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Foreword

This Record is concerned with various aspects of the regulation of taxicabs and other paratransit modes in U.S. cities. It consists of the transcript of a session at the Transportation Research Board's 64th Annual Meeting in January 1985 and three other papers prepared for the 64th and 65th Annual Meetings. Together these papers form a valuable collection of recent research on how paratransit is regulated, the effects of recent regulatory changes, and the policies regulators should consider to realize the full potential of paratransit.

The Transportation Research Board session transcribed here, "Paratransit Regulatory Revisions: What Are We Learning?," provides six views of the effects of relaxing restrictions on the paratransit industry. The first speaker, Mark Frankena, examines the economic arguments for five categories of regulations and concludes that restrictions on entry, downward fare competition (that is, setting a floor on fares), and the types of service that may be provided have no convincing economic justification. On the other hand, he finds that there are potential justifications for fare ceilings and service and quality requirements.

Lawrence Doxsey discusses the experiences of Seattle and San Diego with relaxing entry and allowing fare competition in the taxi industry. In both cases, he finds that the number of firms and vehicles increased, whereas fares remained stable or declined in real terms. He cautions, however, that these effects are in part the result of the particular market structures in the two cities.

David Reinke provides an overview of San Diego's unique jitney industry, which was created in its present form by a revision of the paratransit code in 1979. He notes that jitneys have filled some significant market niches, but that unresolved problems exist with regard to competition with transit and taxis, due in large part to inadequate enforcement of restrictions on jitney operations.

Roger Teal reports on the effects of Arizona's removal of entry, pricing, and service restrictions on the paratransit industry in Phoenix and Tucson. He terms deregulation there a "bust": although the concentration of the taxi industry declined, the number of airport limousines increased, and competition for public-sector contracts for demand-responsive service was heightened. There were large increases in fares, few pricing or service innovations, and a marked decline in the quality of taxi vehicles.

Sandra Rosenbloom derives lessons for policymakers and planners from the recent experience with regulatory reform. She stresses the need for realistic expectations and argues in favor of staged implementation strategies.

Finally, Alfred LaGasse rebuts the notion that the taxicab industry is noncompetitive, and argues against open entry. However, he recognizes the need for more flexible regulations regarding both entry and fare setting.

A common thread running through these six presentations is an emphasis on the complexity of the impacts of paratransit regulatory reforms. The impacts will vary according to the local market structure and supply and demand factors as well as the specifics of the reforms. Analyses of these impacts must therefore take care neither to oversimplify nor to make inappropriate generalizations.

The other three papers in the Record deal with quite different aspects of paratransit regulation. Allison, Bloch, and Levinson discuss the private vans providing commuter-express and subway-feeder service in New York City, and the problems caused by fragmented regulation and inadequate enforcement. They provide recommendations to rationalize the regulation of these services in order to attain the potential benefits while minimizing conflicts with transit.

Ardekani, Jamei, and Herman propose a formula for determining taxicab fare structures, taking into account vehicle operating cost, driver's compensation, profit, and overhead. They find that although current systems result in fares similar in magnitude to those determined by the proposed formula, they tend to overcharge customers in congested traffic compared with the cost

of the trip and undercharge customers in uncongested traffic. This fare-determination formula may prove useful to regulatory agencies in establishing efficient fare guidelines.

Last, Morris discusses New York City's taxi drivers school, a program required for all new applicants for hackers' licenses. Her demographic survey of the school's students found that three-quarters were foreign born and nearly half had schooling beyond the high school level. Focus-group discussions of attitudes toward the school, held before and after training, and interviews with fleet managers indicate that the school is perceived as a worthwhile, effective preparation for providing high-quality taxicab service.

The papers in this Record are indicative of considerable progress over the past decade in the discussion of paratransit regulation. Formerly, discussions of paratransit regulation tended to be highly polarized, with advocates of laissez-faire free enterprise at one extreme and proponents of maintaining tight economic controls at the other. The session transcript, in contrast, illustrates a definite move toward a middle ground characterized by the recognition of a need for flexibility in economic regulation, depending on local market conditions and site-specific problems. Similarly, the paper on New York's vans is noteworthy in that it is neither a rejection of the vans out of hand as undercutting the public transportation system nor an endorsement of their unrestricted operation, but rather an attempt to find ways to take advantage of their benefits while minimizing their costs. In the fare-formula paper an attempt is made to find a way to rationalize fare setting and eliminate cross-subsidies between different types of taxicab passengers, and the study of New York's hackers school demonstrates a concern with the non-economic issues of service quality and safety.

This progress in the discussion of paratransit regulation is clearly a reflection of the increased importance of the paratransit industry and of the research attention paid to recent experiences with significant regulatory changes. As more experience with the paratransit industry is gathered and analyzed, our understanding of how the industry should be regulated will grow. It is hoped that this Record will be seen as a significant contribution to that growing understanding.

Ronald F. Kirby
Chairman, Committee on Paratransit

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The **Transportation Research Record** series consists of collections of papers on a given subject. Most of the papers in a **Transportation Research Record** were originally prepared for presentation at a TRB Annual Meeting. All papers (both Annual Meeting papers and those submitted solely for publication) have been reviewed and accepted for publication by TRB's peer review process according to procedures approved by a Report Review Committee consisting of members of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

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Paratransit Regulatory Revisions: What Are We Learning?

RONALD F. KIRBY, PRESIDING

This session consists of six presentations in which the effects are debated of the relaxation of regulations affecting taxicabs and other paratransit modes, particularly in regard to allowing open entry and removing restrictions on setting fares. The first presentation provides the results of a theoretical and empirical analysis of paratransit regulation, concluding that there is no economic justification for many of the existing regulations. The following three presentations examine the recent real-world experience with relaxation of regulations in Seattle, San Diego, and Arizona, finding mixed results. In the fifth presentation it is concluded that the results of regulatory revisions have often been disappointing and ways are suggested in which planners and decision makers considering regulatory reform can set and achieve more realistic goals. In the final presentation, a representative of the taxicab industry argues against open entry and market-determined fares, but in favor of more flexible entry and fare standards.

We have six presentations this morning on the subject of revisions in local regulations affecting paratransit modes, particularly taxicabs and jitneys. This, as I am sure many of you know, has been a subject of debate over many, many years, going back to the early part of the century. The battle has been joined again with some vigor over the last 10 or 15 years as interest has grown in the potential of paratransit modes, particularly jitneys and taxis, to play a larger role in the public transportation system.

It has been suggested that jitneys could perform much of the fixed-route service along heavier corridors and help relieve some of the serious problems with subsidies for conventional transit modes and that taxis could do more in terms of providing shared-ride service and service for the handicapped. It has also been suggested that one of the major factors limiting participation by taxis is regulations, mostly at the local government level but in some cases at the state government level, that actually restrict the number of taxis or jitneys that are allowed to operate and the services that they are allowed to provide and that set the fares that they are allowed to charge. Many cities have a fairly high value on taxicab medallions, with medallions changing hands for thousands of dollars—tens of thousands sometimes—which suggests that there is considerable potential for additional supply.

Until recently, this discussion had been to a large degree based on theory and anecdote. Over the last few years, however, several U.S. cities have made substantial changes in paratransit regulations: relaxing entry controls in some cases, relaxing price controls as well in other cases, and relaxing virtually all controls in a few cases. Fortunately, the federal government has been sufficiently interested in these changes to provide support to monitor their impacts.

We have several researchers here today who have been able to study the effects of these changes, and they are going to present their finds to date. The views, as you will see, are by no means unanimous. The interesting thing for us as researchers is that a lot of well-informed and well-trained people are looking at the same sets of information and arriving at somewhat different conclusions. This is the background for the discussion at this session.

Economic Analysis of Taxicab Regulation

MARK FRANKENA AND PAUL PAUTLER

Because taxi regulation is fairly complicated and there are a lot of regulations, it is quite important at the outset to think carefully about the different kinds of regulations that exist.

First of all, it is important to keep in mind that some of our comments may apply to only one of the market segments: radio dispatch, cruising, taxi-stand, airport, and, perhaps, contract service. It is important to keep those five taxicab market segments separate in discussing regulations because there are some regulations that might be justified in one of those market segments but not in others.

It is also important to keep in mind the rather large variety of regulations that exist, because some of our critical comments will apply to one type of regulation but not to others. In particular, it is important to separate entry regulations or restrictions, which include franchise restrictions that limit the number of firms as well as medallion licensing systems that limit the number of taxicabs. We have concluded that there is no persuasive economic justification for those sorts of regulations.

A second category of regulation is fare regulation, and here it is important to disaggregate fare regulation into different types. There are many fixed-fare regulations in which the government specifies the fare and firms cannot discount below the floor. We have concluded that there are no persuasive economic justifications for this limitation on downward fare competition.

There are, however, other types of fare regulation, for example, ceilings and posting and filing requirements. We have concluded that there are potential justifications for some of those types of regulation. The meaning of "potential" will be spelled out a little later. I am not really endorsing these regulations, but there are some arguments that suggest that there might be some benefit to them.

Third, there are regulations governing service. Some restrict certain types of service, such as shared rides, dial-a-ride, jitneys, and so on. On the whole we have concluded that there are no justifications for most of those types of restrictions.

There are, however, service requirements—for example, that all calls must be answered, that service must be provided 24 hours a day, and that there be a certain number of taxicabs per firm. With some hesitation we have suggested that there are some potential justifications for those regulations. They are of a third-best nature, if you are into the idea of second best and third best. There are a lot of better ways to handle problems in taxi markets, but service requirements might be a second or third best way to handle some of them if the better alternatives are unavailable.

The final area of regulation is quality regulation, for example, vehicle safety requirements and liability insurance require-

ments, and again we have concluded that there are potential justifications for those regulations.

So if you look at what we have really focused on here, our criticism is essentially aimed at restricted entry and restrictions that prevent taxi firms from lowering fares. We are particularly concerned about regulations that would prevent an entrant, particularly in the radio dispatch market, from getting, say, 10 cabs, entering with a new small fleet, and offering service at a fare below that currently mandated. The other types of regulations, on the other hand, may have some merit. We cannot reject some arguments for regulation out of hand. Although we are not endorsing all regulations, we are keeping quite an open mind on some of them. In other words, in the real world they would require further study. It would really be best to do a cost-benefit study of a particular quality regulation to see if it is justified, but at least there are potential gains from these regulations.

Why are we critical of the entry restrictions and the limits on downward fare competition? The first thing to think about, apart from the direct restriction of having fewer taxicabs, is that many of these restrictions open the way for firms to have monopoly power. Limits on the number of firms or limits on the number of licenses make it possible for one or a small number of firms to get control of most of the licenses so that the result is a concentrated industry. This is important, because if you look at taxi markets across the country, you will find that in a lot of cities, even though the number of licenses is restricted, not all the licenses are used, and that is presumably in many cases a reflection of the exercise of monopoly power. In other words, if you have all the licenses, you may do even better by not using all of them. So limiting the number of licenses may create a sort of multiplier effect, which results in monopoly power.

Now, beyond that, what are the basic problems with these regulations? One is that they result in a waste or an inefficient allocation of resources. The problems that we think are common as a result of limits on entry and on downward fare competition, particularly in the radio dispatch market, are that fares will be higher or waiting times longer, or both. As a result ridership of taxis will be lower, so fewer urban trips will be served by this mode. There are inefficiencies of that sort, the same type of inefficiency with, say, the exercise of monopoly power when output is lower and prices are higher than they should be.

A second type of inefficiency that results from these regulations is that occupancy rates on average will be lower and the cost per trip higher. This happens in a variety of ways. Restricting ridesharing is one example: a lower occupancy rate is the result. Requirements to provide various sorts of service result in a lower utilization rate for those services. There are anti-reciprocity restrictions that result in deadheading.

A third general area of inefficiency or waste of resources is the shortages that exist in many specific segments of the taxi

market, for example, refusals to make short-haul trips, which often reflect the peculiarities of the fare structures that make certain types of trips unprofitable to offer.

Thus, there is a range of inefficiencies. In addition to the waste of resources, taxicab regulations may be criticized on grounds of inequity. In economics there is often a supposed conflict between efficiency and fairness. In this case, there is not, because in addition to the waste of resources, these regulations impose a disproportionate burden on the low-income population in two ways. First, the low-income population spends a higher share of their income, and often simply more dollars, on taxis than does the high-income population. As a result, of course, they are disproportionately burdened by higher fares and longer waiting times. Second, the employment opportunities that are lost as a result of the entry restrictions are typically for lower-skilled jobs. Thus entry restrictions and limits on downward fare competition may be criticized on the bases of both inefficiency and inequity of income distribution.

The body of our study leads to the foregoing conclusions in two different ways. First, we examined and evaluated a variety of theoretical arguments for taxicab regulation. To justify government intervention in a market, typically one determines whether there is some imperfection in that market that would lead to an inefficient allocation of resources in the absence of government intervention. We went through all the literature and tried to think of the various arguments for why the market might fail if the government didn't intervene with one or another type of taxi regulation. I will cover five somewhat plausible arguments that provide a potential justification for some of the regulations that I have mentioned. The interesting point is that these arguments don't support restrictions on entry or on downward fare competition. And in fact, on the basis of specific arguments that have been offered to justify those restrictions, they have been rejected.

Let me just mention some of the types of arguments that led to justification for one or another type of fare restriction.

First, there are two or three different reasons that might be hypothesized for inefficiently high fares in the absence of government regulation. One of these is that there are some impediments to fare competition in the market because shopping for the lowest fare can be quite costly for riders in some situations. This is where it starts to become important to analyze separately the different market segments mentioned earlier. In radio dispatch service there is no real problem. It is not hard to shop around on the phone, for example, and as long as a certain number of people are shopping around, there will be an incentive for firms to offer lower fares, which is really all it takes.

On the other hand, in the cruising market, as you might imagine, there might be a problem. When the cab drives up, if the fare is 15 cents higher than expected, is the customer going to reject it and wait for another cab? Maybe not. In other words, in the cruising market shopping around is costly for the customer because he actually has to wait for another cab. He doesn't know when it is going to come or whether that cab will have a lower fare. Therefore cruising cab companies may not have an incentive to lower their fares. On the other hand, this is only a potential justification, because cruising cabs are still competing with the taxi-stand and radio dispatch services. It still is a possibility for fleets to enter the cruising market and

make it well known that there are a lot of cabs offering a lower fare if the customer is willing to wait for one.

Let's take another example, say, the taxi-stand market, which is the typical type of airport service. Here again there are problems of fare competition. Typically, airport service is on a first-come, first-served basis for which the cabs are lined up. However, once they have lined up, it is pretty hard for a customer to do comparative shopping. When a cab drives up, it is difficult to say, "No, I want to check around." Another difficulty is that many airport customers are out-of-town visitors who may not have the information to bargain effectively. The problems at airports could be solved without fare regulation, by redesigning the queues, posting fares, and so on. However, it is possible that part of the solution might be fare ceilings. We do not endorse those ceilings but we suggest them as a possibility.

The argument for fare ceilings applies in the radio dispatch market also. We discuss various economies of scale in that market in this paper. In a small city under a system of open entry, it might be possible to have only two or three optimally sized radio dispatch companies. They might be able to exercise market power. The gains from fare ceilings in the radio dispatch market in smaller cities do not justify fare ceilings in other markets, however. It is important to think carefully about the size of the segment, the size of the city, and so forth.

A third problem arises from bargaining over fares. If fares are not regulated and meters are not used, the customer has to bargain every time he hails a cab. A lot of time is wasted negotiating over the fare. If it is raining, it is costly to wait for the next cab. In such situations there may be price discrimination. Basically, the cab company will try to extract all the consumer surplus. It may be debated whether this is an argument for fare posting, fare filing, or fare ceilings. There are various potential solutions to such a problem.

A fourth type of problem is information. It is difficult for a rider to know everything relevant to the quality of the cab, its insurance coverage, and so forth. This may justify fare regulation.

A fifth problem (one that is rather more interesting) is a market failure not inherent in the market but introduced by fare regulation itself. Suppose that the government imposes a uniform fare or some sort of simple fare structure. Even if many trips are overpriced, it is very likely that certain trips are underpriced. If fares are charged by the mile, trips at certain times of day to certain sectors of the city where demand is low will be underpriced and it will not be profitable to offer service there. Service refusal problems and short-haul problems will occur. Once these problems have been caused by fare regulation, it may be a second- or a third-best argument for the government to require that service be offered, that all calls be answered, and that short hauls not be turned down.

At that point there is a further problem. If there are many independent cabs, service requirements will be difficult to enforce. It is very costly for an independent driver with one cab to operate 24 hours a day. If the numerous independents cannot be controlled, they will provide only profitable service. If they are forced to serve all areas at all times, the fleets will be serving no markets where they are earning an excess profit and yet will be required to serve markets where they are operating at a loss. Ultimately, it will not pay to be in business as a fleet.

To retain service for unprofitable trips, a cross-subsidy is required to make sure that there are some segments that are profitable to compensate those firms that serve the unprofitable segments. This cross-subsidy argument has been used as a justification for requiring 15-cab minimum fleets.

Requiring 15-cab minimum fleets is likely to be a third-best solution. A first-best solution would be to change the fare regulations, and a second-best policy would be to subsidize the losing segments.

Having suggested that there is some potential argument for regulation of one sort or another, I just want to point out that we have rejected a number of the arguments that are used to justify entry restrictions, for example, those based on congestion and pollution. Another argument is best typified by the airport situation. Imagine that the fare is set too high, for whatever reason, and that there is a line of cabs at the airport. It is not going to improve service to have another 100 cabs at the end of the line. So once fares are high enough to cause lineups, it would make sense to argue that the number of cabs should be restricted, thereby cutting down on the waste of resources caused by excess cabs waiting in line and trying to earn those high profits.

There is, then, a second-best argument for entry restriction based on efficiency if fares are too high. But the situation just described is not really an argument for entry restriction. Rather, it would make more sense to reduce fares by using a fare ceiling, which would eliminate the profit of being in the lineup of cabs at the airport.

So far we have been examining taxi markets from a theoretical point of view. We also looked at the empirical evidence, essentially by using published reports in which consultants have reviewed the experience of regulatory revision in a dozen or so cities in the last 5 years.

On the basis of those reports, we conclude that in radio dispatch markets, on the whole, the experience with deregulation or regulatory revision has been good. Some of the problems are anecdotal—perhaps something that happened 10 years ago in Indianapolis—and hearing about them in interviews later does not clarify the situation. Other problems do not appear to be widespread and significant, but rather characteristic of one locality or one taxi market. In some cases, the problem that resulted from deregulation was not caused by the easing of entry restrictions, but by lack of enforcement or regulation of drivers or vehicle condition.

In general we found that the results were fairly positive. I have handed out some tables to make a couple of these points in a systematic way. First, new entry in response to open entry appears to occur at least half the time. In about half the cities that have deregulation or open entry, there are about eight or nine cases in which new radio dispatch firms entered with 10 or 20 cabs. Second, in virtually all cases that we considered, there was also a deconcentration of the industry; in other words, the largest firms ended up with a smaller share.

The number of both independent and fleet taxis has increased significantly in most of the cities that deregulated. Some of the entry restrictions probably were not binding, so the impact of these restrictions varies by city. Thus we were not surprised to see different effects, but the median effect was about a 25 percent increase in the number of cabs over the period covered by the literature reviewed.

We also found some evidence that after deregulation, there was a decrease in fares, waiting times, and certainly some resources spent by city councils in regulation.

On the negative side, there have been some problems, but most have not been related to the radio dispatch segment but to the airport and taxi-stand segments, which have caused some difficulties in a number of cities. These difficulties appear to be related to high fares for airport trips, which in turn provide an incentive for long lines of cabs at the airport. These, in turn, lead to refusal to make short hauls, disputes over place in the line, administrative problems in the hiring of extra starters, and so forth.

But are the regulations we are talking about the way to respond? Should entry be restricted? Should fare competition be reduced in the downward direction? Our answer is no. What should be done is to try to improve fare competition, perhaps through redesigning the queues, posting fares, and so forth. Anything beyond that would probably consist of either fare ceilings or user charges for picking up passengers in the line (a sort of congestion toll for being in the line).

These remarks are the sole responsibility of the authors. They do not necessarily reflect the views of the Federal Trade Commission or any of its members.

COMMENTS

MR. KIRBY:

Any questions for Mark Frankena?

MR. SAMUELS:

My name is Robert Samuels and I have had some experience in this business. I suggest to you that the public is in no position to shop at the variety of rates of fare that exists. For instance, is 10 cents per $\frac{1}{10}$ mi greater or less than 20 cents for $\frac{1}{5}$ mi? You are standing there, you see, and the cabs are going by. You are shopping.

MR. FRANKENA:

Well, it is the same, but that is not...

MR. SAMUELS:

Of course it is not the same, because of the way the meters work. Now if you have one cab charging \$1 for the first $\frac{1}{5}$ mi and 10 cents for $\frac{1}{10}$ mi and one charging 75 cents for the first $\frac{1}{10}$ mi and 10 cents for $\frac{1}{5}$ mi, which would you choose? You know, the problem is that in places like Seattle, if I recall correctly, there were 400 different fares filed with the commission, and nobody could shop for cabs in that environment. I think that

your comment about Indianapolis is not correct. UMTA had a conference in Kansas City in May 1981, at which the commissioner from Indianapolis testified that when they deregulated the entry provisions, he ended up with a different color scheme on every one of the 300 or 400 taxicabs in Indianapolis. When he got a service complaint, he couldn't identify the owner of the cab because the customer couldn't tell the polka dots from the stripes.

MR. FRANKENA:

Let me just make two points. On the first question about comparing fares, I think again that it is important to go back to the first point I made, which is that if you look at the different segments in this market, about 75 percent of the trips are typically by radio dispatch. I don't think it is particularly difficult for anybody to make those fare comparisons, and if you think of the way competition over price works, you don't need everybody comparing every time on radio dispatch. The important thing is that if some people make comparisons some of the time, there will be an incentive to reduce fares. Once the fares are reduced, it isn't important for each person to check each time. The point is, the fares will be lower than they otherwise would have been. So, as far as the radio dispatch market in particular goes, and that is the main market we are talking about, I don't see the point.

MR. SAMUELS:

Radio dispatch is not the major way in the big cities. Certainly it is not in Chicago, New York, Los Angeles.

MR. FRANKENA:

As to Indianapolis, I don't want to dispute one way or another what happened there, but I don't see that the alleged problems really have anything to do with the restrictions that I am talking about, which are entry restrictions and downward restrictions on fares. Some of the various activities being done in cabs would be the concern of general law enforcement or have to do with the characteristics of those people who drive taxis. They have very little to do with the nature of fare competition, and nothing to do with the number of taxis.

PARTICIPANT:

Would you say something about your attitude toward regulations requiring maintenance and testing stations?

MR. FRANKENA:

As I said, I can think of perfectly good reasons why those might be sensible regulations. We did not actually look at specific regulations in specific cities and figure out whether they made sense the way they were done. What I have said is that I hesitate to endorse these types of regulation. There may, in fact, be some maintenance regulations that are inefficient. On the other hand, the arguments for some sort of consumer protection regulations are not absurd. But you can't just base government intervention on a potential market failure. You actually want to look in detail at what the benefits and the costs are of intervention in the particular case. I am not rejecting the hypothesis that it is a sensible regulation, but, on the other hand, I am not accepting the existing quality regulations as efficient.

PARTICIPANT:

I wonder if you could explain what problem led you to exploration of taxicab regulations in the first place? Is it part of the general climate of deregulation that is taking place in a number of industries or were there particular complaints within the taxi industry or about the taxi industry that brought it to your attention?

MR. FRANKENA:

I don't really think I can give you an accurate explanation. I was essentially asked to do it when it was already under way. So it is hard for me to suggest what happened bureaucratically.

MR. PAUTLER:

I really don't have very much to add to the comments Mark has made about our paper. However, I think I can answer the last gentleman's question about why the FTC might have been interested in this area. There has been a lot of discussion in the economics literature over the years about taxi markets and how they do or don't operate. In particular, some interesting work was done about the city of Chicago and the cabs there, and I think that work was probably the intellectual impetus for the FTC's interest in taxicab regulation in general. I am sure there were other objectives somewhere in the bureaucracy, but I am not aware of them.

