CONGESTION PRICING IN THE UNITED STATES: A REVIEW OF EARLY IMPLEMENTATION EXPERIENCE

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Motor vehicle user fees of many types have been widely debated in the United States over the past decade. Recently some have begun to be implemented on an experimental basis. This paper reviews four efforts to implement congestion pricing, one variant of a family of user fees. Three of the efforts reviewed have been successful, the fourth has not. The analysis suggests three factors that explain the early success of congestion pricing: 1) it addresses both the need to finance infrastructure and reduce social costs of transportation consumption; 2) it is a flexible policy that can be tailored to solve unique transportation problems at the level of local government; 3) it is successful in those instances where it leads to an increase in travel options. The primary conclusion is that early experience with congestion pricing is promising, although large-scale implementation will necessitate a basic shift in U.S. transportation philosophy towards an acceptance of market-based policies:

In the past decade there has been a lively discussion over the promise of motor vehicle user fees in the United States. Most reasons given for why such fees would be desirable concern economic efficiency or environmental protection. User fees have been proposed to reduce congestion costs, make better use of infrastructure, raise investment capital, and to reduce vehicular pollution. The most widely discussed fees included traditional fuel taxes, vehicle emission fees, "fee-bates," vehicle-miles traveled (VMT) fees, congestion fees, and parking fees.[1]

Early theoretical consideration of vehicle user fees dates back to the 19th century, and road tolls have been in existence for as long as there have been roads. Yet the early 1990s witnessed a plethora of papers, studies and conferences devoted to these ideas.[2] The literature that emerged largely substantiated the claim that user fees are worth trying. It also identified technical implementation challenges and questions about the socioeconomic effects that user fees would have. Most analysts concluded that these were manageable problems. A general consensus emerged that the most significant impediment to the success of vehicle user fees is that they are politically controversial.[3] Presently, several years after the flurry of debate and study, several fees have reached the point of implementation on a limited experimental basis.

This paper evaluates the early experience with implementing congestion pricing, the variant of fees that appears to be making the most headway. The second section of this paper reviews four specific congestion pricing pilot projects. Three have successfully reached implementation. The fourth was a detailed proposal that was rejected by the California state legislature. The review of the projects reveals three factors that appear key to the early success of congestion pricing.

Section three identifies possible long-term implications of early road pricing experience. In particular, it concludes that policymakers appear to be implementing congestion pricing both to raise capital for investment in transportation infrastructure and to increase the efficiency of existing capacity. This section suggests that congestion

pricing is simultaneously serving competing notions of "sustainable transportation." It is at once serving to finance additional transportation infrastructure and to extract greater productivity from existing infrastructure.

FOUR CASE STUDIES IN CONGESTION PRICING

Among the motor vehicle user fees that have been debated in the United States over the past decade, congestion pricing has enjoyed the significant advantage over others of receiving Congressional support.[4] In 1991, Congress, via the Intermodal Surface Transportation Efficiency Act (ISTEA), authorized $125 million to support the development and implementation of congestion pricing pilot projects across the United States[5] Presently, 10 metropolitan areas in the United States have availed themselves of the program, with four projects having reached implementation.[6]

This section considers four of those projects: State Route 91 in Orange County, California; Interstate 15 in San Diego; Lee County, Florida; and the San Francisco—Oakland Bay Bridge. Among the first three successful projects one can discern several features that seem to have been key to their success. The fourth unsuccessful project, underscores these points, as it lacked several key features. The mix of successful and unsuccessful projects reveals that congestion pricing is politically viable, but that significant political challenges lie ahead of large scale implementation. The Bay Bridge project, in particular, illustrates clearly the nature of the political opposition to congestion pricing and, by inference, to motor vehicle user fees generally.

