



Planning, Policy  
and  
Programming

## MARCH 2020

**Project Title:**

Pacific Southwest Region 9  
University Transportation Center

**Task Number:** 3404

**Start Date:** February 1, 2019

**Completion Date:** March 31, 2020

**Task Manager:**

Stuart Mori  
Associate Transportation Planner  
stuart.mori@dot.ca.gov

## Cost-Sharing Mechanisms for Ridesharing

Providing a method to determine cost savings to incentivize ridesharing

### WHAT WAS THE NEED?

Congestion in the United States continues to rise, stressing vital infrastructure, causing delayed shipments, late employees, and countless other problems. The increased adoption of dynamic cost-sharing transportation systems, such as ridesharing, could help alleviate some of this traffic and its related nuisances.

A set of technologies focusing on cost-sharing transportation systems have recently emerged. While these new cost-sharing transportation systems are not the complete answer to congestion nationwide, their ability to augment existing public infrastructure, such as mass transit, could help to solve many congestion-related problems in urban areas like Los Angeles.

### WHAT WAS OUR GOAL?

The goal of this research was to develop cost-sharing mechanisms for ridesharing providers to determine suitable prices for passengers sharing a trip. While there has been extensive research of using optimization models to determine routes for ridesharing services, there has been little research in determining the suitable cost to a ridesharing passenger, especially incentives for ridesharing



Caltrans provides a safe, sustainable,  
integrated and efficient transportation  
system to enhance California's  
economy and livability.

## WHAT DID WE DO?

This research provided a method to determine how to allocate the cost savings in ridesharing; whereby, potentially increasing the incentive to use this type of service. The researchers completed a literature review. They then built a cost-sharing mechanism based on the Proportional Online Cost Sharing Mechanism. Next, they extended the model to the dynamic case where passengers arrived dynamically to the system. The researchers then validated the mechanisms in the Los Angeles region.

## WHAT WAS THE OUTCOME?

The research showed that it is possible to develop a cost-sharing mechanism that quotes reasonable prices to all participating passengers, allowing the driver to recover all their costs, and ensuring it is in the participants' interests to declare their ride requests truthfully.

## WHAT IS THE BENEFIT?

Significant congestion and the projected demand with limited infrastructure investment will make necessary the development of improvements in transportation systems. Agencies must, therefore, find ways to improve transportation conditions in a cost-efficient manner. The increased adoption of dynamic cost-sharing transportation technologies, such as ridesharing, could help alleviate some traffic congestion and determine suitable pricing for passengers sharing a trip.

## LEARN MORE

The final report will be posted to the project's webpage: <https://www.metrans.org/research/cost-sharing-mechanisms-for-ridesharing>

## IMAGE



Image: Cost-sharing transportation systems can augment existing public infrastructure, such as mass transit, and help to solve many congestion related problems in urban areas.