Tolls as a Source of Market-Based Efficiency

Toll roads provide two types of incentives for efficient use of resources. First, to attract private financing, they must yield a competitive expected return on investment. The projected toll revenues must cover costs and provide investors and lenders with a high enough expected rate of return. It is difficult to obtain private financing for roads that cost more than the revenues they are expected to produce. Expectations can be incorrect, however, as in the case of the Greenway. The market does not prevent bad investments from being made, although it discourages them.

Second, the presence of tolls helps to allocate demand for scarce roadway capacity. In the case of the SR 91 Express Lanes, for example, in which tolls are higher at peak hours, motorists who value saving time can pay the toll and enjoy uncongested travel, while others spend more time in traffic but save the cost of the toll. To achieve that kind of efficiency in the use of resources, however, requires that the toll be set at a level that reflects the marginal social cost.[32]

Tolls as a Source of Funding

From the standpoint of state and local officials, the primary benefit of the toll roads discussed here is that they provide a new source of funding for roads. Toll roads offer a mechanism for tapping the resources of the private sector to build roads sooner than would be possible with traditional financing. If highway funds remain tight at the federal and state levels—reflecting higher priorities for projects other than highways and a reluctance to raise tax rates on fuel—governments may look increasingly to ways of raising money voluntarily from the private sector (that is, not through taxes). From the taxpayer's standpoint, letting private investors bear the risk and financial burden of building new roads is attractive.

The projects described above illustrate the gradations in balance between public and private sector. The Dulles Greenway used only private sources of funding, although it required state approvals of environmental permits, toll levels, and other matters. The Greenway will be operated and maintained privately for a specific length of time and eventually will be turned over to the state.

The 91 Express Lanes are also privately financed, but they follow a build-transfer-operate model. Because of concerns over liability, investors in the 91 Express Lanes turned ownership of the roadway over to the state once it opened

32. Ibid.

to traffic. The private firm will operate the express lanes for 35 years—and collect tolls to pay for maintenance, law enforcement, and other operating costs—after which all interest in the roadway reverts to the state.

The Orange County toll roads also are build-transfer-operate facilities for the same reason—namely, concern over tort liability. In their case, however, the state will assume the costs of operation and maintenance as each segment of roadway is opened to traffic. They also experience more governmental involvement than the 91 Express Lanes because the agencies created to develop them are instruments of the state. The agencies issued municipal bonds and levied fees on developers. In addition, taxpayers at the federal level are helping to subsidize those roads because interest on the bonds is exempt from federal income taxes.

Why are public-private partnerships attractive to the participants? For state and local governments, they present a way of getting some roads built sooner than otherwise because the initial capital comes from the private sector rather than constrained government budgets. If repayment is through tolls rather than taxes, it reduces the need to raise taxes. If the private sector operates and maintains roadways, some efficiencies may occur by avoiding burdensome procurement rules. Yet some of those rules are in place to ensure accountability and guard against corruption in awarding and overseeing contracts.

As noted above, the Orange County toll roads are turned over to the state for operation and maintenance as they are opened to traffic. That arrangement means that California must anticipate the need for funding those activities in the future. With relatively few such roads, those costs should not present a large burden on the state. However, if numerous roads were built under those conditions, they could impose a noticeable demand on the state's budget for maintaining roadways. To decide whether such an agreement is worthwhile, of course, a state would have to compare those costs with the benefits of substituting private for public capital for construction. The state also has an interest in seeing that the roads are built according to its standards so that they do not crumble prematurely or otherwise impose greater burdens on the state. The toll agencies share that incentive because they need the roads to be in good condition in order to attract motorists and keep toll revenues high.

OBSTACLES TO TOLL-FINANCED ROADS

Sponsors of toll roads must overcome many obstacles, some of which result from federal policies. The obstacles are often interrelated. Sponsors must obtain financing, rights of way, and environmental permits. Without environmental

approvals, a project may be too risky for private lenders or equity investors, but funds are needed up front to pay for environmental studies and applications. Some of the obstacles also apply to roads that are financed entirely with tax revenues, but when private funds are involved, the complexity increases.