Some key differences among the successful projects reveal that congestion pricing is a flexible policy tool that can help solve a range of problems. The successful projects also have several key features in common: they each helped address a critical shortage of public funds; they each addressed problems at the level of local travel corridors; and they each increased travel options in their respective corridors. The Bay Bridge proposal was similar to the successful projects in some respects but lacked two key features: it lacked a viable constituency for the revenue, and it would not have increased travel options meaningfully. These points, borne out in the case studies, are summarized into the following three elements of success:

- *Public Finance and Externality Benefits:* Congestion pricing can reduce congestion problems in a given corridor both by managing demand and by generating capital for adding transportation capacity.
- *Flexibility at the Local Level:* Congestion pricing policies can be designed to address a variety of policy problems and can be tailored to the particular needs of the implementing jurisdiction. It is a workable strategy for solving local, corridor-level, transportation problems.
- *Increases Travel Options:* Congestion pricing is being implemented in contexts where it enriches travel options.

A. State Route 91, Orange County, California

Perhaps the best known experiment with congestion pricing in the U.S. is the "91 Express Lanes" on State Route 91 in Orange County, California. The SR-91 project involved the construction of four new toll lanes for 10 miles in the median of an existing, severely congested, eight-lane freeway.[7] The express lanes began operating in December, 1995. Motorists pay between $0.60 and $2.95 to use the facility depending on the time of day and direction of travel. Carpools of three or more travel for free.[8] Tolls are collected using state of the art "Automatic Vehicle Identification" (AVI) technology.[9]

The impetus for SR-91 Express Lane project was financial need.[10] The four lanes had been planned as high-occupancy vehicle (HOV) lanes for many years but had not been built due to a lack of available public funds. Through the 1970s and 1980s, congestion on the existing lanes grew in lockstep with the Orange County economy. Forced to innovate, state and local elected officials, at the urging of planners, granted a franchise to a private toll road company to build and operate the road.[11] One and a half years after opening, over 86,000 motorists have established billing accounts to use the road. Roughly 25,000 vehicles use the facility each weekday. The project's first year financial report indicates that revenues have been sufficient to pay for operating costs.[12] The user fee approach enabled the provision of badly needed infrastructure.

In addition to providing capital, the 91 express lanes have been successful insofar as they have increased the travel options available to motorists. Users of the original roadway still may use those lanes for free, or, if they choose, they can pay or form a carpool to use the faster express lanes. Moreover, the diversion of traffic onto the new express lanes has relieved congestion on the existing lanes, improving traffic for those who continue to use the free lanes. Public polls support these conclusions. While pre-projects polls of SR-91 patrons indicated a skeptical public, post-project polls show that 65 percent of users view the project favorably.[13]

The positive effect of the variable toll on travel demand has been an additional element of the project's success. One in five vehicles on the express lanes is a carpool of three or more people. The average vehicle occupancy (AVO) is 1.65, compared with the Southern California regional average of less than 1.2.[14] To attract paying customers from the adjacent free lanes, the 91 Express Lanes offers a superior service, in the form of a 20-minute time savings during peak hours.[15] Peak period tolls are set high enough during the peak to keep demand within the design limits of the Express Lanes. In the off-peak, when the advantages of using the Express Lanes are less, the tolls are correspondingly lower.

The availability of the adjacent free lanes, and the improved traffic flow on those lanes mean that the 91 Express Lanes has avoided the adverse impact that tolls could otherwise have on the mobility of travelers with low incomes. In contrast to the warnings of critics who dubbed the 91 Express Lanes as "Lexus Lanes" because they represent a separate service for the affluent, the operator of the road reports that the demographic profile of toll customers mirrors that of users of the adjacent free lanes.[16]

Many customers use the lanes irregularly (several times per week), suggesting that people's need for express service varies from day to day.

Finally, the technological achievement of the automatic toll collection system on the Express Lanes is noteworthy. The revenue system for the 10-mile express lanes currently includes roughly 86,000 collection points—one for each customer. By contrast, state and federal fuel taxes collected in California support thousands of miles of roadway and include only nine wholesale distribution points. The success of the toll technology on SR-91 suggests that the technical implementation challenges of user fees are manageable.

B. Interstate 15 High-Occupancy Toll Lanes.

Interstate 15 in North San Diego has an 8-mile, reversible, HOV lane that historically was open to vehicles with two or more passengers. In recent years, the mixed flow lanes were regularly congested, and the HOV lanes had excess capacity during the peak hours. Overall, highway and transit capacity in the corridor was inadequate to serve demand. On December 2, 1996, a pilot congestion pricing project was initiated which permitted single occupant vehicles to pay to access the HOV lanes during peak hours.