Interpreting the Results of Regulatory Revisions in Seattle and San Diego

LAWRENCE DOXSEY

In both Seattle and San Diego, the regulations that were reduced were restrictions on entry and restrictions on rates. The period that I am considering for Seattle is 1979 through the end of 1981, which is now a while ago, but that was the period covered by UMTA's survey. The period I am considering for San Diego is 1979 through 1984.

Changes in Seattle involved two jurisdictions—the city of Seattle and King County. Two years before the changes in rate and entry restrictions, the two jurisdictions had established taxi license reciprocity, effectively merging their taxi markets. However, the two took separate paths for regulatory reform. In the county, open rate setting began in May 1979 and open entry began over a year later in June 1980. The city introduced both open rate setting and open entry in June 1979. (The reciprocity agreement was thus effectively suspended for new city entrants during the intervening year.) Because there were companies serving both jurisdictions, this somewhat uncoordinated revision approach must be regarded as a potentially influential, site-specific circumstance that serves to retard generalization from the case, although with the city market outweighing the county by approximately 5 to 1, effects were probably modest.

Perhaps curiously, there was prohibition of external posting of the rates until May 1981 when external posting became required. Certainly it reduced the latitude for any kind of comparison shopping, even if common units were used.

Before the removal of entry restrictions in Seattle, the three largest firms together held 70 percent of the licenses. Between August 1979 and August 1981 the number of taxi licenses in Seattle rose from 421 to 527 (25.2 percent). In the process the industry became somewhat less concentrated, with the greatest growth being found among moderate-sized firms. Although there was an increase in the number of single-cab firms, their share of the market increased by less than 1 percent. Three-fourths of the new licenses—those taken by companies in the two largest size categories—went to firms generally suited to serving the telephone segment of the market. This emphasis on the pattern of expansion is consistent with increasing the role of competitive forces in the taxi industry.

For assessing impacts on fares, I am using the cost of a 5-mi trip in a cab with fleetwide average rates.

From the inception of open rate setting until December 1981, taxi fares in Seattle increased 23 percent. During the same period the consumer price index (CPI) increased 30 percent. In real terms, taxi rates declined about 6 percent. Put another way, in constant 1967 dollars the average cost of a 5-mi trip fell from \$2.53 in June 1979 to \$2.38 in December 1981. The Bureau of Labor Statistics maintains a national taxi fare index. For this same period, the index increased by 37 percent, so that the

Seattle increase is even smaller relative to a national index of taxi fares than it is to the CPI.

An additional point should be addressed at this juncture. Under a regime of regulated rates, all cabs charged identical fares. In the time periods compared earlier, it is this fare that we are comparing with the industry average fare realized under open rate setting. However, under open rate setting the rates charged have varied among cabs. One consequence of rate dispersion is that people have available to them rates below those of the industry average, and thus the average, in a sense, overstates the fare burden faced by industry patrons. Also note that throughout the flexible rate-setting period at each site, the industry median fare has been below the industry average fare, indicating that more than half of all cabs were available at rates below the average fare.

In San Diego, entry restrictions were reduced in January 1979 by allowing issuance of six new permits a month, which was intended to somewhat relieve the pressure of pent-up demand for entry. Just before this, in December 1978, the industry totaled 409 permits, so this flow of new entrants was quite small relative to the total industry. Beginning in July 1979 this limit was raised to 15 per month. Rate restrictions were lifted in August 1979.

Of most interest in San Diego is the effect of entry restrictions after rate restrictions were lifted. During this period new license issues continued to be limited to 15 per month. The waiting list for permits was many months long, indicating that the 15-per-month limit acted as a significant entry barrier long after the rate ceiling was removed. Perhaps more important, no individual was allowed to hold more than one place at a time on the waiting list. This implied that to build a fleet, an entrant had to either buy licenses from other holders or work his way through repeated circuits of the waiting list. The effect was to strongly discourage entry by other than small companies. This circumstance is critical in light of the relative lack of potential for competition in the queue market and the need for a minimum size in order to efficiently serve the telephone market.

San Diego's decision to reduce entry restrictions 7 months before lifting rate restrictions was an attempt to bring the industry toward an equilibrium size before the rate ceiling was lifted. However, the restriction to 15 per month even after open rate setting worked against any influence of entry on realization of a competitive equilibrium. The perpetual waiting list suggests that the latter effect dominated.

With continuing outspoken opposition from the largest firm in conjunction with a few very high rates filed by firms serving the queue market, in April 1983 San Diego partially reversed the regulatory changes with the imposition of a 1-year moratorium on the issuance of new permits and on the secondary market for permits. At the same time, individual company rates were limited to no more than 120 percent of the average of all

rates. In practice, the industry continued to grow for some time as individuals acquired vehicles for permits that had already been issued.

The moratorium, although intended for 1 year, effectively has been continued. It is clear that at the time of the moratorium the industry was still in flux, so the premoratorium conditions should not be viewed as an equilibrium. One bit of evidence for this is that roughly 100 license applications were pending when the moratorium was imposed.

What were the impacts of all this? Between December 1978 and December 1981 the total number of licenses in San Diego rose from 409 to 752, an increase of 84 percent. By November 1984 the total reached 916, for a cumulative growth of 124 percent. This far larger increase suggests that before entry was eased, San Diego's taxi industry was much farther from an equilibrium size than was Seattle's.

With the moratorium, the industry appears to have stabilized at around 900 cabs. Even during the period following the moratorium there were both entry and exit, with the former largely the result not of circumventing the moratorium but of a backlog of those who had been issued permits but had not obtained vehicles and related equipment at the time of the moratorium.

Over the 3-year period ending in December 1981, the one large company added only a single permit and witnessed a decline in its share of all licenses from 68 percent to 37 percent. A second new permit was added between December 1981 and November 1984, although the firm's share of licenses declined to 30 percent over this period. Even with the waiting list procedure and its effect in deterring single firms from obtaining more than a few permits, it would have been feasible for this company to have added more than the two new permits. Furthermore, the company could have pursued expansion through the acquisition of other firms' permits. It is therefore relatively safe to conclude that the company's failure to expand was the result of its perception of the market rather than of residual entry barriers.

As in Seattle, the greatest number of new permits went to the medium-sized companies of the four-or-more-permit category. The single largest of this group of firms held 25 permits in November 1984, indicating a significant gap between firms in this category and the industry's largest firm. The number of firms in this group rose from 7 in December 1978 to 22 in December 1981 and to 31 in November 1984, with the number of cabs increasing from 69 to 238 in December 1981 and to 278 by November 1984. The average size of these firms thus declined modestly from about 10 to about 9 cabs.

As for the rate impact in San Diego, in constant 1967 dollars, the average 5-mi trip fare rose from \$2.36 in September 1979 to \$2.58 in December 1981. By January 1983, 4 months before the moratorium, the figure was \$2.60, only 1 percent higher than it had been 1 year earlier. The median fare was only 3 cents above the median rate before the 1979 regulatory reform. In contrast, the mean rate was 24 cents, or nearly 10 percent higher. This relationship in early 1983 was largely the result of a handful of cabs with rates two to three times the average. Just over 17 percent of cabs had rates more than 10 percent above the average; 70 percent of the cabs were below the mean.

In December 1983 the average rate had fallen to \$2.43 and by June 1984 it had declined to \$2.36, just where it had been

immediately before regulatory reform. At this \$2.36, still 67 percent of the cabs had rates that were below the mean. The median fare was \$2.25, which is roughly 5 percent below.

The differences are small enough that I don't think they should be taken as differences one way or another. The effect of the moratorium with its ceiling on rates at 120 percent above the mean was to bring rates back down to where they had been before the regulatory change.

In summary, during 2 years in Seattle there was 25 percent growth in the industry size, most of that in the first year and in the larger firms, those with four cabs and up. Rates did not change much in real terms.

During 5 years in San Diego there was a 125 percent increase in the industry size. Overall rates rose initially, leveled off before the moratorium, and finally came down to where they had been before regulatory change.

I think one can infer from the fact that restriction on entry has been lobbied both for and against that entry is still attractive, but that this industry is not at the size where it would level off if left to its own devices. For the most part, I think this sounds fairly positive for the regulatory experience.

There clearly were problems, the most prominent of which was at the airport in each case. Airport rates were higher than industry averages and large numbers of cabs crowded the airport stands. Vital to these problems is the fact that the airports had the most active taxi queues, with the attendant difficulty of noncompetitiveness in queue markets. Understanding the mechanics of market failure in the queue market is necessary in order to understand the reasons for these airport difficulties. To the extent that cabs can survive by specializing in the queue market, unrestricted rate setting and entry will lead to an inefficient oversupply to the queue market, with more cabs than required to maintain passenger expected wait times at zero and with fares rising to compensate cab companies for extremely long waits.

The lesson is that some manner of rate regulation is necessary for efficient operation in the queue market. Following the initial flurry and commotion, both Seattle and San Diego imposed rules for maximum rates that could be charged on trips originating at airports. In both cases the approach was to set a ceiling as a maximum percentage by which airport trip rates could exceed the industry average or median. Because the industry average is influenced by rates filed by companies serving the inherently more competitive telephone market, this device tends to harness rates in the noncompetitive queue market to the results of competitive forces in the telephone market. The effectiveness of this approach depends heavily on the relative sizes of the telephone and queue markets. The larger the relative size of the former, the more effective will be the approach, although the experience from the two sites is too limited to gauge the minimum necessary share in the telephone market.

Neither of these cities has a very important hailing component, so there is not much empirical evidence for what would happen where this kind of market is important. I think one can perhaps make an argument there if there is a tendency for cabs with lower rates to be hailed more readily, then that means that the cab with a lower rate will be utilized more of the time, introducing a competitive pressure for holding rates down in the hail market. For that process to work in the hail market,

however, there has to be a fairly ready identification of whether this rate is higher than that rate. The simplest way to do that is to impose the units in which the drop charge and the mileage charge are registered, so that everyone is charged such-and-such for the first $\frac{1}{5}$ mi and such-and-such per additional $\frac{1}{5}$ mi, or whatever unit you desire.

COMMENTS

MR. ROBERTSON:

My name is Robertson. I am a member of the paratransit community. You say you are talking about the average price of a 5-mi trip in terms of somewhere around \$2?

MR. DOXSEY:

Yes, in 1967 dollars, but we have had considerable inflation. It is more like \$5.50 in nominal terms.

MR. ROBERTSON:

In the FTC report on page 86 it says that a 5-mi trip in San Diego is approximately \$7.40. The \$2.50 price is contemplating a fare at 25 to 30 cents a mile, and there hasn't been such a rate in 50 years.

MR. DOXSEY:

That is in 1967 dollars. That is adjusted for all of the inflation since 1967.

MR. ROBERTSON:

I don't think there were any 25-cent-a-mile rates.

MR. DOXSEY:

That was the rate that was approved. The \$2.36 and the \$2.50 were the rates that were approved, converted back to 1967 dollars.

MR. ROBERTSON:

Your are saying in 1967 you were charging 25 cents a mile for a cab?

MR. DOXSEY:

It is 50 cents a mile. What I am saying is that in Seattle in 1976 what was approved in nominal terms as \$4.30, if one adjusted for the inflation between 1967 and 1976, would have been \$2.36.

MR. ROBERTSON:

That is not 50 cents a mile because you don't have any allowance for a flag drop.

MR. DOXSEY:

That is inclusive of the flag drop. It is not inclusive of any waiting charge, but it is inclusive of the flag drop.

MR. ROBERTSON:

Five miles then at \$2.50 is 50 cents a mile only if you don't have anything for the flag drop. It is really more like 30 cents a mile.

MR. DOXSEY:

I think \$1 is too much for the flag drop. I do not recall what the number was, and we are again adjusting it back to 1967 dollars. There has been a lot of inflation. The reference point that I have used is the 1976 rate level approved by the regulatory commission in Seattle and the 1977 fare level approved by the regulatory commission in San Diego. Those are very simple to compute because they were prescribed rates, and the CPI is from the Bureau of Labor Statistics. It is computed by taking the drop charge, plus 5 mi times the mileage charge. In nominal terms in 1976, in Seattle, that added up to \$4.30, and I apologize for not being able to tell you what they approved in those components as of that date.

MR. ROBERTSON:

Where did the \$7.40 from FTC come from?

MR. DOXSEY:

That is in nominal terms in a period where there had been nearly a threefold increase in the price index between 1967 and 1981, which I think is the reference point for that number.

Update on Taxicab and Jitney Regulation in San Diego

DAVID REINKE

Jitneys have become an important part of the private-sector-operated transportation in San Diego. They have not usually been an issue in studies of paratransit regulatory change, but in San Diego there had been significant development. Our study of jitneys has so far been limited to monitoring the new developments, mostly by collecting secondary data and by holding discussions with those involved in the jitney industry in San Diego. We hope that the city will soon have the resources to collect new data for the study.

In this talk I am going to go over the past and recent regulatory changes regarding jitneys, the changes in the industry size and structure, how the jitneys operate, the markets they serve, and some key issues as I see them.

Before the 1979 regulatory changes, the jitney services were covered under an automobile-for-hire provision in the old paratransit code. Passengers could be charged only on an hourly or a mileage basis. Automobile-for-hire permits were easier to obtain than taxi permits, which required a Certificate of Public Convenience and Necessity. In 1979 the city of San Diego reviewed its paratransit code; the changes focused mostly on taxis, but there were provisions for other modes. Jitneys and the vehicles for hire, as they were called then, were defined as separate services. Jitneys were allowed to charge on a per-passenger basis, and they were to run on predetermined routes. Rates and routes were not regulated, but they had to be filed with the city. Like taxis, if jitneys were out of service for more than 30 days, their permits expired.

There have been some changes recently. There was some pressure from the jitney operators to establish what are called holding areas where jitneys can wait to pick up passengers. The city responded by adding a provision for establishing holding areas where jitneys can wait up to a maximum of 5 min. Jitneys are also required not to run too close to the bus schedules along the bus routes, and they are not allowed to use bus stops in the downtown area.

The industry size and structure has changed quite a bit since 1979. In 1978 there were six companies. They operated 15 vehicles along three routes. By the end of 1981, the industry had nearly doubled to 11 companies operating 58 vehicles on about 40 routes. One major operator owns three companies and a total of 13 vehicles. There are another 11 operators with three to five vehicles each; the remaining six operators have one vehicle each. Some operators have both taxis and jitneys. Some jitney vehicles are licensed as both jitneys and vehicles for hire; they can operate in either mode.

The supply of jitneys is highly variable, depending on anticipated demand, for example, whether a ship is coming in to port

or whether it is military pay week. A count of jitney vehicles at military bases about a year ago showed that there were almost twice as many vehicles in weekday service during military pay week as there were during other weeks. The weekend supply of vehicles appears to remain nearly constant over time.

Some companies have arrangements with observers or spotters to call in when potential demand is observed. For example, when a ship is rounding the point or when a bar is letting out, a spotter will call in and the vehicles will then be dispatched by radio.

There is also service to the airport. Jitneys are confined to one area in the main passenger terminal. The smart operators usually know the plane schedules, and they will plan their service there accordingly.

Typically, each vehicle is licensed to serve more than one route, and the vehicle is required to display a sign showing its route before any passengers board. But the usual practice is to wait for passengers to board and then decide on the route.

Vehicles are typically 12- to 20-passenger vans. The fares are charged on a per-passenger basis. It is usually more expensive for a single passenger to take a taxi than a jitney, but it is usually less expensive for two or more persons who travel together to take a taxi and share the ride. The drivers, though, can bargain with groups of passengers. Drivers are typically owner-operators or employees. The usual arrangement for employees is to split the revenue with the owner after the owner takes a deduction for gasoline and maintenance. A driver's earnings for a 12-hr shift typically range between \$50 and \$100.

The drivers tend to regard jitney driving as much better paying with a lot fewer hassles than taxi driving. The markets have changed quite a bit since the regulatory changes. In 1978 the market was mostly tourists, with some military patrons. There were routes between downtown and the airport, the airport and the hotels, and the downtown and the Mexican border. Since the changes in 1979, there has been a large increase in the military market, and jitneys have captured a substantial share of the bus and taxi business to military bases. There has been an increase in service among the communities near the Mexican border, and there have been increases in the tourist market.

The large growth in the tourist market includes new routes between the hotels and tourist attractions. There are new types of service also. The horse carriages in Balboa Park are considered jitneys under the code. One operator has also begun to run vans made to look like old trolleys, which have been quite popular. These serve such tourist areas as the Gas Lamp and Old Town. The fares are usually very low, about 25 cents, which, of course, doesn't pay for the service. Most of the rest of the service is paid for by carrying advertising by merchants in the area. This is an example of private-sector cooperation to

provide transportation. These trolley-vans also work as vehicles for hire during periods of low tourist activity. When they operate as jitneys, the trolley-vans are regarded as moving advertisements for the operator's vehicle-for-hire service.

We know very little about the current total ridership on jitneys because there have been so many changes and so little data has been collected. The previous study of the taxi regulatory changes in San Diego looked at jitney ridership in mid-1981; it was estimated to be about 1,600 passengers per day. This was equivalent to about 15 percent of the estimated taxi ridership at that time and about 2 percent of the transit ridership.

Military passengers accounted for almost 40 percent of the riders, or about 600 per day. Jitney ridership counts taken at the military bases only about a year ago showed the ridership to be about 2,000 a day, or more than three times the estimated military ridership in 1981. The major jitney operator considers even this figure to be too low. Nevertheless, it is clear that jitney ridership is a significant percentage of paratransit ridership in San Diego. We need to take actual counts to better determine the patronage by market.

As I see it, there are three important issues in looking at the jitney: (a) the conflict between public transit and the jitney, which has been a historical battle; (b) conflicts between taxis and jitneys; and (c) the general issue of enforcement.

There has been quite a lot of conflict between public transit and the jitneys in San Diego. Jitneys have competed successfully for much of the military market formerly carried by public transit. San Diego Transit has had no particular objection to this because they have had to reduce service during nights and weekends because of budget cuts. Much of the patronage during those times was from the military.

But transit does complain about unfair competition from jitneys. Transit staff charge that jitneys travel just ahead of buses on busy routes to "scoop" bus passengers. For example, they say that a jitney will go along the bus route and tell passengers, "The bus is broken down, and I am coming along to pick you up." They also say that jitneys interfere with bus operations, especially in the downtown, by stopping to pick up passengers by bus stops. Transit would like to prevent jitneys from traveling along the bus routes just ahead of buses. Transit would also like to have the authority to veto applications for new jitney routes when they conflict with bus service. The city's response is that transit has no exclusive right to use bus stops. Transit can comment on, but they should not be allowed to veto, new route applications by jitneys. There has been some resolution of these issues. Jitneys are now allowed to stop only at special jitney stop signs in the downtown area; San Diego Transit paid for the installation of these signs.

Jitneys are not allowed to precede buses too closely. If the bus headways are greater than 20 min, jitneys cannot go along the route within 10 min of a bus. If the bus headways are less than 20 min, jitneys can go along the route only between the scheduled bus arrivals. Jitneys have also been rerouted through some parts of the downtown to minimize the conflicts with traffic and transit, but San Diego Transit is still concerned. They say that jitneys continue to violate regulations. There is a system whereby bus drivers can report possible violations by jitneys; they note such infractions as deviation from routes, scooping bus passengers, and stopping at transit stops.

San Diego Transit believes that jitneys have a useful niche to fill. They have even offered to show jitney operators where transit doesn't run and where jitneys could be free to develop their own markets. They ask, "If jitneys take away transit's bread and butter, which is the high-productivity routes, then how is transit going to survive, especially in these times? And then how is the public going to be guaranteed that jitney service will always be around when it is needed?"

But jitneys can serve as a complement to transit. In the previous case study of taxi regulatory changes in San Diego, it was found that the trolley operator regarded jitneys in the areas near the Mexican border as useful feeders to the trolley. San Diego Transit itself is now funding a fixed-route taxi service of its own, which is effectively a jitney. It acts as a feeder to the bus, and it has been quite successful.

There have also been conflicts between taxis and jitneys. Some taxi operators have alleged that jitneys compete unfairly by choosing their own routes after they pick up passengers and not before, as they are supposed to. They also say that jitneys deviate from their routes and that jitney holding areas allow jitneys to operate as taxis waiting at the stands. Jitneys are in effect operating as taxis, but they are not subject to the taxi regulations. For example, there is still open entry and jitney fares are not regulated. Taxi drivers have also alleged that jitneys will scoop groups of potential taxi passengers.

Jitney operators respond that taxis are blaming jitneys for problems they have brought on themselves. Among the problems they cite are operating vehicles in poor condition, grouping passengers for long hauls, and charging excessive rates of fare. Jitney operators say that in order to be able to survive, they have to make use of the holding areas and they have to be able to change routes as they please. Jitneys also allege that taxis scoop jitney passengers.

The city's position is that the official holding areas have not yet been established. There have been no official requests for them, but an unofficial holding area has been developed downtown. They say that jitneys are supposed to declare their routes beforehand, but this and other alleged abuses are extremely difficult to prevent.

I think that enforcement is a very important issue when you are talking about regulatory changes. The enforcement task does not decrease. You are still looking to enforce regulations that are there, and there is more scope for abuse. So you have to strictly enforce the regulations that are left, and a lack of enforcement has been perceived as a major problem by both taxi and jitney operators.

In 1978 San Diego had 62 taxi companies with 411 taxis and 3 jitney companies with 15 jitney vehicles; there were two persons from the police department to enforce the paratransit regulations. In 1984 there were over 300 taxi companies operating more than 900 taxis and 21 jitney companies operating 58 vehicles, and there are still only two enforcement officials. There are complaints by taxi and jitney operators that even when abuses are observed and reported, there is not enough manpower to enforce the regulations. But strangely enough, enforcement doesn't appear to be regarded by the city council as an important issue.

In summary, the jitney industry has grown substantially since the paratransit regulatory revisions in San Diego in 1979. Most of this growth is due to changes in the code that provided

explicitly for jitney service, but some growth is probably due to the transit cutbacks that were going on at the time, because Proposition 13 had been passed the year before. The jitney industry serves a variety of markets in San Diego, and it fills some useful niches. For example, it provides late-night and weekend service to the military bases that transit cannot economically provide. It also provides service that is tailored to the needs of the special markets.

Airport passengers like the direct service to military bases, the downtown, and the hotel area. Jitneys offer some advan-

tages over taxis. Unlike the taxi, which has variable rates of fare, a jitney has a set total fare to different places. So, for example, if you are going to board a jitney at the airport, you know what it is going to cost you to go to Hotel Circle. Jitneys play a significant role in the San Diego paratransit industry, but there are still many problems remaining to be resolved. These include the resolution of conflicts between jitneys and other modes and determination of how to provide a level of enforcement that is perceived as adequate by all concerned parties.

Impacts of Comprehensive Urban Transportation Deregulation in Arizona

ROGER F. TEAL

My paper has a somewhat broader focus than those of the previous presentations. So far we have talked primarily about taxicabs and jitneys. In Arizona the entire motor vehicle common carriage industry in the state was deregulated in mid-1982. This includes trucks, buses, taxis, airport vehicles, and the like. The deregulation was complete, and I do mean complete. There are no entry restrictions, no exit restrictions, no pricing restrictions, no service standards. Operators are still required to carry insurance. However, the oversight of those financial responsibility requirements is quite minimal, and there is a suspicion that many of the single-cab operators in the taxicab industry either do not carry adequate insurance or do not carry any insurance whatsoever.

In general, there is no regulatory oversight. Whatever you want to do as a transportation entrepreneur, you can do, as long as it doesn't break any other laws in the state. I am going to report on the paratransit aspects of Arizona's deregulation. That deregulation has been in effect now for about 2½ years.

I have identified several impact areas for which it would have been desirable to have gathered some information. These are entry, exit, prices, service innovation, industry structure, company and industry productivity, profitability, labor, and safety. For several of those areas we were able to gather sufficient information to come to some conclusions about what the impact of deregulation had been. For others, namely, safety

and operator profitability, there is simply no information available.

I should emphasize what the data collection problems are in a completely deregulated economic environment. No operator records are required by the state. It is not like Seattle or San Diego where operators have to file fares and get a license from the city to go into business. There is no way of even knowing at the state level how many taxicabs are in the industry. All that is needed to join is a driver's license and a vehicle registration certificate.

