Net Effects of Gasoline Price Changes on Transit Ridership in U.S. Urban Areas

Hiroyuki Iseki, Ph.D. and Rubaba Ali

MTI Project 1106

December 2014

SJSU Research Foundation
210 N. Fourth St., 4th Fl.
San José, CA 95112

Tel // 408.924.7560
Fax // 408.924.7565

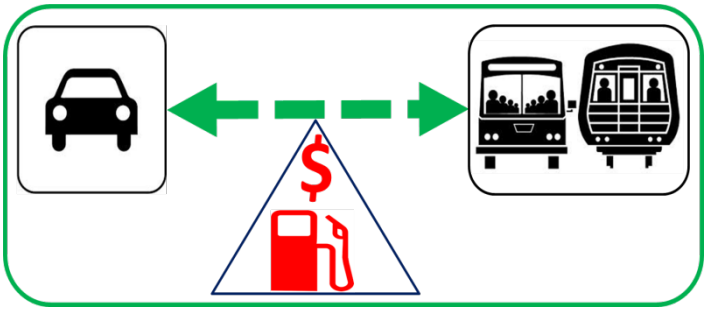
transweb.sjsu.edu

A 10 percent increase in gasoline prices yields a ridership increase of 1.67 percent for bus, 2.05 percent for commuter rail, and 1.80 percent for the aggregate.

Transit ridership is affected not only by the level of service provided and fare, but also by external factors that transit agencies do not control. Gasoline prices have been one of these external factors considered to have affected transit ridership in the last ten years. This research project provides a more comprehensive understanding of the net effects of gasoline price changes on ridership of various transit modes in ten U.S. urbanized areas.

Study Methods

This study used panel data regression analysis methods to estimate how much transit ridership changes in response to changes in gasoline prices for bus, light rail, heavy rail, commuter rail, and these four modes combined. The study includes the short- and long-term effects of gasoline prices and the threshold effects of $3 and $4 marks. The two main variables analyzed in this study are: (1) monthly average gasoline prices based on weekly prices of three different types of gasoline – regular, midgrade, and premium – collected from the U.S. Energy Information Administration, and (2) monthly unlinked passenger trips obtained from the Federal Transit Administration's National Transit Database from January 2002 to December 2011 for Boston, Chicago, Cleveland, Denver, Houston, Los Angeles, Miami, New York, San Francisco, and Seattle. The analysis controlled for other influential variables related to transit service, demographics, and regional economy, and it addressed the endogeneity problem in regression analysis that potentially arises from the simultaneity issue between transit service supply and ridership.



Findings

The analysis results of this study generally show a modest level of impacts compared with the findings in previous studies on the subject. In the short-term, positive effects were found only for bus and the aggregate transit: a 0.61-0.62 percent ridership increase in response to a 10 percent increase in current gasoline prices (elasticity of 0.061 to 0.062). The long-term effects of gasoline prices, on the other hand, were found for all modes and indicated a total ridership increase ranging from 0.84 percent for bus to 1.16 for light rail. Commuter rail, heavy rail, and the aggregate transit placed in between in response to a 10 percent increase in gasoline prices. The effects at the higher gasoline price level of over $3 per gallon were found to be more substantial,

with a ridership increase of 1.67 percent for bus, 2.05 percent for commuter rail, and 1.80 percent for the aggregate for the same level of gasoline price changes. Light rail shows even a higher rate of increase at 9.34 percent for gasoline prices over $4.

Selected results to show the effects of a 10 percent increase in different ranges of gasoline prices for bus, light rail, and the aggregate

	% Increase in Ridership				
20% Increase in Gasoline Prices (GP)	**Bus**	**Commuter Rail**	**Light Rail**	**Heavy Rail**	**The Aggregate**
Within the GP range $3-$4	1.67%	2.05%	0.16%	0.41%	1.80%
Crossing the $4 mark (from $3.90)			6.82%		
Within the GP range over $4			9.34%		

Policy Recommendations

It is likely that gasoline prices will remain high and possibly exceed $4 in the future in major urban areas due to a market price increase and/or an increase in fuel taxes and potential carbon taxes. To accommodate the public's higher transit travel needs during times of substantial gasoline price increases, transit agencies are recommended to:

- Examine potential changes in ridership in response to different magnitudes of gasoline price changes for their transit modes
- Assess existing capacity of transit service especially during the peak period
- Incorporate potential fluctuation in ridership due to gasoline prices into planning for operations and capacity management in the short-term
- Take into account a substantial increase in ridership due to gasoline price increases in the long-term in pricing strategies and general financing.

About the Authors

Hiroyuki Iseki, PhD, is an assistant professor of Urban Studies and Planning (URSP) and a research faculty at the National Center for Smart Growth Research and Education (NCSG) of the University of Maryland, College Park. Rubaba Ali is a PhD candidate at the department of Agricultural and Resource Economics at the University of Maryland, College Park.

To Learn More

For more details about the study, download the full report at ***transweb.sjsu.edu/project/1106.html***

MTI is a University Transportation Center sponsored by the U.S. Department of Transportation's Research and Innovative Technology Administration and by Caltrans. The Institute is located within San José State University's Lucas Graduate School of Business. WEBSITE transweb.sjsu.edu