Applying the Cashing Out Approach to Congestion Pricing

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Congestion pricing is extremely difficult, perhaps impossible, for the public to accept in the form in which it is currently being proposed, for a variety of reasons. First, there are too many people who perceive themselves as big losers under congestion pricing. Second, congestion pricing is viewed by some as "just another tax increase" that will lead to bigger government. Third, others perceive congestion pricing as having a disproportionate impact on low-income groups, taking a larger share of their incomes. Interestingly, all of these objections to congestion pricing may be overcome and pricing made more acceptable by taking the cue from recent developments in parking pricing. Pricing of commuter parking has been made more acceptable through policies that "cash out" employer-paid parking subsidies (i.e., if an employer offers a parking subsidy to an employee, the employer is required to give the employee the option to receive, in lieu of the parking subsidy, the fair market value of the parking subsidy in cash). The "cashing out" concept could be extended to peak period road pricing, either to an entire regional system or to a specific corridor or bridge location. It would work as follows: Peak period tolls would be imposed on free roads, and all peak period commuters would be provided with a credit or a "smart card," which they could use to pay tolls during the peak periods. The value of the credit or the amount encoded on the smart card would be equal to the peak period toll each commuter would be required to pay each month after congestion pricing is implemented. Credits or smart cards could be exchanged for transit farecards or cash, thereby providing an inducement to solo drivers to carpool and pocket the cash or to take transit. Noncommuters, who would not be eligible for "free" credits or smart cards, would provide sufficient funds through their toll payments to fund all cash payments. Discussed are various implementation aspects of such a policy and its probable impacts on travel demand. It is demonstrated that sufficient funds would be received from noncommuters to pay those who want to "cash out" their credits. Fairness issues are discussed. Finally, a method to test the concept on a limited basis on an existing congested toll facility is suggested.

Recently, interest in congestion pricing has increased in the United States (1). The interest stems from three recent developments: (a) the recognition that, because of funding and environmental limitations, urban areas will not be able to "build their way out of congestion"; (b) the emphasis on reductions in vehicular travel demand, environmental considerations, and economic efficiency in recent federal legislation, such as the Clean Air Act Amendments of 1990 and the Intermodal Surface Transportation Efficiency Act (ISTEA); and (c) electronic toll collection (ETC) technology, which eliminates the need for toll booths and allows tolls to be collected without the vehicle having to stop or slow down.

In spite of the increase in interest, however, only one urban area (San Francisco) is proceeding to implement congestion pricing on roadways or bridges. In November 1992, FHWA solicited congestion pricing projects for funding with 100 percent federal funds under ISTEA's Congestion Pricing Pilot Program, but only

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one project met the eligibility criteria that FHWA had set. Most of the projects submitted for consideration did not propose to increase the price of travel on congested mixed-flow traffic lanes or bridges, and therefore little or no change in motorist behavior could be expected. The only acceptable project was one that involved increasing tolls on the San Francisco Bay Bridge during peak periods.

WHY CONGESTION PRICING IS CURRENTLY UNACCEPTABLE

It is not surprising that only one project involving true congestion pricing was proposed. This is because, in spite of its many economic and environmental benefits, congestion pricing is extremely difficult and perhaps impossible for the public to accept in the form in which it is currently being proposed, for a variety of reasons.

First, there are too many people who perceive themselves as big losers were congestion pricing to go into effect. The very few who perceive themselves as winners do not see themselves gaining much. Only a few high-income travelers and commercial road users value the time savings from reduced congestion somewhat more than the toll price. Second, congestion pricing is viewed by many as "just another tax increase" that will lead to bigger government. Third, many are against congestion pricing because it is perceived to have a disproportionate impact on low-income groups, taking a larger share of their incomes. Finally, it is difficult to tell the commuting public that they will be charged for something that they currently get free, especially when they have already made long-term decisions, such as where to live, on the basis of the current price structure for transportation.

