The Role of Price in the Urban Transportation Market

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There appears to be general agreement about the major factors that contribute to the present financial distress of urban transportation, but we seldom use an economic framework to isolate the sources of the market failure and to consider their combined effects on the market performance of the transit industry. In this paper, I will use the concepts of industrial organization to relate the characteristics of market structure and conduct in urban transportation to the poor market performance. The source of market failure of primary concern to this workshop—price-cost distortions—will then be singled out for particular emphasis.

TRANSIT LOSSES: A CASE OF MARKET FAILURE

How to achieve safe, convenient, efficient, and financially sound urban transportation has been a major concern for transportation professionals and elected officials at all levels of government since shortly after World War II. During this period the tradition of federal noninvolvement in urban transportation was abandoned, and large amounts of federal funds were allocated for the planning and construction of urban highways, rail transit, and bus systems. In spite of these investments and the development of sophisticated urban transportation planning methodologies, public transportation service has generally declined as financial distress became the rule in the public transportation industry. In fact, there appears to have been an inverse relation between the amount of federal aid provided and the deterioration of the service. It is now accepted almost without question that both operating and capital subsidies will be necessary if public transportation is to survive.

Chronic deficits, or negative rates of return, indicate poor market performance. The financial condition of urban public transportation—and virtually all for-hire transportation with the exception of the taxicab and intercity bus and motor freight—is symptomatic of our understanding and our treatment of the market environment in which transportation decisions are made and transportation services are produced, bought, and sold. The market is a very delicate mechanism that serves as a communication system and coordinates the actions of thousands or millions of individuals in a given metropolitan area. As consumers, these individuals make transportation and other decisions on the basis of their incomes, their preferences, the alternatives available to them, and the prices of these alternatives. Similarly, the producers of transportation and other services must make decisions concerning what to produce, when, where, how, and how much on the basis of the demands for their services, their costs, and the constraints under which they operate.

In situations in which the market response is sensitive to consumers' demands, prices represent the economic costs, productive factors can be combined in different proportions and transferred among uses with relative ease, and decision makers have easy access to information concerning product quality, alternatives, prices and costs, workable or reasonably satisfactory market performance results. Such workable performance exists in a wide range of goods and services, particularly such consumer items as clothing, small appliances, and many foods. Although the prices of these items are frequently regarded as too high and the goods may not be produced under conditions of perfect competition, they are not generally regarded as major problem areas. If the market performance in urban transportation were satisfactory, it would mean in principle that

1. There would be a range of alternatives available to potential trip makers;
2. Prices would be efficient, in the sense that they would be equal to the economic costs of providing the services, and equitable, in that they would represent value to the users as indicated by willingness and ability to pay;
3. The services would be produced efficiently, i.e., at the minimum cost consistent with the type of service demanded;
4. The suppliers of transportation services would tend to receive a normal (i.e., competitive) rate of return;
5. Suppliers would respond quickly to changes in demand by expanding or contracting services as a result of changes in tastes, incomes, origins and destinations, and so on; and
6. There would be some degree of innovation and service improvement over time as the suppliers of transportation services competed with each other for customers.
In contrast, the performance of the urban transportation market can usually be described as follows:

1. Potential trip makers, whether in the inner city or in the suburbs, frequently have poor or no access to transit and must choose between the private automobile and the taxicab for at least a portion of the trip.
2. Price-cost distortions—There are substantial external costs to other road users and to the community in the form of congestion, accidents, air pollution, and noise costs that individual drivers do not consider because they are not confronted with these costs. Municipal services to motor vehicles are heavily subsidized by property and sales taxes, and commuters typically pay no parking charge or pay a rate that is not commensurate with the opportunity cost of the space. The methods of payment further distort perceived costs. The fixed costs of the automobile and use of credit cards and checks to pay for operating costs lead people to underestimate the costs of driving in comparison to travel by transit, which frequently requires exact change. Both automobile and transit peak-hour users are cross-subsidized by off-peak users. On a passenger-kilometer basis, transit fares tend to be related inversely to the length of the trip.
3. Economic regulations—Restrictions on routes, schedules, fares, initiation and termination of service, service areas, and profits impose severe limitations on transit operators. Some types of services—principally jitney—may be outlawed altogether. These regulations restrict competition and stifle incentives and innovation. The customer is the principal loser.
4. Labor work rules and collective bargaining—Labor practices that require that drivers be paid on the basis of 40 hours of work a week with provisions for overtime pay for 2 to 4 hours a day of productive service for the majority of drivers create higher operating costs in the face of few opportunities to increase labor productivity in the present environment. Agreements that link the wage scales of one union to those of others and the labor protection requirements of the 1964 Urban Mass Transportation Act exacerbate the situation.
5. Government programs—Proposals administered at all levels of government have conferred much greater benefits on private than on public transportation. Aid programs have been biased toward the automobile in terms of the amounts of funds available and the required local matching ratios. At least until recently, the transportation planning process has been automobile oriented. Automobile owners are permitted to deduct fuel tax payments in calculating their federal income taxes. Taxes on transit company earnings and property have also tended to place them at a disadvantage vis-a-vis their major competitor, the private automobile.

