

Phasing in the User-Pays Concept on Urban Freeways: The Privatization Strategy

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There is a role for the private sector to play in helping to solve what one transportation economist termed the "plague of the century," urban traffic congestion. For a variety of reasons, increasing the number and capacity of freeways as a means of reducing traffic congestion is unlikely. Similarly, tolling traffic- and driver-management techniques are limited as long-term solutions to this problem. The expansion of public transit also lacks promise as a long-term solution. The introduction of the user-pays principle could make a significant contribution to ameliorating traffic congestion if a politically feasible strategy to phase in the user-pays concept can be developed. The successful application of privatization to other public services suggests that a privatization strategy may have an excellent chance for success. Such a strategy is outlined and incentives, which might overcome the opposition of interest groups that have hitherto opposed the user-pays concept, are suggested.

More and more of America's large cities and major metropolitan areas face traffic congestion that significantly reduces the quality of urban life and threatens their economic vitality (1, p. 2092). Traffic congestion may be the major transportation problem of the late 1980s and early 1990s according to C. Kenneth Orski, former Associate Administrator of UMTA and currently a transportation consultant (2).

Public officials from large cities such as Los Angeles predict regular gridlock by 1990 (3). However, some prominent transportation economists reject this possibility, arguing that when traffic reaches a certain threshold level, commuters and businesses will seek to relocate their economic endeavors to less congested areas. They predict, instead, central city stagnation and more decentralized development rather than regular gridlock.

Transportation economists indicate that a major reason for much peak-hour traffic congestion is that vehicle users pay for road use indirectly through license fees and the gasoline tax. Such indirect pricing fails to take into account the location and time of use. Thus motorists consider only their own time costs and not the time effects on other users (4, p. 3) or what some economists term "congestion externalities" (5). As economists have shown, beyond a certain threshold point the addition of more motorists to the traffic flow has an increasingly cumulative effect on traffic congestion.

To reduce peak-hour congestion, traffic engineers and public officials have traditionally sought to expand the supply of roads to meet peak demand. In recent years, however, budgetary constraints and environmental concerns have slowed new construction, so engineers and public officials have sought to reduce traffic congestion through the use of more efficient

traffic and driver management techniques as well as the fostering of public transit.

More than 20 years ago, a few courageous economists began to research the feasibility of another approach to reducing traffic congestion: the application of direct pricing to road use. Transportation economists generally have agreed that direct road pricing could significantly reduce traffic congestion, although a number of problems would have to be addressed and resolved. By the mid-1970s, UMTA was sponsoring research and seeking to implement a direct road-pricing demonstration project.

In spite of the generally strong endorsement of transportation economists (4, p. 1) and the willingness of UMTA officials to sponsor road-pricing experiments, the direct road-pricing movement screeched to a halt. As one of the first economists to suggest direct road pricing, Alan A. Walters, observed (6, p. 50):

[T]he main and abiding failure has been on the political front. . . . Road pricing has been a progeny of the technocrat or even the administrator, but politicians have generally disowned it.

Thus the major obstacle to road pricing in the United States appears to be one of political feasibility. As UMTA learned in its unsuccessful attempts to set up a direct road-pricing demonstration project in three U.S. cities, opposition to road pricing arose from several different transportation interests who were, for the most part, impervious to strong economic arguments.

Within the next few years, a new approach to the delivery of public services may provide or add enough additional incentives and advantages to overcome the strong opposition from these interests and to garner support from the general public. This approach is known as privatization, the transfer of services and assets from the public to the private sector. The successful application of privatization concepts in both U.S. local and state governments and in Britain at the local and national level suggests that there may be untapped resources with which to generate additional incentives to overcome the opposition from interests opposed to direct road pricing.

TRAFFIC CONGESTION BECOMING INTOLERABLE

The severity of traffic congestion in some urban areas is indicated by congestion that may begin as early as 5 a.m. or 6 a.m. and that often lasts until midnight on some freeways in Dallas, Houston, Los Angeles/Orange County, and Long Island (1, p. 2092).

The environmental costs are also becoming increasingly high. According to one Urban Institute researcher (7, p. 5):

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In some areas where dense traffic occurs primarily at peak periods, traffic congestion and large volumes of carbon monoxide emissions go hand-in-hand. In most cities, peak period traffic accounts for about one-third of total traffic in an eight-hour period; as a result, reductions in peak traffic alone will substantially reduce carbon monoxide pollution.

In Los Angeles, pollution generated by just 10 percent of daily traffic (upwind, morning, and peak hour) may be responsible for 40 percent of vehicular smog and congestion (8, p. 1).