Acquiring the Right of Way

Acquiring land for the right of way can be very difficult, especially in built-up areas where numerous property owners are involved. A single landowner who does not want to sell can stop a project or cause its costs to escalate. Governments generally have the right of eminent domain, which allows them to buy a property from an unwilling seller at a price deemed to reflect the fair market value, although exercising that right may be more costly politically than local officials are willing to bear. For a private venture or a public-private partnership that does not have the right of eminent domain, obtaining the right of way for a road can be daunting. Therefore, most new ventures will probably need governmental assistance in obtaining rights of way.

Obtaining Environmental Permits

If road developers succeed in obtaining land for the right of way, they must convince neighboring property owners as well as other members of the community that building a road will not harm the environment. People living near the right of way are often concerned about potential noise and other pollution that may affect their property values. That reaction is so common that it has generated its own acronym "NIMBY"—"not in my backyard." Overcoming NIMBY opposition is a major hurdle for highway developers.

The effect of additional highway capacity on regional air quality is also a concern. Environmentalists worry about encouraging more vehicles that will pollute the air, and they frequently argue that additional spending on transportation should be for mass transit—to get vehicles off the road—not for highways. If a new road would traverse wetlands or other environmentally sensitive areas, obtaining permission from the appropriate government agencies becomes even more difficult. From the standpoint of private developers, therefore, obtaining all the environmental permits required to proceed on a project holds considerable risk. Because of that risk, many participants in projects to develop roads consider some kind of governmental backing essential in the early stages. They suggest that governments put up their own funds or provide loan guarantees for the planning and initial engineering phases of the project. Once a project has received the

necessary environmental and other regulatory permits, the financial risk decreases substantially, making private investment (either equity or debt) more attractive.

Obtaining Financing

One common element of all toll roads financed at least in part by loans or equity from private investors is that the initial investment must be repaid. A key question is whether toll revenues will be sufficient to repay debt to bondholders and provide an attractive return on investors' equity. Although project costs are often subject to overruns, the revenues are generally more difficult to project because they entail more uncertainties about human behavior—will enough motorists be willing to pay tolls to use the road?—and because the revenue stream extends farther into the future and thus is subject to more unpredictable events that may affect the demand for the road.

Projecting revenues includes not only estimating the total volume of traffic but also the amount of traffic at various possible toll rates. Estimating the elasticity of demand—the percentage change in traffic from a 1 percent change in the toll—is always subject to error but all the more so given the relatively limited amount of experience to draw on.[33]

A study by J. P. Morgan Securities of 14 urban toll roads financed over the past 12 years compared actual revenues with the original forecast.[34] In only two of the projects did revenues exceed projections during the first four years of operation. For 10 projects, revenues fell short by 20 percent to 75 percent. For the remaining two projects, revenues for completed segments appeared close to projections but the results were not in for the entire projects. The findings of that study may prompt potential lenders and equity investors to take greater care in scrutinizing projections of traffic and revenues and to require government funding or financial guarantees to reduce the risk of investing, especially at the earliest and riskiest stages of the project.

Despite the overly optimistic revenue projections, none of the toll roads in the J. P. Morgan study has defaulted on its debt. That is not the case, however,

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33. Borivoje P. Dedeitch, Randy B. Machemehl, Mark A. Euritt, Robert Harrison, and C. Michael Walton, *Reliability of Toll Road Revenue Forecasts for Selected Toll Roads in the United States*, Research Report No. 1281-2 (research conducted by the Center for Transportation Research, University of Texas at Austin for the Texas Department of Transportation in cooperation with the U.S. Department of Transportation, Federal Highway Administration, July 1993).

34. Robert H. Muller, "Examining Tollroad Feasibility Studies," *Municipal Market Monitor* (New York: J.P. Morgan Securities, Inc., March 22, 1996).

for the Dulles Greenway in Virginia, where the traffic has fallen short of projections, and toll revenues have not been sufficient to meet interest payments. The J. P. Morgan study offers several insights, which are borne out in the Greenway experience. In general, the projections that proved to be most accurate were based on conservative assumptions about economic activity in the traffic corridor served by the toll road. Toll revenues were most likely to meet projections in corridors that were already congested—that is, where substantial potential demand already existed. Although suburban development is moving in the direction of the Greenway, the road has preceded demand. Traffic on the road will probably continue to grow, and eventually toll revenues should cover costs. That possibility may be of scant comfort to initial investors, however, who may not realize their expected return.