Besides making better use of the HOV lane, the I-15 project is raising revenue to fund additional bus transit capacity in the corridor. In fact, the primary success criteria of the project, set forth by the local administering agency, is the degree to which the project can finance greater transit service. Because the project is relatively new and is still increasing in scope (and complexity), administrators are waiting to gain a better estimate of likely future revenues before they initiate the new transit service. The ability of the project to support expanded transit service, however, was a key in convincing local officials to implement the project.

In contrast to the SR-91 project, in which toll-paying, single-occupant vehicles (SOV) ultimately take precedence over carpools, the California State legislation that authorized the I-15 "Express Pass" project requires that toll paying SOVs be limited in number so as to maintain free-flow conditions for HOVs.[17] Also unlike the SR-91 project, which charges for each vehicle trip using electronic toll technology, the I-15 project began with a simple monthly pass that sold for $50 per month and allows unlimited peak-hour use. The simple-technology approach suited the I-15 project, given its initial small scale. The implementing agency, the San Diego Association of Governments, began the project by selling only 500 monthly SOV permits on-a first-come, first-served basis.

Differences between the SR-91 and the I-15 projects illustrate that congestion pricing is an adaptable policy instrument. In the former case, pricing was used to finance new lanes and to finance a specific level of debt. In the latter case, congestion pricing is being used to take better advantage of existing lane capacity and to finance as much new transit service as the revenue will support. Another important difference is the sophistication of the technology used for implementation.

The initial 500 passes, priced at $50 per month, were purchased within several hours after going on sale, indicating the public's support for the project. After monitoring the effects on the HOV lane of the 500 permit-holders, project administrators gradually increased both the number and price of the permits. In February 1997, 200

subscribers were added, and, in March, the price of a pass was raised to $70. Despite the price increase, 84 percent of original subscribers opted to remain in the program.[18] The I-15 project plans to replace the monthly pass system with an electronic toll system by the end of Summer 1997.

By opening the HOV lane to a limited number of paying SOVs and increasing transit service, the I-15 project is, like the 91 Express Lanes, increasing travel options in the corridor. A counter-intuitive result of opening the HOV lane to SOVs has been an increase in the number of carpools and a *decrease* in total SOV use. Prior to the Express Pass, the lanes typically were used by roughly 3,200 carpools in the a.m. peak and 700 illegal SOVs. Since implementation of the Express Pass carpool, usage has risen to over 4,000 vehicles, and total SOVs has fallen to a little more than 600 SOVs, with 500 of those being legal, paying users.[19] This data reveals that the I-15 project has increased travel options and. resulted in more efficient use of existing capacity.

The similarities of the projects are that they both were instigated primarily to increase financial resources and infrastructure capacity. The SR-91 project added lanes only, while the I-15 project makes better use of existing lanes and will add transit service. The projects are similar also in that they are functioning at the scale of discrete travel corridors. Finally, they have been acceptable to the public in large part because they have increased travel options, tolls are incurred on a voluntary basis, and neither imposes a financial burden on low-income travelers.

C. Lee County, Florida

Lee County Florida has one operating toll bridge, Cape Coral, and another under construction, Midpoint. Congestion is a problem on the existing bridge and is expected to be a problem on the new bridge. In anticipation of the future, when travel demand is projected to exceed the county's capacity to finance additional infrastructure, the county has committed to implement a variable toll system on the bridges in late 1997, solely to manage demand and better utilize existing capacity. Peak-period pricing is expected to more efficiently allocate traffic more efficiently and forestall the need for additional capacity.

A revealing facet of the Lee County program is that, instead of increasing the current $1 toll during the peak, the county has opted to lower the off-peak toll to $0.50. This approach was made possible by a federal congestion pricing pilot program grant that will offset the lost revenue. Presumably, in time, both the off-peak and peak tolls will be raised to eliminate the need for federal funds.