MODEL TO FOLLOW IN OVERCOMING OBJECTIONS

Interestingly, the preceding objections may be overcome and congestion pricing made more palatable by taking the cue from recent developments in parking pricing. Currently, well over 90 percent of U.S. commuters receive free or subsidized parking from their employers. Pricing of commuter parking has been made more palatable through an ingenious idea developed by Donald C. Shoup of the University of California at Los Angeles (2). Shoup proposed a policy to cash out employer-paid parking subsidies. The policy was passed into law by California recently. Under the law, if an employer offers a parking subsidy to an employee, the employer is required to give the employee the option to receive, in lieu of the parking subsidy, the fair market value of the parking subsidy in cash. (Recently, the Clinton Administration has proposed revision to the U.S. tax laws to encourage employers to provide cash out options to their employees, as part of its plan to reduce emission of greenhouse gases and combat global warming.)

There are no major losers from the cash out policy. The employer does not spend any more than before, but simply pays the employee who chooses not to drive the amount previously paid the parking operator. Employees who continue to drive do not pay any more than they did before.

However, there are many who gain: (a) employees who decide to switch to a carpool get extra cash in their pockets; (b) employees who switch to transit have all or part of their fares subsidized; and (c) the government gets additional tax dollars, because cash payments to employees are taxable as income. The benefits to those who switch are progressive, that is, the poor who take cash get a larger percentage increase in their incomes.

CASHING OUT FREE ROADS

Shoup's idea can be extended to peak-period road pricing, through a concept that may be called "cashing out free roads." One study (3) has shown that future public highway infrastructure costs to serve peak-period travelers range from 12.5 to 19.8 cents per peak period vehicle mile of travel (VMT), whereas user taxes and tolls average only 2.0 cents per VMT. Thus the subsidy to peak period travelers amounts to 10 to 18 cents per VMT, or \$2.00 to \$3.60 for a 20-mi round-trip during peak periods. This subsidy, like parking subsidies, could theoretically be cashed out. In other words, funding proposed to provide infrastructure for free peakperiod travel could theoretically be offered in cash to would-be peak-period drivers as an inducement to shift to other modes, thus reducing the need for additional infrastructure. However, this would be difficult if not impossible to do in practice for a variety of reasons. For example, the funding necessary to provide for new highway infrastructure needs may actually be nonexistent.

The paper discusses a way in which the concept could be made more practical through a modification in the source of funds for cash payments and a change in criteria for determining who is eligible for the cash-out option. The concept could be applied either to the entire regional system or to a specific corridor or bridge location. Implementation on a regional basis is discussed first. Later, implementation on a single facility or set of facilities during the testing phase is discussed.

The concept would work as follows: Peak period tolls would be imposed on all free roads, and tolls on existing toll roads would be raised during peak periods. If tolls are equated to the subsidy to peak period travelers on the basis of long-run highway infrastructure costs (3), they may be more acceptable to the public than congestion-based tolls. All peak-period commuters would be provided with a credit or a "smart card" to pay the tolls. The smart card would be similar to transit farecards currently provided for travel on rail transit systems. The value of the credit or the amount encoded on the smart card would be equal to the peak-period toll (or toll increment, on existing toll roads) that each commuter would be required to pay each month after congestion pricing is implemented in the urban area. Information on the employee's home and work location, obtained through the employer, would be used to calculate the total toll value to be credited to the employee or encoded on the smart card. (A similar system is currently being used by the U.S. Department of Transportation to distribute transit farecards to its Washington headquarters employees.)

Credits or smart cards could be exchanged for cash. Noncommuter traffic, which would not be eligible for free credits or smart cards, would provide sufficient funds through their toll payments to fund all cash payments. Cash could be obtained from ATMlike machines at rail stations or carpool park-and-ride lots. Alternatively, unused credits could be periodically rebated to the employee like income tax refunds. This would be a significant monetary incentive for singe-occupant vehicle (SOV) drivers to share rides and for high-occupancy vehicle (HOV-2) commuters to increase the number of riders in the carpool. If adequate transit service is available, some SOV drivers or HOV users might be induced to switch to transit.