There is certainly reason to expect that traffic congestion will have increasingly serious effects on particular businesses. For example, the effect on central city retailers may be quite detrimental (9, p. 91):

Shoppers are increasingly discouraged from entering the city centres by time wasting congestion. This means that those whose time is valuable are the first to attempt to buy their goods in less congested suburban centres, while it is those whose time is least valuable who tend to shop in congested areas.

The effect of severe congestion may also lead to limited-growth measures that cannot help but retard overall economic development. In Los Angeles, for example, several powerful city council members spearheaded a successful initiative, passed on November 4, 1986, to impose strong restrictions on future development in order to prevent worse traffic congestion (10).

OTHER SOLUTIONS LIMITED

Four basic approaches have been used to relieve traffic congestion. The first, increased supply of freeways and highways, has had limited success for several reasons. These include environmental concerns, increasing construction and operations costs, budgetary cutbacks, and the perception that newly built freeways rapidly reach high levels of congestion.

A second approach has been the development of increasingly sophisticated traffic management techniques such as freeway information displays and ramp meters. Many traffic engineers assert that ramp meters improve traffic flow. On the other hand, freeway meters reallocate much of the congestion to on-ramps and feeder streets (11). Another traffic management technique is the designation of special traffic lanes for buses and carpools. But, as California learned in its reserved "diamond" lane experiment in the mid-1970s, initial political opposition from motorists and the media can bring such experiments to an abrupt halt. Moreover, even with buses and carpools, such reserved lanes may remain underused (Ward Elliot; *Fumbling Toward the Edge of History: California's Quest for a Road Pricing Experiment*; undated, unpublished paper; Claremont-McKenna College, Claremont, California; p. 10.)

A third approach consists of driver management techniques. These include urging employers to institute flextime and employee carpools and vanpools. But, as was seen in Los Angeles, government exhortations have had little effect in reducing congestion in any long-term sense.

Expansion of public transit is a fourth approach pursued by many transportation engineers and public officials. One such measure is to subsidize public transit fares. However, few

motorists appear to be ready to abandon their automobiles even given significant fare reductions.

Another public transit approach is to build huge heavy rail transit projects, but rider projections have traditionally "overestimated patronage and underestimated costs" (12). Moreover, the touted Washington, D.C., subway, for instance, provides service at an exorbitant cost of \$10 per ride according to UMTA (13).

In sum, relief of traffic congestion by a significant increase in the supply of freeways and highways is unlikely. Although traffic and driver management techniques provide some short-term relief, they will not provide a long-term solution. Finally, the expansion of public transit as a means of relieving traffic congestion also appears to be unpromising.

DIRECT ROAD-PRICING SOLUTION

Superiority of Direct Pricing

Only if indirect road pricing is replaced with direct road pricing will there be continuing economic incentives for avoiding peak-hour use of roads. As Gabriel Roth argues (9, p. 89),

Since it is impossible to meet unlimited demand without congestion, there are only three alternatives: either regulation, restriction by congestion, or road pricing.

The need for continuing (and thus long-term) incentives is one of the main lessons of the Los Angeles Olympics. In Los Angeles, short-term measures, including voluntary agreements with the business community and appeals to the public, did reduce traffic congestion by a small percentage for the first week or so. Even this small reduction in the percentage of traffic volume caused substantial improvements in traffic flow (14). Direct road pricing would provide ongoing, long-term incentives and, as demonstrated in Los Angeles during the Olympics, it would only have to reduce peak-hour traffic by a small percentage in order to produce significant improvement in traffic flow.

Transportation economists have demonstrated that direct pricing of roads could substantially reduce urban traffic congestion during peak periods and would have beneficial effects on pollution, noise, and neighborhood intrusion (15, pp. 101-103). Because direct pricing has the advantage of taking into account the time, location, and degree of impact of road use (15, pp. 112-113), employees least in need of regular work hours, for example, will have an ongoing incentive to commute during off-peak periods (11, p. 306). This is not likely with indirect road pricing. As Gabriel Roth wrote (16, p. 54),

The imposition of additional charges at peak times is beneficial in that it promotes the better use of scarce resources. Peak charges are taken for granted in the telephone and electricity services, although for psychological reasons they are described in terms of "off-peak reduction" rather than "peak hours increases." But the principle is the same.

In addition, direct pricing provides a better indicator of whether new capital investment should occur. Direct road pricing

ing will better permit market considerations rather than political considerations to determine the extent of response to demand for new freeways in a given area (e.g., double-decking existing freeways). Indeed, if congestion continues in the face of full-cost pricing (including noise and pollution externalities), it suggests the need to consider additional supply for that area. Direct road pricing based on supply and demand principles inherent in the private sector will provide the best process by which to ascertain the need for additional roads or the abandonment of economically unjustified roads.

