

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

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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 10/31/2024.

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 project is producing 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, before and after they opened new or extended existing light rail transit. We have identified control corridors with similar geographic and socioeconomic traits to the corridors which received new light rail lines, allowing us to select control households and compare their travel changes with households along the new transit lines. The final results 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.

Update April 2024: After some initial delays due to issues with GIS datasets, the data processing is now nearing completion. A literature review and some portions of a research paper have been drafted.

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: This research will generate: 1) one peer-reviewed publication; 2) one policy brief; 3) one conference presentation; 4) one or more webinar or training workshop; 5) an analytical model of quasi-experiment to quantify the total effects (direct and indirect) of public transportation (specifically light-rail transit) investment.

Outcomes/Impacts: VMT is tied to many of the direst issues facing our modern societies, from social inequity to environmental degradation and climate change as well as personal health. Understanding the multiplier effect and quantifying the benefits of expanding high quality public transportation systems such as light rail is essential to allow planners and policymakers to demonstrate the value of these systems and advocate for future expansions. While short-term costs of these systems may seem high to policymakers, the long-term benefits are great. We hope that in demonstrating and quantifying these benefits we can provide information needed to effectively advocate for systems which will help create healthier and more equitable cities for all citizens.

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