The Effect of a National Congestion Pricing Regime on Commuting Habits in Israel

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This paper analyzes the benefits of a congestion fee with the use of a specially built model. The purpose of this research is to outline, according to a wide range of reasonable assumptions, the expected scale of increase in welfare as a result from congestion pricing and find the optimal congestion fee.

The first chapter introduces the subject, and **the second** reviews the literature. **The third chapter** analyzes the model's outcomes.

The **fourth chapter** describes congestion pricing theoretically as a Pigovian tax and the **fifth** describes the model itself in detail.

Summary:

In Israel, as is the case in many other countries, commuting to work in a motor vehicle involves a lot time spent waiting in traffic. According to an Israel Central Bureau of Statistics social survey, in 2018 2.1 million full-time workers routinely traveled to work by private car, at the average travel time of 27 minutes each way. A review of the average speed of travel on the most common commuting routes (using Google's maps app) shows that the average commuting route would take twenty minutes with no traffic, so that a third of the time spent commuting is due to other drivers being on the road.

Charging a toll for congestion reduces the number of vehicles on the road. However, although such a reduction shortens travel times, it simultaneously reduces the number of vehicles that take advantage of the road and enjoy the shortened commute.

This paper attempts to find the congestion fee that can optimize the balance between these considerations and thus bring about the optimal benefit that can be derived by such a tax regime for the public.

The reduction in the number of commuting vehicles is projected to lessen the density of workers in the metropolitan areas, which in turn lessens the advantages of economic agglomeration. The simulation itself does not consider this cost, but a rough estimate gives the impression that such a reduction will have a significant impact only on areas with less traffic, and not on those representing the three highest deciles of congestion.

We found that for nearly 30% of the most congested commuter routes, the benefit of a congestion fee seems rather worthwhile. This is because every car on highly congested routes delays the traffic

more, and such delay slows travel for a larger number of drivers and commuters on buses and other paid rides.

In the simulation we ran, the value of time saved minus the inconvenience for drivers in changing their commuting patterns in high congestion areas came to about 10-15 shekels per driver per day. The aggregate benefit for 730,000 drivers reaches approximately 10 million shekels a day.

In contrast, this model's findings show only a modest potential benefit to congestion fees on the rest of the country's roads, where the congestion levels are relatively low. The potential increase to welfare on these roads is estimated at 1-4 shekels per driver per day; 3 million shekels a day for 1.5 million drivers in total. On these routes, the current taxes on driving, such as the blo tax on gasoline, are already close to the desired rate of the congestion fee.

The actual increase in welfare derived by the congestion fees is expected to be significantly lower than what it is now projected to be, due to suboptimal fee rates, operational costs, and the potential reduction in urban agglomeration. As mentioned, driving a substantial number of workers towards lower density working hours or working locations may erode their productivity.

Our model predicts that the efficient fee for peak hours would be 50 NIS a day in high density areas, projected to save those paying it approximately twenty minutes of travel per day. Nearly 20% of drivers would be forced to find alternative arrangements.

<u>Recommendations</u>:

Great benefit can be expected from the launch of congestion pricing in the State's Central district, where congestion is extreme and the alternatives for travel and employment locations are relatively wide.

The source code for the model created and used in this paper is published to allow other researchers to review the model and draw their own conclusions.

[Full Paper in Hebrew](#)