Therefore, we had to resort to provider surveys to obtain most of our information. Only in extreme cases could we find out anything about the financial status of companies other than those who were willing to cooperate fully with us. By extreme cases I mean the sale of a company or a company going out of business. Thus I must emphasize the limitations in our data collection. We were forced to rely on provider surveys, and we were very much aware that this created some limitations, perhaps some significant ones, on the accuracy of the data. Given the situation, however, there was simply no other way to do it. In addition, we were not operating with a huge budget, it was not possible to spend months and months in the field to collect this information.

Those paratransit services for which we had at least some information about the key issues of entry, exit, prices, and service were the taxi industry, the demand-responsive transit industry (both subsidized and unsubsidized), airport transportation, commuter transportation (by which I mean vanpool and bus services), and any jitney services or their variants.

First I would like to discuss the taxi industry impacts in Phoenix and Tucson. For those of you who are not familiar with Arizona, there are two large cities, Phoenix and Tucson. The rest of the state is very sparsely populated: there are only three cities in the rest of the state that have more than 50,000 population. We contacted individuals in those cities to try to determine what the impacts of deregulation were. With the exception of one town, Prescott, impacts were essentially nil. Therefore, I am reporting on Phoenix and Tucson because that is where the impacts occurred.

In Phoenix and Tucson there were some significant impacts in several of the paratransit services that I just listed. In Phoenix, as in Seattle and San Diego, there was a major increase in entry into the taxicab market as a result of deregulation. There are nearly twice as many active vehicles in the industry as before deregulation. However, the increase was much less significant in the radio dispatch or telephone order segment, whichever you wish to call it. As best we can track it, there was only a slight increase in the number of vehicles serving this particular segment, and even though two or three relatively large new companies entered, the large established provider reduced the number of cabs with which it was providing this service. The huge increase in the size of the industry was primarily in the taxi-stand segment, particularly at the airport, the hotels, and the resorts.

Relative to the question of turnover in the industry, there is substantial evidence that many single-cab operators left the industry. As I say, it is very hard to track these operators. We were able to do so only through the airport, but these operators only have to purchase quarterly permits. So we could simply track them over, say, a couple of quarters, but they might come back into the industry again in the winter, because there is seasonal fluctuation at the Phoenix airport: winter is the high season, and summer is the low season. So even if we found that they were out of the industry for a couple of quarters, that still would be absolutely definitive evidence that these operators had left the industry. Nonetheless, there was a lot of turnover on that basis.

In terms of prices, they increased quite substantially at the time of deregulation. Immediately after deregulation the price of taxicab service went from 85 cents a mile to \$1.20 a mile. A 4-mi trip went up by 36 percent. That is for the telephone order segment. In the airport segment, prices have ranged from about \$1.40 to \$1.60 a mile. That is up from 85 cents a mile. You can see that there has been a rather substantial price increase in both of those markets.

However, some caveats are necessary vis-à-vis price increases. There have been no subsequent price increases in Phoenix; that is, the \$1.20-a-mile fare or \$1.40-a-mile fare for some of the other operators has been maintained over the past 2½ years. After adjustment for inflationary effects on a trend-line basis since 1971, fares are about 3 to 5 percent higher today than they would have been if the prederegulation trend had held. It appears that immediately after deregulation fares were about 10 to 20 percent higher than probably would have been the case under continued regulation. That evidence comes from conversations with people in the industry. The largest operator was planning to file a \$1-a-mile fare if regulation had continued. In fact, he went to \$1.20 because he knew he would lose market share, and he hoped to maintain his revenues in that

way. Compared with those in other Southwest and Rocky Mountain cities, Phoenix fares were about 15 percent higher. Thus, there is evidence that prices in Phoenix increased somewhat more than they would have under regulation.

A significant fact relating to some of the hypotheses of the economists from the FTC about the role of competition in price setting is that there has been no downward pressure on fares in the radio dispatch market. The \$1.20 rate that was established by the large company in the Phoenix area became the market rate for all new competitors. There was no downward pressure on fares, and in fact two or three companies in the radio dispatch market have \$1.40-a-mile fares. At this point, at least, there is no evidence that the open entry provisions are leading to any particular downward pressure on fares or any particular fare competition.

I would like to comment on pricing innovations. Again, the economists from the FTC had anticipated that there might be some pricing innovations as a result of open entry and the lack of fare controls. Again, we have no evidence of that in the case of Phoenix. In fact, some firms practice short-haul refusal on a systematic basis. These tend to be the firms that actually have the higher fares, not the lower fares, somewhat contrary to anticipation. Yellow Cab is the only company that you can generally rely on for a short-haul trip, and it charges the same amount for that trip as it does for a long-haul trip.

In addition, no shared-ride services have been initiated. I think that there is a simple explanation for why there have been no shared-ride services in Phoenix, or anywhere else that has deregulated taxis for that matter. It is simply that the demand densities are insufficient to support such services.

I determined the demand density for taxis for the Phoenix area by assuming that 80 to 90 percent of all the trips were made during 14 hr of the day. The result was less than one trip per square mile per hour, a demand density that is insufficient to support any shared riding. Therefore, it appears to be a marketplace condition that shared-ride services are not operationally feasible, even if firms are predisposed to offer them.

In common, again, with the results from San Diego and Seattle, Phoenix registered a sharp decline in the productivity of the average cab in the industry. About one-third fewer trips per day were served by the average cab after deregulation compared with the number before.

Obviously, there has also been a decline in industry concentration. The taxi industry is no longer a monopoly, which is essentially what it was before. The market share of the large company measured in number of riders has gone from about 95 percent to about 65 percent. Nonetheless, in the telephone order market we are still dealing essentially with an oligopoly. Phoenix has gone from one firm to three or four firms in that particular market, surely nothing approaching the conditions for pure competition.

Another noteworthy impact has been a decline in quality of vehicles. This is particularly a problem at the airport.

The airport in Phoenix has attracted a large percentage of the new entries. It has experienced rather severe problems due to the fact that there are too many cabs that charge prices well above the average in the telephone order market. As Larry Doxsey said, it is simply a question of a queuing situation. The cabs are able to maintain these relatively high prices because the customers don't shop around and are under infor-

mal pressure to take the first cab in line. At one point there was even price collusion within the industry that led to a uniform fare, but apparently that price collusion has fallen apart. However, fares have not gone down as a result. Instead, they have gone up.

The impacts in Tucson are more limited. The industry has gone from monopoly to a duopoly. There have been about 15 new cabs at the airport, all independent operators. As in Phoenix, there has been no price competition. Prices were raised by the established operator just before deregulation. All new entrants have accepted those prices. There has been no downward pressure on prices. No new shared-ride services have developed in Tucson.

In both of these cities, then, the impacts have been relatively similar. The taxicab industry is, in fact, the industry in which there has been the most impact of deregulation in Arizona. The other industry with some significant impacts is the airport transportation industry.

There has been a large increase—approximately 50 percent—in the number of airport limousines. Many of these are vans. There was vigorous price competition between the shared-ride airport vans and the taxi industry for about a 6-month period before the airport authorities intervened.

During this 6-month period, drivers of taxicabs and airport vans could enter the terminal areas and go to a designated place where they could advertise their prices. Many of the drivers of the airport vans would practice time-of-day or demand-oriented pricing. There was vigorous price competition between the two modes, which often included bargaining with customers over rates. However, the airport authorities came under strong pressure from the tourist and convention interests in Phoenix, who thought that this bazaar-type atmosphere was inappropriate for their city, and a set of regulations was imposed that prohibited this sort of behavior. Under the new regulations, the drivers could no longer enter the terminal. Taxis were restricted to one terminal area and the airport vans to another. It became extremely difficult for consumers to get price or service information, and the airport vans were the definite losers in this situation. Their market share declined. Many of them left the industry, although there has been a continual renewal of entrants.

This 6-month experience is a very interesting example of potentially workable price and service competition. The taxis and vans offered a different type of service. With the vans there was a few minutes' wait while the load was picked up. The vehicle is not under the riders' control, and only certain destinations are served. The taxicab offers more personalized service. However, the experiment was aborted before we could see how it would work out.

In the demand-responsive transit industries, which include both subsidized and unsubsidized service, a very modest amount of new entry into the unsubsidized portion of the market occurred. The focus of unsubsidized service has been medical transportation and transportation for the handicapped. Two new companies have entered into the Phoenix market. Each, however, operates fewer than five vehicles.

The major impacts in demand-responsive transit have been on the subsidized service. In terms of contracting, there has been tremendous competition for the contracts because these are obviously secure revenues in an economic environment

where no other revenue source is at all secure. There has been great downward pressure on the rates in those particular markets—rates that I cannot believe are economical—down to \$10 or less per vehicle service hour in some cases. This is marginal cost pricing, probably short-run marginal cost pricing. It is quite unclear how companies could continue to operate these services over more than a 1- or 2-year period without sustaining losses. It will be interesting to see how this works out. To date, there has been considerable turnover of contractors. If agencies rebid their contracts, they can get a new contractor every 1 or 2 years. Contracting agencies can take advantage of contractors' willingness to bid short-run marginal prices.

In the other paratransit modes, absolutely nothing has happened. There have been no jitneys, no transitlike services. Remember that there are no nonmarket impediments to the establishment of such services. Anybody who wants to go out and buy minibuses or vans can run them up and down any Phoenix street. They can use the bus stops because the bus stops are public property. They can do whatever they want to. No one has chosen to do so, and obviously the barrier here is the presence of subsidized competition from the transit authority.

Potential entrepreneurs clearly have judged that it is not possible to make a profit by offering that service when you have to compete with Phoenix Transit, which has a 50-cent to 60-cent fare. In addition, Phoenix is an extremely automobile-oriented city. The modal share for transit is around 1 percent of all trips. Thus, there is very little transit market at all.

In this sense, then, deregulation has been a failure. That is, if it had been expected that new quasi-transit services would develop, the expectations have been shattered. In 2½ years they have not developed. I attribute this largely to the market conditions in these two cities. They are very definitely automobile-oriented, and there is little market for transit, subsidized or unsubsidized.

What can we conclude in terms of the overall pattern of deregulation impacts? The key policy question is the sort of benefits we as a society get from deregulating these types of urban transportation relative to any problems or costs that may be created. What can we point to, then, in terms of benefits from deregulation?

It is difficult to identify many firm benefits. Vigorous competition in the contract service market and decreasing contract prices are definite benefits. Entrepreneurs now have the ability to enter paratransit and transit markets without the regulatory restrictions that prevailed in the past. The industries are less concentrated, but concentration is nonetheless still quite pronounced. The taxi-van competition at the Phoenix airport offered some interesting potential for consumer benefits. Unfortunately, the airport authorities by their actions have largely made that potential moot.

In my view, one of the most important aspects of the pattern of impacts is that the focus of new entry has been on established markets. There was an existing market for common carriage urban transportation in Phoenix and Tucson, and deregulation has not enabled providers to expand the size of that market. It is still the same size and of the same character as it was before deregulation. That, to me, suggests something about the nature of these markets in automobile-oriented cities, namely, that it is not deregulation that is keeping those markets

small. It is simply the basic character of such urban transportation markets. There has been little or no service innovation in either Phoenix or Tucson. Again, I think that is a function of market conditions, because no matter what sort of innovations you propose, you are still going to have a price and service combination that is inferior to that of either the automobile or public transit. It is very difficult to imagine some service that will be superior.

There has also been little or no price competition within the industries themselves. I would suggest that this has to do with structural characteristics of the industry. Despite the decline in concentration, these industries are still quite concentrated. Overall, then, one is not able to find much evidence of consumer benefits in terms of either price or service aspects.

What sort of policy lessons can we derive from this? It seems to me that in automobile-oriented urban areas—except in special cases such as the military market in San Diego, where the jitney services have been quite successful—deregulation does not produce significant benefits to either consumers or providers. The one exception is the opportunity it presents to those who were previously excluded from the industry to move into the industry and compete. I should note, however, that all the evidence indicates that driver income is down after deregulation and company income is also.

It's probably not fair to lay the blame for these results on deregulation. It is simply that the market conditions are not appropriate to produce benefits from deregulation in many urban areas. Nearly half of all the large metropolitan areas in the country have a transit mode share for work trips that is less than 5 percent, and this mode share tends to be about twice as high as the mode split for all trips. In these automobile-oriented cities, the market conditions simply aren't appropriate for an increase in the size of the common carriage market. If the size of that market cannot be increased, the market is split up among more providers, and I think the impacts of that on the providers are obvious. It is merely going to result in less revenue for each one.

I think that subsidized transit represents an important potential barrier to new services. However, it is not likely that we are going to get rid of subsidized transit. Perhaps the amount of subsidy will be reduced, but transit as a subsidized mode is highly unlikely to go away simply so that we can deregulate—that is not an avenue by which to make deregulation work.

It therefore appears to me that the impacts and the benefits of deregulation are going to be very small in these automobile-oriented urban environments. I would suggest, also, that the benefits and the impacts will probably be considerably larger in transit-oriented environments. Nonetheless, the evidence from Arizona simply doesn't permit one to say that significant benefits will be produced by deregulating urban transportation in automobile-oriented cities.

COMMENTS

PARTICIPANT:

I am Paul Nagle, United Bus Operators of America. Will you please direct yourself to the topic of commuter transportation, which I did not hear mentioned.

MR. TEAL:

Basically nothing happened in the Phoenix and Tucson areas. We thought that something might develop in terms of an express transit service or perhaps transitlike service in vans. It did not. We talked to all the major bus operators we could find, and they were of the opinion that the market was not there. Phoenix Transit had tapped the small transit market that did exist, and unsubsidized services simply couldn't come in and provide profitable service. I think it has a lot to do with the fact that Phoenix is definitely an automobile-oriented city.

MS. LUPRO:

I wanted to comment on your final remarks about the benefits of deregulation not being that significant. You mentioned that the benefits have been for the contract services and the jitney market. I really think those should not be minimized, because the contract market deals with the elderly and the handicapped, who traditionally form a very large portion of the paratransit passenger trips, whereas the airport gets a considerable amount of attention. Perhaps airports have not benefited as substantially from deregulation. In San Diego, for instance, airport trips constitute 10 percent of taxi trips. In addition, the jitney market in San Diego is important, and the ridership that is served by the jitanys is significant.

MR. TEAL:

Those are, I think, very good corrections, Barbara. However, relatively few cities in my experience have the size of the military market that San Diego has. We expected, on the basis of San Diego's experiences, to find at least an attempt to provide some jitney services in Phoenix or Tucson. There was none, and we came to the conclusion that it was the presence of that large military market without ready access to automobiles, basically a transit-dependent market, that made the jitney services possible in San Diego. Absent those conditions, jitney services appeared much less promising in the typical low-density urban environment. *Vis-à-vis* your comments about the contract market, I wholeheartedly agree. I think it has a very important impact. It is unfortunate, however, that that type of impact does not appear to carry over into the common carriage type of markets, because there is not that same sort of price competition for the individual consumer.

Lessons for Policy Makers

SANDRA ROSENBLOOM

I have been studying deregulation and regulatory reform and the U.S. taxi industry for a number of years. Currently I am studying the role of the taxi in a deregulated mode in a variety of cities, with funding from the Mike Hogg Endowment for Urban Governance. As part of that work, I am also studying taxi contract services.

One of the things that strikes me about taxi deregulation is that quite often it is brought to cities with a sort of missionary appeal. People show up and set up tents on the outskirts of the city, preaching free enterprise and deregulation. Then when the local community is stirred up, the preachers go away and leave it to city officials and planners to figure out how to bring deregulation about and if, in fact, it is worth bringing about.

I would like to suggest that that kind of religious fervor is probably misplaced; I think it leads us into a situation in which, when all promised benefits don't materialize—and there are substantial economic and political costs—disgruntled officials tend to throw the baby out with the bath water. That is, having been promised so much, local policy makers are unwilling to consider more modest regulatory changes that could bring small but measurable improvements.

I would like to discuss seven important lessons for policy makers looking at municipal experiences with taxi deregulation. After that discussion, I would like to review three or four things that planners, analysts, and even advocates must do for local policy makers if they are interested in considering or implementing some reform measures.

I base my observations on discussions with city council members and their staffs, county commissioners and their staffs, and other relevant actors both before and after regulatory revision in most of the cities discussed by the other panelists. I think that it is important to watch a regulatory experience "age" because you find that memories change over the years. It's important to remember that people's memories, and the history of a project, can alter as subsequent events unfold.

Above all, it is my view that most policy makers, if thinking clearly, would find the religious fervor on the part of economist advocates to be a little off-center. The economic argument that a publicly established monopoly brings a misallocation of societal resources is not relevant for local officials who care little about the proper distribution of resources throughout society.

Instead of being concerned with the economic arguments, I think that most policy makers would have the following real questions or concerns about the regulatory efforts that have been discussed at this session and in the literature.

First, most policy makers would see a relatively small positive impact in terms of fares, level of service, and quality of service. In fact, they may even see negative impacts in one or more of these important dimensions.

Even if the impact is positive, I stress the fact that it is often relatively small, that is, relative to what the local population has been led to expect. Advocates appear to offer 300 percent more taxicabs and saturation service on all the streets. Either all the poor people in town are going to have jobs as taxi drivers or they are going to be riding around town in suddenly cheap taxis. Relative to these kinds of promises, the results appear very small indeed.

Moreover, the positive impacts that exist are often the kind not immediately obvious to policy makers. I personally believe that the single most positive impact of almost all of the regulatory reforms that I have seen is what Barbara and Roger were talking about: the increased ability of taxi and other paratransit operators to enter into contractual relationships with public bodies.

Many of these contractual arrangements are for services for the elderly and handicapped, although in Tucson the transit companies are contracting with taxi operators for provision of late-night and low-density services for the general public. It has often been held that some of the taxi contracts that San Diego Transit has in low-density suburban areas were made possible by regulatory reform in San Diego.

So I believe that increased contractual arrangements with taxi operators are a really positive impact of reform, but not the kind of impact that is very obvious to a policy maker, even after it has happened.

Second, even when there are positive impacts, they often take a long time to become visible. In some deregulation efforts, new providers need to find a new service area, like the army base in San Diego. Finding profitable service areas may take a couple of years; policy makers may not see the change or necessarily see it as a sharp enough difference from the situation before.

Third, in spite of the anecdotal nature of airport taxi experiences, when policy makers look at deregulation, they see terrible and not anecdotal problems at the airport. The problems are often so terrible that even people who were proponents of regulatory reform—tourist bureaus and convention and hotel people—as in Atlanta, turn around and put substantial pressure on city councils or county commissioners to reregulate the industry.

I'd like to point out, parenthetically, that there are other ways to deal with the problems at the airport than reregulating. But I am describing the political reality facing a decision maker who is looking at a zoo at the airport after reform and is searching for the easiest way to fix the situation and not for a "let's tinker around with this" type of solution.

Fourth, I think that local policy makers would come away from some of the fights between and among those of us in this type of forum and conclude that deregulation is an all-or-nothing affair. When regulatory reform doesn't work (as it didn't in Portland, for example), some proponents argue that measures there simply didn't "go far enough." They argue that

Portland, or City X, didn't take off enough fare restrictions, or didn't take off enough restrictions on service levels, or didn't let taxis compete with transit operators.

The lesson that policy makers get from this kind of discussion is that reform is all or nothing. You can't try it in stages, see how it works, and then try something different because the first efforts weren't successful. I'd like to suggest that it is really important for both proponents and planners to think about identifying some sort of staged implementation of regulatory reform in ways that will allow cities to experiment without incurring too great a financial or political cost.

A fifth message that policy makers get when looking at the result of regulatory reform efforts is that, related to earlier points, the public impact of positive results is often very small. To put it another way, the positive impacts that do come from deregulation are not politically and publicly salient, whereas the negative impacts are definitely so.

For example, I don't think that the public in San Diego or Tucson realizes that more elderly and handicapped people can be transported, perhaps at a lower cost, because of deregulation. It's just something that no one is ever going to see. A subset of the population in San Diego, those at the military base, perhaps realize that they are getting better service, but in general, the positive results of deregulation are diffuse.

Thus even if positive results do exist, even if they can be justified from an economic perspective, and even if the regulatory reform is justified, politicians often don't get the political benefits they need to offset their risks. It is the classic pork barrel syndrome: a politician would rather go home and dedicate a dam or a rail system than a social service agency where the results are so diffuse. A politician needs something to point to and say to constituents, "See what I did for you?" The results of deregulation, which often have high political risks, often don't have that kind of political payback to decision makers.

A sixth issue facing local decision makers listening to advocates and preachers is that a city often incurs a number of expenses with deregulation that it didn't have before. For example, if you wanted to deal with the airport problem ahead of time you could build special holding tanks at the terminals. Seattle did so, and they believe that they are getting all construction costs back from the drivers by charging them a fee. However, in most cases there has to be a significant outlay of public funds to build facilities to handle the congestion at the airport.

Other aspects of deregulation cost money too. You have heard about the problem of enforcing remaining regulations; almost every city is spending more money than it did before to find independents, to regulate their vehicles and insurance, and to deal with the kinds of restrictions that remain. The costs to do so are not insignificant.

Finally, in examining the existing experiences with municipal regulatory reform, decision makers would see that that there is often political conflict after the implementation that did not exist before. In many cities that experienced some type of regulatory reform, the only meaningful opposition was from enfranchised taxi operators—hardly trivial but not widespread. The regulatory reforms did not themselves engender much public interest or opposition.

But after reform, city council members started getting calls about gypsy cabs, which, of course, were no longer gypsy cabs. They started getting calls about price gouging at the airport. There is the anecdotal Seattle story about some man—who was either the mayor of Anchorage, a tourist from Sweden, or somebody from Florida (depending on who's telling the story)—who was charged hundreds of dollars for the trip from the airport to downtown.

Even though the story is anecdotal, there is undoubtedly some basis in fact; it is these incidents that start politicians' phones ringing off the hook. At the same time there are few senior citizens calling politicians up to thank them for deregulating taxis because their fare has gone down on subsidized service. This is the kind of political reality faced by decisionmakers considering taxi regulatory reform.

In addition to the seven lessons that local politicians and policy makers can glean from the existing history of taxi deregulation, there are lessons that planners and even advocates can learn as well. First, it is very clear that if benefits are to be achieved from any kind of regulatory reform, you must know what both the supply and demand sides of the market look like. You have to know the structure of the companies, the percentages of franchise and individual drivers, and, as Roger suggested, you have to know the likelihood of increasing the market. Allowing more entrants into a market that cannot increase is asking for trouble. It is also, according to classic economic theory, inefficient as well, if productivity goes down.

One of the first things that anyone interested in local revision should do is to give policy makers a clear idea of the supply and demand sides of the market and what kind of regulatory reforms could bring positive impacts given those market conditions. I think our FTC speakers started by pointing out very carefully that there are different markets, and different things work in different markets. These more complex issues are not the sort that people think about in the first blush of religious fervor, but they are central in planning and operational issues.

After having matched the proper kind of regulatory reform to local conditions, planners must give decision makers a very good idea of exactly what benefits they are going to get. Are they really going to get more taxis? Are they going to get lower fares? In addition, decision makers need to know if different market segments will be affected, if they can expect to see differentiated services and distinct market niches, and if they will see group riding. The answers should be based much more on empirical evidence than on classic economic theory; for example, in Arizona there were more entrants and fares did not go down.

The next thing that planners need to tell decision makers is who the actual and potential opponents of the proposed reform are. I know that every time I go to see one of my elected representatives about some local issue, somewhere in the first 5 min they ask me, "Who is in opposition? Who doesn't like it? Who's going to show up and bring 400 people to a public hearing?" And I think that those are fair questions.

Those are exactly the things local decision makers would want to know about taxi regulation and the answer is not simply existing taxi operators. Opposition could come from tourist associations, hotel and convention bureaus, the transit operator, and so on. (And support might come from suburban or other taxi companies who want to get into the local market.)

The third major lesson for planners and advocates is based on the fact that you can achieve the same result with several different policies. Every speaker, in one way or another, has mentioned that some of the problems with regulatory reform could be or could have been fixed, not by scrapping relaxed regulations but by changing something else around. Therefore planners in each city ought to lay out exactly what the problems are likely to be, what the potential solutions will be, and what the solutions will cost, so that decision makers can see the bottom line.

For example, I believe that it is true that the problems at the airport could be fixed without scrapping regulatory reforms. You could build holding areas and take other measures. The question for planners is to identify all of those measures and their associated costs. Can you add it all up and say that the cost—political and financial—of achieving these kinds of regulatory reforms in this city gives you greater benefits than simply tinkering around with the current system?