Direct Road-Pricing Technologies

There are several feasible technologies available to implement direct road pricing. One approach would be the use of stickers as permits to enter congested areas or enter congested areas through specific corridors. Stickers can be purchased to make daily trips, acquired on a monthly basis, or for seasonal commuting. The nuances of a sticker system have been worked out to a point (stickers can be strategically torn, color coded, self-cancelling through chemical treatment, etc.) where there is a tremendous flexibility to meet most needs. Another major advantage is the low capital investment that would be required to implement such a system. The use of the permit-sticker technology has been proven workable in Singapore where, after implementation in 1975, morning peak-hour traffic was reduced by an impressive 44 percent (15, p. 103).

Enforcement of Singapore's sticker-permit system is achieved through the stationing of police observers on the handful of access highways to the central city. These observers record the license plate numbers of violators who later receive citations through the mail. For urban areas with many access roads to the central city area, technology may soon be available to permit photographic surveillance (of the licenses) of large numbers of vehicles (17).

Another available technology is on-vehicle meters. Meters with flags or outside-visible lights could be mounted in cars to register the time of road use. These meters could be activated by the driver or, preferably, by external electronic signals. A major advantage of on-vehicle meters would be the amount of privacy afforded. Payments could be made periodically by bringing in the meter for assessment as is done with postal meters (18, p. 27). Enforcement could be provided by basically the same system as was described for sticker permits.

Probably the most flexible and viable technology in a long-term sense is that of electronic road pricing (ERP). For many years economists and engineers projected the development of a technology that would automatically register road usage but that would involve little effort on the part of the user. After examining several road-pricing technologies, Hong Kong selected electronic road pricing as the best of several approaches to implementing road pricing in its city. In 1985 a pilot project was completed that conclusively demonstrated the viability and robustness of the technology (19). By its nature ERP, which electronically identifies individual users, should present less of an enforcement problem than other methods. However, there is always the possibility of tampering with the transponder attached to the vehicle. The developers of the technology used in the Hong Kong pilot program have consid-

ered this problem and believed that the transponder they developed is substantially tamper proof. Drivers of vehicles without transponders or with irregular transponders may attempt to use priced roads. During the Hong Kong project special camera equipment to photograph the license plate of an offending vehicle was developed and tested (19, pp. 614–615).

One major concern with electronic road pricing has been the issue of privacy. However, electronic road pricing can be implemented in ways that minimize this problem. There is little doubt that road pricing is economically, technologically, and administratively feasible.

ADVANTAGES OF GOING BEYOND DIRECT ROAD PRICING

The campaigns to implement direct road pricing in the United States in the 1970s were unsuccessful to a large degree because of political opposition. The incentives offered by UMTA to local officials, even for demonstration projects, were insufficient to overcome the opposition of various transportation interests and the natural resistance of the public to such new ideas as direct road pricing. Early opposition from the media and the business community, often based on limited information, was a primary barrier to UMTA road-pricing proposals (7, p. 84).

UMTA's efforts were unsuccessful for several fundamental reasons. First, and perhaps foremost, was the lack of an adequate educational and public relations campaign to lay the groundwork for such a policy innovation as direct road pricing. Second, the concept itself may have been presented as too much of a fixed package without enough incremental options and variables to be tailored to the individual needs of different cities (7, pp. 80–89).

Direct pricing of road use, as opposed to indirect pricing through gasoline taxes and license fees under which users as a class pay for roads, is a more advanced form of private financing inasmuch as individual private users are charged on the basis of the time and place they use the service. Thus, under direct pricing, road users who wish to use freeway space during a time of high demand will tend to be charged a rate closer to the full costs of providing the service at that time—in this case, driving during premium hours. Nevertheless, the obviously greater efficiencies and advantages of direct road pricing were insufficient to persuade transportation interests in the three U.S. cities approached by UMTA to participate in a road-pricing experiment.

In addition to private user financing of road use or "direct road pricing," other privatization measures may add enough additional advantages to the partial privatization approach of direct user charges to overcome political barriers to road pricing and gain public support.

First, a phase-in of additional privatization measures such as contracting out operation and maintenance would introduce competition into the development and operation of a road-pricing program and thereby be more likely to generate creative implementation and lower operational costs. These advantages could make a marginal difference in selling the program and make additional funds available to insure against risk and to compensate negatively affected interests.

Second, full privatization through sale of freeways to the private sector could free the capital now unproductively frozen as a government asset in such a way as to generate even more incentives to obtain the support of interests that perceive serious risks and possible negative effects. This capital (along with the stable revenue stream created through the application of direct road pricing and the advantages of using efficient private management to operate and maintain a freeway) could provide the leverage needed to attract new private investment to finance badly needed rehabilitation of many economically productive U.S. highways and freeways. Moreover, it could provide an additional incentive to accept the risk of direct road pricing, even at the early stages of a phase-in plan. For example, transportation interests that perceive serious risks and possibly negative effects might be enticed by the opportunity to participate in a consortium that would have an ownership interest in the freeways.

