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TECHNICAL REPORT

Equity and Congestion Pricing

A Review of the Evidence

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Summary

Congestion pricing has become an increasingly viable option for managing congestion and raising revenue for transportation investments. Once relegated to academic discussions, congestion pricing can now be more easily implemented thanks to technologies that make it possible to charge motorists as they drive. Because of these technological advances, congestion pricing has been implemented in various forms in a number of countries, including the United States.

However, congestion pricing tends to raise equity concerns among both the public and elected officials. Since congestion pricing imposes a cost on something that was previously free—access to roadways during peak driving times—critics often suggest that it will harm those with lower incomes who will be forced to pay additional costs or be priced off the roads.

On the other hand, supporters argue that congestion pricing can be more equitable than the current U.S. system for managing the use of roads and funding transportation improvements. First, congestion pricing means that those who contribute most to congestion will be required to pay more. Second, existing transportation fees and taxes, such as the motor-fuel tax, are often regressive, meaning that low-income drivers pay a higher proportion of their income toward them than wealthier drivers do. If broadly adopted, congestion pricing revenues could be used to offset or reduce other regressive fees and taxes. Finally, some argue that congestion pricing can reduce air pollution, which is, in many cases, a serious problem in low-income neighborhoods located near major freeways and arterials, and promote better management of the roadway network, thus avoiding costly capacity investments.

This report examines the equity issues associated with congestion pricing. We used published work, supplemented in a few cases with communication with practitioners, as the basis for the analysis. The evidence we reviewed came from two types of sources: evaluations of existing congestion pricing implementations and models of proposed or hypothetical congestion pricing systems. We found work on equity with regard to congestion pricing in two strands of literature: economic and planning. The former is most often concerned with the distribution of costs and benefits that accrue to society, while the latter is generally concerned with social-justice aspects of congestion pricing and the potential negative consequences for low-income and other disadvantaged individuals.

While equity is broadly concerned with the costs and benefits that accrue to different members of society, specific notions of equity can vary a great deal. In particular, four notions of equity commonly cited in the congestion pricing literature include (1) horizontal equity (members of the same group are treated the same); (2) vertical equity (members of different

groups are treated differently); (3) the cost principle (those who contribute to a social cost pay for doing so); and (4) the benefit principle (those who receive social benefits pay for them).

When congestion pricing is evaluated, it may fare well under some notions of equity but poorly under others. This issue is not easily resolved. For example, since those who contribute to congestion pay to drive during congested hours, congestion pricing fares well on the cost principle. On the other hand, if people in the same income group pay widely different amounts in congestion tolls because of where they live or work, congestion pricing does not fare well in terms of the horizontal-equity principle. While these aspects of equity can be stated precisely, calling one policy or set of outcomes more equitable than another requires that one impose some preferences on the way in which benefits and costs are allocated within society.

Another problem is that, since assessing the equity implications of congestion pricing requires comparisons of people from different groups, the ways in which the groups are drawn makes a difference to the outcome. The economics literature tends to group people based on their income or where they live and work, whereas the planning literature tends to look at the broader category of those who may be in some way disadvantaged with respect to transportation (e.g., because of disability, age, gender, or language ability). Particularly important with respect to congestion pricing is where people live—because of the way in which congestion pricing is implemented, some neighborhoods may bear a far greater burden than others. So, an equity assessment that considers only income may reach a different conclusion if the basis for the assessment is the neighborhood.

For all these reasons, we argue that there is no single answer to the question, "Is congestion pricing equitable?" The answer depends on how we measure equity and define groups, the specifics of the location, and to what we compare congestion pricing. Since it is not generally possible to consider all the numerous facets of equity, it is important for a region considering congestion pricing to select the most relevant criteria for assessing equity given local conditions and concerns.

That said, in reviewing the literature, we did attempt to determine whether there were any broad conclusions that might help address the questions that are often posed with regard to equity and congestion pricing. The main findings are described next.

First, depending on how congestion pricing is implemented, it can be either regressive or progressive. This depends in large part on how toll revenues are used. For instance, if regions spend revenues in ways that benefit low-income individuals, congestion pricing is more likely to be progressive. However, if regions use revenues in a way that benefits all individuals equally, congestion pricing may be, overall, regressive. This is the strongest finding in the economic literature.

Second, even when low-income and other transportation-disadvantaged groups benefit as a whole from congestion pricing, it is very likely that some individuals will still be worse off. These include people with no choice but to drive on congested routes with pricing in effect and those who may have to forgo important trips because they are too expensive. However, many of these same people are also disadvantaged by the current transportation system, and assessments of equity should take this into consideration.

Third, for all forms of congestion pricing (but more for some than for others), the distribution of residents and job opportunities (not to mention shopping, schools, places of worship, and other important destinations) has a large impact on the equity implications. One study, for example, found that cordon pricing, a form of congestion pricing in which drivers pay to enter

a designated area, can be progressive, regressive, or neutral depending on where low-income people live.

Fourth, high-occupancy toll (HOT) lanes, the most common form of congestion pricing in the United States, tend to raise fewer equity concerns among motorists, since they provide drivers with an additional choice of using a set of priced lanes while allowing them to continue using parallel, free lanes if they prefer. While high-income drivers use HOT lanes more often than other drivers, there is little evidence that low-income drivers are made worse off. However, the equity implications of HOT lanes are affected by the location of residents, the costs of participation, and the way in which revenues are utilized. Some analysts have raised concerns that, if HOT lane revenues are used to expand the road network, they will harm the environment and equity by inducing more traffic growth and sprawl.

Fifth, while congestion pricing has been shown to reduce emissions in general, there is scant evidence showing that congestion pricing can specifically reduce negative environmental consequences for neighborhoods disproportionately affected by emissions.

Finally, we found very little or no literature on some topics that we consider important. In addition to the dearth of research on the environmental-justice impacts, there was very little work on the long-term land-use impacts of congestion pricing, the equity implications of building new roads with congestion pricing revenue, and how adding congestion pricing to existing transportation-finance mechanisms (as opposed to replacing them) would change the equity implications overall. Now that congestion pricing is in more widespread use, we recommend that these topics receive further attention by researchers.

Given the risk of negative impacts to low-income and other groups under congestion pricing, we looked at suggested ways to diminish these impacts. Two mechanisms are in common use: (1) revenue redistribution and (2) discounts and exemptions. Revenues from congestion pricing can be redistributed through public works—for example, increasing transit service to create better options not to drive. For this to be effective, the project benefits must flow to those people most disadvantaged by congestion pricing. Researchers have also proposed a number of ways to redistribute revenues on an individual basis, through credit-based systems and tax credits. As none of these credit-based proposals has been implemented, it is difficult to judge their effectiveness.

The other main way to lessen the burden of congestion pricing is through discounts and exemptions. Congestion pricing proposals can selectively exclude or discount certain individuals (e.g., disabled persons), vehicles, or types of trips to make congestion pricing less expensive. However, the trade-off is a higher number of unpaid or discounted trips, which will reduce incentives that seek to discourage driving on congested roads.

The last point on promoting equitable outcomes is that a region seeking to implement congestion pricing should look at measuring and assessing equity early in the planning process. Since equity is so specific to individual regions, those responsible for developing a congestion pricing proposal should test it through modeling to determine who tends to pay charges and whether low-income or other transportation-disadvantaged groups are disproportionately affected. They should also conduct sufficient outreach that residents understand the proposal and have opportunities to offer suggestions. Finally, equity should be monitored after congestion pricing is implemented, and the system changed periodically if the initial tools to promote equitable outcomes are not meeting their goals. It would be useful to develop an "equity audit tool" to simplify this process.