Like the SR-91 project and the I-15 project, the Lee County experiment was motivated primarily by scarce resources. In this case, however, congestion pricing is not going to generate additional financial capital, at least in the short run. Rather, it will address the shortage of road space and funding by more effectively using the existing increase road capacity. That is, congestion pricing in Lee County will primarily manage demand. Moreover, the implicit political decision was that implementing variable tolls via an increase in the peak period toll was infeasible. An off-peak discount was the only viable approach. This choice underscores that congestion pricing is acceptable only if it increases travel options.

The Lee County project, like the SR-91 and I-15 projects, has been conceived as a corridor-level solution. Moreover, congestion pricing in Lee County has been tailored to meet the unique needs of that area. It has not created any inequities in terms of one group's travel options improving at the expense of another's.

D. San Francisco-Oakland Bay Bridge

The proposal to implement a variable toll on the Bay Bridge has been the most sustained and intensive effort to implement congestion pricing in the United States. Unlike the three prior case studies, however, the Bay Bridge project so far has failed to reach the point of implementation. The project began when a broad spectrum of Bay Area stakeholders came behind the idea in January 1993 and worked to develop a variable toll proposal and persuade elected officials to implement it. In keeping with the project's history of steps forward then back, the effort came to a rest most recently in August 1997, when the state legislature firmly rejected the proposal and, in order to pay for needed seismic bridge improvements, opted for a flat toll increase from the current $1 automobile toll to $2 at all times and days of the week.[20]

Congestion on the Bay Bridge is the worst in the Bay Area, a region that suffers from widespread traffic tie-ups. The facility is the workhorse of the region's transportation network, enabling over 260,000 vehicles to transport people and goods between the East Bay and San Francisco each day. Recurring congestion on the bridge delays regular commuters 20 minutes each day, resulting in an estimated $17.5 million in time, pollution, and fuel costs each year.[21] The major alternative route to the bridge is the Bay Area Rapid Transit (BART) rail service.

The coalition that has worked to implement congestion pricing on the Bridge includes representatives from the business, environmental, and public sectors. Among the key supporters are the Bay Area Council (representing large employers), the Santa Clara Valley Manufacturing Group, the Bay Area Air Quality Management District, the Bay Area Metropolitan Transportation Commission, the State Department of Transportation, the Environmental Defense Fund, the Sierra Club, and the Union of Concerned Scientists.

With financial support from the Federal Highway Administration, the group prepared a variable toll proposal that originally called for raising the current $1 toll to $3 during morning and evening commute hours.[22] Using state-of-the-art models, the coalition estimated their proposal could reduce delays on the bridge by 40 percent - saving regular users the equivalent of a work-week's worth of time over a year. The resulting $22 million in new toll revenue was to be spent enhancing transit options in the Bridge corridor.[23]

The proposal included measures to mitigate potential inequities. To avoid pricing low-income travelers off the bridge, the proposal called for a "lifeline" toll of $1 for people who qualified for lifeline rates with the local phone and electric utilities. Reflecting the fact that the average income of commuters on the bridge is 50 percent higher than the regional average income, it was estimated that roughly 8 percent of bridge users would have qualified for the program.[24]

The failure of the Bay Bridge proposal to reach implementation may reflect the fact that it differed in at least two important respects from the other three case studies.

First, the impetus of the project was not a shortfall of funding. The coalition that put the proposal together was concerned exclusively with reducing congestion and dependence on single-occupant vehicles. The group developed an expenditure plan for the revenue that the program would generate, but it was clearly a secondary consideration. While the investment plan adhered to reasonable transportation planning practices, there was no organized constituency to agitate for the funds or for the proposed transit services.

The second difference is that the program would not have meaningfully increased travel options. The proposed transit improvements arguably would not have been viable improvements for many bridge users. More important, in the eyes of critics, the program would reduce options because those who could not afford the peak toll would have to forgo their trip. Unlike the SR-91 and I-15 projects, users would not have a choice between free, congested lanes, and priced, fast lanes. Whereas it is hard to identify a class of "losers" in the three success cases, those Bay Bridge users who value $2 more than the time savings it would buy and those who would forgo their travel due to the peak toll surcharge would lose. In spite of the affluence of regular bridge users and the lifeline pricing feature, the proposal was regarded by some as problematic for low-income travelers.

