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Does road pricing affect port freight activity: Recent evidence from the port of New York and New Jersey

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ABSTRACT

In this paper, we examine the movement of container freight in, out and around the third largest maritime port in the United States and the use of toll facilities by these freight movements. Understanding how road pricing affects freight activity is of significant interest to transport planners, port operators and commercial interests with regards to regional competitiveness and economic development.

Using a unique survey of truck activity at two maritime terminals in the Port of New York and New Jersey, we examine the frequency of truck trips, toll costs and trip distance, and how these characteristics may affect port freight costs and operations by location.

Key findings indicate that while the New York ports serve 19 states and Canada, the vast bulk of cargo moves are short haul trips of less than 50 miles one way from the port facility. We also find that toll charges in the New York City metropolitan region may represent over 50% of the total costs for a short haul truck trip into or out of a maritime port depending on the location of the port facility. The results presented suggest that road toll programs can place non-trivial costs on truck trips to/from major regional freight centers.

1. Introduction

The New York City metropolitan area represents a massive market for goods movement, both for end point consumption and as a trans-modal point of entry for air and maritime freight. The New York region boasts nearly 20 million residents and sits at the center of the Northeast Corridor megalopolitan region that features about 18 percent of the U.S. population and 20 percent of the nation's Gross Domestic Product (GDP). Goods movement into and out of the New York and New Jersey region is a major economic activity, and the transport and delivery of goods represents about eight percent of total employment growth in recent years, and 1 in 13 jobs in New York State is being supported by the trucking industry. The 405 million tons of freight annually leaving, arriving and moving through the ten-county region within the New York Metropolitan Transportation Council (NYMTC 2014) jurisdiction had a total economic value of $1.34 trillion in 2007, and most of this freight arrived at and left the ports by truck. In 2012, the bridges and tunnels between New York and New Jersey had 105,895,000 vehicles crossing, including 7,401,000 trucks (PANYNJ 2012).

At the core of this freight traffic is the third largest maritime port district in the United States. The maritime commerce activities of the Port of New York and New Jersey are mainly located around the perimeter of the deep water port of the Upper New York Bay. Since the advent of containerization for goods shipping in the 1960's, the port freight facilities have concentrated in five major container facilities around the Upper Bay – three in New Jersey, one in Staten Island and two minor facilities in Brooklyn. Fig. 1 provides a map of the major maritime freight facilities and highway network.

Hauling freight by truck in New York City is a challenging undertaking. The 2001 NYMTC report summarizes the physical and capacity constraints on the industry:

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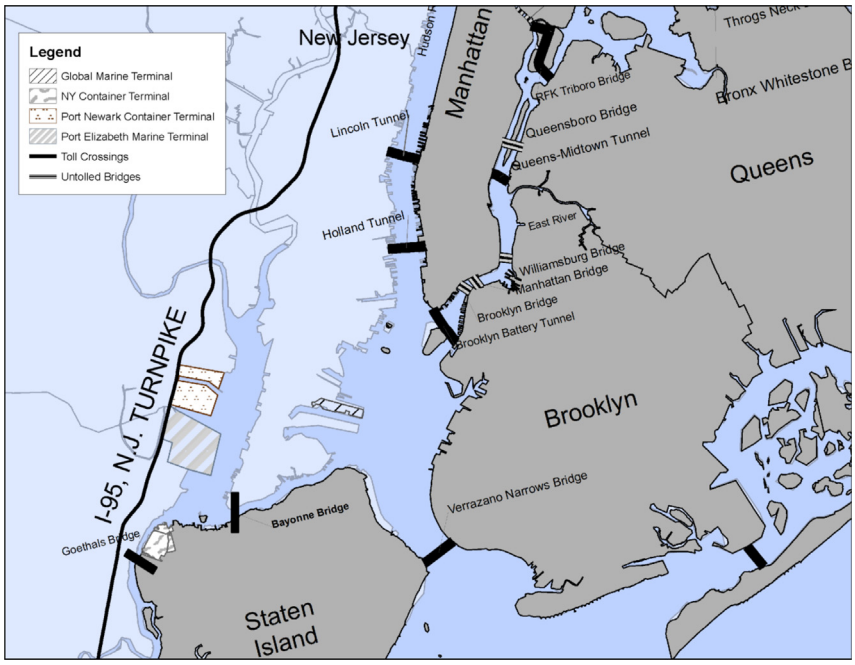

Fig. 1. Map of NY& NJ toll and port facilities.

