

## **Longitudinal Analysis of Transit's Land Use Multiplier in Three Regions**

**Recipient/Grant (Contract) Number:** University of New Orleans/69A3552348337

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

**Research Priority:** Preserving the Environment

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**Project Partners:** N/A

**Research Project Funding:** \$120,000 (USDOT) + \$60,000 (matching funds) = \$180,000

**Project Start and End Date:** 06/01/2023 to 05/31/2024

**Project Description:** To date much transportation research has relied on cross-sectional data, and leaders in the field have increasingly begun to call for research on longitudinal studies to investigate the impacts of changes in the built environment to travel outcomes over time. Handy (2017) noted: “I would discourage researchers from producing yet more cross-sectional studies ... we need before-and-after evaluations of the impact of changes in the built environment on VMT and other aspects of travel behavior ... these kinds of studies provide a much stronger assessment of the potential for compact development to reduce VMT, although they are more challenging than cross-sectional studies.” Previous research has indicated that transit expansions such as light rail can lead to a ‘transit multiplier’ effect, whereby VMT is reduced by amount greater than simply that caused by conversion of individual trips from vehicular travel to transit. Transit stations become hubs of commercial and other activity, as well as sites of greater density, and produce additional trips by modes such as walking and bicycling in the process. Very few studies have explored this effect with longitudinal data over time, and those that have were confined to single metropolitan areas, thereby lacking in external validity. Using a quasi-experimental design and data from three metropolitan regions (Sacramento, CA, Seattle, WA, and Austin, TX), this research will produce such a before and-after study to quantify the changes in VMT, transit usage, and active travel for households along light rail expansions. For these three regions, we have household travel survey data for two points of time and each of them had opened new or extended existing light rail transit during the two points of time. We will employ either control corridors or propensity score matching to select households and compare their travel changes with households along the new transit lines. The result will provide the total (direct and indirect) effects of transit (or called multiplier) on travel. This research is essential to better understand and quantify the benefits (social, environmental, economic, and health) of expanding and improving high-quality public transit systems such as light rail.

**USDOT Priorities:** A better understanding of transit’s land-use multiplier effect is key to planning for the USDOT strategic goal of *Climate and Sustainability* and its research priorities of *Decarbonization* and *Sustainable and Resilient Infrastructure*, as well as the side effects these planning processes and outcomes have on issues of *Equity*.

**Outputs:** 1) At least two conference papers to be submitted to Transportation Research Board Annual Meeting; 2) At least one peer-reviewed journal publications; 3) Interactive web-based visualization of temporal and spatial effects of transit investment within the 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).