Despite these shortcomings, the Bay Bridge project won a remarkable showing of support. Many civic leaders, including a handful of local and state elected officials, publicly support the project. A poll on the idea revealed that 59 percent of Bay Area residents supported the program.[25] Three of the region's largest daily papers editorialized in favor of the project.

This support notwithstanding, Bay Bridge toll rates are the prerogative of the state legislature. Thus far, no senior member of the legislature feels that variable pricing will greatly serve a valued constituency, so none has been willing to author a bill. Perhaps the key factor that has stifled legislative interest is the vehement opposition to the proposal by the most powerful member of the state senate, President Pro Tern Bill Lockyer. Lockyer objects to congestion pricing as a matter of principle. Lockyer wrote in an op-ed in the *San Jose Mercury News:*

> *I view tollways as economically burdensome and discriminatory— particularly on low- and middle-income drivers. Those who can't afford tolls get stuck in traffic while the wealthy zoom by on their private toll roads and lanes. That's un-Californian....I can't endorse what I see as another step toward the balkanization of our society, where the rich in their gated communities send their kids to private schools and drive on their private toll roads while everyone else lives without civilized amenities. That's tantamount to abandoning our civic culture and our responsibility to work together to build a great state.*[26]

Lacking a sponsor in its original incarnation and facing Lockyer as an opponent, the proposal languished until January 1996 when the state department of transportation revealed that it had underestimated by $2 billion the costs of reinforcing Bay Area toll bridges to withstand a powerful earthquake. This unexpected event created a fiscal crisis that, in turn, created a powerful constituency for additional toll revenue.[27] Despite the

improved political standing of the Bay Bridge variable toll proposal, however, it still went down to defeat due to the influence of Senator Lockyer. In August 1997, the California Legislature and the governor signed the final financing package for the bridge repairs; included was a flat toll increase from the $1 current toll to $2.[28]

Many believe that variable pricing on the Bay Bridge will come to pass, the only question is when. It is conceivable that, once the $2 toll goes into effect in January 1998, a future variable toll could be implemented which not only raises the peak toll, but lowers the off-peak toll in a revenue-neutral fashion. For example, a $1.50 off-peak toll and a $3 peak toll would raise the same amount as the $2 toll. Arguably, this variable toll option would also be more fair than the flat $2 toll, as off-peak bridge users have lower incomes than peak users.[29]

In the meantime, it appears that the failure of the proposal to increase travel options, and the fact some groups of users will be left worse off, have been key obstacles to implementing variable pricing on the bridge. One broad implication of this finding is that pricing of existing freeway lanes is likely to be difficult. Before that level of implementation is reached, there will likely have to be many more successful pilot projects, like SR-91 and I-15, to generate sufficient public familiarity and support for the concept. The battle over the Bay Bridge leaves no doubt as to the enormity of the political challenges to a large-scale shift of transportation policy toward market-incentives and user fees.

LONG-TERM IMPLICATIONS AND SUMMARY

Two Groups of Advocates

Perhaps the most informative conclusion that can be drawn from these case studies is that, where policymakers have chosen to implement congestion pricing, they have done so both to finance increases in transportation capacity and to increase the efficiency of existing capacity. For those who have followed the user fee debate closely, this finding appears to resolve a division between two distinct groups of user-fee advocates.

The first group consists of those institutions, public and private, that are responsible for building and operating our public transportation infrastructure. The second group consists of those institutions that are focused on reducing the social costs of transportation consumption, including economic inefficiency and environmental externalities.