Full privatization via sale to the private sector will also no doubt entail the need to obtain enabling legislation at the federal, state, and possibly even the local levels of government.

A third major benefit of full privatization would be the addition of yet more incentives for cost-efficient and cost-effective operation of freeways. Private owners would have more of a personal stake in ensuring that their customers, the paying users, were satisfied. Private ownership, in contrast with political ownership, would better ensure that revenues were allocated to consumer demand and not redistributed for the benefit of politically influential special interest groups. Privately developed fee schedules would be much less likely to be politicized to (a) provide for cross-subsidies between types of users or (b) keep them artificially low at the expense of long-term maintenance and rehabilitation needs.

Finally, as suggested by Gabriel Roth in one of his many insightful comments on an earlier draft of this paper, full privatization may well make it easier to sell direct road pricing to the public. Private user charges would not be perceived as a tax increase. Moreover, the introduction of private provision of some freeways would tend to act as a competitive influence on the prices charged for use of governmentally provided freeways.

IMPLEMENTING POLITICALLY FEASIBLE USER-PAYS CONCEPT

There are two basic challenges to phasing in the user-pays concept: the natural reluctance of the general public to accept the idea of paying directly for use of the roads and the opposition from interests that perceive possible negative effects. Each step of the phase-in process must be tailored with these challenges in mind.

Stage 1: Identification and Analysis of Problems

The first stage in phasing in road pricing would be to establish that a change must be made in advance of drastic problems. (If a city waits until a crisis, this step will be unnecessary. But unnecessary suffering and economic dislocation will result.) Lessons learned from UMTA's experience in the 1970s indicate

that the best way to do this is for farsighted political and civic leaders to establish a technical advisory committee composed of independent transportation economists and planners.

Such an independent committee of experts is needed at this early stage to provide, as much as possible, an objective, credible determination of the extent of the problem and to analyze all possible solutions with a minimum of political considerations. It is vital that such innovative ideas as direct road pricing receive as objective a consideration as possible and not be killed before receiving a fair hearing.

The mandate of this committee would be to determine if there is or will be a problem that needs to be addressed, to examine all possible alternatives, and to assess the short-term and long-term advantages of each alternative. The committee would also have as a major part of its responsibilities the task of identifying the full indirect and direct costs of each alternative, including the option of doing nothing.

If such a committee determines that the problem will become increasingly severe, seriously affecting central city viability and the quality of urban life, it should recommend specific short-term and long-term solutions. In many localities, direct road pricing may well be included as one of the long-term solutions. If it is, the measures described in this section and the following section for mitigating the impact of direct road pricing, reducing risks, and providing incentives for affected transportation interests to accept direct road pricing should be articulated.

The next step in this phase would be the creation of a task force composed of representatives of all interests that are affected by direct road pricing including media representatives, affected business and commercial interests, and representatives of the poor. The task force should be charged with the mission of casting the recommendations of the technical advisory committee into a concrete plan for adoption by pertinent local and state governments. The task force should also hold extensive public hearings to receive testimony from all affected interests.

At this stage, efforts must begin to construct a coalition of interests that favor direct road pricing. One major interest group to be approached would be environmentalists because one of the side effects of direct road pricing would be a reduction in air pollution. Health organizations, such as the American Lung Association, could also be approached on this basis. Another interest that might participate in such a coalition would be developers who increasingly face special transportation assessments and limited-growth policies. Even groups that might initially be thought of as opposing direct road pricing should be consulted. For example, in Los Angeles the local chapter of the Automobile Club is reportedly interested in the concept (unpublished paper by Ward Elliot).

Stage 2: Educational Campaign

The next step should be an educational campaign to persuade the media, the general public, and interests that perceive risks or negative effects of the need for and feasibility of direct road pricing. According to Emerson et al. (20, p. 56),

The potential for generation of public antagonisms by . . . unfamiliar new measures is so great that as much atten-

tion must be given to this negative aspect during preimplementation planning as is normally given to planning of more orthodox project elements.

As a part of the educational campaign, the feasibility of the technology, for example, could be demonstrated to the media as it was in Hong Kong in order to convince reporters of the technical and administrative feasibility of direct road pricing (21, p. 22). The campaign should refer to analogous situations such as telephone and utility service.

The educational campaign should also stress, as did Hong Kong, the draconian nature of the alternatives such as regular gridlock, bans on automobiles in the central city, "non-automobile" days, and substantial increases in gasoline taxes and license fees that would price low-income people out of car ownership as occurred in Hong Kong (22, p. 235). Such draconian measures, it could be noted, would substantially harm the image of the business community. The campaign should furthermore stress the fail-safe provisions developed for worst-case situations.