Finding toll projects involving new roads that private investors would consider investing in may prove difficult. If state and local governments have chosen highway projects according to their rate of return, then they have already undertaken the projects with the highest net benefits, leaving only projects that would be less able to recoup costs through tolls. All the most remunerative projects may already have been undertaken.

Private investors also bear a risk that their returns may be limited. When the state regulates the level of tolls or the rate of return, investors may not be able to realize the full fruits of their investment.

Anticipating Tort Liability

Another large risk for investors is potential tort liability. They might be sued for damages resulting from accidents. Moreover, the potential liability could be quite high for accidents involving deaths, injuries, and damage to the environment (as might result from multi-vehicle collisions involving trucks carrying hazardous materials). The California toll roads have dealt with this problem by turning ownership and operation of the roadway over to the state once the road was open to traffic. That way, blame for unsafe conditions or other factors leading to accidents falls on the state—not on private investors. That principle has not been tested in court, however.

Overcoming the Resistance of Motorists to Tolls

Federal policies discouraging states from imposing tolls have enabled motorists to enjoy toll-free use of limited-access highways for a long time, and few are eager to start paying tolls. Many motorists think that the motor fuel and other user taxes

and fees they have paid should be sufficient to meet the needs for highway capacity. Assessing the amount of financial resources necessary for highways is beyond the scope of this memorandum. But if additional funds are needed, they must come from either taxes or tolls, and right now public resistance to increases in taxes is formidable. That leaves tolls as an alternative.

Recent experience with toll roads suggests that motorists are willing to pay tolls if they see a clear benefit--such as having additional capacity available that enables them to avoid congestion and save time getting to their destinations. A recent study funded by the Texas Department of Transportation found public support for the use of tolls as an alternative to fuel tax increases on newly built roadway capacity.[35] Most Texans surveyed opposed the imposition of tolls on currently non-tolled roads, however, and they also opposed tolls as a mechanism for pricing for congestion. The last finding is an interesting one because the existing toll roads in Texas are in the Houston and Dallas areas where higher tolls during peak periods could reduce congestion, saving travel time for commuters willing to pay for it.

Opponents of toll roads often charge that such roads are unfair to motorists with low incomes who may not be able to afford them. That concern is intensified if it involves trips to work and the motorist has few alternatives. The Texas study, however, reported that the level of income of people surveyed did not affect their preference between fuel taxes and tolls, although people with higher incomes did tend to use toll roads more often than people with low incomes. Also, in the California SR 91 project, the income distribution of users mirrors the overall income distribution in the area.

Technology is helping to overcome one longstanding complaint about toll roads: wasting time waiting in line to pay the tolls. The new toll roads make use of electronic toll collection. Electronic tags placed in vehicles can be read by roadside sensors, and the amount of the toll can be debited automatically.[36] Although some observers have expressed concern about privacy, most motorists do not find that a problem. One way of addressing the problem is to give the motorists the option of paying a cash toll at a traditional toll booth (with the traditional delays) or of buying a debit card that does not identify the user.

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35. Chungwon Lee, Christopher Oswald, Randy B. Machemehl, Mark Euritt, and Rob Harrison, "A Survey Approach for the Acceptability of Highway Tolling and Congestion Pricing in Texas," *Journal of the Transportation Research Forum*, vol. 36, no. 1 (1996), pp. 43-58.

36. For additional discussion of electronic toll collection, see Congressional Budget Office, *High-Tech Highways: Intelligent Transportation Systems and Policy* (October 1995).

Obstacles and Public Policies

The obstacles to toll roads increase the risk to potential investors. If the federal government wants to enhance the resources available for roads, it can adopt policies that encourage participation by the private sector. With passage of ISTEA and the NHS act in the 1990s, the Congress has redirected its stance from opposing to mildly encouraging toll roads. In reauthorizing ISTEA, the Congress can choose whether to continue along that course. The policies it adopts will influence the amount to which tolls will augment user taxes—the traditional source of funds for highways—in the 21st century.

