

## **Modelling Response to Congestion Pricing in Tel-Aviv – A Tour Based Approach**

**Yoram Shiftan**

**Transportation Research Institute, Department of Civil and Environmental  
Engineering, Technion City, Haifa 32000, Israel**

**[shiftan@technion.ac.il](mailto:shiftan@technion.ac.il)**

Auto restraint policies and congestion pricing in particular are continuously becoming popular among urban planners and policy makers to manage travel demand and traffic in city centers. Many governments and cities are increasingly using and considering such policies as a means of reducing urban road traffic and there is a growing agreement among professional, policy makers and even the public that such measures are effective means of reducing congestion.

Congestion pricing can encourage people to shift from private cars to public transportation. Such policies, however, can have other effects on travel patterns. It may encourage people to travel to other destinations, change the time of day of the trip, and change or cancel their activities. In the long run, it may even cause businesses to move outside the existing business district, thereby dispersing activities and increasing dependency on the private vehicle. Such a response to a new policy may increase congestion and air pollution in the long term, and thus achieve the reverse effects of those intended in implementing the measure.

The objective of congestion pricing should be to increase the attractiveness of the CBD as much as possible by encouraging people to change their choice of travel mode and travel time without discouraging them from coming to the city center. A good policy should restrain commuting by car without hindering shoppers and people doing personal business. Commuters can only shift their travel mode and occasionally the time of day of their trip, but shoppers and other visitors can also shift their destination or even cancel the trip thus affecting the economics of the center.

The benefits and costs of congestion pricing policies should be carefully studied before implementation. To evaluate the potential benefits of auto restraint policies and to learn how they function as a powerful transportation-planning tool, we need an improved understanding of people's responses to them, and how people's response in turn affects traffic congestion, land use, and the vitality and value of the CBD. The need to study the effect of congestion pricing is magnified given the traditional opposition to such measures from state and local officials, business interests, and the general public.

The Ministry of Transport in Israel is currently considering various congestion pricing schemes for the city of Tel Aviv including six specific alternatives using two different approaches: cordon pricing where every driver entering the city has to pay a toll and area pricing where everyone driving in the city has to pay the toll. Residents of the city will receive significant discount of the toll level. For each alternative three different geographical areas for the toll boundary are considered with different radius from the center of the city. The toll will be a flat rate and will be paid once a day independently on the number of times you drive into or in the city or the amount you drive.

In order to study the potential response of driver in and to the city center to congestion pricing a stated preference questionnaire was conducted and a congestion response model is currently being estimated based on these data stated preference data. The focus of this paper is to describe the unique features of this survey, discuss the model estimation results and their implication to the implementation of congestion pricing policy in Tel-Aviv.

The Stated Preference survey is a web based questionnaire. The unique feature of this questionnaire and the model being estimated is in its focus on the person tour patterns and not only on the specific trip in which he entered or drove in the congestion pricing area. A random sample of 800 drivers who drove in or to the center of Tel Aviv in the last week was asked to fill all the details of the tour in which they drove in or to Tel Aviv. This is similar to a travel diary filled in most travel habit surveys and include the time, mode, and destination of every trip they made since they left home till they came back home during the sequence of trips in which they drove

in the potential congestion pricing area. Once the details of the tour are completed the program generates for the driver six different scenarios with different congestion pricing alternatives. For each alternative the program shows the person if it is a cordon pricing or area pricing scheme, the toll being charged and the geographical coverage. The program then asks the driver to consider the tour he just reported under the various congestion pricing schemes. A unique feature of this questionnaire and model is that it allows various responses to the congestion pricing policy at the tour level including shifting to public transportation, changing the time of day of travel to avoid the congestion charges, changing destination, cancelling the trip to the center and paying the toll without changing anything in his travel habits. The program shows the respondent the total travel time and costs for all trips in his current tour and then calculate these parameters for each of his potential responses, i.e., it calculates the time of all trips in his tour if he choose to pay the toll considering the time saving that will be obtained once the toll is implemented, as well as the time that these trips will take if he choose to change his travel time as well as the time and cost of doing these trips using public transportation. Various transit fare reduction are also considered and tested in the choice experiment as part of the policy.

Initial analysis shows that the purpose of the tour and the tour travel pattern affect the response to congestion pricing and these unique observations are possible with such unique data. The model estimation considers all potential responses and accounts for socio-economic variables, tour patterns and level of service data. Model estimation results are expected in the end of February 2008. These results will be compared to previous trip based congestion pricing response model estimated by the author for Tel Aviv and reported in Shiftan Y., and Golani A. (2005), "The effect of auto restrain policies on travel behaviour". *Transportation Research Record, the Journal of the Transportation Research Board*, Vol. 1932, pp. 156-163. Implications for the suggested Tel-Aviv congestion pricing policy will be discussed.