

## **ABSTRACT**

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Title: A Study of the Role of Transportation Accessibility in Regional Economic Resilience

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The 2007 recession is considered the worst economic downturn in the post-war era of the United States (US), because it resulted in the highest number of unemployed people since 1948. While this might be viewed as an extreme event, studies addressing this type of economic fluctuation are still relevant, because the US has experienced, on average, at least one official recession or depression every decade. Regional economies that were able to resist or cope with the effects of the recession are labeled as “resilient,” a term that has become an ideal objective for policy making and planning. Although there is a significant body of research conceptualizing regional resilience and, to a lesser degree, assessing which regional characteristics influence the degree of resilience to recessionary shocks, there was little evidence of the role of infrastructure systems, such as transportation systems, in making regions more or less resilient. In other words, whether and how efficiently transportation systems contribute either directly or indirectly to a region’s response to economic shocks remained to be answered. Furthermore, the spatial distribution of the effects that a recession has across different units in a region, such as cities, counties, or metropolitan areas, was not well understood. Whereas the importance of transportation for economic resilience has been acknowledged in some studies, there was no available tool or framework to measure the impact that transportation-related decisions have on regional economic resilience.

In view of the above, this dissertation attempts to address this gap by proposing a framework in which different transportation-related variables (such as highway and rail density) and transportation-derived measures (such as accessibility) are evaluated in terms of their association with a measure of resilience to economic shocks at the county level. To achieve this, this dissertation proposes a three-step approach. First, a taxonomy of the study of resilience is developed in order to generate a metric of economic resilience that considers local performance only and does not require the definition of a pre-shock equilibrium state. The second step

involves evaluating the interdependency between transportation accessibility and spatial location of manufacturing industry, commuting patterns by income groups, and regional performance in Indiana during the recession, using three case studies. The third step involves the development of econometric models to evaluate the association between (a) the transportation-related variables and seven other components of economic resilience with (b) the regional performance of regions, while explicitly considering their spatial interactions. A global model, based on a spatial autoregressive model with autoregressive disturbances (SARAR), and a local model, based on a Geographically Weighted Regression (GWR), are estimated using data for six states of the U.S. Great Lakes Region during the last Great Recession.

The estimation results show that transportation-related variables, such as proximity to industrial parks, proximity to intermodal facilities, low commuting times, and distance to work, are strongly associated with the spatial economic structure and interactions in Indiana. After controlling for other factors such as human capital, industrial structure, and metropolitan location, the association between transportation accessibility and the regional economic resilience was positive and significant. In specific, the SARAR results show that the global relationships between distance to interstate highways, distance to rail stations (Class I railways), and accessibility to labor, were positively associated with regional performance during or after the recession. Nonetheless, the local spatial analysis shows that the association between these variables and the regional performance varied significantly across space. Turning to the practical implications, this dissertation provides metrics and a framework that could be incorporated in the decision-making process of transportation project investments. Ultimately, this dissertation can contribute to a better understanding of the complex interactions between economic resilience and transportation infrastructure and can better guide the development of policies designed to strengthen the ability of regions to be more resilient to economic shocks.