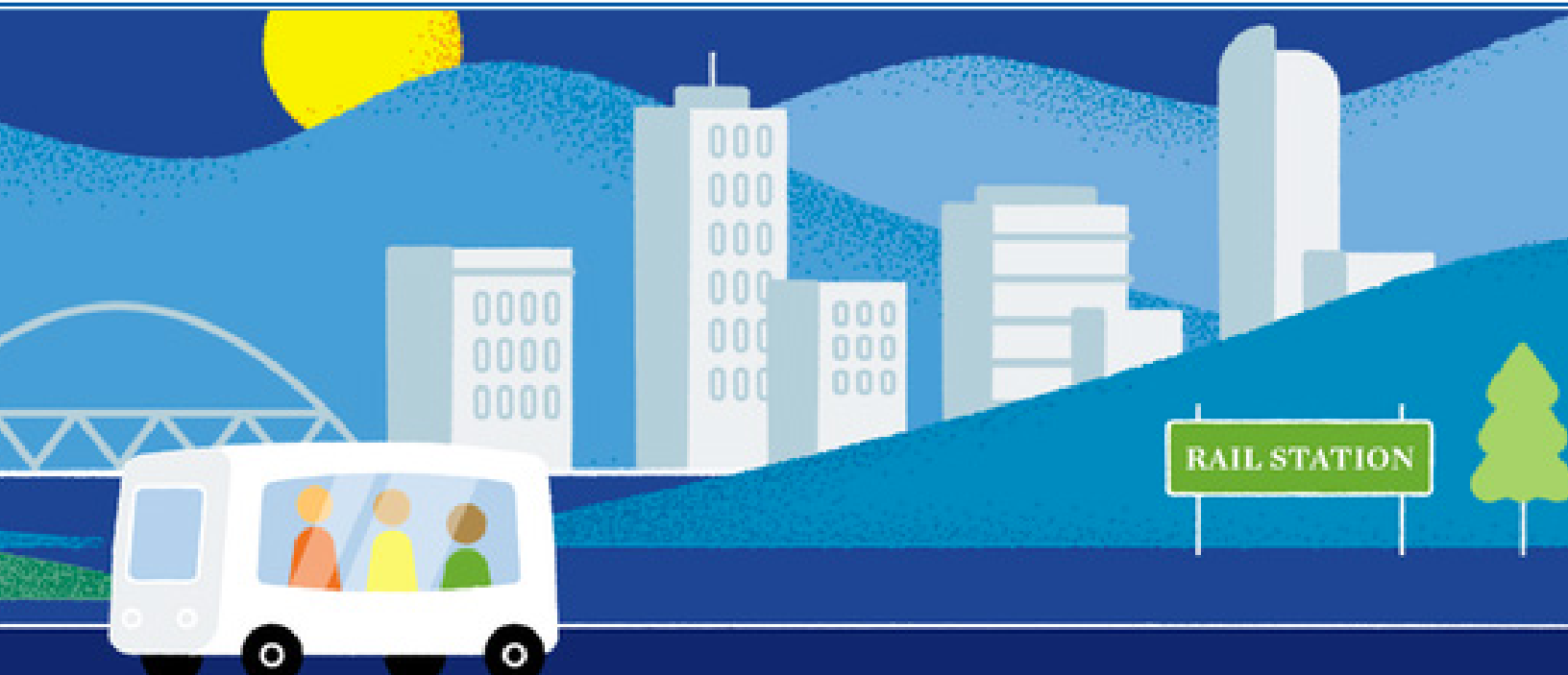


Cost-Benefit Analysis of Novel Transit Access Modes: A Case Study in the San Francisco Bay Area

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The first-mile, last-mile problem is a significant deterrent for potential transit riders, especially in suburban neighborhoods with low density. Transit agencies have typically sought to solve this problem by adding parking spaces near transit stations and adding stops to connect riders to fixed-route transit. However, these measures are often only short-term solutions. In the last few years, transit agencies have tested whether new mobility services, such as ridehailing, ridesharing, and microtransit, can offer fast, reliable connections to and from transit stations. However, there is limited research that evaluates the potential impacts of these projects. There is a growing interest in the future of automated vehicles (AVs) and the potential of AVs to solve this first-mile problem by reducing the cost of providing these new mobility services to promote access to transit.