WHY PRICING?

Except for the advocates of free (i.e., zero-fare) transit, there are few who question the need to price public transportation. Some method must be used to obtain the necessary revenue to cover expenses. Whether fares should cover both fixed and variable costs or only variable costs has only become an issue rather recently. Before World War II, transit was seen as an enterprise that offered the opportunity to make at least a normal profit, and the fare box was expected to cover total costs over the long run, although rates might be set below the average variable cost in the short run in order to minimize losses.

Beginning in the 1950s, economists began to urge that automobile trips, particularly during peak hours, be priced according to marginal cost rather than average cost (the level drivers perceive in terms of their operating and time costs) in order to get drivers to take into account the external congestion costs they impose on the total stream of traffic. Since a driver's marginal cost exceeds his average cost when traffic density is sufficiently high for vehicles to interfere with one another and cause average speed to fall, a price or toll equal to the difference between marginal and average costs would be necessary to satisfy the classical condition for economic efficiency, i.e., price = marginal cost. The problem was first seen as a problem with a toll, the equilibrium volume would be too large and would result in a marginal cost in excess of the price. With the appropriate toll, the drivers' average costs would equal the social marginal costs, and a smaller and more efficient volume would result. This basic argument was expanded in the later 1950s and 1960s to achieve an optimum allocation of resources over the long run when capacity is variable (i.e., no fixed costs) and employed the theory of peak-load pricing that had been developed and successfully used for certain utilities, particularly thermoelectric power.

Within the past several years, transportation planners and traffic engineers have become interested in price as an instrument of traffic control. As the emphasis has shifted from normative economics concerned with the conditions of achieving an optimum allocation of resources to the use of price as a means of traffic restraint in the management of the urban transportation system, the interests of the economist, the planner, and the engineer have converged. From a transportation system management (TSM) perspective experience has shown that providing alternatives to the private automobile is a necessary but not a sufficient condition to
induce a significant proportion of automobile commuters to abandon (or share) their cars or to change their time of travel. Thus, the most pragmatic reason for charging motor vehicles higher prices is to permit the TSM plan to succeed, since an essential element of the plan is to make additional street and highway capacity available for high-occupancy modes and to provide them with priority treatment in order to permit them to travel at the highest speeds consistent with safety and the design characteristics of the system.

In addition to making it possible for the TSM program to perform at levels that are consistent with its potential, there are a number of other reasons for advocating the pricing of roads on a more economic basis:

1. Pricing makes the costs of travel more explicit and places both the individual and the community in a better position to make trade-offs between different transport alternatives.

2. Pricing gives users of the system a greater range of choice than they would have if the automobile were banned in certain areas (e.g., in automobile-free zones), since anyone willing to pay the higher price can travel to any destination he or she chooses under a pricing scheme or under conditions of heavy congestion (the driver could pay the price and drive with less congestion, an option he or she does not currently have).

3. Prices are flexible and can initially be set relatively low and subsequently raised to the levels necessary to achieve the levels of service specified in the TSM plan.

4. Pricing encourages choices that will facilitate the implementation of the other components of the TSM plan. In the short run it will discourage peak-hour vehicle travel, encourage car pooling, stimulate transit demand, encourage freight vehicles to avoid the peak hours, and make it safer and more pleasant for pedestrians and bicyclists. In the long run it will encourage developmental patterns that will reduce the length of commuting trips.

5. Pricing will provide a valuable source of revenue that may be used to finance other components of the TSM plan. In particular, and transit operating costs or additional highway capacity if demand proves adequate. The potential revenue in the Los Angeles Basin from peak-hour pricing is estimated conservatively at $450 million per year. Charging commercial parking rates to federal employees in Washington, D.C., would provide at least $10 million per year.

6. Pricing would greatly assist urban transportation planning by providing much better information about the value people place on different types of service and what types of system changes—particularly capital-intensive programs—are necessary over the long run.

ANOMALIES IN PRICING URBAN TRANSPORTATION SERVICES

The pricing practices that have evolved in urban transportation are rather startling. We live in what is essentially a market (or at least a mixed) economy. The market system, the "invisible hand," and the use of the dollar vote to determine the answers to basic economic questions (with price occupying the central role) are all generally taken for granted. It is part of our heritage and as American as apple pie. We advocate the use of price to ration supply and to guide the allocation of resources in national transportation policy statements as well as in textbooks at virtually all levels of education. Furthermore, we urge it on our Russian counterparts as the best solution to some of the transportation problems they face.

We are generally satisfied with the results of market performance when the market functions in a competitive manner and price is allowed to perform its proper role. We know how to price services according to marginal costs when there are peak loads and intermittent demands and have observed the advantages of such pricing schemes with respect to market performance (i.e., in terms of price versus cost of the product, quality of the service, responsiveness to changes in demand, progressiveness in terms of improving the quality of the product and reducing costs, and providing a normal rate of return), e.g., rates for seasonal tourist services, off-season and evening travel fares (particularly in air travel), and telephone and electric services.