The educational campaign should emphasize that the use of roads is not now a "free" good. People must be educated about how they are already paying indirectly for roads through gasoline taxes and license fees. What is being proposed, it should be emphasized, is a change in the means of financing roads to promote more efficient usage. Moreover, the campaign should stress that this change is not an additional tax burden. Those who are directly charged for road use will be able to receive a proportional reimbursement of their gasoline taxes. It could be further pointed out that the freer flow of traffic will reduce vehicle operation and maintenance costs.

Another major theme to articulate would be the issue of privacy. This is not a major problem in reference to sticker systems because enforcement is basically dependent on identification of a violator via existing license plates. However, ERP presents a different problem in the sense that people will be fearful of the government and other potential abusers tracking their movements. The campaign must therefore emphasize the legal provisions for inviolability and security of data collection and other provisions that minimize the possibility of misuse. Of course, after full privatization of freeways, such data would be removed from direct government control and would be handled in the same way that telephone companies and private utilities maintain information about their services.

The campaign could furthermore educate the public about the historical precedents for private toll roads and the general success of public toll roads in many U.S. states. Other examples throughout the world could also be cited including a major private toll road in France owned and operated by La Société Cofiroute.

Many people oppose direct road pricing on the basis that they have little choice about when they use certain roads. Thus another important theme to stress is that people with strong economic reasons for using the freeway at peak times are probably already paying disproportionately more in terms of congestion costs (the value of their time) than are marginal users who receive less economic return from using roads during peak hours. Road pricing would permit people who do have more of a choice about when they use the freeway to reschedule their trips or pursue other alternatives (e.g., telephone).

Finally, the campaign must include discussion of the equity of road pricing and how negatively affected interests shall be compensated. For example, one measure used in Hong Kong was the development of a videotape and pamphlet entitled *A Fair Way to Go*. It is vital that any perception that direct road pricing will entail discrimination against the poor be dispelled because equity for the poor is considered a major issue by policy makers and the media (15, p. 107).

Stage 3: Pilot Project

The third stage in phasing in direct road pricing would be a successful demonstration project on a badly congested freeway (8, p. 12). It could be set up so that those who did not wish to pay could easily switch to an alternative route (23, p. 4). Another option would be to limit the period during which direct road pricing would be in effect to morning rush hours (23, p. 11). In this way, there would be little threat to downtown retailers concerned about the loss of shoppers, but commuters would still be significantly affected. A drawback would be that through-traffic taking alternative routes in the morning hours could switch back to former routes in the evening (24, p. 224). Nonetheless, the contrast in congestion levels between morning and evening rush hours would provide a dramatic demonstration of the benefits of direct pricing.

Those who use freeways that are priced could be allowed to receive full, refundable tax credits against state and federal gasoline taxes in order to remove the objection that they are paying twice. There is precedent. Farmers receive gasoline tax refunds on tractor fuel because they are not using their tractors for travel on public roads (except perhaps incidentally) (25, p. 44). In some states road taxes are cancelled for mileage logged on toll highways (26, pp. 445-446).

The road-pricing demonstration project should begin with the use of sticker technology because of the low-capital investment required (9, p. 56) and flexibility (27, p. 2). An important feature would be provision for a refund for the stickers to ensure that if the program fails, no one loses money through the advance purchase of stickers. The sticker program should furthermore include massive off-freeway support for the purchase of stickers, perhaps along with on-freeway sticker plazas that would not impede traffic flow (e.g., on outlying freeways far from congested central areas) (8, p. 13).

Another option at the pilot-project stage could be to use just one lane of an expressway. Ward Elliot of Claremont-McKenna College in Los Angeles County has suggested, for example, using Los Angeles's San Bernardino busway lane to accommodate not only high-occupancy buses and carpools but also vehicles displaying stickers purchased by users. Such a measure might not only speed the commutes of additional vehicles using the reserved lane, it might also provide more optimal use of road capacity. This is because it would have the added benefit of diverting some traffic off other lanes, thereby benefiting other users. Alternatively, bus-lane separation could be a part of the road-pricing pilot project (28).

Lanes reserved for permit purchasers as well as carpools, vanpools, and buses would probably provide the successful demonstration project needed to persuade doubters. A review of the unsuccessful "diamond" lane project on Los Angeles's

Santa Monica Freeway suggests that prospects for success are good. In the last week before the diamond lane was terminated, Santa Monica Freeway traffic equaled the preexperiment passenger carrying rate in overall traffic flow. If pricing had been applied to permit some motorists to use the diamond lane that was only operating at one-third of its capacity, it might have optimized use of the diamond lane and probably drained off enough commuters from other lanes to achieve an overall improvement in the traffic flow of all lanes (unpublished paper by Ward Elliot). Furthermore, at this stage of road pricing no one would believe that they were being excluded because of price.