Study Methods

The authors examine three types of access services to transit stations and stops in the San Francisco Bay Area

offered over a range of fares. These services use a fleet of automated vehicles to provide home-based drop-off and pick-up for single passenger service (e.g., Uber and Lyft), home-based drop-off and pick-up for multi-passenger service (e.g., microtransit), and meeting point multi-passenger service (e.g., Via).

Findings

Transit access services may increase ridership and reduce VMT, especially when fares for these services are low. However, fares need to be relatively low (less than about \$6 per trip) to generate ridership. The estimated lower operation costs for automated vehicles, due to avoided labor, may enable lower fares.

Pooled access service trips have lower VMT and travel time, including wait times, relative to single passenger services. The single passenger service requires longer travel routes and travel times to pick up each rider at their home. In contrast, the pooled services with home pick-

ups reduce VMT because passengers are pick-up and drop-off en route. And pool services with a group pick-up point provide even greater reductions in VMT and travel times.

Pooled service models may be more likely to create profits, while single passenger service is more likely to struggle to keep out of the red. Profit is higher overall for the pooled home pick-up service compared to the pooled group pick-up location. When costs are high single passenger service does not make any profit, and when costs are low, it only makes a profit at certain price points. Please see the figure below.

Policy / Practice Recommendations

Transit planners may only want to offer low-cost transit access services. Thus the cost of commercial services and expected demand should be carefully considered. Pooled models appear to provide superior results overall and thus should be prioritized.

Pooled first-mile, last-mile transit access services reduce VMT and travel time and increase revenues compared to the single-passenger service; however, fares all services need to be kept relatively low to attract riders.

Figure 1A. Operating Costs and Revenue by Service Type and Fare

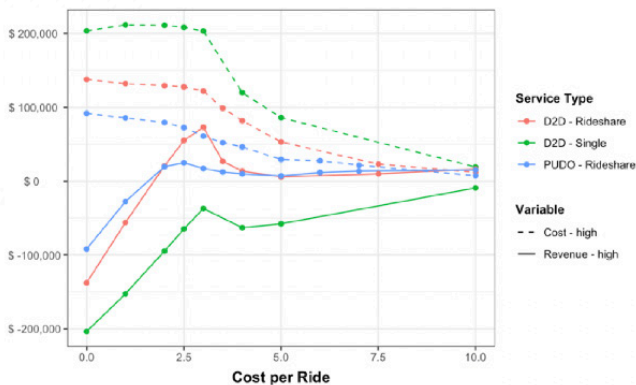
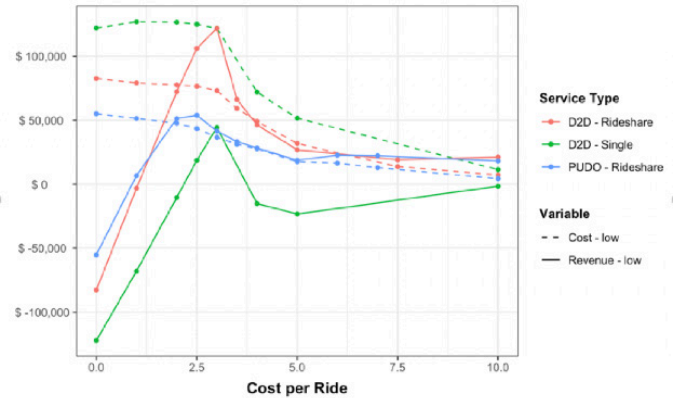


Figure 1B. Operating Costs and Revenue by Service Type and Fare



About the Principal Investigator

Dr. Caroline Rodier is a Researcher at the Institute of Transportation Studies, University of California at Davis. Her current research includes analysis of travel, environmental, and equity effects of shared mobility.

To Learn More

For more details about the study, download the full report at transweb.sjsu.edu/research/1816



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