Note that there are two conceptual differences between congestion pricing and the parking cash-out approach. First, market prices already exist in the case of parking (at least in downtown locations), whereas the imposition of tolls creates a new market. Second, noncommuters will lose, whereas in the parking cash-out case few if any will lose.

IMPACTS OF CASHING OUT FREE ROADS

What would be the impact of such a policy? Shoup's case study analysis (2) has shown that when drivers pay for parking, the number of cars driving to work per 100 employees drops from 72 to 53—a drop of about 26 percent. Many economists believe that there is no difference between the travel demand impacts of cashing out policies and simply raising prices, because drivers are put in a position of having to forego cash to continue their previous travel behavior. Responses to California's cashing out policy should provide data to make comparisons between the two approaches.

Assuming that peak-period tolls for a commuter's trip would roughly equal the parking cost differential in Shoup's analysis (equivalent to an average toll of about 15 cents per mile), we could estimate that a regionwide system of congestion pricing would result in a similar drop of about 26 percent in the number of commuter vehicles driven during peak periods. Larger reductions could occur if commuters have the flexibility to shift their time of travel to off-peak periods.

Recent data from the 1990 Nationwide Personal Transportation Study (4) suggest that commute trips represent about half of the total number of VMT during peak periods. The reduction in peakperiod VMT that could be expected from the policy would thus be 26 percent of the 50 percent commuter VMT, or about 13 percent.

PAYING FOR IMPLEMENTATION COSTS

Would there be sufficient funds from paying noncommuters to pay those who want to cash out their credits? First, let us estimate the amount of credits that will be cashed out. On the basis of estimates discussed in the previous section, only about 26 percent of former drivers would cash out their credits. However, previously existing nondriving commuters (e.g., carpool passengers, transit passengers, and bicycle commuters) are potential drivers. They would also be eligible for credits or smart cards, which they would cash in. On the basis of current carpooling, transit, and other mode usage for commuter trips (5), the pool of potential drivers represents an additional 14 percent of base commuter drivers. The total number of commuters cashing in their credits or smart cards would thus represent about 40 percent (i.e., 26 percent plus 14 percent) of commuter drivers. Assuming that nondrivers and drivers have roughly the same trip lengths (in miles), the amount to be paid out would represent about 40 percent of the 50 percent of base peakperiod VMT represented by commuter travel, or about 20 percent of base peak-period VMT.

The remaining 50 percent noncommuter share of base peakperiod VMT represents nonwork travel, commercial travel, travel through the urban area by outsiders, and travel into or out of the urban area by visitors. These travelers would pay tolls that would provide the funds to pay those commuters who want to cash out their credits or smart cards. Elasticity of highway travel relative to price generally ranges from 0.1 to 0.4. In other words, a doubling of price (i.e., a 100 percent increase) would reduce highway travel by 10 percent to 40 percent. Assuming an extreme case drop of about 40 percent in noncommuter VMT as a result of tolls, about 30 percent of base peak-period VMT (i.e., 60 percent of the 50 percent base noncommuter VMT) would pay tolls. The funds collected from the 30 percent of base VMT who were paying tolls would be more than enough to pay for the 20 percent of base VMT who would use the cash out option. In other words, even under a very pessimistic rate of revenue recovery from noncommuters, there would be a balance of funds equivalent to tolls from 10 percent of base peak-period VMT.