Oversight of the pilot project could initially be by public officials from the affected jurisdictions, including surrounding jurisdictions. Representatives from various affected transportation interests including representatives of the general commuting public might also be included (23, p. 39). Perhaps better would be an advisory committee composed of these affected interests that would work closely with management.

Sticker prices could be adjusted to optimize roadway capacity. Prices should probably initially be set high and then quickly reduced if optimal usage is not forthcoming (15, p. 104).

An important part of the pilot project would be the simultaneous deregulation of transit along the participating corridor area (29, p. 19). For example, it might be assumed that some of the traffic that was "tolled off" would take alternative routes along major street thoroughfares. To enable these street thoroughfares to handle the increased traffic, local authorities should completely deregulate (except for health and safety) private transit-for-hire, especially private jitneys. Another measure to reduce initial opposition would be to exempt for some period buses, carpools, motorcycles, and perhaps commercial vehicles. Commercial vehicles could also be charged a reduced rate for a limited period of time.

Another privatization measure for improving public transit would be to contract out for additional public-transit capacity to handle expected increases in public transit (thus avoiding violation of Section 13c of the Urban Mass Transit Act of 1964).

Finally, during the pilot project, electronic road-pricing infrastructure should be tested as it was in Hong Kong to determine its operational viability and robustness. At this stage it would be important to assess the potential of using any existing ramp-meter systems for adaptation or use in ERP infrastructure. Perhaps freeway on-ramps with meters could be more easily accommodate such things as electronic information boards and cameras to identify the licenses of vehicles without electronic transponders or stickers. Government agencies, private fleets, and citizen volunteers could participate in the ERP experimental program at this time, although no charges would be recorded against these vehicles during this period.

Stage 4: Expansion to Major Freeways into Central Business District

The next step in phasing in full privatization would be to extend road pricing from one corridor or pricing area to several freeways entering a central business district (8, pp. 16-17). At the same time, oversight management for the project could be

handed over to an independent public authority that would administer a trust fund collected from charges. Such an independent highway authority would tend to generate more public confidence by fixing, for example, responsibility for protection of data collection and ensuring that funds were used only for local freeways and streets (21, p. 82). The authority would finance operation and maintenance of the system out of the trust fund.

Public authorities have many advantages over government departments. They are largely independent and self-financing, which reduces the political considerations in budgeting and the pressure from special interest groups. Because they are self-supporting, public authorities tend to better maintain their facilities (30, p. 82).

Another option at this stage would be to turn over the actual operation and maintenance to a contractor after competitive bidding. Experience and scientific studies have both demonstrated that significant operational savings can be achieved by contracting for the actual supply of public services, if it is done properly.

This stage would also be the appropriate point at which to introduce electronic road pricing to largely replace permit stickers. Large-scale ERP infrastructure could be financed through tax-exempt bonds (the debt for which could be eventually assumed by private owners).

There must always be strong assurances that ERP records will be confidential. One such provision in the projected Hong Kong ERP system is a requirement for the destruction of all detailed records as soon as a charge is credited to an account (19, p. 604). This would be similar to what the telephone company does for message units (4, p. 9).

Stage 5: Expansion to All Freeways in an Entire Congested Area

The final stage would be the extension of direct road pricing to all the freeways in an entire congested area (8, p. 18). Because financing (e.g., assumption of debt) and operation and maintenance will have already been handed over to the private sector, this would be the appropriate point to complete full privatization by transferring ownership from the public authority to the private sector (30, p. 89):

The state would simply sell their ailing highways and bridges to private investors to be operated as business paid for entirely by user fees collected from AVI [i.e., electronic road-pricing] systems and other incidental sources of revenue. The level of tolls would be set by the company's management to cover the cost of operation and maintenance. They will presumably depreciate the highways and bridges and provide in their revenue requirements for rehabilitation of the highways as well as future preventative maintenance in order to maintain long-term viability of their investment. Additionally, liability laws will force the road owner to maintain the roads in safe condition.

Given the political sensitivity of turning ownership of freeways over to the private sector, an important strategy would be to institute certain conditions in the sale such as requiring profits to be reinvested in the roadway. If there are several economically viable and competitive corridors, these should be sold to different companies, or, if economically feasible and admin-

istratively practical, different segments of the same freeway could be sold to different management firms—provided, of course, that as a condition of sale they agree to cooperate and to coordinate their operations. If these measures designed to ensure direct competition were not feasible, the agency disposing of the assets could provide formulas to ensure that future prices would not be excessive (30, p. 90).

