

Examining the Role of Transit Investments on Opportunity Outcomes

Recipient/Grant (Contract) Number: University of New Orleans; University of Colorado Denver/69A3552348337

Center Name: Center for Equitable Transit Oriented Communities (CETOC)

Research Priority: Preserving the Environment

Principal Investigator(s):

Aditi Misra; University of Colorado Denver; aditi.misra@ucdenver.edu; ORCID: 0000-0002-5600-597; Manish Shirgaokar; University of Colorado Denver; manish.shirgaokar@ucdenver.edu; ORCID: 0000-0001-6458-1885; Wesley Marshall; University of Colorado Denver; wesley.marshall@ucdenver.edu; ORCID: 0000-0002-3106-7342

Project Partners: RTD-Denver: Regional Transportation District

Research Project Funding: \$150,000 (USDOT) + \$75,000 (matching funds) = \$225,000

Project Start and End Date: 10/01/2023 to 10/31/2024.

Project Description: This project seeks to study transportation investments and the resulting outcomes across social and economic markers across different communities. This research will look back at historic transit and transportation investments, using Denver as a case study. The neighborhoods impacted by the investments will be tracked through time using ACS and Census data as well as other datasets as necessary (e.g., land use, transportation infrastructure, property transactions, crime rates, air pollution, and heat island effects) on markers such as average income, education level, racial and ethnic composition, rate of incarceration, and employment, among others. The study will explore traditional spatial and temporal relational models (e.g., time series, hierarchical models with time series effect, spatial autoregression and self-selection models) to identify the effects of the investments through time and space in addition to Bayesian models and its derivatives. Visual methods like time-space diagrams will also be examined to better explain the findings to practitioners and policymakers. The idea for the visualization tool has two dimensions: i) a time-space activity diagram can help us understand how different transportation investments can expand community accessibility and can act as a useful tool for prioritizing projects; and ii) developing an interactive web-based visualization of the impact of transportation investment on housing and displacement (based on past historical data and predictive models) can help us to understand possible scenarios and develop regulations preemptively. For communities, it can create awareness of future opportunities and threats. For policy makers, it can help in identifying neighborhoods and communities to be protected and supported. For example, if investing in a bus line to hopes of helping a marginalized community address their transportation needs instead threatens to displace that community itself, there may be policy levers worth exploring (e.g., a premium on property transactions in that area may be mandated for some time along with making the transit free or subsidized for the community). Our interactive map will help in identifying the catchment area of displacement and the estimated timeline for which such policies should remain in place.

Update April 2024: The team obtained property transaction data for the Denver Metro area from 1990 – 2021 and data on bus stop amenities (bus stop installation date) from RTD and spatially joined location, infrastructure data and Census variables. The team has submitted an abstract for presentation at the TRB Conference on Advancing Transportation Equity 2024 and ACSP 2024.

USDOT Priorities: This project responds primarily to the strategic goal of *Equity*, aiming to uncover the disparate effects of transportation planning on communities, as well as the goals of *Climate & Sustainability* and *Transformation* as it provides policy makers with tools to better understand climate as well as equity impacts of transportation planning and to devise more sustainable and equitable systems for the future.

Outputs: 1) At least two conference papers; 2) At least one peer-reviewed journal publication; 3) Interactive web-based visualization of temporal and spatial effects of transit investment within Denver County; 4) Predictive models for spatial and temporal effects of transit investment.

Outcomes/Impacts: The outcomes of this research are to examine how transit and transportation investments impact waves of property owners downstream, especially considering the current gentrification and housing crises around key transit corridors; and establish relationship between transportation investments and life outcomes through mapping of changes in socioeconomic markers for the communities. The findings from this research are relevant for social and environmental justice-oriented policies at the local and regional level. Our aim is to unpack the complex and dynamic relationship between transit-related investments and its impact on the people it hopes to serve. While transit investment is a priority, our hypothesis is that those decisions need to be made on a case by case, community by community basis, and requires understanding that the effects are neither temporally nor spatially bound to the present state. As mentioned before, using the time space-activity diagram can examine how similar investments compare in terms of providing accessibility and for whom. Second, if temporal changes in community characteristics post transit investment are identified, policies related to price-controlled housing and rents could be implemented in efforts to control displacement of original residents. Our research will shed light on the impact of transportation investments on communities through a data-driven analysis while also helping increase understanding of these complex issues such as the link between the supply of affordable housing and transit-accessible locations. The main contribution of this project is enabling communities to make informed future forward choices, both in terms of supporting projects and in terms of where they want to live. While previous research has looked at housing and displacement with transit investment, there remains no comprehensive visual tool for planners, policy makers, and communities alike to see and understand past and future impacts of investments. The findings from the project will be shared with the broader transportation community through conference presentations as well as through the public-facing, open-access, interactive web maps. The open-access interactive web maps will enable planners and policy makers to see past and predicted trends and accessibility outcomes while enabling the communities to understand future opportunities and threats, thus helping them to make informed future conscious decisions.

Final Research Report: (Link to be provided after project completion).