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RUSH- HOUR HORRORS: How Economics Tackles Congestion

by Adam M. Zaretsky



Highways have already been paid for by taxpayers. To toll an interstate is like asking you to pay rent on property you already own.

—Bill Fay, president, American Highway Users Alliance (1997)

The delusion still persists that the primary role of pricing should always be that of financing the service rather than that of promoting economy in its use.

—William Vickrey, economist (1963)

Traffic. Most of us have endured it and maybe even said a few choice words while sitting in it. We've suffered through bottlenecks, gridlock, accidents, rubbernecking, potholes and other annoyances. Rush hours seem to get longer. Generally, they are. Between 1980 and 1990, drivers in St. Louis and Hartford, Conn., spent an average of four more hours a year getting to work. In cities like Los Angeles and San Diego, it took an extra 23 hours a year to get to work.¹

Longer commutes cost not only time, but money, too. Congestion means reduced fuel efficiency and more wear and tear on vehicles and roads. In a 1994 report the General Accounting Office estimated that traffic conges-

tion costs about \$40 billion annually. And this figure will likely go up. New roads are built, but they often end up congested too, as more people choose driving over other modes of transportation. New mass transit systems could be built, but getting people to use existing ones is tough enough.² What else is there to do?

Old Problem, Forgotten Solution

Economists realize that this dilemma is typical of most economic problems, like determining how much an acre of land is worth, and, thus, has a similar and simple solution—market forces. Like acres of land, roads are a scarce resource, which our market system effectively divvies up through prices. And prices act to clear away market imbalances between supply and demand. For example, if the price of an acre of land is too low, too many buyers will want it, forcing the price up until the number of buyers and available acres is the same. The

reverse occurs when the price is too high—too few buyers for too many acres forces the price down until the two are equal.

The same can be said of roads and congestion. Congestion occurs when too many drivers want to use the roads—which have fixed capacity—at the same time because their price is too low. Raising the price, which is now essentially zero, would reduce this demand and better allocate the limited space.

This is not a novel idea. Actually, it was first proposed more than 30 years ago and is already used in similar situations—for instance, landing and take-off slots at airports.

Because only a few planes can take off or land at a particular time, airports charge airlines fees to ration these slots. Phone companies also ration when they charge different rates for calls made during different hours of the day. Basically, both are examples of price discrimination, which tends to redirect some business (traffic) from busy periods of the day to slower ones. In most cases, it works.

So why do roads and highways seem different to most people?

Probably because governments usually provide them through tax dollars, which are used to pay for their construction and maintenance. Hence, drivers believe they are already paying their way for road and highway usage through gas taxes and licensing fees. The story, however, isn't so cut-and-dried.

Private Cost Confronts Social Cost

What drivers are essentially paying for is their *direct* use of roads. They are, in other words, covering their private cost of driving—their share of construction and maintenance costs. However, as soon as a person chooses to drive, he is also imposing a cost on others—an *externality*, in economics lingo—that he does not pay for. One more person driving to work adds an additional car to the traffic flow, which slows down the commute for all drivers. This additional cost, which occurs solely because one extra person chooses to drive, is the social cost of driving and is not usually paid for through taxes or fees.

To illustrate the social cost of driving, economist William Vickrey asserted that a person who bought a \$3,000 car in 1963 was effectively asking his community to match this investment with \$23,000 in general highway funds—an estimate of the government's cost to provide and

maintain the extra traffic lanes needed so that another person could drive to work alone. In 1996 dollars, the community's \$23,000 would have been about \$120,000.³ This is a cost, Vickrey was arguing, that an individual asks society to bear just so he can drive to work each day. But by having to pay a toll during rush hour, drivers would be forced to realize the actual cost their choice imposes on others. Only then could the driver decide if he is willing to pay the price or find an alternative.

How much should this toll be? Economic theory says that the optimal price is the gap between the implied social cost of driving at the time in question and the private cost. Thus, because the additional burden imposed on others is greater during rush hours than, say, late-night hours, tolls would be higher then.

But Will It Work?

In theory, at least, tolls are the best solution to congestion because they would better allocate a scarce resource (road space). In fact, governments already levy tolls when they install parking meters on streets. The meters don't usually charge different rates for different times, but they do ration a limited number of parking spaces.