Finally, the possibility of full privatization might help persuade transportation interests that perceive possibly negative effects to incur the risk by giving them the option of purchasing stock in the privatized freeway at reduced prices. Future stock might be reserved for use in a trust fund to finance transportation vouchers for the poor.

MITIGATING THE EFFECTS ON VARIOUS INTERESTS

One of the major lessons learned by UMTA and the Urban Institute in the 1970s is that strong theoretical and even empirical evidence is insufficient to persuade interests that perceive possibly negative effects of road pricing. The previous section reflects many of the suggestions of Urban Institute policy analysts that, with better education and implementation policies, might overcome these barriers. In this section will be stressed, as recommended by the Urban Institute policy analysts, the need to prepare for worst-case situations and offer guarantees of compensation.

One of the major barriers to road pricing has been the issue of equity to the poor; that is, would the effect of direct road pricing be progressive or regressive (31, p. 111). This issue has been studied by a variety of economists who have come to different conclusions based on different assumptions. A number of arguments can be cited to the effect that the poor will benefit from road pricing, under certain conditions or types of compensation programs. One suggestion of Urban Institute policy analysts (4, p. 20) is to use revenue collected from road-user charges to expand public transit as a means of compensating the poor. According to Bhatt (32, p. 24),

[r]oad pricing policies will generate substantial revenues which, if targeted for the poor, would be more than sufficient to redress the inequities they incur because of the pricing policy. This could be achieved in a number of ways: by providing various types of tax advantages to the poor, by improving and expanding public transportation with the poor as the primary target group, or—at least in principle—even by compensating the poor through direct payments.

However, there are serious questions as to whether people tolled off the freeway will turn to public transit in its present form. In addition, deregulation to allow various forms of private paratransit such as jitneys may provide greater benefits to the poor.

Certainly, if many of the poor do turn to public transit, it may be expected that part of the negative impact will be mitigated by the probability of faster bus trips. In addition, public transit could be temporarily exempted or have a lower initial charge for using the freeway.

If lower-income commuters are individually priced off the freeways, Gabriel Roth points out that they will have another,

probably more viable alternative—carpooling or shared rides. And, again, it is important to remember that the cost per individual will be lower than if they rode alone and that automobile trips will be faster.

Given the extent to which equity is a barrier to road pricing, a more fundamental question that some have begun to ask is whether it is desirable to redistribute income through the transit system (33, p. 19). If it is determined that the poor should be subsidized, a voucher system could be implemented. Using a voucher would have two advantages. First, as one transportation economist suggests, if subsidization of the poor is a social welfare function, it is the obligation of everyone in society to provide the subsidy and not just road users (9, p. 39). Second, this makes the subsidy explicit, thus enhancing accountability.

Probably some of the strongest opposition would be from downtown business and commercial interests. A number of arguments can be marshalled as to why such business and commercial interests would not be negatively affected and perhaps could even be benefited. For one thing, a decrease in traffic congestion does not necessarily mean fewer people traveling to the area. The following probable effects could be beneficial to such interests (9, p. 89):

- Less peakish traffic downtown,
- Ability to make more business trips at off-peak times,
- Encouragement of high time value individuals to remain downtown,
- Improvement in traffic conditions that would encourage off-peak users to shop downtown, and
- More downtown parking available.

To mitigate the impact of possible negative effects on business and commercial interests, a number of measures could be used. First, revenues collected in road pricing could be used to offset reductions of business taxes (offered as an incentive to business and commercial interests) in the priced area (7, p. 29). Second, the fleet departments of affected businesses could be provided with data on their own fleet usage. This concept is included in the full plan for Hong Kong (21, p. 81). (This author does not believe that the provision of data on fleet use necessarily infringes on the privacy of commercial vehicle users because this type of monitoring can be considered a condition of employment. However, if a government entity is providing or operating the direct road-pricing technology, the dissemination of such information, with reference to providing fleet information to commercial users, should be strictly regulated to prevent abuse.) Third, businesses would be given a guarantee against financial losses out of the highway user-fees trust fund or the right to purchase roadway stock at a reduced price as a part of the sale to the private sector.

Ultimately, downtown business and commercial interests will have to decide if central city stagnation (caused by the congestion resulting from indirect road pricing) and the possibility of comprehensive, highly restrictive growth policies (brought about by political overreactions to traffic congestion) are a better alternative than direct road pricing. Direct road pricing may, indeed, be a major part of the solution to declining central city commercial areas.

Parking and taxi interests will represent a subset of business interests with a particularly strong natural opposition to road

pricing. At one point, UMTA agreed to ensure taxi revenues would not fall below a negotiated baseline. Special new incentives would have to be developed to reduce their opposition.