Both the theory and the technology are available to price urban transportation services at levels that are commensurate with their economic costs. The theory is straightforward and was laid out clearly by William Vickrey when he testified before Congress in 1959 (1). The technique can be sophisticated, e.g., toll collections by automatic vehicle monitoring systems like those currently in use in New York Port Authority buses, or extremely simple, e.g., parking arrearages for commuters, as advocated by the U.S. Department of Transportation (DOT) and the Environmental Protection Agency (EPA), or supplementary licenses for peak travel in the central business district (CBD) (as actually practiced now in Singapore). Yet we have been willing to tolerate a situation in which urban transportation is improperly prices in a manner and price is allowed to perform its proper role. Pricing can be a powerful tool to achieve environmental and energy goals as well as transportation goals.

Fortunately, there are now some grounds for optimism. Pricing has emerged from the underworld of economics and is now regarded as a legitimate tool. The effort we have undertaken here is a positive step. More significant is the success of Singapore's supplementary licensing scheme in reducing peak travel into the CBD without the feared negative consequences. I suspect that, prior to the energy crisis, very few of us would have thought that in 1975 DOT would include pricing in the TSM program and attempt to initiate a pricing demonstration during the U.S. Bicentennial (which is also the bicentennial of the publication of Adam Smith's Wealth of Nations).

Each of the sponsors of this study—the Federal Energy Administration, EPA, the Urban Mass Transportation Administration, the Federal Highway Administration, and the Office of the Secretary of Transportation—is committed to the goal of more efficient and viable urban transportation. In our policies and our programs, we are placing increasing emphasis on more rational pricing of transportation services in order to create the necessary environment for improved urban transportation and to further the goals of our specific agencies. We anticipate that this workshop can help us answer a number of important questions:

What has been learned from recent experience, specifically in Singapore, where supplementary licensing was implemented, and in London and Caracas, where it was planned but not implemented? What have been the recent developments in pricing, which cities in the world are considering it and in what form? What should be the main emphasis in the United States? How can a local pricing scheme be tailored to achieve multiple goals—improved transportation services, better environmental quality, and conservation of energy? Are there trade-offs among these goals? Who should be the major actors
in a pricing demonstration (or demonstrations) in the United States, and how can dialogue among them be achieved? What should be the priorities for research and development? How can we proceed incrementally, and what should be the first steps? What should be the roles of the federal, state, and local governments in implementing urban transportation pricing changes?

REFERENCE


Transportation Pricing Program of the Urban Mass Transportation Administration

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The Office of Service and Methods Demonstrations in the Office of Transportation Management and Demonstrations is involved in demonstrating concepts in numerous functional areas, including priority techniques for surface transit operations, innovations in paratransit, methods to improve service for the transit dependent, and transportation pricing policies to encourage the use of high-occupancy modes of travel. This paper presents a description of the transportation pricing program.

The overall goal of this program is to reduce severe traffic congestion in urban areas and to improve the environment by encouraging use of the public transportation system. These goals are being pursued by promoting pricing strategies that directly improve the performance of the public transit system, i.e., speed, productivy, or reliability, and by using disincentives that discourage the use of low-occupancy modes of travel.

TYPES OF DEMONSTRATIONS

All the pricing demonstrations now being planned are of an experimental nature and are intended to develop and test new and unproven pricing policies that merit widespread use. The driving force behind these demonstrations is the desire to learn about the relationship between various pricing strategies in relation to the basic transportation options for travelers and the reactions of the many sectors of the transportation market.

At present, two general categories of demonstrations are being considered for implementation. The first consists of pricing measures that will discourage the use of low-occupancy vehicles. Concepts tested in these demonstrations affect the cost of low-occupancy modes, decreasing their attractiveness in comparison with the public transit system. The major effort in this category involves a supplementary license scheme that is used to charge low-occupancy vehicles for driving in highly congested areas, but this is only one of many potential pricing approaches of interest. Consideration will be given to other collateral measures, such as corridor pricing and establishment of parking surcharges.

In the second category, pricing strategies are used as a means to achieve positive rider attitude and support toward the public transportation system and to increase its ridership and productivity. Included are demonstrations to investigate major transit pricing issues ranging from pricing of various transit services for different user groups and mechanisms for prepayment of fares to the complete elimination of fares.

These demonstrations provide a real challenge since it may be very difficult to gain acceptance for many of the pricing policies planned for study. The pricing measures aimed at reducing use of the automobile will undoubtedly meet strong opposition from local special interest groups; a special effort will have to be made to communicate to local concerns the potential advantages of such a concept. It may be difficult to obtain local tax resources to support pricing incentives to use transit, e.g., low fares, and pricing policies to more completely cover the cost of certain premium transit services, e.g., dial-a-ride and subscription and express services, also may have considerable difficulty gaining local political acceptance.

Fare-Free Transit Demonstrations

Title 2 of the National Mass Transportation Assistance Act of 1974 provides for the "research and development, establishment, and operation of demonstration projects to determine the feasibility of fare-free transit." The Urban Mass Transportation Administration (UMTA) is therefore studying the concept of fare-free transit with the ultimate objective of designing a demonstration program to evaluate all the basic issues associated with setting fare levels for public transportation.

The definition of fare-free transit ranges from the