COLLECTION PROBLEMS AND THE PROMISE OF SELF-CANCELING TICKETS

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This paper discusses collecting motor vehicle user charges by time-calibrated self-canceling tickets (timer-tickets). In a designated area, a timer-ticket, about the size of a 3- by 5-in. (76- by 127-mm) card, would be displayed on the windshield of an automobile to show whether the driver paid for the vehicle to be in the area. The timer-ticket, when bent or scratched, changes color to red. This shows that the ticket has been activated. It also starts a chemical reaction that, after a preset time, results in a second color change, to blue. This shows that time is up. The ticket has canceled itself. The paper emphasizes that the administrative simplicity and the ease of sale of timer-tickets would be profitable to local governments. It also discusses the categories in which timer-tickets may be used: overnight parking, historic area parking, toll collecting, and congestion pricing.

•IN THIS era of big science many people do not understand that small technologies have a large effect on the system to which they are applied. For example, the invention of carbon paper made it possible to design an endless variety of administrative systems based on shared information. These are sometimes called "linchpin" technologies. I am going to discuss a new linchpin technology for collecting motor vehicle user charges that would offer great flexibility and would be a necessary first step in the implementation of user-charge systems. This new technology is a time-calibrated self-canceling ticket (timer-ticket). The ticket, about the size of a 3- by 5-in. (76- by 127-mm) card, would be displayed on the windshield of an automobile to show whether the driver paid for the vehicle to be in a designated area.

The timer-ticket, when bent or scratched, changes color immediately to red to show that the ticket has been activated. It also starts a chemical reaction that results in a second color change, to blue after a preset time. The blue shows that time is up. The ticket has canceled itself. Here is how a 25-cent timer-ticket would be used to pay for 1 hour of parking:

The motorist, after parking, pulls out a 25-cent timer-ticket that was bought earlier. The driver rubs the card with a coin and the ticket begins to turn red. After more rubbing, more red appears and the ticket is activated. The driver notes that it is 1:30 p.m. and puts the ticket on the dashboard so that it shows through the windshield. The ticket stays red until 2:30 p.m. when the hour is up. Then it changes to blue.

A sharp color change when time is up is important because the ticket must tell enforcing officers on a "yes or no" basis whether the vehicle is permitted to be in a restricted area. A ticket that gradually changes from one color to another will not work because it would be difficult to tell whether it was valid.

A wide variety of administratively simple user-charge systems can be designed around self-canceling tickets. One feature that contributes toward simple administration is that tickets can be sold undated in advance. Tickets could also be sold one at a time or in books, over the counter, from slot machines, at gasoline stations, or by mail. And, because of the convenience, many motorists may keep books of prepaid tickets on hand, and the local governments that issue the tickets could borrow larger sums of money on their larger capital income.

PARKING

Because timer-tickets are cheap and require no street installation or maintenance, they could be used where mechanical parking meters are inappropriate—for example, overnight parking where charges are low and parking is long-term; historic area parking where aesthetic considerations rule out street hardware; or truck parking where different charges for time, space, or type of vehicle will be made.

Overnight Parking

The self-canceling ticket might be particularly useful in charging for overnight parking on city streets where charges are low and parking long-term. Timer-tickets for 12 hours would be presold to motorists as overnight parking permits for designated streets. The motorist, after parking his or her car, would "pay" for the space by activating the ticket and placing it against the inside of the windshield. While the ticket showed fluorescent red, the car could park all night on streets designated for all-night parking. After 12 hours, the ticket would cancel itself by turning blue. To park the next night, the motorist would have to use another timer-ticket.

New York, Philadelphia, Baltimore, Boston, and Minneapolis have considered charging for overnight street parking to generate revenue more than to allocate street space. Although their financial need was great and potential revenues were substantial (the Office of the Administrator in New York City estimated that an overnight parking charge would net approximately $60 million per year), there was no suitable way to collect overnight charges. Overnight parking charges could have been collected by conventional meters. But parking meters, particularly in residential areas, have several drawbacks: Some neighborhoods object to them for aesthetic reasons and in some neighborhoods they are vandalized. Overnight charges also could have been collected by a monthly or annual permit system. This avoids the aesthetic and vandalism problems, but a prepaid permit is so inflexible that it is likely to be politically unacceptable because it requires payment in advance whether or not the motorist actually gets to use what he has paid to use. At worst, a permit system works like a nuisance tax—at best, like a hunting license. A city that has an overnight charge in residential areas should charge for space only when it is used. Otherwise, the public response might be what it was in Philadelphia some years ago. In that city, motorists who could not find parking spaces under the "hunting license" scheme were so angry that they actually stoned the mayor's house to emphasize their displeasure. The scheme was dropped.

Under a timer-ticket scheme, a motorist would pay for a parking space only if it was used. If the motorist did not find a space on the street and parked in a garage, he or she need not use a permit. So the timer-ticket system may be politically more acceptable than other prepaid systems.

