

Abstract

To assess the policies of developing highway network projects, various impact studies should be carried out. It has been proposed that "Social Efficiency" and "Spatial Equity" are included in the assessment of highway network projects. However, for the quantitative analysis of "Spatial Equity" it is difficult to prepare the necessary information and model the impact of highway network projects, compared to the conventional study of "Social Efficiency" effects. Therefore, a Spatial Computable General Equilibrium model can be used to calculate the spatial incidence of benefits occurring from highway network projects.

In this paper, we apply the RAEM-Light model to analyze the benefit incidence of highway network projects from the viewpoint of spatial equity issue. The RAEM-Light model has some innovative features. The spatial behavior between producers and consumers is explicitly described and is endogenously determined by using econometric production and consumption functions. The model applies a slightly different concept from a traditional Computable General Equilibrium model with independent on the Input Output data. The model is well suited for analyzing small areas, i.e. zones subdivided to the city and neighborhood area level.

The study area of this paper was the Chugoku and Shikoku area with 59 small regions. Economic sectors were aggregated in three sectors and the travel time by highway network between the origin and destination were selected as the attributes of the model. The RAEM-Light model was examined in the following two scenarios.

In Scenario 1, the regional economic impacts by the present highway network were simulated. This base case simulation concluded that the present highway network doesn't have a positive impact to the region, moreover gives negative impacts on the provincial area, i.e. the structure of the present highway network in Chugoku area quantitatively clarified that the present structure increases the economic differences between regions.

In Scenario 2, the RAEM-Light model was applied in the future highway network case. Compared to Scenario 1, the negative impacts by implementation of the highway network were reduced, especially in the provincial area. This comparison analysis clarified the effective network structure from the viewpoint of spatial equity. We have not done a theoretically and quantitatively comprehensive study from the viewpoint of the spatial equity on the infrastructure development (e.g., highway network projects) so far. However, the results of the comparative analyses are promising in the sense that they show the possibility of assessing what are more and what are less appropriate highway networks from the viewpoint of spatial equity.