Both sets of stakeholders have argued that user fees could lead to a more sustainable transportation future. Their definitions of sustainability, however, are markedly different. Those interested in user fees for financial reasons define "sustainable" as: *a transportation system in which more investment capital is available for growing our road (and presumably transit) systems to facilitate auto-mobility and growth.*

Those interested in reducing social costs define "sustainable" as: *a transportation system that yields less overall pollution and consumes less energy and fewer resources than our current auto-dependent system.*

Generating Capital

Some analysts find a certain incompatibility between these two definitions. At a minimum, those who identify with one of these visions have tended to dismiss the problem being addressed by the other. Yet in the four cases considered here, it appears that policymakers have implemented congestion pricing for both financial and social cost purposes. Moreover, while both justifications have proved compelling to decision-makers, the ability of user fees to generate capital appears presently to be more important to implementing agencies. The effects of the user fees on consumer choice of travel time and mode have been secondary, although highly relevant to the decisions to implement congestion pricing.

In the case of the SR-91 Express Lanes, the idea of charging tolls was conceived because toll revenue was the only means of paying for $126 million of construction costs for badly needed highway expansion. However, the demand management aspect of the variable toll system turned out to be critical to the financial success of the project, as they enable greater revenue generation than would a flat toll.[30] The variable toll method also enables the express lanes to successfully compete for customers from the adjacent free lanes. That is, variable tolls enable the operator of the toll lanes to manage demand to keep traffic moving fast enough to attract paying customers out of the congested free lanes.

In the case of I-15, the primary measure of success, as expressly stated by SANDAG, the administering agency, is the amount of funding the project generates for expanded transit service. Yet what has most impressed analysts about the I-15 experience to date is that it has noticeably increased the efficiency of the existing roadway.[31] The Lee County case appears to value pricing foremost for its ability to manage demand, although the federal grant that holds the Lee County treasury harmless makes this conclusion tenuous.

Investing in Transportation Networks

Perhaps the primary reason that congestion pricing is making headway is because it can address both notions of sustainability. Perhaps, as in Aesop's fable about describing an elephant, both sets of user-fee stakeholders have their hands around different aspects of the transportation problem; policymakers are responding to the whole. Through congestion pricing, policymakers are able to make necessary expansions to the size of the system and to get better use out if it.

One simple long-term projection of this trend is that investment in transportation networks, and the size of those networks, is likely to grow. A second projection is that policymakers will be searching for ways to make transportation systems more efficient and productive, thereby reducing the social costs of each unit of mobility or transport consumed.

It will be interesting to evaluate whether this feedback will affect the policy positions of user fee advocates. For example, will those advocates of pricing who are principally concerned with reducing the environmental impacts of transportation balk at

the news that congestion pricing is being used to expand transportation capacity? The answer may hinge on whether the early experiments, where revenue has gone to new capacity, are perceived as enabling future applications of pricing to existing capacity.

Local Solutions and Increased Travel Options

The other two success factors considered in this paper, that congestion pricing was implemented because it was suitable at the local level and because it increased travel options, may also be significant for the long term. Devolution has been a popular theme in government for the past several years, although it is unclear how much real authority higher levels of government will ultimately be willing to surrender to locals. In transportation, the increasing complexity of the systems suggests that centralized policies will become increasingly inadequate and that local solutions will become more prevalent. In California, for example, the long-term erosion of the purchasing power of the state and federal gas tax has meant that local governments are increasingly turning to local taxes to pay for transportation services.[32] To the extent that congestion pricing and user fees offer a decentralized solution to increasingly complex network problems, their stock is likely to rise.

Finally, it should come as a welcome sign that a given policy's impact on travel options is an important criterion to decision-makers. A serious shortcoming of the current U.S. transportation system is the dearth of alternatives to the household automobile for personal travel. In each of the successful congestion pricing projects, travel options were enhanced. In theory, by "getting the price right," congestion pricing could create a more level playing field on which higher-occupancy modes can more effectively compete. Whether or not this potential is reached, it seems reasonable to conclude that the degree to which vehicle user fees are implemented in the future will depend, in part, on the degree to which they increase travel options.

System Pressures and Philosophical Shifts

All things considered, it is premature to predict whether targeted user fees, such as congestion pricing, will emerge as a major force in transportation finance. The three success cases considered here suggest a promising future for congestion pricing. Several pressures on the U.S. transportation system, including financing needs, the need to reduce social costs, the need for flexible policies and the need for more travel options, work in favor of congestion, pricing and, perhaps, other user fees.