APPENDIX: HISTORY OF FEDERAL POLICY TOWARD TOLL ROADS

The federal government has a long tradition of favoring "free" roads over toll roads. The Federal-Aid Road Act of 1916 established a policy prohibiting the use of federal aid for toll roads and bridges. Section 1 of that act provided that all roads built with federal aid be "free from tolls of all kinds."[37] The Federal Highway Act of 1921 reiterated that policy, which was codified as Section 301 of Title 23 of the U.S. Code.[38] As it currently stands, Section 301 states:

> Except as provided in section 129 of this title with respect to certain toll bridges and toll tunnels, all highways constructed under the provisions of this title shall be free from tolls of all kinds.

Over the years, policy changes have occurred as Section 129 of Title 23 has expanded.

BRIDGE BUILDING: THE 1927 BRIDGE EXCEPTION

Rivers presented a problem for proponents of a nationwide road system. By the 1920s, private entrepreneurs had built a number of bridges linking roads and communities on opposite banks of rivers. They charged tolls to recoup their investment and pay for operating and maintaining the bridges. As government road building proceeded in the 1920s, it often turned out that the roads that were economically desirable to improve were those leading up to bridges. That placed owners of bridges in the enviable stance of holding monopoly positions that government investment had made even more valuable. As partial redress, federal highway authorities sought and obtained a ruling from the Comptroller General that federal aid was prohibited on roads or highways leading to toll bridges.[39]

That ruling still left the problem of how to link highways across rivers—an essential component of a national highway system—and how to mitigate the detrimental aspects of bridge monopolies. In addition to presenting physical barriers, rivers often serve as boundaries between governmental jurisdictions, and building bridges between them requires achieving agreement on design, alignment,

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37. Section 1 of the Act of July 11, 1916 (popularly known as the Federal-Aid Road Act of 1916), 39 Stat. 355. For a more detailed discussion, see statement made in the U.S. House of Representatives, *Relationship of Toll Facilities to the Federal-Aid Highway Program,* Hearings before the Special Subcommittee on the Federal-Aid Highway Program and the Subcommittee on Roads of the Committee on Public Works, 89th Congress, 2nd session (March-June 1966), Appendix A, pp. 912-929.

38. Section 9 of the Federal Highway Act of 1921, 42 Stat. 212.

39. *Relationship of Toll Facilities*, p. 912.

timing, financing, and many other matters. Creating interjurisdictional agencies with the authority to build and finance bridges appeared to offer a solution to some of those problems.

To encourage such bridge-building, the Congress in 1927 passed the Oldfield Act, which permitted federal aid to be used for constructing toll bridges owned and operated by states or their political subdivisions.[40] The act required, however, that toll revenues be used only for operation and maintenance and repayment of the debt. Once the debt was repaid, tolls were to be removed. The Federal-Aid Highway Act of 1956 made tunnels subject to that provision as well.[41]

POLICIES IN THE 1930s AND 1940s

The Depression of the 1930s presented both challenges and opportunities for road builders. On the one hand, government revenues were reduced, leaving less money for roads. On the other hand, land, labor, and materials were cheap. Moreover, road building was the kind of public works program favored by Keynesians to stimulate the economy, and federal officials touted the potential benefits of a nationwide system of highways to promote travel and commerce.

Throughout the 1930s and 1940s, the Bureau of Public Roads (forebear of the Federal Highway Administration) maintained staunch opposition to the idea of using federal aid for toll roads. As sometimes happens, however, the federal government did not speak with one voice on the issue. Two Depression-era agencies, the Public Works Administration and the Reconstruction Finance Corporation, jointly provided financing for the Pennsylvania Turnpike—a toll road that opened to traffic in 1940.[42]

Nevertheless, the position of the Bureau of Public Roads prevailed in defeating legislation introduced in the late 1930s to allow federal aid for toll roads. During World War II, the government took no further action on the issue.