I think that if planners and policy makers had seriously asked that question in some of the cities we are discussing, they never would have implemented regulatory reform. In other cases, San Diego for one, I think that they would have gone ahead. I think that even in San Diego things would have been done differently if that question had been asked ahead of time, but I think that the benefits would still be seen as outweighing the costs.

By asserting that you have to ask questions about the costs and benefits of taxi deregulation, I don't in any way mean to imply that looking at the down side will necessarily bring you to decide against regulatory reform. But these are questions that decision makers want and need to know about.

The last thing that planners and advocates should do for local decision makers is something I discussed earlier and that arises logically from my last three points. If those interested in regulatory reform as a concept could put together some staged packages, some staged implementation strategies, it would be a significant help. The package would say, "Do this much, which costs you this much to achieve X; if the expected things happen, try step two, which will cost you so much," and so forth.

I think that such a strategy would help us to avoid throwing the baby out with the bath water by either giving up regulatory reform in cities where it has run into snags or preventing its consideration in cities where limited efforts might be successful and worthwhile.

I think that there are some positive aspects of regulatory reform when it is applied properly. The job for planners and advocates is to look at the needs of the city and of decision makers, see what they need to know before they can intelligently implement these kinds of strategies, and tell them.

COMMENTS

MR. TEAL:

I wanted to ask Sandi why she linked contract services per se with regulatory reform. I don't see a per se linkage. I see

perhaps a linkage in terms of the rates for contract services, but I haven't seen anything to indicate that you get more service contracting with public agencies as a result of deregulation. It certainly wasn't the case in Arizona. The contract services were there already. The ones that have been developed subsequently would have been developed irrespective of the regulatory changes.

MS. ROSENBLIOM:

It seems sort of intuitively obvious that if you are trying to expand your market, you are going to go after services you never went after before. The growth of the elderly and handicapped market is an exogenous impact, I think. There are lot more elderly and handicapped services every year, and I think that this was the result of two forces: demand and, of course, federal requirements for more elderly and handicapped services. At the same time, in some cases there was regulatory reform in the industry. I think the companies were just going after an expanding market niche. I saw it in San Diego and in my interviews with the cab companies in Arizona. A local official claimed that in Phoenix a major operator went after that market because he was afraid of the impact of deregulation.

PARTICIPANT:

In any of these cities does the press or anyone become the advocate of the public and publish rate comparisons once a month or so?

MS. ROSENBLIOM:

I don't know the answer to that. I know that San Diego is the only city in which I found that the newspaper had run a number of editorials against regulatory reform before it occurred. But I think your question is whether somebody is following taxis to see what they are doing. I don't have any evidence on that; I have not seen any, and no one has mentioned it to me. Barbara, can you comment on what has happened in San Diego?

MS. LUPRO:

There were no periodic updates of what the status of the industry was. The press became active when the problems at the airport caught public attention. I wanted to comment on the question about the contracts. I think it was very clear in San Diego that the users themselves have benefited greatly, as well as the funder of elderly and handicapped services. Both the competition itself, because the users have a variety of services to choose from, and the prices with competition, where discounts are freely offered, have brought the city costs down for providing those services and also brought costs down for the users and provided them with higher-quality service than before.

PARTICIPANT:

You mentioned that there are other ways to solve the airport problems than reregulating. I tend to agree, but I would be interested in, first of all, your comments on the first-in, first-out

queue market, which doesn't follow conventional rules for consumer choice.

MS. ROSENBLOOM:

Yes, there are ways to deal with that but not without cost. One of the ways to deal with it is to provide four or five lanes in the holding area, so that there are five drivers at the head of each queue, with telephones at the head of all those lines to the terminals. A passenger can walk up and call a cab, and in fact that is really almost a variant of what is happening in Seattle now. If passengers know, or come in and see signs and are given proper information, they can be aware that they don't have to take the first cab in line. Passengers see a line of green, pink, yellow, and purple telephones and they can call up each one of these cab companies and ask what the fare would be. What also happens in Seattle is that passengers can call the telephone-dispatched cabs, which are cheaper but for which you have to wait. You can still do that in other cities.

To summarize, either you could call the five drivers that are waiting in the five lines or you could call the local telephone-dispatched cab and wait for it in a certain holding area. You can deal with assuring a competitive fare if you want to do it. Airport management in these areas already knows this. The speakers here today, if no one else, has said to them, "Here is what you can do; here is what you can't do." Airport management doesn't want to do these things because they are administratively complex and because it is always easier to deal with a simple regulated situation than a market.

Once you have problems at the airport, and the mayor calls up and tells you about this guy from Pittsburgh who was cheated, and the newspapers are complaining, that's not the time to start with little changes and pink telephones and green telephones. If you have to make changes in physical facilities, such as adding separate holding areas, that is not accomplished overnight. So the offered solutions are also problematic. But you should analyze before you implement, you should identify significant problems ahead of time—there are a number of bright suggestions for solutions and it has been determined what they will cost. Are you willing to pay the price for the benefits you get?

MR. KIRBY:

I would just add to that that the San Diego airport authority has been exposed continually to these various solutions.

MS. ROSENBLOOM:

But after there was a problem.

MR. KIRBY:

After there was a problem but still not too late to correct it. It could be corrected very easily, if they were interested. From their viewpoint, taxicabs are a minor consideration, and the temptation is to adopt a very simple measure like price controls or limited entry. It is much easier for them to control their problems that way than it is to adopt these measures of telephone requests, installing special phones, and so forth. Some of

the benefits and costs associated with this are not seen by the airport. We have a lot of cases like this with externalities and that is one of the real problems that we are dealing with here. When you look at what people are doing, they are behaving logically from their viewpoint, and it is going to be very difficult to change their minds under current arrangements.

MS. ROSENBLOOM:

Let me add something else. It is not as if there were major benefits to anybody in the system and very few to those at the airport. Because if there were, those getting the major benefits would trade something off with those at the airport. In fact, as I have suggested, the benefits are diffused throughout the whole system. There are not a lot of advocates of a competitive airport market. There are not a lot of reasons to make those political tradeoffs, to make the airport do those kinds of things.

MR. REINKE:

I just wanted to pick up on what Ron Kirby is saying and offer some comments on the airport problem. A lot has been said about the airport because it is the visitor's first contact with the city. At the San Diego airport, the attitude has been that it was deregulation by the city that created the problem in the first place, and the airport authorities just want the problem to go away. So they try to make it go away by limiting permits. They do tell you that cabs charge different rates of fare, and if you can read the signs, you know it. They have only tried to control cab rates by controlling the number of cabs with permits serving the airport. Recently they have gone to an odd/even system.

I will mention contrasts. In San Francisco, where they do have a regulated cab market of about 700 cabs, the airport management believes that they cannot deny anybody a permit to serve the airport who has a cab already. They have a holding area for only 85 cabs, and they don't allow any other cabs to wait. They charge a cab \$1.50 every time it leaves with passengers. It appears to work pretty well. There isn't the long waiting time that you see in San Diego. On enforcement, there is another contrast between San Francisco and San Diego: San Diego has two enforcers for 900 cabs and San Francisco has six enforcers for 700 cabs.

Just another point on some innovations that have come since deregulation. Some cabbies have taken on their own marketing activities. In addition to building personal business, a group of cabbies have gone to hotels and said, "If you guarantee to call us, we will guarantee that your people will only get charged a certain rate of fare to the various places." It appears to be working well.

MS. ROSENBLOOM:

I think those are all interesting points. I do want to point out that comparing San Francisco with other cities in the country might be misleading. Other cities have airports run by different authorities that generally allow all licensed cabs from all municipalities around to operate there. San Francisco has one of the most restricted taxi markets in the country, and even if

they allow other municipalities in, it is already restricted for them. The problem is not the same as in San Diego.

MR. REINKE:

But there is still a large number of cabs in San Francisco; it is roughly comparable with the number in San Diego. They appear to have managed it. San Diego's complaint was just the large number of cabs.

MS. ROSENBLOOM:

Other people have suggested that it might be a question of time, too—that as markets settle in, there will be less trouble at the airport. That is sort of what is happening in Seattle. There are operators who have gotten totally out of the airport business, whereas almost all independents are at the airport, and things have sort of settled down. So maybe it is just a time problem in San Diego.

An Industry Comment on Regulatory Change

ALFRED B. LAGASSE III

What is transportation? Is it taxis? I think the transportation market has been too narrowly defined. The transportation market is getting a person from point A to point B.

What are the major segments? First we have the miscellaneous category, which includes walking, cycling, and so on. The miscellaneous category accounts for about 3 percent of the total transportation market.

Next is paratransit. Let's define paratransit as the organized provision of transportation in sedans, vans, and minibuses. That would include taxicabs, rental cars, social service and nonprofit agency vehicles, limousines and delivery vehicles, carpools, vanpools, church vehicles, hotel courtesy vehicles, and jitneys. They are ranked in the order (I believe) most significant in terms of passengers carried. This entire market segment may be 3 to 4 percent of the entire transportation market. (Taxis are almost 1 percent of the entire market.)

Next is mass transit, which handles approximately 4 percent of the trips in this country. Mass transit may be important in some cities, but from an overall global aspect it is not terribly significant.

The number two carrier is school buses. There are obvious reasons for this, but it doesn't change the fact that school buses are the second largest carrier of the public in this country. What is the number one carrier? The automobile. Eighty-four percent of all trips are made in the private automobile.

Why have we segmented the transportation market? Why are we looking at taxis instead of other forms of paratransit? Why are we looking at taxis instead of the automobile, public transit, and so on?

Before I go into that, I should make a point. You may not believe that there is competition between taxis and subways, buses, private automobiles, and so on. I will give some examples to illustrate that competition exists. When I drove into Washington, D.C., this morning from the suburbs it was very cold, and there was a bitter wind. I also drove in yesterday, which was a fairly nice day, about 40 degrees. There were many more people at bus stops yesterday than today. People aren't willing to stand out in the cold and wait for the bus. I am sure that taxi business was very good this morning in Washington. Last week it snowed in this community. If you had called a cab, the odds are that you would have had an extended wait because cabs were inundated with demands for service. People simply did not wish to drive their own cars. They did not want to risk an accident. The summer is the low period of taxicab service. Taxis generally make lots of short trips, but in the summer they don't make nearly as many because walking is a competitor to taxicab service. Taxis are competing in this transportation market, and although this review may not be terribly analytical, there is legal precedent. In November 1984, there was a court decision in Honolulu, Hawaii. An exclusive taxicab franchise at the airport was called into question on antitrust grounds. The judge ruled in favor of the exclusive contract; it is a fascinating 35-page decision. One of the key elements was that the judge found taxis to be reasonably interchangeable with rental cars and the Airporter bus system.

So, the key in this case was that taxis were not determined to be the market. As the judge defined it, the market was determined to be all readily accessible, comparably priced ground transportation.

All these competing modes of local transportation are significant and should be taken into account when one examines or plans for a community's transportation network. However, laws, regulations, and policies developed at federal, state, and local levels have segmented local public transportation modes into distinct categories (e.g., mass transit versus exclusive ride, public versus private, taxicab versus bus). Each of these modes is licensed and regulated separately.

The differing laws, regulations, and policies most certainly serve to inhibit comprehensive planning for local transportation. Public transit receives billions of dollars annually in federal, state, and local subsidies. The private automobile is subsidized by an extensive and expensive road building and maintenance program. Private providers of local public transportation pay taxes and license fees not required of public operators. There are many more examples.

It is less effective to look at the taxicab industry in a vacuum, but for ease of administration that is exactly what has been done. The Urban Mass Transportation Administration is seeking to do away with some of the federal barriers to comprehensive local planning (e.g., the new Section 3e/8e policy issued October 22, 1984) and there is hope that Congress will review the financial incentives and operating laws that cause bias or interfere with local transportation planning. The fact remains, however, that communities throughout America will continue to segment the local transportation market by provider group (competing mode) because the institutions are already in place, and there has not been, nor is there now, an outcry to change the system.

Reality, not desire, dictates a divergence from the development of a comprehensive transportation regulation to a review of regulations by market segments. Because my knowledge and experience are best suited to a review of the taxicab industry, and because taxicab regulations have recently been the subject of experimentation, the balance of this presentation will focus on the taxicab industry.

The taxicab industry is made up of approximately 4,040 organizations (companies, cooperatives, associations, etc.) that operate 141,000 vehicles. Half of the industry's vehicles are located in the 100 largest urban areas. Approximately 87 percent of the vehicles are four-door sedans. The remaining 13 percent are vans, limousines, buses, and so on. The industry directly provides 240,000 jobs; 87 percent are held by drivers. The industry grosses \$4.42 billion per year and transports 1.87 billion passengers per year.

The stereotype of the typical taxicab driver and his or her passenger is incorrect. Most drivers are independent contractors. That means they pay a fixed fee for their taxicab vehicle and related services. They lease that car just like you rent a car from Hertz or Avis. Each driver, whether he drives a Yellow Cab, Red Top, or other type, is competing with every other driver on the road, even in the same fleet. He has to compete because he is not guaranteed a wage. He is not guaranteed anything. He has got to get out there and hustle the business. For every passenger he takes, he keeps 100 percent of the fare. He does not split the fare or tips with the company. Leasing

creates tremendous competition within a fleet, and certainly there is tremendous competition among fleets. The notion that this is a noncompetitive industry is nonsense. Overwhelming outside influences are the greatest competitors, but there is also tremendous competition from within.

The idea that there is extremely high driver turnover is not true. The typical driver has worked in the same taxicab organization for nearly 4 years and drives full time.

Approximately 60 percent of all taxicab passengers are transportation disadvantaged (e.g., elderly, young, handicapped, unemployed), and the remaining 40 percent of the passengers are tourists, businessmen, and the affluent.

Not only are drivers and riders different from the stereotype, but the services provided also differ. Only 82 percent of taxicab organizations provide exclusive-ride service, whereas 73 percent offer package delivery, 62 percent offer contracted services, 47 percent offer shared rides, and 17 percent offer limousine service. Also, 37 percent of all taxicab organizations offer fare discounts to the elderly.

The taxicab industry is extensively regulated. The four primary areas of regulation are entry (number of vehicles or companies or both), fares, safety (insurance, driver licensing), and quality of service (vehicle, conduct of drivers, radio dispatch). Regulation extends to a variety of items, including the number and type of vehicles, fares charged, trade name, color scheme, insurance levels, license fees, inspections, driver licensing, owner's moral character, permissible solicitations, placement of cabstands, 24-hr service, two-way radios, meters, and so on.

Current regulations may be traced to 1635 in London, England, when King Charles I restricted the number of paratransit vehicles (horse-drawn carriages for hire). Nearly 200 years later, the London Hackney Carriage Act of 1831 became the first comprehensive paratransit regulation to be developed. In 1943 more regulations were added. These time-tested regulations in essence compose today's taxicab ordinances.

To those who may now be saying, "If taxicab regulations haven't been substantially altered in over 150 years, it is high time they are improved and modernized," remember that "those who fail to remember history are condemned to repeat it." Nearly every imaginable change has been tried with taxicab ordinances. Although some improvements have been made, in other instances harm has resulted.

Before outlining some regulatory changes that I believe should be considered, let us review and learn from several documented regulatory experiments. Cities that have been extensively studied and that are now experimenting or have recently experimented with their taxicab regulations are Atlanta, Indianapolis, Phoenix, San Diego, Seattle, and Washington, D.C. All are major metropolitan cities with a significant tourist and convention trade.

Atlanta allowed taxicabs open entry in the mid-1960s, primarily to merge its taxicab and private car service industries. This action was viewed as a civil rights issue because private car services were operated by blacks whereas taxicabs were operated by whites. In 10 years, the number of taxicabs doubled to 1,400 and the number of companies grew from 5 to 55. Atlanta allowed open entry but continued to set a uniform fare and regulate safety and service quality.

In early 1977, a task force recommended that Atlanta's

taxicab ordinance be totally revised. One year later, Atlanta's Chamber of Commerce joined the call for improved taxicab regulations. A Chamber-funded research project found driver income to be extremely low and reported that what that meant in terms of taxicab drivers was that the "rip-off" had become a frequent occurrence, and insults to riders and inadequate service abounded. They noted that this had occurred as a result of the influx of unqualified, "casual" drivers.

On February 3, 1981, Atlanta enacted a new taxicab ordinance. The ordinance (in effect today) limits entry (attempting to reduce the number of taxicabs from 1,500 to 1,200), establishes uniform fares, and regulates safety and quality. Open entry did not meet Atlanta's requirements for quality taxicab service.

Open entry in Indianapolis was reviewed in a study sponsored by the U.S. Department of Transportation (1) in which it is stated:

After the first winter the independent operators found they had no money to maintain or repair their vehicles. Insurance cancellation notices received by the City Controller's Office increased from one or two per month to about one hundred fifty per month. Complaints to the city about cab service tripled.... The cab driver often could not be found.... Service complaints were particularly high in reaction to airport taxi business. From the City's standpoint, enforcement became a major problem.... Added to these difficulties was a reported rise in the amount of crime committed by taxi drivers and operators.

As has already been revealed, the largest drug ring ever uncovered in Indianapolis was dial-a-drug. You could call the cab company and they would deliver what you wanted. That is market innovation, I suppose, but I don't think it is what the proponents were arguing for.

Phoenix differs significantly from Atlanta and Indianapolis for several reasons. In Phoenix, there was state instead of municipal regulation, and open entry was combined with open fares and the removal of quality-of-service regulations. The only element that continued to be regulated was safety (licensing, vehicle inspections). Phoenix provides a rare example of what happens when an entire local transportation system is deregulated. The results are disappointingly similar to those in cities that allowed open entry exclusively in the taxicab segment of the local transportation market. That is, fares rose, demand for service dropped, there was no service innovation, and the airport had significant new problems.

After San Diego deregulated, fares increased 60 percent in 2 years. That had to be in excess of inflation. What was said here earlier is that over the long run, from 1967 to the present, the fares have been brought into line. I am not sure I question that. Fares are clearly higher than they would have been if they had remained regulated, but in time the regulated fare would have risen. San Diego had an inordinately low fare, and that helped to cause the supply of taxis to be unreasonably low. The city had a tremendous growth in population and a burgeoning convention and tourist trade, and needed more public transportation. Unfortunately the city did not reasonably regulate their industry. The city did not allow a reasonable fare, and if drivers cannot make money, the city should not demand more vehicles on the road. Yellow Cab would have been silly to put more

vehicles on the street when their current drivers were hardly making a living. Had the fares been reasonable, Yellow Cab would have been the first demanding more taxicabs on the street. So, the notion that the private sector pulls vehicles off the road to keep fares artificially high is nonsense.

After Seattle deregulated, fares increased tremendously. There are a lot more vehicles on the street now in Seattle, but according to the DOT study, the total number of trips by all passengers declined 25 percent. If there is such a public benefit, why are people finding other modes of transportation? Why did they leave the taxicab industry? Again, I find it very hard to believe many of the statements made earlier today. Theory may be nice, but the reality is somewhat harsh in this case.

Students from the University of the District of Columbia in Washington, D.C., were recently hired to ride taxicabs and document the fares. In 305 trips, more than one out of three was overcharged. The average overcharge was 22.6 percent. The District, by the way, is often posed as a model of deregulation, but Washington, D.C., is not deregulated. Fares are uniform and regulated. Entry is open. Service quality is regulated and safety issues are regulated, but regulation doesn't seem to be working well with one out of three trips overcharged and one out of 10 trips refused. By the way, the sample was split almost evenly between hails and telephone calls, and there was no significant difference between the markets. Another interesting fact is that in Washington, D.C., the average age of the vehicle is 9 years. I know of no other major city in America that would tolerate vintage vehicles.

I will do something that may shock those who have heard me speak before. This is my personal opinion: I believe that there is a need for some regulatory reform in entry, fare setting, quality of service, and safety. All elements need to be reviewed, but I want to make it clear that I do not support open entry. I think it is extremely damaging to the general public and to the industry.

What is needed is flexible regulation of entry standards. Convenience and necessity or population ratio standards are flexible and, when properly administered, are successful. The key here is proper administration. I favor the convenience and necessity clause that features a publicly known formula. The formula should be developed in consultation with elected city officials, taxicab operators, public transit officials, and public interest groups. All of the factors utilized in the formula must be measurable and routinely published (annually). The formula could take into account such factors as population increase or decrease, deplaning passengers, tourist activity, and convention activity—the major factors that influence taxicab service. If the formula calls for an increase in licenses, the licenses should be made available for issuance. If, on the other hand, the formula calls for a reduction in licenses, existing operators should be given the opportunity to purchase outstanding licenses and return them to the city.

This is being done now in Montreal, Canada. The city has authorized the retirement of 2,000 taxicab licenses to bring the market back into balance so drivers can earn a decent living. Thus, there is precedent for retiring licenses.

Fares are another area that could reasonably be reformed. The current hearing process for setting uniform fares can be burdensome and lengthy. Extended delays in granting fare

increases can be damaging to the industry and ultimately to the taxicab-riding public.

I lean toward a taxicab fare regulation that would allow for a zone of reasonableness in fares. The zone of reasonableness could be 10 to 15 percent above or below the weighted average fare (or current citywide fare) and would allow for fare competition and fare increases when needed (e.g., during the fast-paced inflation of the 1970s). For consistency and public awareness, the fares should be permitted to be changed only twice a year during designated months (e.g., April and October). Although fares could vary between fleets, each fleet should be required to have a uniform fare. Thus consumers would shop quality and fares on a fleetwide basis. Another fare-setting mechanism could be a fare formula. The formula could adjust fares (annually) based on cost increases or decreases for (a) automobiles, (b) maintenance, (c) fuel, (d) insurance, (e) driver earnings, and (f) financing (interest rates). In this case, there could still be a zone of reasonableness, or the formula could be used to set a citywide taxicab fare. There are two considerable benefits to a citywide fare. First, every consumer will know what he should be charged, and second, operators are forced to compete on quality of service instead of price.

Quality of service is an area that is particularly important. I believe that all taxicabs should be required to be affiliated with a fleet large enough to serve all parts of the city 24 hr a day (e.g., 25 vehicles) and that every taxicab should be required to have a two-way radio and a meter. Then you would not have the independents, who cause the greatest number of problems.

Safety issues should continue to be regulated. Drivers are still alone in the car with passengers. You still need to do a background check [on the drivers]. Every community should examine its insurance requirements to ensure that they are in keeping with today's costs and judgments. Some cities require too much. Other cities require too little.

We are not opposed to improving taxicab regulations. What we don't want is destructive experimentation with the lives of the operators and drivers. We are calling for reasonable regulatory reform.

REFERENCE

1. G. Gilbert and P. Gelb. *Indianapolis Experience with Open Entry in the Taxi Industry*. UMTA Report MA-06-0049-80-15. Transportation Systems Center, U.S. Department of Transportation, Cambridge, Mass., 1980.

These remarks are the sole responsibility of the author. They do not necessarily reflect the views of the International Taxicab Association.

COMMENTS

PARTICIPANT:

Do you realize you said that you wanted to do background checks on travelers?

MR. LaGASSE:

No, check the drivers' background.

MR. UNDERWOOD:

Ray Underwood, University of Tennessee. Could I get summaries from each of the panel members? Would you suggest that deregulation for paratransit and taxicabs as it pertains to the airport is a dismal failure?

MR. KIRBY:

Because we are short of time, I will respond to that. I think all the speakers have identified problems at the airport, certainly where price controls have been removed and there hasn't been adequate provision for competitive selection by the users. I think everyone agrees with that.

MR. UNDERWOOD:

Was there anyone who had an example of a positive or beneficial deregulation of taxicabs at an airport?

MR. KIRBY:

I did not hear one.

I think we have had some very valuable discussion of paratransit regulatory revisions at this morning's session. I think it is clear from these discussions that this is quite a complex issue. There are a lot of dimensions to regulation of public transport, and they have to be looked at very carefully. The theoretical model doesn't handle the whole situation. There are a lot of special problems, as there are in all markets, that have to be solved. If decision makers go ahead with an overly simplistic approach and don't deal with those special problems adequately, there will be political repercussions. There are strong reasons for caution.

On the positive side, I think the experience over the last 5 or 10 years has certainly informed us all, to the extent that we have all adjusted our views to some degree. That, of course, is the purpose of research. The overall conclusion that I would make is that each city should look at this in its own particular environment, in its own particular context. Obviously, the impacts of regulatory changes will be very different depending on the base condition existing at the outset, and I think that is where some of the disagreements arise. We try to compare what happened in Phoenix with San Diego or somewhere else. The starting conditions were quite different, and obviously the impacts were different.