The balance of funds (i.e., funds from the 10 percent of base peak period VMT) could be used, in part, to pay for toll transaction costs (e.g., ETC, enforcement, administration, and billing). Toll transaction costs perhaps could be reduced by instituting tolls only in the afternoon peak periods at twice the rate that would otherwise be charged. Such a strategy should not change the impact on commuter behavior and will maximize the impacts on noncommuter travel, which represents a much larger share of afternoon than of morning peak-period travel. Toll transaction costs can be expected to be about 5 percent of toll charges when ETC is implemented on a massive scale. Looked at another way, tolls paid by 5 percent of peak-period VMT would be sufficient to pay for all toll transaction costs. Because after implementing the policy peak-period VMT would represent about 67 percent of base peak-period VMT (i.e., a 13 percent reduction from commuter VMT and an extreme-case 20 percent reduction from noncommuter VMT), toll transaction costs would equate to tolls paid by about 3.3 percent of base peak-period VMT.

The remaining balance of tolls collected (i.e., funds from about 6.7 percent of base VMT) could be used to subsidize any noncommuter travelers with particular hardships (e.g., by providing discount toll rates for low-income groups).

PUBLIC ACCEPTABILITY

The concept of cashing out free roads can overcome most of the major objections from the public that have stymied implementation to date.

First, the most vocal opponents of peak-period pricing (i.e., commuters) under the traditional approach do not lose anything under this approach. All gain from reduced delays and frustration as a result of lower congestion levels, and some in fact gain in

monetary terms if they decide to switch modes. Second, the concept can easily be sold to fiscal conservatives as being both revenue-neutral and economically efficient. Third, those concerned about impacts on the poor will clearly see the benefits to low-income commuters—who are more likely to "take the cash" and carpool or ride transit. Finally, commercial users will find it appealing (because their transportation productivity will increase) and will not mind paying for the benefits of time savings and reliability. (For example, commercial travel time is valued at about \$30.00 per hour; this means that commercial travelers should be willing to pay as much as \$2.50 in tolls if the pricing policy saves them just 5 min per trip from reduced congestion.)

Some will remain losers. For example, nonwork travelers will lose money. However, they will have smaller losses if they decide not to travel regularly during peak periods or shift their time of travel to avoid the toll. Proponents of the pricing policy should expect to draw substantial opposition from this group, which may pose a significant political stumbling block. However, the magnitude of the opposition would be far less than the outrage that a traditional approach would elicit from commuters. Besides, support for the policy could be expected from commuter groups because highway commuters would benefit from reduced congestion levels, and transit commuters and carpoolers would in effect get a commuter subsidy. This support could be used to counter any opposition from noncommuters.

Whereas most commercial travelers will have net benefits despite the new tolls they will have to pay, it may be hard for the policy proponents to convince commercial travelers that congestion levels will indeed drop drastically and that their time savings from reduced congestion will be enough to compensate them for the tolls. However, if pilot tests of the concept (as discussed in the next section) are carefully crafted and prove it to be successful, the concept will be a lot easier to "sell" to commercial groups.

Occasional travelers, such as visitors to the area or those passing through, may lose. However, many visitors and those who pass through the urban area will not mind tolls since they make longer trips and therefore value time saved. In any case, these travelers have a limited ability to organize any substantial opposition because they do not live in the area. However, if the economy relies on tourism, some opposition could be expected from the tourist industry.

Despite additional administrative burdens that employers will have to face if they are to be tapped for verification of employee data and for distribution of smart cards, they may be expected to support the approach because (a) a commuter subsidy would become available to employees who carpool or ride transit; (b) the promise of lower congestion would reduce the psychological toll on their employees and thus make them more productive; and (c) employers who have instituted transit fare subsidy programs may be in a position to terminate those programs, with consequent savings. In air quality nonattainment areas classified as severe, this approach may be a substitute for the requirements of the Employer Commute Options program, whose burdens on larger employers are greater than those under this approach. On the basis of these considerations, area employers might be expected to support the congestion pricing policy.

