ABSTRACT

Bardaka, Eleni Ph.D., Purdue University, December 2016. Socioeconomic Impacts of Infrastructure Development: Distributional Implications and Causal Identification at Different Spatial Scales. Major Professors: Raymond G.J.M. Florax, Jon Fricker.

Inducing economic growth through appropriate transportation investments and policies and simultaneously, focusing on reducing income disparities and equitably distributing the benefits of transportation improvements is a challenge researchers and policymakers currently face. Despite the considerable research on the evaluation of wider economic impacts (such as travel time reliability, market access, and connectivity impacts) of transportation projects, limited studies have been devoted to the evaluation of transportation project externalities disproportionately experienced by lower-income or spatially segregated communities. This dissertation contributes to the research in the area of socioeconomic and distributional implications of transportation investments by: (i) studying the effects of transportation infrastructure development on economic growth and income inequality at a macroscopic level and (ii) developing a methodology for quantifying the potentially causal relationship between gentrification (measured as socioeconomic change) and urban rail development at a regional level.

Through the macro-level analysis, this study attempts to estimate the direct impacts of transportation infrastructure development on the mean income (GDP) and the income distribution (income inequality), as well as the indirect impacts emerging from the hypothesized relationship between GDP and income inequality. These impacts are modeled within a system of simultaneous equations and estimated using three-stage least squares. Microdata from nationally-representative household surveys from 36 countries are used to calculate measures of income inequality. Only two measures of transportation infrastructure (road density and railroad density) are used

due to data limitations at the country level. Regarding the impact of transportation infrastructure on income inequality, we find that a one percent increase in railroad density decreases income inequality by 0.046–0.105 percent, depending on which measure of inequality is used. Additionally, we find that the relationship between income inequality and economic growth is not robust and depends on the type of specification used for the economic growth equation. Despite the data limitations, this is the first time transportation-specific measures are used in macroeconomic distributional analyses. Also, this analysis differs from existing literature because it focuses not only on direct relationships but also on possible interdependancies among GDP, income inequality, and transportation infrastructure capital.

The objective of the regional analysis is to develop an appropriate methodology for quantifying gentrification induced by public investments in urban rail infrastructure. The complex phenomenon of gentrification is measured at the census block-group level using median household income, educational attainment, and median house value. We propose the use of spatial quasi-experimental approaches (spatial difference-in-differences for multiple or sequential partially overlapping treatments) to test the hypothesis that urban rail causes the gentrification of nearby neighborhoods directly and indirectly (through spatial spillover effects). A seemingly unrelated model with spatial error components is utilized to account for the multiple dimensions of gentrification, spatial autocorrelation, and unobserved heterogeneity across space. The developed methodology is illustrated through the investigation of transit-induced gentrification in the neighborhoods within the proximity of the Regional Transportation District Light Rail facility of the Denver–Aurora–Lakewood Metropolitan Statistical Area (MSA). The results of the econometric analysis suggest that the predominantly lower-income neighborhoods located close to centrally-located walk-and-ride light rail stations have been experiencing the strongest socioeconomic impacts due to the light rail: a 65.9 percent increase in median household income, a 10.0 percent increase in educational attainment, and a 60.5 percent increase in median house value due to the light rail during 1990–2011.