In the decade following World War II, efforts to change federal policy toward toll roads were revived. The Bureau of Public Roads, aided by the Bureau of the Budget (predecessor of the Office of Management and Budget), continued to oppose federal aid for toll roads. Their arguments are interesting, especially in

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40. Act of March 3, 1927, 23 U.S.C. 129(a), 44 Stat. 1398.

41. Section 113(d) of the Federal-Aid Highway Act of 1956, 23 U.S.C. 129, 70 Stat. 384.

42. *Relationship of Toll Facilities,* p. 916.

light of the subsequent program of massive federal aid for the Interstate highway program, and are similar to arguments heard today. The Bureau of Public Roads argued that:

- If toll roads were built, their owner-operators would resist building free roads that might compete;
- Imposing tolls on some roads and not on others creates geographical inequities;
- Using bond financing for toll roads is just another way to skirt government debt ceilings, and thus the preferred financing was pay-as-you-go; and
- The federal government should not get involved in activities that could be pursued more appropriately by the private sector and state and local governments.[43]

The Budget Bureau's main arguments were:

- Toll roads do not require federal aid because they would pay for themselves. Holding out the promise of federal aid might lead to construction of toll roads that do not meet sound economic criteria—that is, that would not generate enough revenues to cover costs and would become a burden on the federal government.
- Providing federal aid for toll roads would just draw resources from other projects that could not pay for themselves.[44]

The federal government's continued opposition to federal aid for toll roads did not discourage states from building them. In the late 1940s and early 1950s, some 30 states contemplated building toll roads because they needed more highway capacity and were encouraged by the success of the Pennsylvania Turnpike.[45]

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43. Ibid., pp. 917-918.

44. Ibid.

45. Ibid., p. 917.

1956 INTERSTATE HIGHWAY ACT

The Federal-Aid Highway Act of 1956 created the National System of Interstate and Defense Highways.[46] The act authorized a 41,000-mile system of highways to promote interstate commerce, provide for more expeditious movement of military supplies and personnel, and expand and improve travel opportunities for citizens.[47] Interstate highways were to be free of tolls; instead, they were to be financed through taxes on motor fuel.[48] That principle was followed for the most part. However, the act allowed existing toll roads, bridges, and tunnels to be incorporated into the Interstate System, provided that federal-aid funds not be spent on such facilities.[49]

The 1956 act also called for a study of using federal-aid funds to reimburse states or other public authorities that had already built toll roads and thereafter to remove the tolls.[50] The resulting study recommended deferring any reimbursement until the Interstate System was completed.[51] That same recommendation was made in a 1980 study required under the 1978 Highway Act.[52]

FEDERAL HIGHWAY ACT OF 1960

Although federal officials favored reimbursing toll-road authorities and making the roads free of tolls, some states contemplated the opposite tack: reimbursing the federal government and turning freeways built with federal aid into toll roads. In something of a challenge to federal policies favoring freeways, Delaware and

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46. Federal-Aid Highway Act of 1956, 70 Stat. 378. During World War II, the Congress had passed legislation outlining plans for building an Interstate System once the war was over (Section 7 of the Federal-Aid Highway Act of 1944, 58 Stat. 842).

47. President Eisenhower had favored such a system ever since participating as a young Army officer in a 1919 convoy across the country. He also envisioned the Interstate Highways as a way to evacuate people from cities in case of nuclear attack. See Stephen E. Ambrose, *Eisenhower, The President* (New York: Simon and Schuster, 1984), pp. 250-251.

48. President Eisenhower had favored tolls but was advised that tolls would bring enough revenue only in the densely populated East and West Coasts. Ambrose, *Eisenhower,* p. 251.

49. Section 113 of the Federal-Aid Highway Act of 1956, 23 U.S.C. 129, 70 Stat. 384.

50. Ibid., Section 114.

51. Eugene McCormick (then Deputy Federal Highway Administrator), "Federal-Aid Toll Policy—Past, Present, and Future Directions" (remarks presented at the 58th Annual Meeting of the International Bridge, Tunnel, and Turnpike Association, Norfolk, Va., April 30, 1990), p. 4.

