The Determinants of Load Factor for Loaded Freight Trips in New York State

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Extended abstract

Objectives and motivation
The economic globalization and rapid development in e-commerce have lead to a boost in freight transportation demand. However, the development also bring along externalities such as the economic losses, environmental pollution and health issues. As a result, companies and transportation professionals are working hard to develop management schemes that allow for more efficient delivery vehicle usage. This study focuses on a popular metric used to evaluate the delivery vehicle's efficiency – load factor – for small, medium and large delivery vehicle trips in the New York State. The objectives of this paper are: 1) Obtain systematic and updated load factor data for trucks in the New York State; 2) Explore the determinants of load factor of loaded vehicles, and propose recommendations accordingly.

General description
This study uses three separate linear beta regression models to study the determinants of small, medium and large delivery vehicle trips in the New York State. The models take into account the effects of cargo type, fleet size and trip distance. The primary data source used in this study is a stated preference survey conducted in New York State in 2014, which is designed to collect information on freight carriers' behavioral changes in response to hypothetical toll increases. The dataset contains 370 disaggregate observations that allow for both trip-level and vehicle-level analysis.

Results and conclusions
The results indicate that: 1) There exists substantial difference between factors influencing small, medium and large delivery vehicle’s load factors; 2) The effect of cargo type on load factor depends on the commodity size, packaging, weight and other delivery requirements; 3) Load factor is generally higher for big companies with large fleet size; 4) For small delivery vehicle trips, the load factor increases with the distance, while the opposite is true for medium size delivery vehicles. There's no obvious effect of distance on large delivery vehicle’s load factor. The influencing factors identified in the study can help the policy makers understand the connections between load factor and a set of vehicle/logistics conditions, enabling more effective policy design to improve freight transport efficiency.

The study presents a series of unique load factor data in the current US market, which can be used to compare with the statistics in other countries, or as a baseline data for future studies. The influencing factors identified in the study can help the policy makers understand the connections between load factor and a set of vehicle/logistics conditions, enabling more effective policy design to improve freight transport efficiency.

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