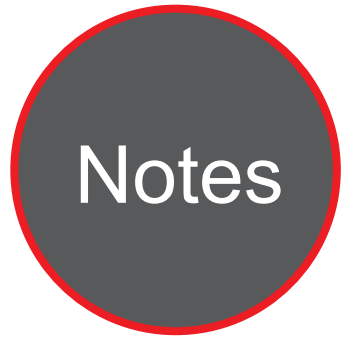




Caltrans Division of Research,  
Innovation and System Information

# Research



# Notes

Planning, Policy  
and  
Programming

JANUARY 2019

Project Title:  
FAST Act - PSR 004: Cost-Sharing  
Mechanisms For Ridesharing

Task Number: 3404

Start Date: February 1, 2019

Completion Date: January 31, 2020

Task Manager:  
Patrick Tyner  
Associate Transportation Planner  
patrick.tyner@dot.ca.gov

## Finding Ways To Improve Transportation Conditions In A Cost- efficient Manner

Providing a method to determine cost savings allocation in the ridesharing industry, potentially increasing the incentive to encourage ridership.

### WHAT IS THE NEED?

A set of nascent technologies focusing on cost-sharing transportation systems such as ridesharing/carsharing have recently emerged. Congestion in the US continues to rise, stressing vital infrastructure and causing delayed shipments, late employees, and countless other problems. The increased adoption of dynamic cost-sharing transportation systems could help alleviate some of the traffic and its related nuisances.

Although 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. However, transportation planners today do not have effective tools or means to quantify the impact of incentive structures for ridesharing.

Therefore, this research will provide a method to determine how to allocate the cost savings in ridesharing, whereby potentially increase the incentive for people to adopt ridesharing more widely.

### WHAT ARE WE DOING?

The study involves the following tasks:

#### **Task 1: Literature review**

The research team will review the scientific literature on the mechanisms for routing problems.

#### **Task 2: Static Cost-sharing Mechanism design for the Ridesharing Problem**

The researchers will build a cost-sharing mechanism based on



DRISI provides solutions and  
knowledge that improves  
California's transportation system

the Proportional Online Cost Sharing (POCS) mechanism which was previously developed for shuttle services; and make it applicable for ridesharing services.

### **Task 3: Dynamic Cost-sharing Mechanism design for the Ridesharing Problem**

This task involves extending the previous static model to the dynamic case where the passengers arrive dynamically to the system.

### **Task 4: Validation and experimental analysis**

The Los Angeles region is ideally suited for being the validation area since there are several dedicated carpool lanes in the region. Furthermore, there are portions of the freeway network where congestion pricing is employed with the added feature that ridesharing vehicles can travel on these lanes free of charge (e.g., Interstate 110).

Additionally, researchers at University of Southern California have developed the Archived Data Management System (ADMS) that collects, archives, and integrates a variety of transportation datasets from Los Angeles, Orange, San Bernardino, Riverside, and Ventura Counties. These data sources will give a detailed spatio-temporal estimate of demand by time of day and trip type to develop different operating scenarios for analysis.

### **Task 5: Final report preparation**

## **WHAT IS OUR GOAL?**

The goal of this research is to develop cost-sharing mechanisms to aid ridesharing providers to determine suitable prices for passengers. While there has been a rich history of using optimization models to determine routes for these types of services, there has been little research in determining the suitable cost to a ridesharing passenger, especially those that take into consideration the special incentives for ridesharing.

## **WHAT IS THE BENEFIT?**

The significant congestion and projected increase in demand with limited infrastructure investment make improvements on transportation systems necessary. 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 alleviate some of the traffic congestion.

## **WHAT IS THE PROGRESS TO DATE?**

The project is expected to begin in early February 2019.

## **IMAGES**



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