52. Ibid.

Maryland sought permission to collect tolls on sections of Interstate 95 in their states. In 1960, the Congress authorized them to do so provided they repay the federal aid that had been used to build those sections of highway.[53] Once the aid was repaid, the road segments would be free of the restrictions that accompanied federal aid, including the prohibition on imposing tolls. Interestingly, the funds repaid were to be apportioned to the states so that, in effect, the funds were simply shifted from I-95 to other highways in Maryland and Delaware. The states did not lose any funds. In fact, state residents probably gained at the expense of out-of-state motorists, since I-95 is the main route for motor vehicle travel between Washington and New York.[54]

1978 LEGISLATION

In 1978, the Congress passed legislation creating a program of resurfacing, restoring, and rehabilitating (so-called 3R projects) Interstate highways that had been in use for more than five years. Federal funds were authorized for 3R projects on toll roads designated as part of the Interstate System if the states agreed to remove the tolls when the debt was repaid and when the cost of operation, maintenance, and debt service during the period of tolls was covered.[55] The agreements became known as "Section 105 Secretarial agreements" after the provision in the law. If states did not eliminate the tolls, they would have to repay the federal funds used on that toll road.

Reminiscent of the 1960 legislation that allowed Delaware and Maryland to repay federal aid and impose tolls on I-95, the 1978 act allowed the state of Maine or the Maine Turnpike Authority to impose tolls on the Maine Turnpike, after repaying the amount of federal aid that had been used to construct various interchanges. The amount repaid was to be deposited to the credit of the Highway Trust Fund and to be apportioned to Maine for other federal-aid highways, and so, as with Maryland and Delaware, the state did not lose any federal aid. After repayment, the Maine Turnpike would be free of the requirements of Title 23.[56]

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53. Section 6 of the Federal Highway Act of 1960, 74 Stat. 523.

54. That effect was accentuated when Delaware removed tolls at the interchanges between Wilmington and Newark and raised the toll at the Maryland state line--which by definition only interstate travelers would use.

55. Section 105 of the Surface Transportation Assistance Act of 1978, 92 Stat. 2692-2693.

56. Section 145 of the Surface Transportation Assistance Act of 1978, 92 Stat. 2713.

1979 LEGISLATION

Following close on the heels of toll relief for Maine was legislation allowing Indiana to repay federal funds it had received for constructing three interchanges of the East-West Toll Road (Interstate 80/Interstate 90) and, providing the state met specified requirements, permitting it to charge tolls.[57] Once again, the amount repaid was credited to the state for other highways.

1987 LEGISLATION

Legislation passed in 1987 marked the first departure from the general federal policy opposing toll roads. That year, the Congress authorized a pilot program in which seven newly constructed (or reconstructed with expanded capacity) toll roads would be eligible for federal-aid highway funds.[58] The act designated five states—California, Florida, Pennsylvania, South Carolina, and Texas—and authorized the Secretary of Transportation to designate two other states. The Secretary designated Colorado and Delaware. Georgia and West Virginia were added as a result of provisions in appropriation legislation for 1988 and 1989.[59]

The 1987 act imposed several restrictions that reduced the attractiveness of toll roads to the states. It excluded highways on the Interstate System. It required that toll revenues be applied to new construction or reconstruction, and to the costs of operation, maintenance, and debt service. Finally, the act set the federal matching share at 35 percent, compared with federal shares of 80 percent to 90 percent on nontoll roads, and the states did not get any additional money. They would have had to use funds for other highway projects that were eligible for a higher federal matching grants. If the state could use a dollar of its own money to get $9 (for Interstate construction) or $4 (for resurfacing, restoration, rehabilitation, and reconstruction), it would have little incentive to use the money on a toll road where a dollar would bring only 54 cents in federal matching funds.

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57. Section 201 of the Surface Transportation Assistance Act of 1978, Amendment, 93 Stat. 800.

58. Section 120 of the Surface Transportation and Uniform Relocation Assistance Act of 1987, 23 U.S.C. 129, 101 Stat. 157.

59. William A. Lipford, *Toll Road Financing with Federal-Aid Highway Funds,* CRS Report for Congress 96-130 (Congressional Research Service, February 13, 1996).