On the other hand, the experience with the Bay Bridge project suggests that before user fees become commonplace in U.S. transportation policy, a fundamental philosophical shift will have to occur. Tension appears to be building between the public's need for a efficient and reliable transportation system, on the one hand, and the desire to preserve the shared American freedom to drive wherever, and whenever, a person chooses. The fact that congestion pricing is being implemented is testament that the public attitude on this point is shifting, albeit slowly.

ENDNOTES

1. Fuel taxes are assessed per gallon of fuel; emission fees would be based on the quantity of emissions of selected pollutants; fee-bates are envisioned as a revenue neutral fee system, whereby vehicles that pollute or consume energy at levels above the fleet average would pay a one-time or annual surcharge, while vehicles that are cleaner, or more energy efficient, would receive rebates; VMT fees would charge a fee for each mile driven by a vehicle; congestion fees would charge vehicles for using particular road segments in proportion to the level of congestion on each segment; parking fees would charge vehicles for parking in private or public parking spaces. A particular parking fee program, termed "parking cash-out," was partially implemented in California several years ago, whereby state law requires many employers to offer commuters the option to choose cash in lieu of any parking subsidy offered.

2. Several comprehensive analyses included *Curbing Gridlock: Peak Period Fees to Relieve Congestion*, published by the National Research Council in 1994; *Transportation Pricing Strategies for California: An Assessment of Congestion, Emissions, Energy, and Equity Impacts*, prepared by Betty Deakin and Greig Harvey for the California Air Resources Board, November 1996; and *Efficiency and Fairness on the Road: Strategies for Unsnarling Traffic in Southern California* authored by Michael Cameron for the Environmental Defense Fund in 1994.

3. See, for example: Wachs, M. "Will Congestion Pricing Ever Be Adopted?" *Access,* Spring 1994, No. 4.

4. Recently Congress also saw fit to support "cash-out" parking pricing programs. Through the Taxpayer Relief Act of 1997, Congress removed a section of the Internal Revenue Code that effectively had blocked California from implementing its "parking cash-out" law. The tax code now specifically allows employers to offer commuters, without penalty, the option to choose taxable cash in lieu of a parking subsidy. This federal tax change does not require employers to offer commuters the cash option, but it will allow California to enforce its own parking cash-out requirement.

5. In 1995, Congress rescinded the final three years of pilot project funding, or $75 million, due in part to the relatively slow rate of spending in the pilot programs.

6. The metropolitan areas include: San Diego; Southern California (2); San Francisco Bay Area; Portland, Ore.; Boulder, Colo.; Houston; Minneapolis; Lee County, Fla.; and Westchester County, N.Y.

7. The $126 million construction project is being financed entirely by private investors who estimated that demand for the expanded capacity was sufficient to

earn them a profitable return on their investment. The terms of the public-private partnership include the following: the median right of way, which had already been graded to accommodate construction, is leased to the operator, the California Private Transportation Company, for $1 per year; the environmental review for the project had been completed and paid for by the State prior to the introduction of the toll road proposal; toll policy is the prerogative of the private franchise; investors are entitled to earn up to a 17 percent return on their investment (any additional profits will be turned over to the State); after 35 years the road reverts to State ownership.

8. The 91 Express Lane Model gave rise to the concept of the "High-Occupancy Toll" (HOT) Lane, on which single-occupancy vehicles pay for access and high-occupancy vehicles travel for free or reduced fare. The 91 Express Lane policy of granting discounts to carpools stems from the fact that the facility was originally conceived in local transportation plans as an HOV facility. In order to comply with the conformity provisions of the 1990 Clean Air Act, the toll road was expected to achieve an "average vehicle occupancy" (AVO) at least as high as the HOV lane would have. The operator, the CPTC, entered into a Memorandum of Understanding with local air and transportation planning authorities, in which it agreed to provide free passage or discounted fares to carpools. If the toll road encounters certain, specified, financial difficulties, however, it will be allowed to reduce or eliminate the carpool discount.

