Assessing the Impact of Light Rail Transit on Land Values and Tax Revenues

Light Rail Transit (LRT) has become an increasingly popular centerpiece of smart growth policies in the United States, yet considerable debate exists about its cost-effectiveness. The overarching question that we propose to address in this research is "What are the early returns to proposed and under-construction Light-Rail Transit (LRT) investment and how do these vary across neighborhoods?" It may take 10 or 20 years to generate substantial revitalization of a given neighborhood, but early increases in property value and tax collections may stimulate neighborhood change, and defray capital costs. A related question is "What is the best methodology to address the responses to LRT at the neighborhood level, while simultaneously measuring changes in property values at a regional scale rather than focusing solely on station area impacts?" We propose also to separate agglomeration effects (such as neighborhood commercial and residential development) from those associated with change in mobility (such as better access to downtown).

Accordingly, a team of researchers with expertise in smart growth, spatial and temporal econometric modeling, investment decision making, and GIS/GIS-T, will build a series of models to estimate the effects of LRT on the land markets. Detailed GIS-based data on land-use, new construction, and residential transactions will be analyzed for the LRT system in Phoenix, Arizona, for three distinct phases-pre-approval, planning, and construction. Innovative independent variables include dynamic measures of accessibility at the metropolitan scale derived from GIS-T models, and a proxy for neighborhood change derived from data on new construction. Modeling techniques capable of disentangling neighborhood and regional effects include Geographically Weighted Regression (GWR) and a local Spatial and Temporal Autoregressive (STAR) model. Comparison of out-of-sample predictive ability and spatial autocorrelation in the models' residuals will inform on performance, and provide a more nuanced understanding of the dynamics set into motion by decisions to build LRT, quantify the spatial distribution and extent of early returns on investment at the metropolitan scale, and provide more effective decision-making on this smart growth tool.

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Research Team

Carol Atkinson-Palombo, Ph.D.
Assistant Professor, Geography
carol.atkinson-palombo@uconn.edu
Ph.D. Arizona State, 2007

Areas of Expertise:
Sustainable transportation
Urban geography
Spatial analysis

John Clapp, Ph.D.
Professor, Finance
John.Clapp@business.uconn.edu
Ph.D. Columbia University, 1974

Areas of Expertise:
Real estate market analysis
Finance

**Nicholas Lownes, Ph.D.**
Assistant Professor, Civil and Environmental Engineering
nlownes@engr.uconn.edu
Ph.D. University of Texas, 2007

**Areas of Expertise:**
Traffic engineering
Traffic simulation
Public transportation systems

**Robert Cromley, Ph.D.**
Professor, Geography
robert.cromley@uconn.edu
Ph. D. Ohio State University, 1978

**Areas of Expertise:**
Spatial data handling and GIS
Computer cartographics
Location Theory and Industrial Geography
Mathematical programming
Statistical analysis