

# Measuring Multimodal Equity in Resource-Challenged MPOs

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## Introduction

Equity in transportation is arguably a function of the entire system as well as each of its parts. Low-income, minority, and disabled (to name a few) communities are often transit, walking, and bicycle-dependent, and yet in the United States, the majority of public and private resources in the past century have prioritized automobile travel. This report provides the findings of Phase II of a study on reviewing and developing transportation equity metrics. Phase I investigated transit equity metrics and provided recommendations on advancements in quantitative methods. The study found that comparing auto (roadway) and transit equity performance and investments within a jurisdiction is an important capability that is lacking in most areas. This study builds on these Phase I recommendations by investigating low-cost methods for comparing the equity between auto, transit, bicycle, and pedestrian modal performance or investments, particularly for low-resource transportation agencies. The team found that many metrics developed for everyday use for planning and engineering practitioners are (1) mode specific and not easily made compatible with each other for cross-modal comparisons, (2) expensive, data intensive, and difficult to operate (e.g., accessibility measures requiring travel demand model outputs),

and/or (3) not usable by low-resource transportation agencies.

## Study Methods

The study first identified methods from the extant literature that are already capable or could be improved to become capable of measuring transit and auto equity. The study compared their capabilities and calculation requirements (e.g., user training/experience, data availability, agency resources), including mode-specific accessibility/travel demand models, neighborhood transit station/stop access models, modal investment calculations, and network design models. Using this process, the study team selected a method that had been used in San Joaquin County, California that allows for relatively inexpensive analysis of transportation agency investments across several equity dimensions, including income, race/ethnicity, vehicle availability, and the presence of children in households. The research team used these metrics and the San Joaquin method to evaluate the investments by mode in 17 regional transportation plan project lists from California metropolitan planning organizations and regional transportation planning agencies.

## Findings

Key findings from this research include:

1. The San Joaquin method is relatively easy to calculate using Census Transportation Planning Package (CTPP) data for the number of low-income households with workers commuting by mode and in other regions/counties, particularly as compared to more data- and resource-intensive methods such as those requiring travel demand model outputs. This makes it a viable option for cross-modal comparisons of investment plans in low-resource jurisdictions;
2. Analysis is best for large urban areas using Census Public Use Microdata Sample (PUMS) data, but due to small sample sizes, it is often best to use CTPP data in smaller/micropolitan regions;
3. The San Joaquin method can be enhanced to calculate other modal investment equity measures/ data from the CTPP, including (a) household vehicle availability by mode to work, (b) race of commuter by mode to work, and (c) the presence of minors in household of commuters by mode to work;
4. Transit and non-motorized spending were the most equitable in regions with large urban centers;
5. Transit and non-motorized spending are often highest in large urban areas compared to roadway spending for disadvantaged groups; and
6. Non-disadvantaged community spending typically favors auto travel in most areas of the state.

This report presents the evaluation and application of a multimodal/cross-modal equity comparison method that can be used to help analyze the relative equity of investments in surface transportation modes for low-resource transportation agencies.

## Policy Recommendations

This study makes several policy and practice recommendations to transportation agencies:

1. Carry out more explicit and routine analytic comparisons between the equity of transportation mode equity in terms of policy, planning,

investments, performance, and service quality.

2. Develop and expand on existing methods (such as the San Joaquin method applied in this study) that can facilitate cross-modal comparisons of transportation equity.
3. Increase and enhance the data, training, and resources available to low-resource transportation agencies that would enable them to conduct routine and effective cross-modal equity comparisons at all levels of geographic scale and coverage.

## About the Authors

**Dr. Christopher Ferrell** is a Research Associate for the Mineta Transportation Institute who completed his doctoral studies in City and Regional Planning at the University of California at Berkeley in 2005.

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## To Learn More

For more details about the study, download the full report at [transweb.sjsu.edu/research/2420](https://transweb.sjsu.edu/research/2420)



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