I vividly remember testifying to a commission on taxicab regulation in New York City and citing the experience in San Diego, and the response was, "How many cabs did you say they had in San Diego—440, 550? Well, we are talking about 11,000 here." They were not at all impressed with experience from other cities, and certainly they had a point. Their conditions were obviously very special, and you had to tackle their particular problems and not try to convince them with evidence that wasn't especially relevant.

The degree to which these regulations are actually binding,

as was mentioned by Mark Frankena, varies enormously around the country. When fares increased dramatically in San Diego, was that because fares had been held down? It may be that an increase was needed. It may or may not be something that you should be concerned about. It is very hard to get a handle on those kinds of impacts. In many cities the entry controls are not really binding. So, if you remove them, you

have a very small impact on the number of cabs. In other cities they are obviously very tightly binding, as evidenced by the instances where medallions change hands for many thousands of dollars.

Unless anyone has wishes to say anything more, I would like to close the session at this point. Thank you very much for coming. Thank you, speakers.

New York City's For-Hire Van Services: Blessing or Curse?

WILLIAM S. ALLISON,* HERBERT S. LEVINSON, AND ARNOLD BLOCH

The results of a study to analyze the operational, legal, and economic impacts of for-hire vans in New York City are presented. As transit service has grown less attractive, these services have proliferated, particularly in the boroughs of Queens, Brooklyn, and Staten Island. However, conflicts between for-hire van services and public transit, whose business the vans are competing for, as well as problems with traffic and licensing, have caused some to view the van services as more of a curse than a blessing. As a result of this study, guidelines for improvements in handling licensing, enforcement, and street use for van services have been drawn that, once implemented, should allow vans to become an important complement to transit.

Many urban transportation planners view privatization as a way of rationalizing transit services and reducing costs. Competition through normal market responses is seen as a means of allocating service areas better, improving transit's efficiency, and cutting, containing, or reducing subsidy needs. Unsubsidized vans carrying peak-period riders reduce public subsidies to the urban transit system, and hence become a public good.

New York City's express and local feeder for-hire vans, however, are viewed in a somewhat different perspective.

These vans, which carry more than 10,000 passengers to and from Manhattan and another 5,000 to and from outlying subway stations, are viewed as a blessing by many, but as a curse by many others.

- The van operators state that they provide a needed service that reflects market demands. Moreover, most van passengers view the vans as an improvement over the public transportation service that they formerly used; more than 95 percent of all van passengers are former transit riders.

- The New York City Transit Authority (NYCTA) has publicly estimated the erosion in revenues caused by vans at \$30 million to \$50 million a year, a figure that others view as inflated. (Conversely some planners claim that vans actually help NYCTA by carrying peak-period riders who would be difficult and costly to accommodate.)

- City officials are mixed in their attitudes. Some believe that because they provide effective journey-to-work trips or trip segments, vans are a positive influence on employment in the central business district (CBD); others would like to limit the proliferation of van services. The New York City Department of Transportation (NYCDOT) views the vans as preempting needed street space, often illegally. The city's Department of City Planning wants to rationalize and bring order to the licensing, control, and operation of the vans so that they can improve the mobility of city residents and workers and at the same time not undercut the regular public transportation system.

To place these conflicting views in a clearer perspective and to determine the city's desired posture with regard to vans, a special study was initiated in 1984 by the New York City

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Department of City Planning. The study was designed to analyze the operational, legal, and economic impacts of for-hire vans and to set forth guidelines for city policy. Included were a review of available data and documents on van travel, conversations and correspondence with governmental officials and private individuals involved with bus and van transportation, and actual on-site observations throughout the five boroughs at places where vans are heavily used.

Special surveys were conducted of express and feeder van passengers in cooperation with drivers belonging to two recognized consortiums of van operations: the South Queens Connection (exclusively feeder services) and the Five Boro Van Association (whose members mainly provide express service from Staten Island, Brooklyn, and Queens into Manhattan). These surveys obtained information about (a) former travel modes, (b) reasons for switching, (c) pickup and drop-off patterns, and (d) frequency of van use.

DIMENSIONS OF VAN SERVICE

Competition between unregulated paratransit services and the city's regular public transportation operations first began in the Bronx in the early 1970s. It spread to Brooklyn and Queens by 1975 and to Staten Island by 1978. The paratransit services started in the city's lower-income areas and then spread out to encompass middle-class neighborhoods as well. Gypsy cabs and other private automobiles carrying up to five passengers (for a fare) were used at first; this later expanded to include all other types of vehicles, and vans now predominate.

Two types of for-hire van services are provided: express commuter service into and out of the Manhattan CBD and local or feeder service to outlying NYCTA rapid transit stations. This study did not include vanpools operated by groups of riders. On a typical 1984 weekday, more than 500 express commuter vans carried 10,000 passengers into or out of Manhattan. Another 250 local feeder vans carried 5,000 riders each day to or from outlying rapid transit stations.

Both express and local vans are more heavily used in the morning peak period. Evening service has grown more slowly for several reasons, including a lack of vehicle queueing space at many subway stations and increased enforcement of No Standing regulations at others.

Van services are part of a natural progression toward more varied transit services in New York City. Express buses entered "subway-poor" areas first, drawing away subway riders; local vans followed, competing with local bus routes in the same subway-poor areas. Express vans serve mainly areas without direct subway service to Manhattan.

- Express commuter van services help to meet service voids or deficiencies, either actual or perceived, that are inherent in existing express transit operations. Like the express buses, they are keyed to the major express highways, taking advantage of the accessibility afforded. The proliferation of van services on Staten Island, for example, reflects the overcrowding of NYCTA express runs.

- Feeder vans serve areas that lie beyond the normal walking distance to subway lines or require payment of two subway fares to reach the desired destination. Feeder vans operate

either as shuttles between apartment complexes or as jitneys along high-density, heavily used feeder bus routes. Like the jitneys, many of these services take passengers from public transportation.

Express Vans

Express vans generally charge the same fare (\$3.00) as the city's franchised express buses; many operate in direct competition with these express buses or the subway system or both. Fewer than half of the express vans have been licensed to carry passengers for hire.

Express vans average 10 to 12 passengers per trip, and 75 percent of all van passengers begin or end their trip in the city's four outer boroughs (Table 1). The Brooklyn–Staten Island, Queens, and Bronx–Westchester–Connecticut sectors each

TABLE 1 EXPRESS VAN SERVICE, NEW YORK CITY, 1984

Item	Amount
No. of van trips	
Morning	516
Evening	484
No. of passengers	
Morning	5,160
Evening	5,808
No. of passengers/trip	
Morning	10
Evening	12
Type of vehicle (%)	
12- to 14-passengers van	92
20-passenger van	8
Point of origin (%)	
Bronx, Brooklyn, Queens, Staten Island	75
Outside city	
Westchester and Upstate New York	16
New Jersey	7
Connecticut	2

account for about 30 percent of the total Manhattan van entries, and about 10 percent comes from New Jersey (Table 2). The specific points of entry into Manhattan are shown in Figure 1.

The service areas in the outer boroughs for most express vans are shown in Figures 2, 3, and 4. In Brooklyn, vans come from the Bay Ridge, Bath Beach–Crosby, and Coney Island areas; all are middle-income communities located near the Belt Parkway. In Queens, express vans come mainly from areas that lie beyond walking distance to subway stops (e.g., Jewel Avenue). In Staten Island, express vans generally serve the central and southern parts of the island.

Local Vans

Most of the local vans charge the same fare (\$0.90) as that of the city's local bus lines, and virtually none have been certified to carry passengers for hire.

TABLE 2 ORIGINS OF EXPRESS VANS BY SECTOR AND ROUTE

Sector	7:00-9:00 a.m.		4:00-6:30 p.m.	
	No.	Percent	No.	Percent
Bronx-Westchester-Connecticut				
Henry Hudson Bridge	20		31	
Third Avenue Bridge	22			
Willis Avenue Bridge			18	
Triboro Bridge	92		91	
Subtotal	134	26	140	29
Queens (East River)				
Triboro Bridge	82		73	
Queensboro Bridge	42		54	
Midtown Tunnel	30		18	
Subtotal	154	30	145	30
Brooklyn-Staten Island				
Brooklyn Bridge	70		20	
Brooklyn Battery Tunnel	128		132	
Subtotal	198	38	152	31
New Jersey (Lincoln Tunnel)	30	6	47	10
Total	516		484	

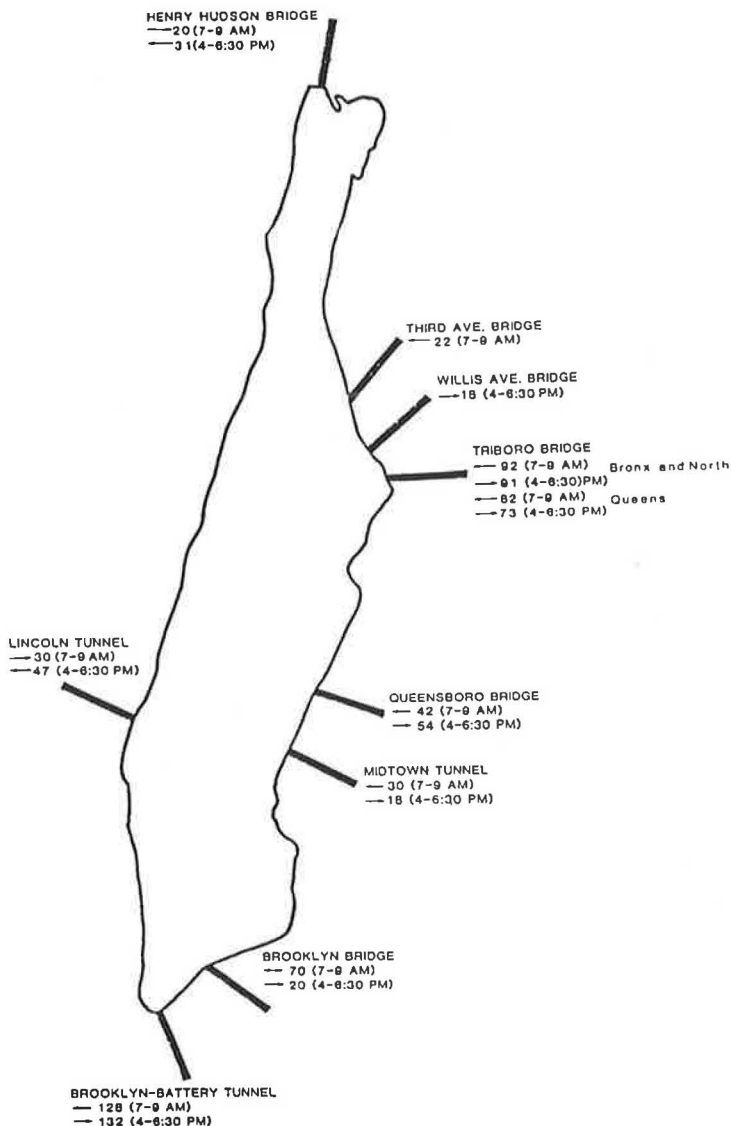


FIGURE 1 Commuter van access and egress points in Manhattan.

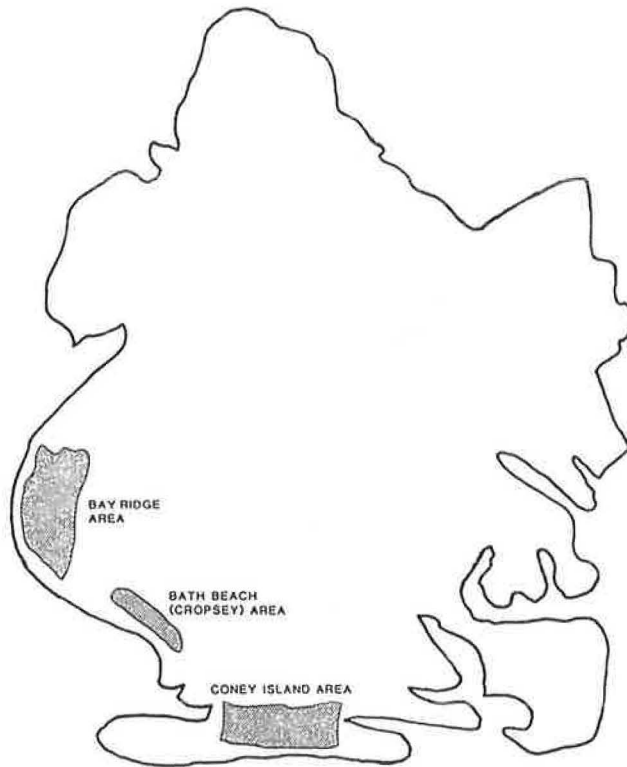


FIGURE 2 Commuter van express service areas in Brooklyn.

Peak-period feeder van service in the Bronx, Brooklyn, and Queens is summarized in Table 3. Load factors average about six to seven passengers per van.

Feeder van services operate in the Bronx between Co-op City and the Pelham Bay rapid transit terminal via I-95 and between River Park Towers and the IRT-IND subways at 161st

Street via the Deegan Expressway (Figure 5). In Brooklyn, vans link high-density areas such as Brighton Beach and Sheepshead Bay with nearby subways, but they also traverse heavily used bus routes such as those on Flatbush and Utica avenues. In Queens, vans operate along busy bus lines to and from Jamaica.

Reasons for Growth

The rapid rise in for-hire van services stems from several factors. These include

1. The growing population in Staten Island and other outlying parts of the city that do not have subway service;
2. Declining NYCTA service in terms of frequency, comfort, overcrowding, reliability, and accessibility;
3. Perceived problems of passenger safety on subways and buses;
4. The 1980 transit strike, during which many van operators began service;
5. High unemployment, which caused many of those in low-income areas to discover that they could make a living by driving vans; and
6. Problems experienced by city agencies in enforcing transportation operator franchise and licensing regulations.

The unattractiveness of NYCTA operations and the lack of comfortable, reliable, and accessible service are particularly pertinent for Staten Island residents and for many in the outer parts of Queens and Brooklyn where the distances to transit stops and stations are long and the competing vans offer a virtually demand-responsive service. Other factors related to NYCTA service include

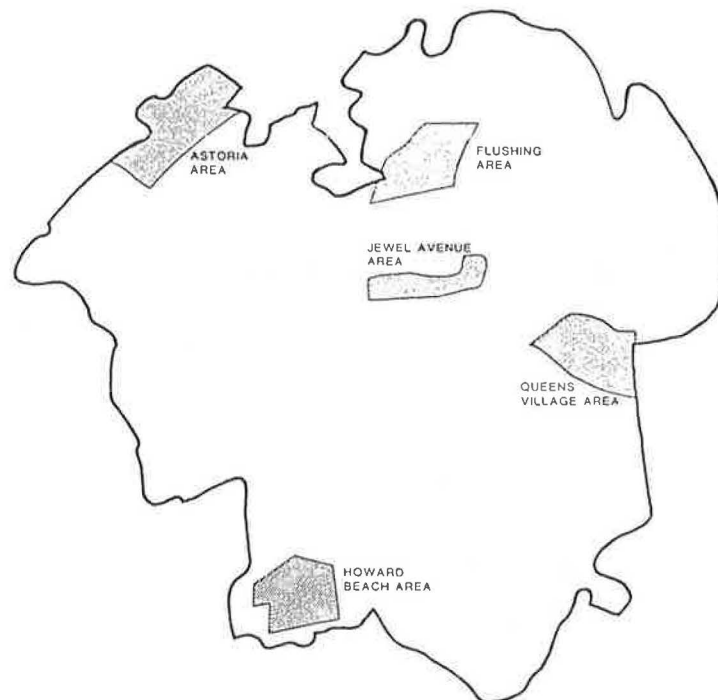


FIGURE 3 Commuter van express service areas in Queens.

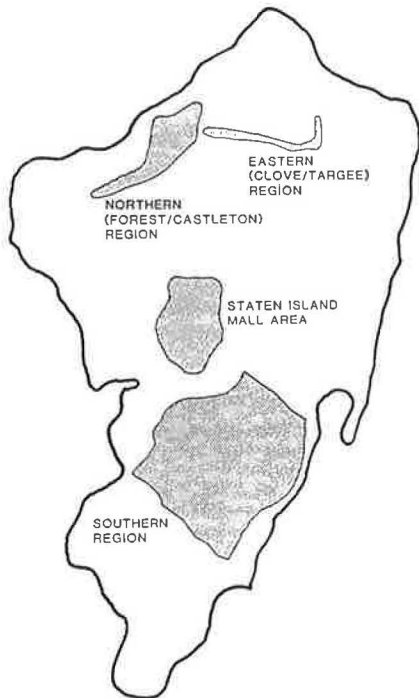


FIGURE 4 Commuter van express service areas in Staten Island.

1. Cutbacks in NYCTA service due to declining ridership, budgetary constraints, and equipment shortages;
2. Fear of crime and considerations of personal security on the subway system;
3. NYCTA's practice of not accepting \$1 bills on its express buses; and
4. The lack of seats and of air conditioning on peak-hour express buses.

Van operations have grown also because of ineffective enforcement of existing licensing and street use regulations due to a lack of enforcement personnel and the lack of authority or of interest in enforcing these regulations compared with other, more serious problems. Related factors include questions regarding the actual illegality of many van operations and lack of concern by the courts.

Finally, popular, political, and press support for van operations and their continuance without governmental interference has also contributed to their growth. There is a perceived societal benefit from van services, including reduced vehicle mileage and energy requirements. This is accentuated by the

fact that vanpooling and group riding are hailed as desirable goals in most areas of the country.

Impacts of Van Operations

The typical van rider in the four outer boroughs has a destination in lower or midtown Manhattan, makes a trip 5 days a week, and previously used local or express buses or the subway.

Street Congestion

Both express and local vans were found to contribute to street congestion. The situation is especially serious in lower and midtown Manhattan, where vans occupy valuable street space. They operate illegally in bus lanes such as those along lower Broadway, where more than 100 buses operate in the evening peak hour. Vans load passengers from the street side on one-way streets and they preempt bus stops throughout the city. These practices increase delays to bus passengers, and they result in a net increase in overall person delay.

Revenue Loss

The total revenue loss to NYCTA, based on 15,000 van riders per day, is conservatively estimated at about \$8,500,000 annually (see Table 4). The bus riders diverted to vans are distributed among a large number of transit bus routes. Consequently, the ridership loss on individual lines in most cases has not been sufficient to allow cost-saving cutbacks in peak-hour transit service. In most cases, it is the number of standees rather than the number of buses that has been reduced.

In the Laurelton, Queens, Corridor, for example, about 70 buses operate in the peak direction during the morning peak hour, carrying more than 3,000 passengers. This compares with about 360 van riders. It is likely that the buses could accommodate these van riders without the addition of more buses. Moreover, NYCTA's vehicle miles of bus service has remained about the same since 1982.

Administrative Fragmentation

Part of the existing van problem arises from the diffusion of regulatory controls among city, state, and federal agencies.

TABLE 3 PEAK-PERIOD FEEDER VAN SERVICE, NEW YORK CITY, 1984

Borough	7:00-9:00 a.m.		4:00-6:30 p.m.			Passengers	Total Passengers	Percentage
	Vans	Passengers/ Van	Passengers	Vans	Passengers/ Van			
Bronx	88	9	754	36	5	169	923	36
Brooklyn	75	6	420	39	6	228	648	26
Queens	105	7	640	38	9	330	970	38
Total	268		1814	113		727	2541	

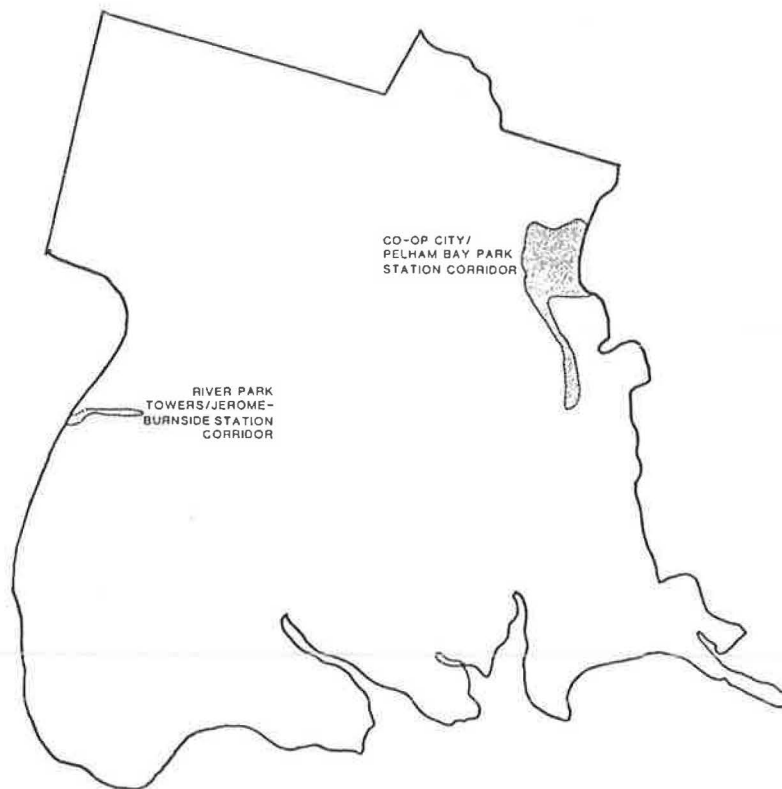


FIGURE 5 Commuter van feeder service areas in the Bronx.

There has been continued controversy as to what type of surface transportation services must be enfranchised or otherwise licensed by the city and what type can operate under certificates issued either by the Interstate Commerce Commission (ICC) or by the New York State Department of Transportation (NYSDOT) or without any special license at all.

Regulation by the Federal Government

At the federal level, the ICC is charged with the regulation of all carriers—including motor carriers of passengers—that cross state lines. The ICC's authority for regulating passenger carriers stems largely from the Bus Regulatory Reform Act of 1982 (Public Law 97-261, 97th Congress) as incorporated in Subtitle IV, Title 49, of the U.S. Code. This act is designed to

reduce regulation of and to increase competition in the bus industry.

The ICC may certify three types of interstate passenger carriage: regular-route service, charter service, and special operations. However, under these definitions the distinction between regular-route service and special operations is not always clear. Transit bus service is clearly regular-route service; commuter van service may qualify as either regular-route service or special operations depending on the specific nature of the operation to be performed.

Van services are defined in the New York State Transportation Law, revised and effective January 1, 1984, as

a sub-classification of common carrier of passengers by motor vehicle that provides service on a prearranged regular daily basis between a zone in a residential neigh-

TABLE 4 ESTIMATED PUBLIC TRANSPORTATION REVENUE LOSS FROM VAN OPERATIONS

Item	Express Vans	Local Vans	Total
Estimated daily ridership	10,000	5,000	15,000
Equivalent public transit revenue/trip (\$)	3.00	0.90	—
Daily revenue loss (\$)	30,000	4,500	34,500
Annual revenue loss (260 days) (\$)	7,800,000	1,170,000	8,970,000
Adjusted for 95 percent former mass transit riders (\$)	7,410,000	1,111,500	8,521,500

borhood and a location which shall be a work related central location, a mass transit or mass transportation facility, a shopping center or recreational facility, but shall not include service to or from an airport. Such service is usually characterized by the use of vehicles having a seating capacity of twenty passengers or less.

New York City is concerned that the ease of entry permitted by the act and the operating flexibility that ICC-certified carriers are granted will compound the city's street congestion, contribute to air quality and other environmental problems, and result in unfair competition for city-regulated carriers. At this time, however, less than 10 percent of the licensed vans that provide express service in and out of the city operate with ICC certificates.

Regulation by New York State

The New York State Transportation Law generally gives the Commissioner of Transportation jurisdiction over motor vehicle common carriers of passengers that operate within New York State. Exceptions to this jurisdiction include (N.Y. State Transportation Law, Article 3, Section 80.5) "van services operated wholly within the boundaries of a city with a population of over one million when such city had adopted an ordinance, local law or charter to regulate or franchise such operations...."

New York City has not exercised its right to regulate intra-city van services and, of course, even if it does so, the state will retain jurisdiction over carriers that operate between the city and the counties.

