteria, there continues to be a lack of consensus on the same. Most existing works defines segments depending on administrative districts or place-names. Few studies have also attempted searching for and optimizing segments with certain cost functions. Moreover, some studies have noted that segments should be geographically continuous. Spatial clustering or regionalization is a method used to determine the optimized geographic segment applying a certain criterion or cost function. Usually, the segmentation criterion points to the homogeneity of a certain attribute, and samples belonging to a same segment have similar attribute values. The segments have often been used to capture spatial heterogeneity. Segments based on administrative districts might not fulfill the intended role in this purpose. In this study, we consider spatial heterogeneity or lack of uniformity in price structure using a geographically generated heterogeneity. Geographically Weighted Regression (GWR) has often been used for coping with a spatial heterogeneity that obeys a spatially smooth function. However, such assumption of smoothness might be erroneous, because there could be abrupt geographical changes in the price structure.

In this study, we propose a new segmentation method, using price functions dealing with spatial heterogeneity on property valuation. This segmentation approach allows local updating of segments so as to capture the spatial heterogeneity, starting from a given initial segment solution. In addition, this segmentation method is constrained geographically (in terms of spatial continuity of each segment). Finally, we conduct an empirical study using the proposed segmentation method. The results indicate the effectiveness of the proposed method, in terms of capturing spatial heterogeneity.

Keywords: spatial clustering, regionalization, hedonic pricing method, spatial heterogeneity