Determinants of Efficient and Effective Bus Service: What can U.S. Transit Agencies do Better?

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Background

- Public transportation is a vital service, but ridership has declined in recent years beginning prior to the COVID-19 pandemic.
- The way agencies make decisions about their service provisions impacts their ability to achieve their goals and to provide efficient and effective service to their patrons.
- Bus service is less dependant on land use density, is less likely to gentrify near high-intensity systems, is used more by low-income riders for short distances, and is vital to providing successful rail transit.

Photo Credit: CHUTTERSNAP / https://unsplash.com/s/photos/bus

Research Questions

- How can agencies improve cost, revenue, and labor efficiency for bus services?
- How can agencies increase cost, spatial, and temporal effectiveness for bus services?

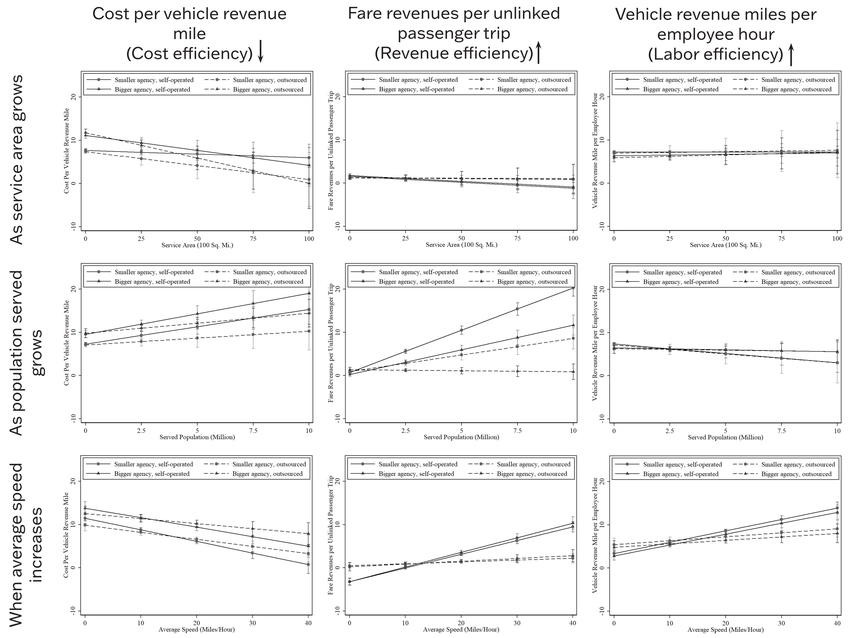
Methodology

- We utilized 2019 data from the National Transit Database (NTD).
- We relied on standard ordinary least squares (OLS) regressions.
- We calculated all costs with both operations and management spending and annualized capital spending.
- We included capital spending to investigate how an agency's total expenditures factored into their success, rather than focusing on annual operating budgets.

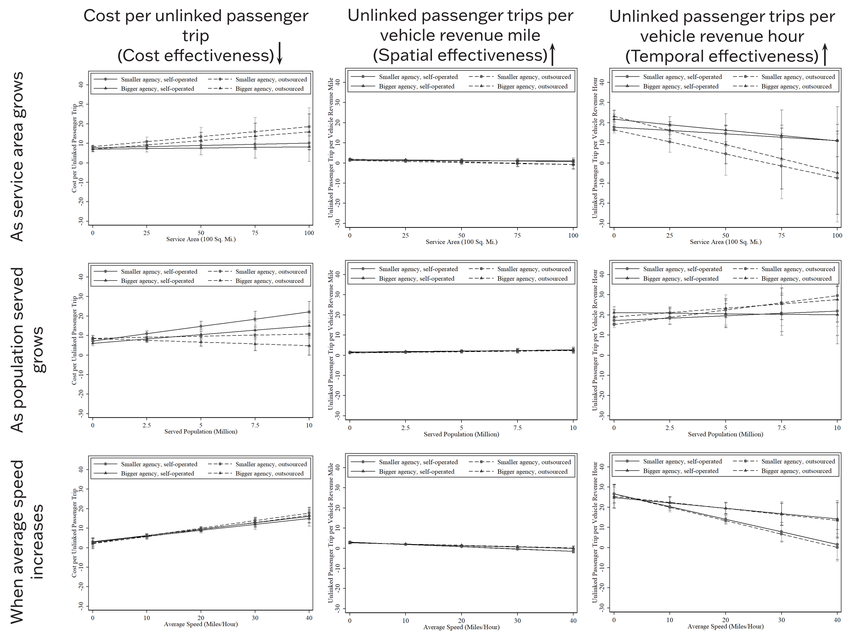
Results

Marginal effects curves for results.

Improving cost, revenue, and labor efficiency



Improving cost, spatial, and temporal effectiveness



- Initial efficiency findings showed that larger agencies, as compared to smaller agencies, had several advanatages when they either outsourced some services or served larger populations. Faster buses boosted efficiency, especially when paired with outsourced services. Spending additional money on supporting equipment (like radios and computers) can also help bring other efficiencies as well.
- Initial effectiveness findings showed that larger agencies were less spatially effective. Agencies in areas that were densifying were less cost effective, but more spatially effective. Gains in speed do not increase bus effectiveness. Spending on guideway and passenger vehicles improved effectiveness.
- Three scenarios from our findings and based on the marginal effects curves
  - Sprawling cities or regions - agencies can increase efficiency by outsourcing, but may lose temporal effectiveness.
  - Densifying cities or regions - agencies will see improved results if they outsource some or all of their service.
  - Locations that invest in faster bus travel - agencies that invest in faster bus travel will most likely want to keep their services in house. Faster speeds do not increase effectiveness.

Policy Implications

- Larger agencies with greater organizational capabilities should consider contracting micro-networks or those services or areas that are necessary to provide. Contracts may want to include specific protections.
- Adding additional stops, improving reliability, or increasing frequency could be more valued than increasing speeds.
- Investing in hardware (route infrastructure, vehicles, and support equipment) can increase efficiency and effectiveness of bus service.