NYSDOT has certified approximately 40 van services to operate within New York City and surrounding areas. (The basic differences between vans and buses as defined by the New York State Transportation Law are given in Table 5.) Because a certificate does not specify the number of vehicles that the holder may operate, it is not possible to determine the

TABLE 5 BASIC DIFFERENCES BETWEEN BUS-LINE AND COMMUTER VAN SERVICE OPERATIONS (NEW YORK STATE)

Bus Line	Commuter Van
Pick up and delivery at designated city bus stops	Use of city stops prohibited; pick up within a designated zone in the outer borough; delivery at designated van stop only
Rides without prearrangement Service operates only over designated routes or between stated termini	Rides by prearrangement only Routings not specified except as necessary for traffic control purposes in areas of high traffic congestion such as Manhattan below Chambers Street
Route numbers and destinations visibly displayed on vehicle	Routes operated, areas served, etc., prohibited from being displayed on vehicle
Service operated on a regular public schedule	Pick up times known to passengers only
Usually conducted with vehicles carrying more than 20 passengers	Usually conducted with vehicle carrying 20 passengers or less

number of vehicles that currently operate in the city with state certificates. Once issued, certificates are good forever; they do not have to be renewed periodically (as is the case with the city's franchise agreements). No certificate ever has been rescinded for failure to provide effective service.

Until 1982, NYSDOT followed a liberal policy in granting certificates to van operators because there was no specific written policy for guidance. In 1982, acknowledging that indiscriminate growth of van operations might adversely affect the city's transit facilities, the state (NYSDOT Regulation Division) issued a policy statement for van service applications that would provide transportation to commuters entirely within the city of New York.

In implementing this policy, the state adopted as the measure of need for a proposed van service that it be 1/3 mi or more from an existing bus stop.

Approximately 45 percent of the commuter vans that currently provide express services into and out of Manhattan have been certified by the state. Less than 5 percent of the vans that provide local services in the city's four outer boroughs have state certificates.

Regulation by New York City

A franchise from the city is required when an operator proposes to provide pickup or delivery service, or both, within New York City with the following characteristics:

1. Operated on a regular, fixed, or stated schedule;
2. Operated along a fixed route or between stated termini; and
3. Available to the general public, picking up passengers by hail at designated stops without prearrangement and on an individual-fare basis.

It is the city's contention that the type of vehicle being operated—standard coach, school bus, minibus, van, limousine, or even taxicab—should not be a determining factor.

The New York State Transportation Law defines a bus line as usually characterized by the use of vehicles having a seating capacity of more than 20 passengers and a van service as usually characterized by the use of vehicles having a seating capacity of 20 passengers or fewer. The significance and meaning of the word "usually" are being reviewed by NYSDOT.

Thus, whatever the type of vehicle, if an operator proposes to provide "bus line" service within the city, that operator must be enfranchised to do so, a process that normally takes more than a year from the date that a franchise application is submitted.

Van services do not require a franchise, and the city has not yet passed the required local law or taken the other steps necessary to take over responsibility for their licensing from the state.

Enforcement of Existing Regulations

The city's existing public transportation operators—both NYCTA and enfranchised private bus companies—argue that

no matter where a legally certified express van operator is authorized to operate, he will quickly shift origin zones to go where the demand warrants, regardless of the impact on existing transit services.

By their own admission, NYSDOT can neither effectively police commuter van operations in New York City nor enforce the restrictions that it places on those services that it has certified. The primary reason is a lack of enforcement personnel, because there are only seven inspectors for the entire New York metropolitan region, an area encompassing all of Long Island and the area north of the city to Poughkeepsie. Furthermore, these inspectors are concerned with all types of carriers under the regulatory jurisdiction of the U.S. Department of Transportation—trucks, buses, and household goods movers—not just vans. To date, no van service certificate has been rescinded because of illegal or unauthorized operations by its holder.

Although NYCDOT has been able to effectively police the legal use of dedicated bus lanes in Manhattan and elsewhere, there are not enough traffic or parking control personnel to police restrictions on the use of bus stops or to otherwise enforce many of the other city traffic regulations, such as keeping unauthorized vehicles out of contraflow bus lanes on major expressways leading into Manhattan. Many van operators who are not authorized to do so use those lanes with impunity. Attempts by city and NYCTA police to require van compliance with existing parking and traffic regulations have produced mixed results at best. They have evoked charges of harassment from the van operators and their association, resulting in at least one court injunction to cease and desist. A large percentage of the summons issued were dismissed by the court and otherwise had little impact on the van operations. For the most part, it is the local feeder vans that operate in flagrant violation of the city's parking and traffic regulations, use the city's bus stops, and solicit passengers at bus stops and other mass transit facilities.

In sum, there is an important need for more effective franchising and enforcement arrangements.

IMPROVING VAN OPERATIONS

The following licensing, enforcement, and street use guidelines emerged from the analyses of existing operating patterns and administrative practices.

Licensing Guidelines

Local control of van licensing should be improved as follows:

1. The city should assume responsibility for the certification of all intracity commuter van services as soon as possible. This will make it possible to establish certification and enforcement policies that are sensitive to the city's unique transportation needs, traffic problems, and transit system capabilities. The best agency to do this is the New York City Taxi and Limousine Commission (TLC), which currently regulates the city's medallion taxicab and limousine industries.

2. All commuter vans that are providing de facto bus-line

type service should be required to have a franchise from the Board of Estimate or Bureau of Franchises to operate.

3. In addition to distance from competing mass transit services (for which the $\frac{1}{8}$ -mi criterion is reasonable), the following factors should be considered in evaluating the need for a proposed van service:

- Presence of significant numbers of standees on competing peak-hour express buses,
- Headways longer than 20 to 30 min during peak periods on competing local bus routes,
- Comparative routings and trip times of the bus and the proposed van service, and
- Impact, regardless of distance apart, of proposed van service on existing transit service ridership and revenues.

4. Van certificates should be issued for renewable 3-year terms on a vehicle-by-vehicle basis only. Vans should be inspected quarterly and required to carry significantly higher levels of personal injury insurance than current state-mandated minimums. Van drivers should be specially licensed by the city in the same way as taxi drivers.

5. New York City should work closely with the Regulation Division of NYSDOT to have the state impose the same requirements on state-certified intercounty carriers that the city establishes for city-certified vans. Few problems are anticipated. However, the city should control federally certified interstate van operators through traffic and parking regulations that apply to all van services.

Enforcement Guidelines

Effective enforcement is essential to develop and maintain a rational passenger transportation system in the city, one that considers all types of service (bus lines, commuter van services, medallion taxis, base-operated liveries, etc.). The key elements are (a) a set of clear, easily understood regulations that are enforceable; (b) adequate inspection or enforcement personnel or both; (c) reasonably stiff penalties for those who violate the laws; and (d) an efficient system for dealing with offenders. Accordingly, the following guidelines emerged:

1. Outlying residential zones where vans are certified to pick up passengers should be easily identifiable, for example, a housing subdivision or apartment complex.

2. Express and feeder service operating authority should be displayed by different windshield stickers, which should be color coded by borough or smaller zone of operation.

3. Only vans certified by the city should be allowed to operate with the (state) license plate designated for use on vehicles certified to operate by the NYC TLC.

4. A prohibition against picking up and discharging passengers at city bus stops should be unequivocally stated in both city and state operating certificates.

5. Vans should not be allowed to display information as to the origin or destination zones served or the routes followed, to reduce the possibility of providing rides that are not prearranged.

Summons issued to van operators, both certified and uncertified, should be returnable to the TLC's administrative tribunal. The existence of this tribunal is a major enforcement asset because it obviates having to handle infractions in the city's court system.

Street Use Guidelines

The city should designate routes (streets, avenues, etc.) over which vans may or may not operate. It should also designate areas where vans may not stop to pick up or discharge passengers and where vans are required to lay over. Within this framework, the following guidelines are appropriate. They are designed to minimize the conflicts between vans and buses and at the same time enable vans to serve major subway stops and passenger destinations. They organize, but do not unduly restrict, van operations. Finally, they suggest better NYCTA transit services to limit the competitive advantage of vans over the long run.

1. Vans represent an important complement to buses and cars. In terms of persons carried per vehicle, they are more efficient than cars, but less efficient than buses.

2. Priorities for the use of curb and street space generally should favor, in order of importance, buses; vans, taxis, and trucks; and cars.

3. Van layover and passenger pickup and discharge should be prohibited along major streets leading to river crossings (e.g., lower Broadway and Flatbush Avenue).

4. Vans should not be allowed to travel on roadways where commercial vehicles are prohibited unless they are specifically permitted to do so. However, they should be allowed to travel on parkways unless otherwise prohibited.

5. Vans should be prohibited from using bus lanes or bus zones (unless authorized to do so). They should not be allowed in bus lanes either as moving traffic or for passenger pickup and discharge, but they should be allowed to use the lanes to make an immediate right turn where such turns are permitted for other vehicles.

6. Vans should be prohibited from receiving or discharging passengers at bus stops and in No Standing areas.

7. Vans should not be allowed to pick up or discharge passengers along franchised bus routes unless specifically authorized.

8. Van access to major passenger distribution points such as subway stations or employment areas should be maintained.

9. Vans should be permitted to receive or discharge passengers only from curb lanes when van doors open on the curb side. (Most vans have doors only on the right side; therefore, they should not be allowed to receive or discharge passengers from the left curb lanes on one-way streets unless special passenger islands are provided.)

10. Off-street van storage should be required in Manhattan. Storage areas should be limited to peripheral parts of midtown and lower Manhattan (e.g., west of Church Street in lower Manhattan and west of 10th Avenue midtown). Vans should not be allowed to lay over in No Parking zones, No Standing zones, or No Stopping zones.

11. Off-street van passenger loading and unloading areas should be encouraged.

12. Outside of the area of lower Manhattan below Chambers Street, vans should be able to pick up and discharge passengers on any street, except where specifically prohibited. South of Chambers Street, vans should be limited to the streets shown in Figure 6.

13. Transit service improvements are essential to reduce the relative attractiveness of vans. They include more direct, more frequent, and faster bus service; additional capacity to reduce overcrowding; adjustments in subway routes; and fare incentives.

In sum, traffic and transit operational improvements should be implemented throughout the city wherever vans are used. Their goals are to better rationalize the use of street space, minimize van-bus conflicts, and increase the attractiveness of NYCTA bus and subway service. These improvements are straightforward. They call for actions individually or cooperatively by NYCDOT, NYCTA, and van operators. They require neither complex institutional arrangements nor extensive costs.

IMPLICATIONS AND NEXT STEPS

New York City's van operations add a new dimension to the city's complex network of public transportation facilities. They provide added transport options for passengers. At the same time they compete with the city's franchised bus and subway services, attracting existing transit riders, reducing NYCTA revenues, and further congesting many city streets, especially in midtown and lower Manhattan. Present regulatory mechanisms are fragmented among federal, state, and city agencies.

The proliferation of uncontrolled van services will adversely affect both transit operations and traffic congestion. To survive, Manhattan must continue to rely on its subway and bus systems for commuter travel. Organized and controlled van services can complement the city's transit services by benefiting riders in areas with poor accessibility, inadequate service levels, and the like.

The city should assume the basic responsibility for licensing and entry controls and their enforcement. Van use of bus stops and bus lanes should be prohibited, and transportation system management operational improvements should be provided in areas where vans are popular. These actions can be implemented with relatively little cost to the city.

Many van services reflect NYCTA transit service problems such as slow or overcrowded bus service, limited subway coverage, and lack of passenger safety. NYCTA's emphasis on keeping the existing system functioning has taken precedence over providing and marketing new services. A major challenge, therefore, is for transit to take the initiative in improving its services, responding to changing travel patterns, and aggressively marketing its services. For example, fare incentives for two-mode riders—such as special passes, transfers, or “uni-tickets”—have merit both in van-impacted areas and citywide; they represent logical considerations for a citywide transit fare policy. Once implemented, they will make feeder bus riding more attractive than vans from a cost standpoint.



FIGURE 6 Suggested van passenger loading and discharge points in lower Manhattan: 1, Vesey-Church-Liberty (clockwise loop, vans and taxis); 2, Warren west of Broadway (south side); 3, Vesey west of Church (north side); 4, Liberty west of Broadway (south side); 5, Water Street (no bus stops, both sides); 6, State Street-Peter Minuit Plaza (south side); 7, Will Street south of Morris (both sides).

Effectively implemented, they would not increase the cost of service.

The city is considering implementing these regulatory, operational, and enforcement guidelines, albeit with possible modifications. The next steps are to implement these changes, enforce them effectively, and monitor the van services. Viewed in this context, vans may emerge as an important complement to other transit services.

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The views expressed are those of the authors and do not necessarily reflect those of the city.

A Taxicab Fare Policy Formula Based on Fuel Consumption Observations

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A new taxicab fare collection methodology is proposed. The formulation developed is based on an urban fuel consumption study performed in Austin, Dallas, and Lubbock, Texas, and in Matamoros, Mexico. The formulation determines the fare as a function of travel distance and time with parameters related to vehicle operating cost, driver's wage, and the taxicab agency's profit and overhead cost. A survey of the 1985 fare-setting policies of taxicab agencies in some major U.S. cities has also been performed. On the basis of the survey results, a comparison is made between the currently used and the proposed fare-determination algorithms. The results of a numerical example indicate that the current practice slightly overestimates the travel time contribution to the fare and underestimates that of the travel distance. Consequently the currently charged fare for a trip in congested traffic conditions (long travel time per unit distance) appears to be overcharging the peak-period customer, whereas the reverse holds for the off-peak traffic conditions. The proposed fare-determination algorithm may be particularly useful to regulatory agencies in inferring a taxi agency's unit profit rate embedded in its fare-pricing policy. In addition, the fuel consumption-based algorithm could be used by regulatory agencies to establish fare guidelines in conjunction with taxicab operating costs and revenues.

Of all the forms of urban mass transit, the taxicab industry alone generates more than 50 percent of the annual revenues in the United States. Yet few analytical relations have been explicitly established for fare calculations in metered taxis. Traditionally, taxi fares have been computed on the basis of an initial cost (flag-drop cost) plus additional charges for the distance traveled and the time elapsed. However, assignment of unit charges to distance traveled and time elapsed have not been based on a systematic framework. In this paper an attempt is made to formulate an analytical rationale for the determination of cost weights for traveled distances and times in taxi fare calculations. Recent vehicular fuel consumption studies for urban street networks (1-5) and a survey of fare policies of taxicab companies in some major U.S. cities formed the basis of this formulation.

DEFINITION OF VARIABLES

- δ = distance increment (mi) for which the taximeter is programmed to advance the fare;
 ΔF_{δ} = fare increment (cents) for each δ mi of travel;
 τ = time increment (cents) for which the taximeter is programmed to advance the fare;

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- ΔF_{τ} = fare increment (cents) for each τ min of travel;
 N_{δ} = number of meter advancements due to travel δ mi before τ min is reached;
 N_{τ} = number of meter advancements due to traveling τ min before δ mi is reached;
 N = total number of meter advancements in a trip ($N = N_{\delta} + N_{\tau}$);
 F = total fare for a trip (cents);
 F_0 = flag-drop charge (initial fare displayed by the meter) (cents);
 δ_0 = distance (mi) covered by F_0 ;
 τ_0 = time (min) covered by F_0 ;
 x = trip length (mi);
 t = trip duration (min);
 v_r = mean running speed (mi/min);
 v = mean overall speed (mph);
 T = trip time per unit distance ($1/v$) [min/mi (t/x)];
 ϕ = fuel consumed per unit distance (gal/mi);
 k_1 = fuel consumption parameter (gal/mi) representing the fuel consumed to overcome the rolling resistance;
 k_2 = fuel consumption parameter (gal/min) representing the time-related fuel losses to the engine;
 C_F = fuel cost (cents) for an x -mi, t -min trip;
 g = gasoline cost (cents/gal);
 C_T = total operating cost of a vehicle (cents) for an x -mi, t -min trip;
 R = ratio of C_T to C_F ;
 p = taxicab company's unit profit and overhead costs (cents/mi per taxicab);
 w = unit wage of the taxicab driver (cents/min per taxicab);
 t_0 = average slack time (min) between unloading one passenger and loading another; and
 x_0 = average slack distance (mi) between unloading one passenger and loading another.

CONVENTIONAL TAXIMETER FARE MECHANISMS

Although taxicabs advertise their fares as a function of traveled distance alone, the taximeter itself is programmed to compute the fare as a function of both distance traveled and time elapsed. The results of a 1985 survey of the fare-pricing policy in some major U.S. cities are shown in Table 1. The distance-related portion of the fare is computed in δ -mi increments, and the time-related part is measured in τ -min increments. During a trip, the meter advances once every δ mi or τ min, whichever is reached first. The fare is then advanced by an amount ΔF_{τ} every time the meter advances because of the time constraint τ and by

TABLE 1 THE 1985 FARE POLICY IN SOME MAJOR U.S. CITIES

City	First Flag Drop			Each Extra Distance		Each Extra Time	
	Fare (F_0, ϕ)	Time (τ_0, min)	Dist. (δ_0, mi)	Fare ($\Delta F_d, \phi$)	Interval (δ, mi)	Fare ($\Delta F_t, \phi$)	Interval (τ, min)
Richmond	120	1.0	1/5	20	1/5	20	1.0
Roanoke	120	1.0	1/6	20	1/6	20	1.0
Dallas	130	0.7	1/10	10	1/10	10	0.7
Austin	110	0.67	1/10	10	1/10	10	0.67
San Antonio	110	0.75	1/10	10	1/10	10	0.75
New York	110	0.5	1/9	10	1/9	10	0.5
Chicago	110	1.0	1/10	10	1/10	10	1.0
Los Angeles	120	1.5	1/2	70	1/2	70	1.5
San Francisco	130	0.5	1/6	20	1/6	20	0.5
St. Louis	130	1.0	1/7	10	1/7	10	1.0
Wash., D.C.	109	0.15	1/10	9	1/10	9	0.15
New Orleans	110	1.0	1/10	10	1/10	10	1.0
Seattle	120	0.45	1/6	20	1/6	20	0.45
Atlantic City	135	1.5	1/5	20	1/5	20	1.5

ΔF_d every time the distant constraint δ is reached. For New York City, for example, $\delta = 1/9$ mi, $\tau = 0.5$ min, $\Delta F_t = 10$ cents, and $\Delta F_d = 10$ cents (Table 1). It may be noted that when the meter advances because of reaching either τ min or δ mi, both the time and distance counters are reset to zero.

Based on the foregoing description, the total fare (F) is computed as

$$F = F_0 + N_t \Delta F_t + N_d \Delta F_d \quad (1)$$

where F_0 is the initial charge for the flag drop, and N_t and N_d are the number of times the meter advances as a result of reaching τ min or δ mi, respectively. As may be noted in Table 1, most taxicab agencies select the lengths of τ and δ so that ΔF_t can be considered approximately equal to ΔF_d ; this results in the following fare-setting relation:

$$F = F_0 + N \Delta F \quad (2)$$

where N is the total number of times the meter advances, regardless of the cause, and ΔF is the fare increment per meter advancement. It must be noted that the flag-drop charge (F_0) generally covers the first δ_0 mi or τ_0 min, whichever is reached first, so that N is measured δ_0 mi or τ_0 min after the start of a ride. The flag-drop charge in New York, for example, is 110 cents, which covers the first $1/9$ mi or 0.5 min (Table 1). Consequently, the fare determination formula for New York becomes F (cents) = 110 + 10N.

In a highly congested area, most of the N meter advancements would be due to reaching the time limit τ , whereas in noncongested locations or off-peak periods N would consist mostly of meter advancements generated by reaching the distance constraint δ . Ghahraman et al. (6) have shown that for a

ride of length x mi and duration t min, N can be approximated as

$$N = [(1/\delta) - (1/v_r^t)] x + (t/\tau) \quad (3)$$

where v_r is the mean running speed during a ride. The taxi fare for a ride may then be computed by combining Equations 2 and 3 to obtain

$$F = F_0 + x \Delta F [(1/\delta) - (1/v_r^t)] + \Delta F (t/\tau) \quad (4)$$

where v_r is in miles per minute.

This fare approximation (Equation 4) can be employed by the taxicab industry for policy-making purposes regarding the values of δ , τ , F_0 , and ΔF through performing sensitivity analyses on the cost and revenue outcome of various strategies. The resulting policy decisions regarding initial and incremental costs F_0 and ΔF must, of course, fall within the limits set by regulatory agencies.

FUEL CONSUMPTION STUDIES

Although the determination of F_0 and ΔF using the foregoing techniques is a sound managerial practice, a more systematic framework may be developed based on analysis of taxicab operational costs. To this end, the results of a series of vehicular fuel consumption observations in urban areas may be applied directly.

Recent studies (1, 2) have shown that in urban regimes of speeds less than 35 mph, some 71 percent of the variance in fuel consumption per unit distance (ϕ) is accounted for by a single variable, T , the trip time per unit distance (the reciprocal

of mean overall speed, v). This one-variable dependence can then be expressed as

$$\phi = k_1 + k_2 T \quad (v < \sim 35 \text{ mph}) \quad (5)$$

where k_1 and k_2 are vehicle-dependent parameters. It may be noted that $T = 1/v = t/x$.

The model expressed by Equation 5 offers a simple and moderately accurate means of predicting the fuel consumption for urban speed regimes ($v < \sim 35$ mph) and relatively flat network topography. Moreover, it has the advantage that its parameters can be physically interpreted (5). The parameter k_2 , for example, is related to various time-dependent losses, mainly the idle fuel flow, which operates while the vehicle is stopped and coasting; this represents 20 to 50 percent of the time spent in congested urban traffic. The parameter k_2 is affected by the engine type, size, and power. The parameter k_1 , on the other hand, is related to the fuel consumed per unit distance to overcome rolling resistance and is mainly a function of the vehicle mass. A set of k_1 and k_2 values is presented for various passenger cars in Table 2. In general, the heavier vehicles display greater values of k_1 , whereas the smaller and newer models display lower values of k_2 . It must be emphasized that as long as a relatively flat topography exists, the

values of the parameters k_1 and k_2 are almost entirely functions of the vehicle itself and not of the operational environment and location.

The 1983–1984 fuel consumption observations in Austin, Dallas, and Lubbock, Texas, as well as in Matamoros, Mexico, showed that in more congested locations (higher T -values) such as Matamoros, a greater amount of fuel is consumed per unit distance. However, the fuel consumption per unit distance under various traffic conditions has indeed been a linear function of T , as suggested by Equation 5. The results of these studies are shown in Figure 1, where each data point represents a 1-mi trip for a 1983 Ford Fairmont six-cylinder automobile with a curb weight of 2,825 lb and a measured idle fuel flow for a warmed-up engine of 0.557 gal/hr. This test vehicle had an automatic transmission with three forward ratios and a 3.3-L displacement engine. It used unleaded gasoline with a minimum octane rating of 87. During the fuel observations the four tires were kept at the maximum allowable cold pressure of 35 psi and the air conditioner–heater was not in operation. The tires were of P175/75R14 size and type. The vehicle was equipped with a Model 1240 Fluidyne precision fuel flow indicator to determine the total fuel used for a trip of a given distance. The fuel meter was installed under the hood. The gasoline line fed through the following parts in sequence: inline

TABLE 2 FUEL CONSUMPTION CHARACTERISTICS OF VARIOUS VEHICLES

Reference	Vehicle	Model Year	Test Mass (lbs)	k_1 (gal/mile)	Idle Fuel Flow Rate (gal/min)	k_2 (gal/min)
Present Study	Ford Fairmont	1983	3125	0.0317	0.0093	0.0090
5,7	British Bedford CF Van	1978	3770	0.0347		0.0082
5,7	British Bedford CF Van	1978	4872	0.0438		0.0083
8	Standard-Sized Car	1975	5050	0.0551	0.0128	0.0153
8	Standard-Sized Car	1974	4980	0.0650	0.0139	0.0166
8	Small Imported Car	1974	2277	0.0256	0.0089	0.0105
8	Intermediate Size Car	1975	3792	0.0496	0.0111	0.0120
8	Large Luxury Car	1974	5474	0.0709	0.0132	0.0172
8	Subcompact Station Wagon	1975	2833	0.0420	0.0073	0.0094
2	Subcompact Car	1973	3620	0.0526	0.0044	0.0070
9	Small Van	1956	2352	0.0209	0.0033	0.0050
9	British Car	1955	3025	0.0447	0.0059	0.0083
10	Empty Minibus	1965	3717	0.0532		0.0055
10	Loaded Minibus	1965	4592	0.0588		0.0063
10	Small British Car	1965	2251	0.0329		0.0084
10	British Car	1964	3258	0.0494		0.0084
11	Australian Station Wagon	1965	3200	0.0362		0.0094
16	Ford Cortina		2667	0.0240		0.0071
17	Ford Escort		2116	0.0172		0.0080
18	Renault RL2		2337	0.0298		0.0044

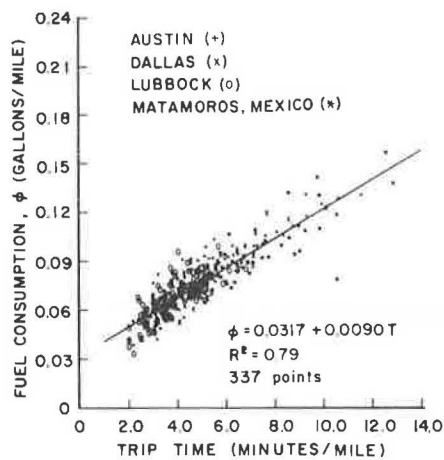


FIGURE 1 Fuel consumption versus trip time, 1983 six-cylinder Ford Fairmont Futura with automatic transmission.

filter, auxiliary electric fuel pump, pressure regulator, glass-walled filter, Fluidyne fuel meter, original mechanical fuel pump, and carburetor.