FAIRNESS ISSUES

Fairness issues are sure to be debated by policy makers. First, is it fair to have noncommuters pay to keep commuters off the roads? Some could argue that commuters and noncommuters have equal rights to the use of roads during peak periods, and therefore noncommuters should not be discriminated against. However, offpeak noncommuters are already paying an unfair share of the costs of building highway capacity improvements needed primarily for peak-period commuters through their fuel taxes, property taxes, sales taxes, and even income taxes (3). With the proposed congestion pricing policy, unfairness to noncommuters will simply be more blatant.

A second fairness issue sure to concern policy makers is as follows: Is it fair to pay existing carpoolers and transit riders simply to continue socially good behavior that they have already opted for supposedly in their own best interest? Do they deserve the windfall from free credits or smart cards? Perhaps one way to counter this concern would be to suggest that existing carpoolers and transit riders could give up their rights to existing and future planned HOV lanes in return for the windfall. (Note that HOV lanes would be unnecessary under congestion pricing, because tolls would be designed to eliminate most congestion, that is, there would be no time advantage in using HOV lanes.) There would be no need to build the massive HOV lane systems being proposed in some urban areas. The resources that the government might have otherwise expended may be likened to the resources that might have otherwise been expended by employers on parking leases and so forth if Shoup's parking cash-out program were not in place. Just as it is fair that the freed-up resources from unneeded parking are returned in cash to employees, it is also fair for freed-up resources that would otherwise be expended on unneeded HOV lanes to be returned to those who help make them unnecessary. Of course, since sufficient cash should be available from tolls on noncommuters, there is no need to dip into the pool of "saved" resources.

The saved resources could instead be expended to maximize total transportation system efficiency or for any other purpose deemed fair by policy makers. One great advantage of the pricing polity is that policy makers would get a clear signal as to when further investment in the transportation system would be more efficient. If tolls needed to optimize traffic flow are higher than the public and social costs for providing added capacity, it would clearly signal to policy makers that investment in added capacity would be warranted on grounds of economic efficiency.

TESTING THE CONCEPT

Before full implementation on a regionwide basis, the concept can be tested on any congested facility, preferably a facility with existing tolls—a toll road, bridge, or tunnel—where opportunities for diversion of traffic are limited. Likely candidates are the Bay Bridge of San Francisco or the set of bridges and tunnels connecting New York City and New Jersey. Peak-period tolls could be raised, and at the same time all commuters could be provided with bonus coupons whose value would be equivalent to the toll increase. Thus, in effect, only noncommuters (nonwork travelers, commercial traffic, visitors, and through traffic) would pay the higher toll. The coupons would be redeemable for cash.

Eligible commuters would be identified through mail-back postcards distributed as they drive through toll booths. To enroll in the coupon program, commuters would use the postcard to provide information on their employer's address, their home address, and their work schedule. To reduce temptation for fraud, the postcard would warn of criminal penalties that might apply to fraudulent claims.

The coupons could be sent to the commuters' employers for distribution to eligible employees. Along with the coupons, the employee would be provided with a carpool match list derived from the initial postcard survey, providing an additional incentive to those who would like to cash out their coupons but don't know who they could ride with. If adequate transit service between the commuter's home and office is available, the route schedules would also be enclosed.

Note that existing transit riders and carpool passengers would be eligible for the coupons. During the postcard survey, all occupants of buses and carpools, as well as transit passengers on rail lines in the corridor, would be provided with the postcards. If transit riders form a large share of corridor commuters, funds from paying road users may be insufficient to pay for coupons cashed out by transit users. Peak-period fares in the corridor may have to be raised sufficiently to provide the needed cash. However, raising transit fares would reduce the incentive for solo drivers to shift to transit. The incentive to shift to carpools would remain.

CONCLUSIONS

This paper has presented a new concept that could improve the political acceptability of congestion pricing, either at the facility level or systemwide. The concept of cashing out free roads would eliminate the major objections of policy makers and the public to the concept of congestion pricing. Urban areas with existing toll facilities that are congested have a unique opportunity to test the concept on a limited basis on those facilities before commitment to larger-scale implementation.

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