"The main constraints to more efficient truck freight operations are infrastructure inadequacy: weight limits on bridges and underpasses, clearance restrictions, tight curves and turning radii and narrow travel lanes. Congestion on major regional highways, access to facilities, terminal gate congestion and limited parking possibility are additional constraints. Many other factors contribute to high costs, delay in delivery, insufficient signage, grade crossings with railroads, and inadequate accident/incident management."

(New York Metropolitan Transportation Council, 2001), p. 4

Yet there is one factor not mentioned in that list: road tolls. In particular, roads in the area are heavily and highly priced: roughly one quarter of U.S. road toll revenue is raised in the New York City region.[1] Tolls in the region are generally flat rate tolls paid based on the use of a particular crossing or highway. Some variation in price exists by time of day and based on electronic toll payment. While most of the literature on road pricing has focused on passenger vehicle travel, road tolls certainly affect freight movements and port competitiveness. This paper utilizes detailed survey data on truck movement in and out of Port Authority of New York and New Jersey (PANYNJ) maritime terminals to quantify and understand these impacts, concluding with some policy implications and suggestions for future research.

2. Road tolls and goods movement in urban areas

Road tolls are not currently widely used in the United States, but constraints on traditional revenues for transport investment and maintenance, plus concerns about productivity lost to congestion, have lead many governments to consider expanding the use of tolls. The federal gas tax—the primary revenue source of federal transport investment—has not been increased since 1993, and many states are reluctant to raise local gas taxes. A number of studies have explored ways to make tolls politically acceptable through distributions of toll revenue (Arnott, Rave, & Schob, 2005; DeCorla-Souza & Whitehead, 2003; Ecola & Light, 2009; Gomez-Ibanez, 1992; King, Manville, & Shoup, 2007), and private trucking companies are generally opposed to congestion tolls (Golob & Regan, 2000). In general, efforts to generate political coalitions of support for road pricing have rarely considered the impact tolls have on freight movements.

In part the lack of scholarship that focuses on trucking in the context of road pricing is explained by the dominance of passenger travel in transportation planning and policy.[2] While scholars argue that the theoretical and empirical support for road pricing is relatively straightforward for automobile traffic, few consider that the characteristics of freight activity are not consistent with passenger travel (Holguín-Veras, 2010; Holguín-Veras et al. 2006). David Hensher and Sean Puckett considered how variable tolls would influence the trucking industry (Hensher & Puckett, 2008), and European nations have experimented with truck tolling for many years in order to pay for infrastructure (McKinnon, 2006). With regard to peak hour fees, though, truckers have less freedom to switch the time and location of their travel than passengers do, and for the large majority of cases freight carriers are unable to pass toll costs onto their customers (Holguín-Veras et al. 2006). Swan and

[1] The authors calculated this using toll revenue data for the New York Region from the New York Metropolitan Transportation Authority and the New York and New Jersey Port Authority, along with national toll revenue data from the Federal Highway Administration. All data are for 2011 and the precise estimate is 26.85% of U.S. tolls are collected on trips into, out of and through New York City.

[2] Most transport investment and planning focuses on the movement of people, and in many cases a primary goal of transport policy is to reduce personal travel through reductions in Vehicle Kilometers Traveled (VKT) and auto trips, and road pricing is promoted to internalize many of the external costs associated with automobility. Some of the reductions in auto travel are substituted with increases in goods movement through Internet shopping and home deliveries. Ultimately, current trends and policies suggest that freight travel will grow as a share of overall travel in urban areas and policymakers and planners deserve a fuller understanding of the implications road pricing has on goods movement.