As is evident from Figure 1, the data for the four cities spread along a fairly linear band, and the regression line that indicates the trend is given by

$$\phi = 0.0317 + 0.0090T \quad (6)$$

with ϕ in gallons per mile, T in minutes per mile, a total of 377 points, and $R^2 = 0.79$. These values of $k_1 = 0.0317$ gal/mi and $k_2 = 0.0090$ gal/min can be compared with the average values over nine vehicles tested in Detroit some years ago (8), namely, $k_1 = 0.0362$ gal/mi and $k_2 = 0.0214$ gal/min. The reductions in the values of these parameters over the years reflect the general improvements in fuel efficiency and idle fuel flow of later vehicle models. This point is further illustrated in Table 2 where k_1 and k_2 values for 15 vehicle models are tabulated. In addition, the values of k_1 and k_2 for the Ford test vehicle in this study fall well within the scatter of the remaining data in Table 2. The data in Table 2 are also graphically presented in a plot of k_1 versus vehicle mass (Figure 2) and k_2 versus the measured idle fuel flow (Figure 3). A linear regression of k_1 versus M , forced through the origin, yields a slope of 1.21×10^{-5} gal/mi-lb (Figure 2) and that of k_2 versus I yields a slope of 1.20 (Figure 3).

FARE DETERMINATION BASED ON FUEL CONSUMPTION

The foregoing fuel consumption results may be used to directly establish a methodology based on fuel consumption for the fare determination of an x -mi, t -min taxi ride. In doing so, it must first be noted that the variable $T (= t/x)$ in Equation 5 by itself accounts for a large part of the traffic dependence of fuel consumption, which in turn constitutes a major portion of the operational cost of a vehicle.

Thus, the vehicle-related parameters k_1 and k_2 as well as the trip duration (t) and the trip length (x) of a ride form a sufficient

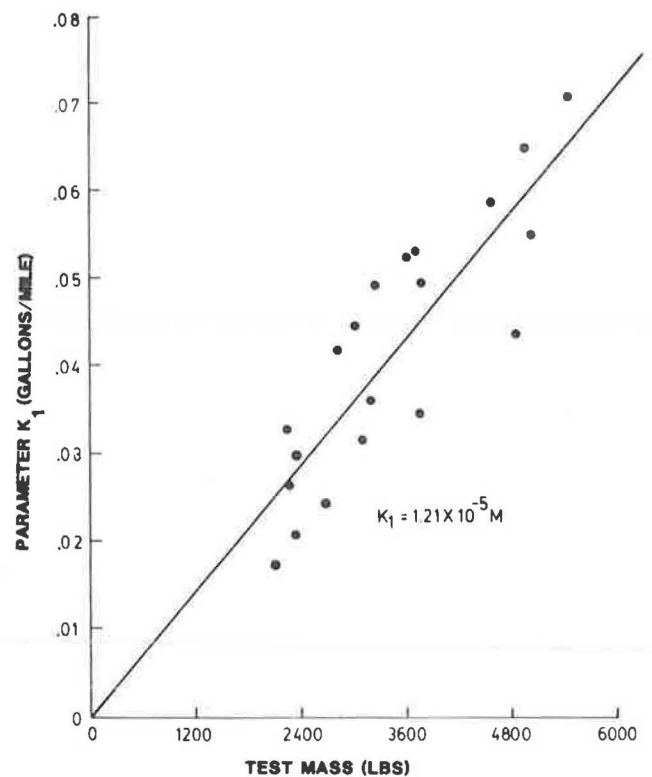


FIGURE 2 Fuel parameter k_1 versus vehicle test mass M for various vehicles in Table 2.

basis for determination of the fuel cost of a taxicab engaged in a trip x mi long and t min in duration; namely,

$$C_F = xg(k_1 + k_2T) \quad (7)$$

where g is the gasoline cost per gallon and C_F is the total fuel cost for a trip x mi long with an average trip time of T min/mi. Knowing that $T = t/x$, Equation 7 may be simplified as

$$C_F = g(k_1x + k_2t) \quad (8)$$

The total operational cost (C_T) of a vehicle includes the fuel cost as well as other major operational expenses such as oil, maintenance and repair, tire wear, and depreciation costs. The ratio C_T/C_F may be denoted by R where $R > 1$. Results reported by Claffey et al. in 1971 (15) yield $R = 1.75$ for a composite passenger car operating at 30 mph average speed (including turns and speed change effects) for a relatively flat topography. A composite car was defined (15) for a vehicle mix of 20 percent large, 65 percent standard size, 10 percent compact, and 5 percent small cars. Data compiled by Zaniewski et al. in 1982 (16) imply that $R = 1.9$ for a medium-sized automobile operating at 20 mph average speed on a relatively flat terrain. The total cost may then be formulated as

$$C_T = Rg(k_1x + k_2t) \quad (9)$$

To formulate a fare-setting algorithm based on the total cost C_T of Equation 9, it is necessary that variables representing the profit and overhead costs of the taxicab agency as well as the driver's wage be included. The driver's unit wage per minute is

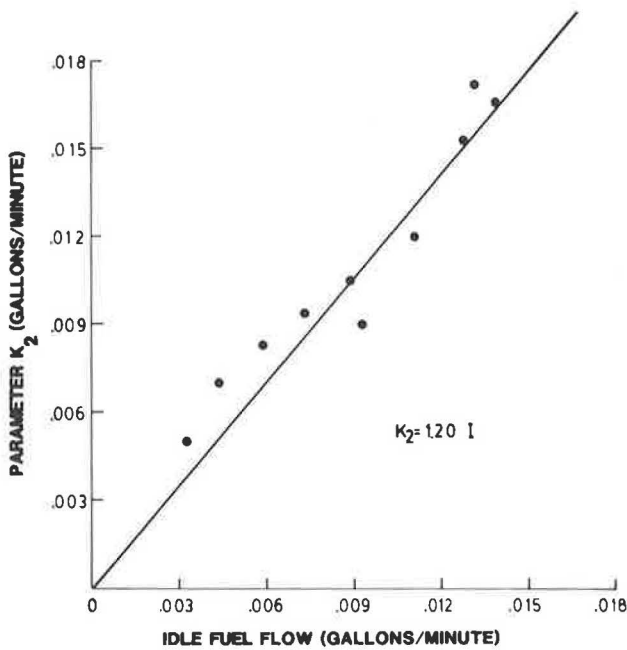


FIGURE 3 Fuel parameter k_2 versus vehicle idle fuel flow I for various test vehicles in Table 2.

denoted by w and the expected company profit and overhead costs per mile of operation per taxicab by p . Then during an x -mi, t -min ride, the accumulated fare (F) may be computed as

$$F = F_0 + (x - \delta_0) (Rgk_1 + p) + (t - \tau_0) (Rgk_2 + w) \quad (10)$$

where F_0 is as before the flag-drop charge, which also covers the fare for the initial δ_0 mi or τ_0 min of the ride, whichever is reached first. The variables in Equation 10 are x and t .

The initial fare F_0 is usually set at a higher value than may be computed by considering unit operating costs, profit, company overhead, and driver wage for δ_0 mi and τ_0 min of operation. A higher value of F_0 is generally used in order to discourage customers from engaging taxicabs for very short trips. Responding to calls for short trips is undesirable from an operational standpoint, because in a competitive environment this could result in losing customers in need of considerably longer and more profitable rides. In addition, the cost incurred by responding to such calls (for driving to the customer's location and making the actual trip to the destination) may indeed exceed the fare collected unless a sufficiently high value of F_0 is charged.

The foregoing considerations suggest that the computation of F_0 as a minimum must include the cost of a trip ($x_0 + \delta_0$) mi long and ($t_0 + \tau_0$) min in duration, where x_0 and t_0 are the slack distance and time, respectively (i.e., the mean distance and time that a taxicab without passengers travels before arriving at the origin of a call). The values of slack distance x_0 and slack time t_0 must, of course, be determined by performing a statistical analysis on the relevant data available or to be collected. These values primarily would be a function of the size of the metropolitan area, the taxi fleet size, and the spatial distribution of taxicabs. Having set the values of δ_0 and τ_0 by policy and knowing the values of x_0 and t_0 , the initial fare F_0 may then be estimated to be

$$F_0 = (x_0 + \delta_0) (Rgk_1 + p) + (t_0 + \tau_0) (Rgk_2 + w) \quad (11)$$

Combining Equations 10 and 11 would then yield an analytical algorithm based on fuel consumption to determine the fare for a taxi ride x mi long and t min in duration.

A NUMERICAL EXAMPLE

The following numerical example is presented to provide a better understanding of the magnitude of the various parameters in the proposed fare-setting formula (Equation 10) as well as the sensitivity of the fare to these parameters. In addition, the fare associated with a specific trip as determined by Equation 10 is compared with an estimate of the currently charged fare obtained through Equation 4.

For example, consider a New York City taxicab agency operating a fleet of medium-sized cars ($k_1 = 0.032$ gal/mi, $k_2 = 0.009$ gal/min). Let us also assume a driver's hourly wage of \$9.00 ($w = \$0.15/\text{min}$) and a profit and overhead rate of \$0.25 per mile per taxicab ($p = \$0.25$). An average cost for unleaded gasoline of \$1.35/gal ($g = \1.35) and $R = 2$ will also be used in the computations. Note from Table 1 that in New York the flag-drop charge currently in effect covers an initial distance of $1/9$ mi ($\delta_0 = 1/9$) or an initial duration of 0.5 min ($\tau_0 = 0.5$ min). An assumption must also be made regarding the values of x_0 and t_0 in New York City. In this example $x_0 = 1$ mi and $t_0 = 4$ min are used. Hence,

$$\begin{aligned} x_0 &= 1 \text{ mi,} \\ t_0 &= 4 \text{ min,} \\ R &= 2, \\ g &= \$1.35/\text{gal,} \\ k_1 &= 0.032 \text{ gal/mi,} \\ k_2 &= 0.009 \text{ gal/min,} \\ \delta_0 &= 1/9 \text{ mi,} \\ \tau_0 &= 0.5 \text{ min,} \\ p &= \$0.25/\text{mi, and} \\ w &= \$0.15/\text{mi.} \end{aligned}$$

With these parametric values, Equation 11 yields a flag-drop charge of $F_0 = \$1.16$ compared with the current New York City flag-drop charge of \$1.10. Substituting a value of \$1.16 for F_0 in Equation 10 and using the foregoing parameter values results in the following fare-setting relation for New York:

$$F = 116 + 33.64 [x - (1/9)] + 17.43 (t - 0.5) \quad (12)$$

Therefore, a peak period 6-mi ride of 30 min duration in New York City corresponds, according to Equation 12, to a fare $F = \$8.28$.

For comparison purposes, the current charge for a 6-mi 30-min ride in New York can be estimated by means of Equation 4 (6) by using the current taxicab fare structure in New York outlined in Table 1, namely,

$$\begin{aligned} F_0 &= \$1.10, \\ \Delta F &= \$0.10, \\ \delta &= 1/9 \text{ mi, and} \\ \tau &= 0.5 \text{ min.} \end{aligned}$$

Note that in using Equation 4, the average running speed (v_r) for this 6-mi, 30-min trip must first be estimated. Observations in the New York–Newark area (17, 18) have shown that, on the average, a vehicle is stopped 36.8 percent of the time during the peak period. Therefore, during the 6-mi, 30-min ride, on the average, the taxicab can be assumed to have been stopped for 11.3 min and in motion for the remaining 18.7 min of the trip, yielding an average running speed $v_r = 19.2$ mph or 0.32 mi/min. Hence, Equation 4 is calibrated as

$$F = 110 + 27.5x + 20t \quad (13)$$

Consequently, by using Equation 13, an estimate of the fare currently charged in New York City for a 6-mi, 30-min ride is \$8.75. This is to be compared with a fare of \$8.28 for the same trip computed by using the fuel-consumption-based relation of Equation 12.

Although these fares (\$8.75 versus \$8.28) are remarkably close, it must be noted that in the current fare determination practice (Equation 13) the traveled time is weighted slightly more (\$0.20/min) as compared with the proposed fuel-based formula (Equation 12), in which time is weighted as \$17.43/min. Unlike travel time, the influence of the travel distance is slightly underestimated in practice (Equation 13), particularly at higher levels of congestion. This is so because the coefficient of x in Equation 4 is directly proportional to the average running speed (v_r). As v_r decreases with an increase in the level of congestion, the value of the coefficient of x would become smaller. In order to avoid a negative coefficient for x , v_r must be greater than δ/τ . Thus, the fare approximation relation of Equation 5 is only valid for $v_r > \delta/\tau$. For this numerical example that threshold is 13.4 mph. As a result, in uncongested traffic conditions (short trip times per mile), from the perspective of the cost of operating a taxicab, customers are slightly undercharged. On the contrary, in very congested traffic (long trip times per mile) the customers would be overcharged. It must, however, be noted that the time and distance coefficients in Equations 12 and 13, although insensitive to x_0 and t_0 , are rather sensitive to these assumptions regarding p and w . Consequently, the foregoing conclusions are only warranted if realistic values of p and w are assumed. In light of which, the proposed fuel-consumption-based algorithm may be particularly useful to regulatory agencies in estimating a taxicab company's unit profit and overhead costs based on its practiced fare-setting formula.

SUMMARY AND DISCUSSION

Any taxicab fare-setting formula must consider both travel time and travel distance. Although the taxicab in-vehicle public information bulletins may imply that the fare is only a function of the travel distance, in reality a taximeter operates as a function of distance and time. This is self-evident when a meter advances while the taxi is standing still.

The conventional taximeter increases the initial flag-drop charge by a fixed fare increment for every fixed distance or time interval, whichever is reached first. The flag-drop charge itself covers the fare for an initial specified travel distance or time, whichever is reached first.

The results of an urban fuel consumption study are presented on the basis of which a new taxicab fare-setting algorithm is formulated. The formulation considers the total operating cost of the vehicle, the driver's wage, the company's profit and overhead costs, and the cost of taxicab slack times as well as slack distances.

In the use of the developed algorithm, it must be noted that it is based on a fuel consumption relation that is valid only for urban speed regimes less than about 35 mph. This is the case because at speeds greater than 35 mph fuel consumption increases with speed due to aerodynamic drag, as shown in Figure 4. However, as may be seen in Figure 4, these increases are small up to speeds of about 50 mph. Thus the proposed algorithm would not be significantly in error if used for rides a

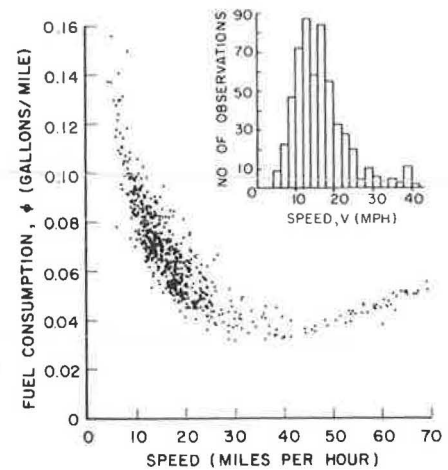


FIGURE 4 Fuel consumption versus speed in central business districts of Austin, Dallas, Lubbock, and Matamoros and highway data from several 3- to 5-mi, relatively flat sections of Texas freeways collected with 1983 Ford Fairmont.

portion of which takes place in nonurban speed regimes. Another limitation of this formulation is that the underlying fuel consumption model does not account for considerable changes in grade. Adjustments are needed if the relation is to be used in other than moderately rolling or flat terrain. Pelensky et al. (11) have suggested an urban fuel consumption relation similar to Equation 5 that includes a grade-adjustment term as well. However, the use of such a relation in the determination of taxicab fares would require significant changes in the taximeter operational mechanism to measure longitudinal roadway grades in the course of a ride.

The proposed fuel-consumption-based formulation has been calibrated for New York City. The resulting outcome is compared with that of the current fare-setting practice as determined from a 1985 survey of fare policies in some of the major U.S. cities. The comparison indicates that although the fare based on current practice for an average ride is reasonable, the current fare-pricing structure may be overcharging the peak-period customers and slightly undercharging the off-peak-period customers. The proposed algorithm may also be useful to the regulatory agencies in studying a taxicab agency's fare

policy and establishing fare guidelines in conjunction with taxicab operating costs.

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Taxi School: A First Step in Professionalizing Taxi Driving

ANNE G. MORRIS

Surveys were completed by 4,396 new applicants for a hack license enrolled in the New York Taxi Drivers Institute, a 20-hr program mandated to start in July 1984 for all incoming taxi drivers in New York City. In this sample population, 74 percent of the students were born in 82 countries other than the United States, and 72 languages other than English were spoken. The majority of the students were in their mid-thirties, were relatively well educated, and planned to work for fleet operations full time after receiving their license. Focus groups held at both training sites before and after the program revealed three major concerns: personal security, the negative image of the industry, and the lack of an advocate for drivers, who are subject to unreasonable demands by the public, the regulatory agency, and the media. The majority of the students gave the program a positive rating and all agreed that the teachers, former drivers or current industry staff, were excellent. Fleet managers attending a focus group identified two changes that had had major consequences for the industry—the shift from salary by commission to leasing and the changed characteristics of the work force. Both drivers and management identified the poor image of the industry as a major problem. The establishment of a taxi school helped prepare new applicants, a majority of whom were not native-born Americans, to deal with the demands of taxi driving in New York City.

Before they go out on the road, do American taxi drivers need special training comparable to the comprehensive training programs for taxi drivers in London and Moscow? The taxi industry in the United States has generally relied on management to train new drivers. Furthermore, educational programs for incoming drivers have been both informal and limited. Because traditionally new applicants were indigenous to the area, it was assumed that they entered the industry with the necessary driving experience, a knowledge of local geography, a basic understanding of motor vehicle laws, and an understanding of the social mores to enable them to easily deal with the bulk of their passengers.

Marked changes have reportedly occurred in the characteristics of applicants for hack licenses in urban areas from the Northeast to the Southwest. However, there is little information about the work force that makes up the taxi industry in the United States. As a proprietary business, taxi management has had little interest in the composition of its work force, and the primary role of the regulatory agencies has been to enforce licensing requirements (1). In New York City demands for a better level of taxi service led to the establishment of a 20-hr mandated educational program for all new applicants for hack

licenses starting in 1984. In this paper the characteristics of incoming taxi drivers as well as their response to the required taxi training program will be described.

A HISTORICAL PERSPECTIVE

Personalized taxicab service is one of the oldest forms of urban transportation (2). The taxi industry, operated by the private sector, remains the leading private-sector provider of paratransit service in urban, rural, and suburban areas (3). Taxicabs have played, and continue to play, an important but generally unrecognized role in providing transport services to travelers of varied social and economic backgrounds (4). The potential of the taxi industry has yet to be realized, although it is recognized that paratransit provides supplemental transit services at a lower cost than does conventional mass transit (5).

The New York City taxi business is increased by 8,000 to 10,000 newly licensed drivers each year; the labor force in New York City consists of approximately 31,000 drivers per year; the proportion of applicants entering the industry annually is estimated to be 24 percent [New York City Taxi and Limousine Commission (TLC)]. Nationally the level of employment is estimated at 400,000 to 600,000 (6). However, the work force is probably 2 to 2.5 times greater than the estimate because many drivers work only part time or enter the industry on a temporary basis (7). There is a considerable amount of labor flexibility within the industry; however, the turnover rate is exceptionally high and is estimated at 200 to 300 percent per year (8).

The prototypical New York taxi driver has achieved mythic proportions, which is due in no small part to the movies, comedians on national television, as well as local shows and more recently by the popular television show "Taxi." Drivers are expected to know every nook and cranny in the five boroughs while discoursing on topical issues from the latest sports hero to politics. The fact that a majority of the current taxi work force is made up of immigrants who speak a variety of languages has led to bewilderment and often hostility on the part of the passengers. For a start, many of the newer drivers are less knowledgeable than expected about New York streets, and their lack of facility in English has made it difficult to carry on the dialogue that some passengers expect.

THE NEW YORK CITY TAXI INDUSTRY

Taxis are a significant element in the total transportation network and economy of the city. There are 11,787 medallion cabs in the New York metropolitan area that collect approximately \$2 billion annually at the farebox and provide 200 million rides

for passengers. The deterioration of public transit service may have increased the demand for taxi services.

The medallion taxi industry in New York City is extensively regulated and involves many organizations, both public and private. Regulations are administered by TLC, a "non-mayoral" regulatory agency composed of nine members, which was established in 1971. Drivers are responsible for following 102 TLC rules, some of which have numerous subcategories, along with the standard motor vehicle regulations. Violations of TLC rules carry specific penalties, including fines or personal appearances or both, and may result in suspension or revocation of the hack license. Fleet owners are represented by the Metropolitan Taxicab Board of Trade (MTBT) and minifleets and owner-operators by the Independent Taxi Owners Council.

Two categories of applicants seek a license to drive a medallion taxicab in New York City. Sponsored drivers apply through the MTBT and are issued a temporary license so that they can drive for the fleets before they have completed the application process. Unsponsored applicants are issued a hack license only after the entire application process (which took about 6 to 8 weeks during the period of this study) has been completed. Drivers must meet four criteria to get a hack license: a medical examination, a criminal record search, a driving record search via the New York State (NYS) Department of Motor Vehicles, and successful completion of the New York Taxi Drivers Institute (NYTDI) program and test. The cost of a license includes a \$75 fee for the training program, which is paid directly to the respective NYTDI school, a \$52 fee to TLC, and an additional \$12 to \$15 to the NYS Division of Criminal Justice for a security check and fingerprinting.

Only medallion cabs have the right to pick up street hails in the five boroughs of New York City. Estimates of the number of nonmedallion or car service vehicles, which do not have the legal right to pick up passengers on the street, range from 8,000 to 40,000. Since 1970, two-thirds of the fleet medallions have been sold to minifleets (two to three cars); in 1985 there were 17 fleet operations, which ranged in size from 25 to 289 vehicles. The market price for a fleet medallion in 1986 ranged from \$100,000 to \$110,000, almost twice the reported cost of \$50,000 to \$60,000 in 1981. The cost of a vehicle, which must meet TLC specifications, is an additional expense.

Starting in April 1979, there was a major change in the New York taxi industry: instead of receiving a minimum salary plus commission, drivers now lease their cabs from the company. The nationwide trend to leasing started earlier and accelerated in 1975 and 1976. Under leasing arrangements the overhead costs for owners are significantly reduced. Leasing agreements range in cost to the driver from \$350 to \$450 for a one-week period. Additional driver expenses include a \$2 union fee for each tour of duty (fleet drivers only) plus the cost of gasoline. Tours of duty are generally 12 hr, the maximum allowed in a 24-hr period. It has been reported that leasing has increased productivity because drivers are now responsible for getting sufficient fares to cover their up-front costs plus payment for their services. Supposedly this has increased competition in securing passengers and caused drivers to work harder. However, there is no documentation to support these claims.

A dramatic and precipitous rise in the cost of insurance accompanied by underwriting constraints began in April 1984.