Historic Area Parking

Timer-tickets might also be used for making space available to short-term parkers in historic or other aesthetically sensitive areas where mechanical meters are unsightly or otherwise inappropriate. In these areas timer-tickets could be used to attract visitors rather than commuters. For example, tourists could buy tickets for parking on the Mall in Washington, D.C.

Truck Parking

Timer-tickets of different values could be used to levy special charges against trucks making deliveries or pickups during peak hours. Similarly, timer-tickets could be used to charge for and thereby discourage unnecessary double-parking where measures to completely prohibit double-parking are unreasonable.

TOLLS AND CONGESTION PRICING

Timer-tickets offer a wide variety of parking options, but they really come into their own when it comes to collecting charges in congestion-prone areas.

Economists and others have long urged that highway congestion be controlled through the application of user charges. While in the past this has had little prospect of being carried out, pressure has built up lately for the application of user charges to control air pollution and to reduce energy consumption. A good deal of attention has been given to the costs and benefits of road user charges. But, except for the British, nobody has really considered the methods by which charges could be collected. Most people simply take it for granted that road user charges can be collected on a large scale because tolls are collected on a smaller scale at highways, bridges, and tunnels. But toll facilities are poor models for collecting user charges on a broader scale.

Current technology for collecting tolls is inadequate for collecting charges in congestion-prone areas. Toll facilities use too much space with plazas and booths that create traffic bottlenecks. Automated electronic collection might reduce this problem, but the cost-effectiveness of automatic vehicle identification (AVI) systems depends on requiring all vehicles using the controlled areas to be equipped with electronic devices. It will be difficult for any government to charge motor vehicles for something that is now free. This difficulty will be compounded if user charges depend on electronic surveillance of all vehicles in the system. Many people might consider this an invasion of privacy. A more flexible user charge collection system should be used as a supplement to or a substitute for electronic devices. The timer-ticket is such an option.

Timer-tickets could be used to collect entrance charges to bridges and tunnels, especially those without room for toll plazas (e.g., New York City's East River bridges) or where toll plazas would spoil the environment (e.g., Washington's Memorial Bridge). The motorist would activate a timer-ticket before reaching the check point of the bridge or tunnel. The activated ticket showing fluorescent red would be displayed on the windshield where it can easily be spotted as cars move past the check point. At the end of a preset time, the ticket would cancel itself. The motorist might have to use another timer-ticket for his next trip through the facility. The timer-ticket could be used in conjunction with AVI. Regular users who prefer to be billed could voluntarily equip their vehicles with AVI devices. Occasional users or those who prefer not to be identified could prepurchase timer-tickets.

Area Access

The timer-ticket is a simple way to levy a 1-day charge on motor vehicle users who drive into or through congestion-prone areas. The area might be a central business district (CBD), a transportation corridor, or even a particular street or highway. Timer-tickets would permit local governments to control the area all the time or some of the time. There could be different prices for different parts of the city. For example, it might cost the motorist 2 tickets to be within the CBD but only 1 ticket to be on its fringes.

Local governments might also use the timer-ticket with either an AVI system or a prepaid monthly sticker system such as that proposed for London. In the sticker system, regular travelers would prepurchase semiannual stickers. In an AVI system, regular users would be equipped with electronic units. Occasional users such as sales representatives and shoppers, would buy a 1-day timer-ticket to save money. This option makes the administratively efficient sticker system workable because the occasional traveler can be easily accommodated.

ADMINISTRATION

Vehicles in a timer-ticket system do not have to be checked at fixed observation points. They can be checked randomly within the control area. The system also lends itself to a statistical sampling type of enforcement.

Some people will try to cheat the system, but total compliance is not necessary for the system to be economical if the number of cheaters can be kept to within acceptable limits. This can be done by cracking down whenever statistical samples show that it is necessary.

Cracking down would involve checking for forgery. Although the timer-ticket is designed to make forgery impossible, some people will undoubtedly attempt it. Although

forgeries would be impossible to spot in moving traffic they can be spotted easily when the vehicle is standing still. Police can also check for forged tickets as a routine matter whenever they stop a vehicle for a traffic violation.

One political question remains to be answered: Are people willing to pay for a public facility that has always been free? Most likely the answer is no. We should, therefore, consider other methods for allocating road space. One method is lotteries. Another is rationing. Timer-tickets could make either system work.

In a lottery system, vehicle owners wishing to try for a monthly set of daily timer-tickets would send in an application form along with a nominal fee. The fee would be set high enough to discourage people with marginal needs. Winners of the lottery would receive 1 month's supply of daily timer-tickets. Because the tickets would not be coded for specific days, the winners could use them as needed or they could sell their unused tickets.

A road rationing scheme, such as the Israelis are using, would operate similarly. Vehicle owners would receive a ration of 1-day timer-tickets that would limit vehicle-days of use. Because the tickets would be open-dated, owners could decide when to use their tickets or they could decide to sell them.

All the systems discussed have their advantages and disadvantages. The point is that timer-tickets would make them all administratively simple and thereby more likely to succeed.