9. Users sign up for prepaid accounts with the CPTC. Each time an account holder uses the facility his or her account number is read by an overhead scanner from a wallet-sized transponder placed on the vehicle dashboard. Depending on the time and direction of travel, the user's account is debited between $0.60 and $2.95.

10. The federal congestion pricing pilot program is funding an evaluation of the SR-91 project but played no role in initiating or sustaining the facility or its operations.

11. The toll roads were authorized by California Assembly Bill 680, which authorized the construction of four private toll roads.

12. "CPTC 1996 Annual Report." California Private Transportation Company, L.P., Anaheim, Calif.

13. Bloom, M.S., and M. Micozzi. "U.S. Experience with Road Pricing Principles." Federal Highway Administration, June 5th, 1997.

14. CPTC 1996 Annual Report

15. Ibid.

16. Ibid.

17. The contract between the private operator of the SR-91 Express Lanes and the state allows the operator to reduce or eliminate the carpool fare discount in the event the operator is unable to service their debt.

18. Bloom et al.

19. Data source: Wilbur Smith and Associates, "Express Lanes Traffic Volumes I-15 Congestion Pricing Project," May 21, 1987. The decrease in SOV violations is likely attributable to the increased enforcement program that the Express Pass is funding. Why HOV use has increased is less clear.

20. 'Tolls are higher for heavy duty vehicles.

21. Bay City Council, "Variable Pricing on the Bay Bridge: Fact Sheet," San Francisco, Calif.

22. Tolls are collected in the westbound direction only. The program would have yielded its greatest benefits in the a.m. commute, which is predominately westbound

23. "Bay Bridge Congestion Pricing Demonstration Program Fact Sheet," Metropolitan Transportation Commission, Oakland, Calif., Dec. 1994.

24. Ibid.

25. Bay Area Poll, Nov. 1995. Conducted by the Bay Area Council, San Francisco, CA

26. *San Jose Mercury News*, Dec. 6, 1996.

27. In response to the Loma Prieta earthquake in Northern California in 1989 and the Northridge earthquake in Los Angeles in 1994, the California Legislature enacted requirements that the state's roads and bridges be seismically "retrofitted" for public safety, and that the retrofit work receive priority funding overall all other state transportation investments. These provisions meant that the $2 billion shortfall threatened new road construction throughout in the state. The political importance of the road projects that were threatened brought many key stakeholders to the table to assemble a plan to raise the $2 billion.

28. The toll increase will be on all state-operated toll bridges in the Bay Area, was approved for eight years, and will raise roughly one third of the funds needed for the bridge work. Another third will be taken from state funds that would otherwise go to new road development. The final third will be paid by a general revenue bond approved by statewide referendum in March 1996.

29. Harvey, G. "Incomes for Off-Peak Travelers." March 28, 1996.

30. The microeconomic theory that explains this relationship is termed "price discrimination." As described in *Microeconomic Theory: Basic Principles and Extensions* (3rd Edition) by Walter Nicholson: "It may sometimes be the case that a firm will have a monopolistic position in two different markets for the same good. If these markets are effectively separated so that buyers cannot shift from one market to the other, there may be the possibility for the monopolist to increase profits further by practicing price discrimination... This may lead to different prices for the same good in the two markets." Published by CBS College Publishing, New York, NY. 1985. P. 423

31. Cite I-15 HOV performance.

32. The failing of the gas tax stems largely from the development of more fuel-efficient vehicles that yield less tax revenue per vehicle mile traveled. As alternative-fueled vehicles increase in number, the fuel tax will become even less effective. Moreover, Congress' refusal to appropriate the full balance of the Federal Highway Trust Fund and the rising marginal costs of adding transportation infrastructure are said to have crimped investment. The California Transportation Commission, for example, reports that between 1970 and 1993 transportation revenue in California rose by roughly 18 percent, while the state population rose by 59 percent, personal income rose by 90 percent, and VMT rose by 147 percent (reported in Governor's Commission on Transportation Investment, "Final Report," January 1996. California Business, Transportation and Housing Agency, Sacramento, Calif. p. 17). Partly in response to this trend, 18 counties in California have passed half-cent sales tax surcharges to pay for road and transit projects.