Another category of possibly negatively affected interests would be occasional out-of-town visitors and persons who refuse to accept ERP because of privacy concerns. Out-of-town visitors could be made aware of the need to purchase stickers and short-term supplementary licenses for peak-hour use on major arterial highways (4, p. 10). They would be able to purchase day stickers or rent loaner transponders from retail outlets. Those users concerned with privacy could also use stickers.

Another major affected interest to consider would be the general car user or commuter. General users could be partly compensated through reduced registration and license fees (23, p. 39) or refunds on gasoline taxes proportional to their use of direct-priced roads.

General users may not be as opposed to transit user charges as was once thought. According to the Executive Director of the International Bridge, Tunnel and Turnpike Association, recent polls and elections demonstrate that if the benefits and facts are properly presented, users will approve toll projects (34, p. 69). Indeed, public toll road authorities in Illinois and Pennsylvania are moving forward with plans for significant expansion of highway toll roads (35, p. 27; 36, p. 13).

Still another group that may be unenthusiastic about road pricing is road builders who consider it contrary to unrestricted, unlimited mobility (37, p. 1). Offsetting that perception are potential increased road repair and new road construction made possible by road-pricing revenues. A recent bill in the California state legislature to permit the private financing, operation, and ownership of new private freeways supported by user charges appeared to this researcher to have the support of some road-building interests.

The final interest to be placated is that of the government bureaucracy, especially the public transportation agencies. Deregulation would permit the entry of private-sector operators that would mitigate the impact of any peak-load increases on public transit. Moreover, as in Singapore, with more rapid speeds, public transit would be able to provide more trips (7, p. 29).

To protect freeway operation and maintenance employees, contracts to turn over the provision of such services or to relinquish total ownership of freeways could include conditions requiring that the transportation department workers be given the right of first refusal of new jobs with the private contractor or private owner. A number of other measures could be implemented to reduce the adverse effects of privatization on transit department workers (38).

Other government departments such as the police department would expect to benefit from reduced traffic congestion and experience cost saving (9, p. 59).

CONCLUSION

In many cities in the United States traffic congestion is rapidly approaching the intolerable point. Even with the introduction of traffic management and driver management strategies and expansion of public transit, traffic congestion will not be sub-

stantially ameliorated. And, with the limits on financing of new infrastructure, it is unlikely that supply can be increased. Even if it could, economists have demonstrated that demand for what is perceived as "free" supply will overwhelm that supply.

Transportation economists have demonstrated that only road pricing will substantially relieve the urban traffic congestion problem. Yet, strong economic arguments even when supplemented by the offer of subsidies have been unable to persuade policy makers to accept an experimental direct road-pricing project. A phase in of full privatization may generate the additional incentives and advantages necessary to overcome the opposition of transportation interests that perceive possibly negative effects and to gain the support of the general public.

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Intraurban Road Privatization

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Although the assumption has been made that intercity highways would provide the natural testing ground for increased private participation in the provision of road services, such an assumption may be unwarranted. It is true that intercity highways more easily fit the mold of a traditional toll road. However, there is no compelling necessity to adhere to this mold. The urban environment, in contrast, offers some significant attractions as a testing ground for privatization innovations. The need for innovative solutions is much more apparent in the urban setting. Urban traffic congestion and the higher cost of constructing new capacity point to a more urgent need for cost-effective solutions. The urban setting also presents more diversity of options for examining privatized alternatives. The possibilities for comparison and competition among possible approaches are much broader in an urban environment. For example, the potential problem of abuse of private monopoly power is less pronounced in a city street system with numerous parallel routes than in a rural highway system route that has no close substitutes. This paper will be conceptual in nature. The goal is to examine the thought processes that could guide experimentation with privatization in order to consider whether the best candidates for initial test cases might be urban rather than rural roads.

Where there are no means of transportation, the decision to build a road is a relatively simple one to make. Under such circumstances even the public sector can scarcely go wrong in plowing ahead with a decision to build. The margin for error that can be tolerated is large. The inherent and notorious inefficiency of government in providing goods and services may easily go unnoticed. The completion of almost any facility is bound to produce greater returns than costs.

Where there are many means of transportation, the decision on whether to build or even to maintain an existing road loses its simplicity. In such complex circumstances there are many opportunities for the public sector to go wrong regardless of whether the decision is to build or not build a facility. The potential margin for error is small. The endeavor is no longer merely to make travel between two points feasible. The pay-off from contemporary roadway investments is more incremental in nature. Improvements to existing systems may result in shaving a few minutes off travel times, making a ride smoother, marginally enhancing access, and the like. The returns are more subtle and difficult to measure. At the same time, the cost to build and maintain modern roadways is considerable.

The combination of high cost and marginal returns places a premium on efficient decision making. Efficiently deploying