In practice, though, collecting tolls from moving vehicles is much tougher. Toll plazas are notorious for adding to congestion by forcing traffic to a halt. However, electronic metering devices, which read signals from small, prepaid transponders inside cars, are currently available. These devices not only keep traffic moving, but also can automatically raise or lower tolls at different times of the day.

Imposing tolls on public roads could pose problems for private businesses, too. Firms assume free access to the public roads on which their workers commute and their goods are transported. If workers didn't want to, or couldn't, pay such tolls, they would have to change their work hours, bypass the toll roads or carpool. Firms would then have to adjust schedules to accommodate these workers or pay for their tolls, which they might do, especially if given a tax incentive to do so. This, however, would not help offset the higher transportation costs that firms would incur because of the tolls.

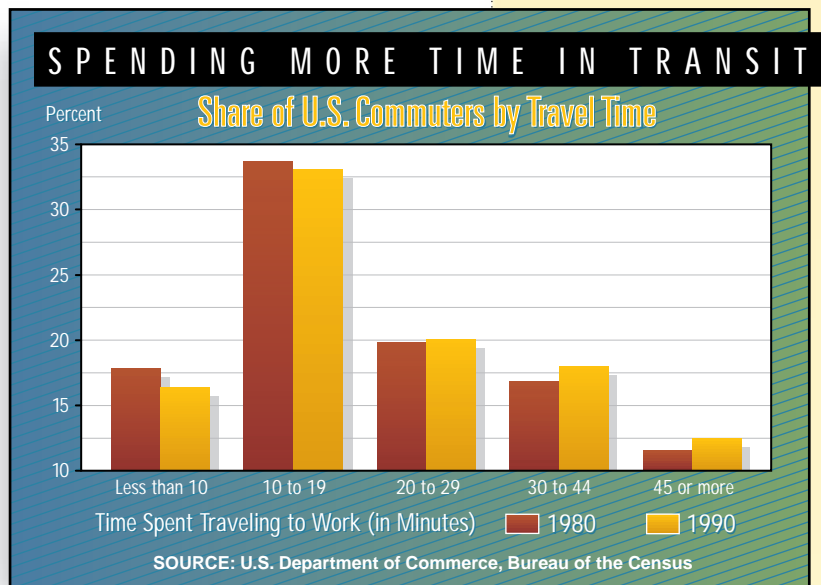
Policy Puzzles

Congestion pricing also raises the question of what to do with the rev-

enues that would be collected. Because the goal of these tolls would not be to raise revenue, but rather to allocate a resource, the price should move as the demand for, and supply of, roads changes. However, since governments are the main providers of roads, perverse pricing incentives could arise. Suppose, for example, that new roads were built to relieve some of the current congestion. Would the tolls on the older roads then be reduced accordingly? Or would the revenues generated by the tolls, which presumably could be used for any government activity, prove too attractive for governments to forego, dissuading them from lowering a toll once it has been imposed?⁴ In other cases in which a

ENDNOTES

- 1 See U.S. Department of Transportation (1993).
- 2 See Zaretsky (1994) for descriptions of some cities' experiences with light rail systems.
- 3 This figure is simply the \$23,000 inflated to 1996 dollars using the Consumer Price Index. It is for illustrative purposes only; no new survey was conducted.
- 4 See Evans (1992) for a more detailed discussion of this objection to congestion pricing.
- 5 A natural monopoly exists when one large firm can produce any level of output at a lower average cost than a group of smaller firms in competition can. See Zaretsky (1995) for a discussion of pricing and regulating natural monopolies.



natural monopoly exists—and this situation is tantamount to a natural monopoly—a government regulatory agency usually oversees it.⁵ Would one be set up to monitor and regulate tolls?

Although these policy issues seem difficult to overcome, they are not insurmountable. And they do not detract from the fact that appropriately pricing congestion will lead to the most efficient outcomes. In response to the tolls, some drivers might carpool or change their schedules to either pay lower tolls or avoid paying them at all; this is exactly the point. These drivers, now aware of the true cost of their commutes, would alter their schedules because this higher cost would be greater than the price they would be willing to pay to drive to work alone. In time, then, the real demand for roads and highways would be revealed, promoting better infrastructure decisions and better use of all resources—pavement, money and time.

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FOR FURTHER READING

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