



# EVIDENCE-INSIGHTS-POLICY ALTERNATIVE POLICY INSTRUMENTS TO REDUCE ENVIRONMENTAL AND CONGESTION EXTERNALITIES IN ONE CITY IN MENA

## CONTEXT

How should congestion be alleviated in large and rapidly growing urban areas in developing countries? In practice, policymakers may think and act somewhat narrowly, considering only some instruments that are more politically desirable, and evaluating each instrument in isolation without optimizing an overall objective.

**Economists have emphasized that congestion should be alleviated by pricing it efficiently**, preferably using first-best congestion tolls or more feasibly by instruments such as parking fees, fuel taxes, or public transit subsidies. This emphasis on demand-side instruments is important, but supply-side policies, particularly the expansion of road capacity or adding buses, tram lines and trains, are necessary along with the demand side instruments.

The following studies developed the urban transportation mode choice models for Beirut and Casablanca. The models demonstrate the relative

efficiency of each demand and supply-side option, how they interact with each other when they are used jointly, and the mix of instruments that maximizes social welfare. It also shows how policy effectiveness and the choice between supply and demand-side approaches to reduce congestion depend on city structure.

### Reducing Traffic Congestion in Beirut

Beirut, the capital city of Lebanon, faces massive traffic congestion, the cost of which is estimated to be more than 2 percent of the city's gross regional product. Effective policies are needed, based on weighing their overall economic cost and benefit to society.

**Anas et al. (2017)** develop an empirical model based on microeconomic theory, accounting for production and consumption behavior related to transportation in the Greater Beirut Area, to simulate various policy combinations.

A key finding of the study is that individual supply-side policies, such as the expansion of roads or introduction of a bus rapid transit system, are quite

effective at reducing traffic congestion while increasing economic output and welfare. They also account for most of the benefits of implementing policy packages with supply- and demand-side measures. The introduction of **a bus rapid transit with the expansion of the road system to feed the bus rapid transit system reduces congestion by about 16 percent and congestion costs by more than 50 percent.** This would increase Beirut's gross regional product by roughly 2 percent, and the average social welfare of the residents of Beirut by 4 percent. In contrast, demand-side instruments, implemented alone, lower gross regional product, and welfare with limited effects on congestion.

### Alleviating Traffic Congestion and In-Bus Crowding in Grand Casablanca

Similar to many large cities in developing countries, traffic in Grand Casablanca, Morocco, is congested and public buses are crowded. These conditions are alleviated by a combination of supply-side infrastructure expansions, such as more buses and new road capacity, and demand-side pricing instruments, such as parking and fuel taxes. Using an empirical urban transportation mode

In the case of Casablanca, the optimal mix of supply and demand-side approaches to reduce congestion is sensitive to the marginal costs of the infrastructure expansions.

choice model for Casablanca, **Anas et al. (2018)** find a mix of these expansion policies and pricing instruments to alleviate congestion and maximize aggregate social welfare. The optimal mix is sensitive to the marginal costs of the infrastructure expansions. If the city were to spread out in its periphery where land constraints do not exist, and the land is available at lower prices, a supply-side instrument, particularly the optimal expansion of roads, would be far more effective in achieving welfare gains than the use of optimal pricing instruments without new roads. By contrast, if the city were to densify in already built-up areas, land and other physical constraints and the high price of land may leave expensive "elevated roads" as the only option. In this case, demand-side instruments, together with the elevated roads, would equally contribute to reducing traffic congestion and in-bus crowding.