Before then the approximate cost of insuring a fleet or minifleet driver aged 21 and older was about \$3,400 annually. In 1984 it cost about \$5,200 to \$5,700 for a driver aged 25 and older. Insurance for drivers between 21 and 25 is now approximately \$12,000 a year. Underwriting constraints have been equally onerous. Insurance companies now require drivers to have one year of experience driving a taxi to get the filed rates just mentioned. A \$25,000 yearly premium (approximate cost for a two-car minifleet) must be paid for an assigned risk plan for new drivers with less than one year of on-the-road experience with taxis. The implications for younger applicants are clear.

SMITH COMMITTEE AND NYTDI

In 1981 the Mayor of New York appointed the Committee on Taxi Regulatory Issues (henceforth to be called the Smith Committee) to identify ways to support and improve the industry. In March 1982, the Smith Committee recommended the establishment of the NYTDI, which was to offer a 20-hr certificate training program for all new applicants starting January 1, 1984.

The school was expected to provide more comprehensive driver instruction, testing procedures to ensure high-level skills, improved driver attitudes, and a stronger sense of professionalism among new drivers. The renowned London taxi driver must pass a rigorous series of written and oral tests before obtaining a license, a process that generally takes from 2 to 3 years. However, the NYTDI program, one of the first mandated educational programs in the United States for all new applicants for taxi licenses, was a major step in the professionalization of the industry in New York City.

The NYTDI program was sponsored by TLC; LaGuardia Community College of the City University of New York (LAG); and Federation Employment and Guidance Services (FEGS). However, the educational program was an independent operation, administered and designed by LAG and FEGS. The curriculum utilized input from the TLC staff, industry, union representatives, and senior taxicab drivers. The nine curriculum modules follow: industry overview and orientation, driver-passenger relations, geography, language and signs, traffic regulations, defensive driving styles and skills, personal safety of drivers and passengers, and vehicle care and maintenance. Handouts specific to various curriculum modules and audiovisual aids provided concrete examples of driving experience. Maps, tourist information, and pertinent written materials were also distributed in the context of the topic under study. The program was scheduled at two sites—LAG and FEGS—either five nights a week or on the weekend to accommodate all prospective drivers. The teaching staff was recruited from current and former taxi drivers who had above-average teaching skills. It was expected that teacher-drivers would use their current or former driver experience, or both, to support, supplement, and reinforce the teaching materials presented.

METHODS

For the study reported here, a research advisory committee made up of representatives from TLC, LAG, FEGS, and indus-

try met periodically to review project activities and provide guidance. In addition, the project director met with NYTDI faculty to apprise them of the study goals and methods. This ongoing dialogue gave the individuals who had direct or indirect contacts with new applicants an investment in the study and greatly facilitated on-site activities.

Demographic Survey

A questionnaire was constructed to identify entry-level skills and attributes, including place of birth and languages spoken, length of time in New York City, and level of education. The pilot questionnaire was distributed at TLC to all applicants for a hack license during the first week of October 1984. Project staff were available for questions. Seventy-five questionnaires were distributed and returned. Minor format changes were made to clarify the responses listed. To ensure immediate access to the total population of new applicants, questionnaires were distributed at both sites.

Focus Group Interview

Focus groups, a qualitative technique, provide market researchers with immediate feedback about emerging attitudes, the success of a new program, and a changed or new product (9, 10). It is a relatively low-cost way to learn about how consumers think, talk, and behave. A major concern in evaluating a mandated educational program is how students view the program and what changes, if any, are needed to make the educational experience of value to the students while meeting the requirements of the licensing agency. The focus group technique was employed to give potential drivers an opportunity to sound off in their own words, in concert with other applicants, about both the industry and the NYTDI program.

Project staff attended the 20-hr training program at both sites before developing a similar structured focus group interview guide for comparative assessment both before and after the program (11). The interview guide consisted of five questions related to curriculum material. A series of categorical responses was prepared for each question to rate responses quantitatively. A qualitative report summarized the results of the session and provided a subjective assessment. It consisted of the five interview questions plus summary statements and was completed by project staff following each group session. One moderator and two recorders (with a minimum of one) were present for each session. At NYTDI faculty's suggestion, pretraining group sessions were held before the class had met the teacher, to minimize possible biasing factors. This eliminated any basis for concerns the students may have had as to whether their comments were truly off the record. To ensure their anonymity, students were asked not to give their names. The posttraining group session was scheduled on the last day of the program at both sites. Assignment of the study team to classrooms at both sites was random.

Taxi Management Interview

An assessment of the NYTDI program by industry management was carried out in a focus group because work conditions

in the garages made the planned telephone survey infeasible. The group session was attended by fleet managers only, because owner-operators do not use new drivers and minifleet managers refused to participate, although reliable reports indicated that they skimmed off 50 percent of the sponsored drivers after they had received permanent licenses. A structured interview that covered the curriculum modules was constructed. To ensure anonymity, no names were taken. A moderator and two recorders were present at the session, which was audiotaped.

Comparisons of On-the-Road Behaviors by Means of Driving Records

The impact of the NYTDI program was to be measured by comparing the number of traffic infractions, accidents, TLC summonses, and civilian complaints for new drivers who had completed the training program with those for new drivers who were not required to take the training program and those for comparable samples of experienced drivers. It was expected that comparisons of new versus experienced drivers would control for vagaries of the system of issuing summonses. However, a lack of reliable data on drivers before the establishment of the NYTDI program along with the absence of accident data for 1984 and 1985 made it impossible to draw inferences on the population under study and the previous groups of experienced and new drivers. Because of time constraints the study could not be delayed in hopes that sufficient data could be generated in the near future.

RESULTS

Demographic Survey

Over a period of 8 months (October 19, 1984–May 19, 1985), 4,369 questionnaires were completed, 2,321 from LAG and 2,048 from FEGS. It should be noted that completion of questionnaires was voluntary, so it was not possible to ensure that all questions were answered. Missing data will be so designated as the findings are presented.

The racial breakdown, using categories that met Equal Employment Opportunity guidelines, follows: white, 32 percent (n=1,358); black, 32 percent (n=1,383); Hispanic, 17 percent (n=747); Oriental, 13 percent (n=558); and other, 6 percent (n=238). There were 4,247 men and only 122 women in the sample population. The proportion of the students aged 25 to 32 years was 39 percent, followed by 28 percent aged 33 to 40 years. The mean age was 33½ years and the mode was 31 years. Only 13 percent of the applicants were less than 25 years old, whereas 19 percent were more than 41 years old. The folk wisdom has always been that New York taxi drivers are street smart but not educated. The sample population under study appeared to disabuse this notion because 47 percent had completed two or more years of college (Table 1). Only 790 students were attending a school other than NYTDI.

Among these applicants for the hack license 74 percent (n=3,182) were born outside the United States and its territories, 16 percent (n=684) were born in New York City, and 10 percent (n=420) were from other states and territories of the

TABLE 1 YEARS OF SCHOOL COMPLETED BY NEW APPLICANTS

Grade	No. of Responses (n=4,187)	Percentage of Total ^a
Less than 6th grade	62	1
Sixth to 9th grade	293	7
Ninth through 12th grade	1,867	45
Through second year of college	1,005	24
Through fourth year of college	576	14
More than 4 years of college and graduate school	384	9

^aPercentages may not equal 100 because of rounding.

United States. A breakdown of students by the 82 countries identified as birthplaces of the population under study is presented in Table 2. (Africa was listed as a place of birth by 12 students, but it was not counted as a country.) The country with the most responses was Haiti (n=792). Nine countries that had between 117 and 193 responses follow in ascending order: Colombia, Rumania, Afghanistan, India, Pakistan, USSR, Korea, Egypt, and the Dominican Republic. A majority of the students (n=2,553) had resided in the New York area for 5 or more years, whereas only 5 percent (n=212) had been in the city for less than 1 year. However, 21 percent (n=974) had lived in the area for a minimum of less than 1 year to a maximum of 3 years, which is not a great deal of time in terms of knowing the places and traffic patterns in New York City.

As expected, students representing 82 countries speak a variety of languages. Data on the primary language spoken other than English are presented in Table 3. Of 3,198 responses, 60 languages were identified. French and Spanish received the highest number of responses, 833 (25 percent) and 814 (25 percent), respectively. The high number of applicants born in Haiti (Table 2), where French is the primary language, correlated with the high percentage of French speakers. The 1,066 applicants who did not answer this question may include 1,104 native-born Americans, who possibly speak only English.

English was the primary language spoken at home by 1,987 respondents (49 percent), followed by French by 458 (11 percent) and Spanish by 454 (11 percent). In addition to the languages identified in Table 3, seven languages other than English were recorded as the primary languages spoken at home; they were Berber, Ewe, Gaelic, Malinke-Bambara-Dyula, Saraki, Sindhi, and Telegu.

With respect to the language spoken by parents, the findings were comparable with those presented in Table 3. Out of a total of 3,924 responses, 1,182 (30 percent) spoke English, followed by 610 (16 percent) and 605 (15 percent) who spoke French and Spanish, respectively. In addition to languages identified earlier, the following five languages were listed as the primary language spoken by the parents: Kannade, Kpelle, Lithuanian, Oremo, and Ukranian. It is likely that applicants were conversant in the language recorded for their parents. Thus, it is inferred that the total number of different languages other than English spoken by applicants was 72.

In response to the question regarding current employment, it was found that 1,833 were employed in jobs other than the taxi industry. It is likely that the 2,322 who reportedly had no other

job included the 1,544 sponsored drivers who were currently working as taxi drivers on provisional licenses. The amount of time that the subjects planned to allot to driving a taxi (after receipt of a license) follows: full time, 2,476; part time, 1,376; full and part time, 67; no response, 450. The applicants' future plans regarding the type of taxi company for which they planned to work indicated that 60 percent (n=2,056) intended to work for the fleets. It was of interest to find that 960 planned to work for themselves, indicating that they may have plans to purchase a medallion.

A passing score on the NYTDI final test was 22 out of a total of 30 points. Students who scored nine or more errors had two more opportunities to pass the examination. A failure after a third try made the applicant ineligible for a hack license. Of a total of 3,980, 3,722 (95 percent) passed the examination and became eligible for a hack license. Of this group 2,657 missed from zero to three questions; thus 61 percent passed the test with little difficulty. Demographic profiles of students who passed the test compared with those who failed the test were similar with the exception of the years of schooling completed. Of the students who had completed nine or fewer grades of school, 22 percent failed the test, whereas 7 percent passed.

Focus Groups with Prospective Taxi Drivers

Four focus groups were held at each of the NYTDI sites (FEGS and LAG), a total of eight groups. The number of participants for the eight pretraining groups ranged from 13 to 28, whereas in the posttraining groups the range was from 12 to 27. The mean number of participants per group was 20 for pretraining and 19 for posttraining.

A breakdown by sex and entry-level category for participants at pre- and posttraining sessions by site, followed by totals at both sites, is presented in Table 4. At the start of the group session, students identified themselves by a show of hands for the following categories: lapsed hack license, gypsy cab experience, and sponsored drivers. This enabled the moderator to identify the various levels of experience within the group and allowed for management of the discussion to encourage participation by all class members, especially students with no driving experience, who might have been reluctant to speak out.

The number of participants was similar at both pre- and posttraining group sessions. The small number of women entering the taxi industry was striking, as noted earlier in discussing the small number who completed questionnaires. Of the three women students who participated in the pretraining focus group, only one was present for the posttraining session. The number of drivers with lapsed hack licenses was comparable across training sites. FEGS students accounted for two-thirds of the total number of gypsy cab drivers, who drive non-medallion vehicles. Of the approximately one-third who identified themselves as sponsored drivers, it was found that more than twice as many attended the Friday through Sunday LAG program, probably because they worked the night shift. Responses to the five before-and-after questions are summarized in the following sections.

TABLE 2 COUNTRY OF BIRTH (OTHER THAN UNITED STATES) OF NEW APPLICANTS

Country	No. of Responses (n=3,182)	Country	No. of Responses (n=3,182)
Afghanistan	124	Iraq	4
Africa	12	Ireland	6
Albania	1	Israel	44
Algeria	6	Italy	12
Argentina	22	Ivory Coast	6
Aruba	1	Jamaica	77
Austria	1	Japan	9
Bangladesh	46	Jordan	10
Bermuda	1	Korea	152
Bolivia	4	Lebanon	10
Brazil	22	Liberia	8
Bulgaria	7	Mexico	1
Cambodia	14	Morocco	4
Canada	1	Netherlands	1
Chad	1	Nigeria	23
Chile	13	Pakistan	130
China	51	Panama	7
Colombia	117	Peru	30
Costa Rica	3	Philippines	10
Cuba	16	Poland	78
Cyprus	5	Portugal	3
Czechoslovakia	3	Rumania	120
Denmark	1	Sierra Leone	4
Dominican Republic	193	Spain	1
Ecuador	75	Sri Lanka	1
Egypt	164	Sudan	1
El Salvador	11	Suriname	1
Ethiopia	24	Syria	10
France	5	Taiwan (China)	5
Germany	8	Thailand	12
Ghana	89	Togo	2
Greece	53	Trinidad and Tobago	30
Grenada	8	Turkey	20
Guatemala	2	United Kingdom	6
Guyana	31	USSR	133
Haiti	792	Uruguay	8
Honduras	5	Venezuela	2
Hong Kong	38	Vietnam	25
Hungary	9	West Indies	26
India	127	Yemen (North and South)	5
Indonesia	5	Yugoslavia	13
Iran	21		

Why Do You Want To Drive a Cab?

In all groups, as expected, the main motive for driving a taxicab was money. The next most important reason was the independent nature of the business, especially the opportunity to be one's own boss and to decide what hours to work. Responses that were related and ranked relatively high were that it was a second job or a job "to fall back on" and that it was the only or best job available.

What Do You Know About the Taxi Business?

Three major concerns emerged. First was the threat to personal safety and the danger in driving a taxi. This point was made

dramatically by a student at the first group: "I just want to make money and not get killed." The security issue was expressed in various ways by students of all ethnic and racial groups. Concerns about safety were clearly heightened by media reports as well as anecdotal stories from students with driving experience. The second issue that was quite troubling was the negative public image of taxi drivers. Students resented accusations that drivers were "rude," "lazy," "dumb," "illiterate," or "crooked," among other derogatory terms. It was striking to see how sensitive the negative image issue was across groups and sites. A third point was that drivers were subject to many and unreasonable demands from a variety of sources, including TLC, the New York City Police Department, the public, and the media, among others, whereas no group or agency served as an advocate for them.

TABLE 3 FIRST LANGUAGE (OTHER THAN ENGLISH) SPOKEN BY NEW APPLICANTS

Category ^a	No. of Responses (n=3,198)
Akan (Ashanti) [West Africa]	3
Albanian	2
Amharic [Ethiopia]	10
Arabic	189
Armenian	6
Bassa [Liberia]	1
Bengali [Bangladesh, India]	41
Bulgarian	4
Cantonese [China]	4
Chinese	105
Creole (Patois) [Haiti, Jamaica]	33
Czech	2
Danish	1
Dari [Afghanistan]	5
Dutch	2
Efik (Ibibio) [West Africa]	1
Estonian	1
Farsi (Persian) [Iran]	97
French	833
Ga [West Africa]	10
German	47
Greek	79
Gujarati [India]	1
Hausa [West and Central Africa]	10
Hebrew	52
Hindi [India]	51
Hungarian (Magyar)	10
Ibo (Igbo) [West Africa]	4
Indian	38
Indonesian	5
Italian	42
Japanese	6
Khmer [Cambodia]	4
Korean	145
Kru [West Africa]	2
Lao	4
Latvian	1
Malay [Indonesia]	2
Malayalam [India]	10
Mende [Sierra Leone]	1
Pakistani (Urdu)	115
Polish	75
Portugese	24
Punjabi [India, Pakistan]	23
Pushtu (Pashto/Pashtu) [Afghanistan]	27
Romanian	98
Russian	122
Serbo-Croatian [Yugoslavia]	8
Somali [East Africa, Ethiopia]	1
Spanish	814
Swahili	4
Tagalog [Philippines]	10
Tamil [Sri Lanka, India]	1
Thai	11
Triginya [Ethiopia]	6
Turkish	16
Twi-Fante [West Africa]	42
Vietnamese	20
Yiddish	9
Yoruba [West Africa]	8

^aOther name or names for the same language are given in parentheses. Countries or regions where language is spoken are given in brackets.

How Do Drivers Make the Most Money?

Drivers' notions of how to make money driving changed after the training program. It was agreed after the program that the best way to earn money was to behave in a professional manner. Professionalism, which was not mentioned before the program, was cited in three-fourths of the groups after the program. To the extent that this topic was covered in the curriculum, it apparently had been successfully assimilated by the students. Both pre- and postprogram students generally believed that the best way to earn money was to work hard and know about the best places to pick up passengers. After the program there was increased mention of the condition of the vehicle and the cost of summonses and tickets as factors in losing money, topics emphasized by the teachers.

Experienced drivers know that short hauls are the most remunerative. Examination of the before-and-after responses showed a shift in attitudes toward airport trips, indicating that the students were now aware that more money could be realized from frequent short hauls. It was of interest to find that both the pre- and postprogram students agreed that tips were not a significant factor in making money, although the instruction included information on how to encourage bigger tips. It was stated repeatedly that the best tips were received from waiters or others who worked in an occupation in which tips are an integral part of the income package.

What Do (Did) You Expect To Learn from This Course?

Preprogram expectations that nothing would be learned were markedly higher at LAG, which had a greater number of sponsored drivers; only at FECS did students mention the possibility of learning the "tricks of the trade." The consensus at both sites after the program was that everyone had learned from the course, even drivers with lapsed licenses, who had often been the most negative before the program. Expectations of learning TLC rules and regulations and of learning geography appeared to have been realized, because the total responses of this type remained relatively constant across before and after groups. Striking postprogram increases occurred in the incidence of mention of the following response categories: importance of driver-passenger relations, defensive driving and vehicle maintenance, and professionalism.

How Much Help Do You Think This Course Will Be? (Was It What You Expected?)

Before the program, as noted earlier, expectations about the upcoming program were quite negative. Students stated repeatedly that the schooling would be of no use, that experience was the only way to learn, and that it was "another TLC ripoff." In contrast, after the program it was generally accepted that the training would be useful to drivers when out on the streets and would supplement on-the-road experience. (This concept was not even considered before the program.) Everyone agreed that

TABLE 4 CHARACTERISTICS OF FOCUS GROUP PARTICIPANTS

Characteristic	Preprogram Interview			Postprogram Interview		
	FEGS	LAG	Total	FEGS	LAG	Total
Total no. of students in four focus groups	75	87	162	75	80	155
No. of women	1	1	2	3	0	3
No. of men	74	86	160	72	80	152
No. with a lapsed hack license	4	8	12	8	7	15
No. with gypsy cab experience	11	6	17	13	9	22
No. of sponsored drivers	15	32	47	12	31	43
No. of nonsponsored drivers	60	45	105	63	49	112

Note: FEGS = Federation Employment and Guidance Services; LAG = LaGuardia Community College, City University of New York.

the instructors, who had been or were currently taxi drivers, were excellent. Students said that a major value of the program was the opportunity to learn about the taxi business from an "insider." The students' enthusiasm about the teaching staff was more pronounced at FEGS than at LAG. This may be due to the fact that at FEGS each class had the same instructor for the entire course, which allowed him to build rapport with the students, whereas at LAG the instructors taught different educational modules and rotated from one class to another.

The positive response to the program might also have been related to the carefully planned curriculum and quality teaching materials, which were constantly reviewed and updated to meet the students' needs. The enthusiasm mentioned earlier might have resulted from the camaraderie that developed during the training sessions. In an industry where one works alone, this was a first and only opportunity to join with peers to collectively discuss the problems of taxi driving as well as to learn about the industry.

Taxi Management Interview

Six fleet or garage employees representing five fleets that managed from 100 to 260 taxis each were interviewed at the offices of the MTBT. Only project staff were present at this group session. Participants were responsible for personnel management, including the hiring and firing of taxi drivers on behalf of their companies. To maximize open and frank evaluations, they were told that neither their name nor that of their company would be divulged. Nevertheless, the six managers introduced themselves and seemed unconcerned about the issue of confidentiality.

They pointed out that in recent years two major changes in operating conditions have occurred and emphasized the need to understand that the impacts of the NYTDI program were secondary to the enormous impact of these structural changes:

1. The shift from a commission pay system to one in which leasing arrangements between the fleet and its drivers are predominant has had consequences in a number of areas, including the quality of the employee-employer relationship and the condition of vehicles, which are now in continuous use for a 12-hr rather than an 8-hr shift.
2. The characteristics of the new driver population are

markedly different than they were 3 to 4 years ago. Most drivers entering the industry have just arrived in the city and have very little prior automobile driving experience. Also, they are often not well versed in English. However, it was emphasized that they were "well educated, hardworking, and family oriented" people for whom the long hours and the level of earnings of taxi driving were an "improvement over conditions in the old country."

The managers said that the consequences of these structural changes made it impossible to consider the program as an independent factor and to compare the performance of new drivers who had completed the NYTDI program with new drivers in the past who had not.

The summary of the managers' comments about the program must be considered in light of the caveats just discussed. Their overall judgment was that the NYTDI program was desirable, even necessary, and ought to be expanded. As one participant said, "Regardless of how good or bad it is, you have to have a school today because of changes in the type of persons driving and the dominance of the lease rather than the commission pay system." It was also agreed that the mere existence of the training requirement was helpful to management, because the cost and time involved in completing the program discouraged drivers who weren't serious about the job in the first place.

DISCUSSION OF RESULTS

In 1981 the mayor of New York City appointed the Smith Committee to evaluate and develop recommendations for the taxi industry. A major factor in its formation was an alarming perceived increase in the public's complaints about taxi service. Passengers related the preponderance of immigrant drivers to a lack of basic skills, such as an inability to find the destinations requested.

The data presented showed that 74 percent of the new applicants came from 82 countries. Only half of the students surveyed spoke English at home. Rather, they listed languages such as Dari, Pushtu, Tagalog, and Tamil from Asia and Akan, Ewe, and Twi-Fante from West Africa. Fleet managers identified major changes in the industry as a shift from pay-by-commission to leasing and new patterns in the composition of the workforce. In addition, there have been prohibitive

increases in insurance rates with underwriting constraints for the less experienced driver or the driver under 25 years of age, or for both.

Relationships emerge as the various factors listed earlier are inspected in the light of the demographic findings. New applicants are older, mostly in their early thirties, mostly foreign born, and relatively well educated. Moreover, the industry that has traditionally provided easy entry now requires drivers to pay significantly higher entry fees plus up-front leasing costs. Increased fees and the cost of leasing may possibly have deterred the younger, part-time college students who drove taxis until ready to start their chosen careers. Although it is against the law to discriminate on the basis of age, another factor to consider is that high insurance costs for drivers under 25 may have had some impact on personnel practices. Pre-screening of motor vehicle records of new applicants by the MTBT as a means of avoiding high-risk applicants may have served as a barrier to younger drivers who, according to insurers, have a greater number of moving violations on their records. Minifleets, the fastest-growing segment of the business, prefer to hire experienced drivers, another possible entry obstacle for younger applicants as well as recent immigrants, who often have had limited driving experience.

Finally, no incentives such as increases for commissioned drivers exist in a leasing arrangement, in which what you make is what you earn. Under these circumstances, the only means of upward mobility in the taxi business is to buy a medallion, although at current prices this is an unlikely option for the average income driver. Another disincentive for entering the industry may be the perceived danger of driving a taxi, a leading concern of applicants as reported in the focus groups. Any combination of the foregoing factors could have contributed to the changes reported in the composition of the work force over the past 5 years.

The data demonstrate that collective factors, a changing work force, leasing arrangements, a management move to minifleets, and higher insurance costs have led to a radically different taxi industry. The replacement of the prototypical New York taxi driver by immigrants from such developing countries as Haiti, Colombia, and Egypt, among others, indicates that the industry is attracting those who often lack the communications and street skills that are essential to providing a reasonable level of service. In light of which, the decision by the Smith Committee to mandate an educational program for incoming drivers makes sense.

The Mayor's Office decided early in the development of the taxi school that it would not be run or funded by TLC but rather by preexisting independent institutions, LAG and FECS. The independence of the NYTDI program was critical to its success. Although industry and TLC staff were involved in all stages of program planning, the school was not obligated to either group. Industry management initially resisted the notion of having the school; however, their active role in its development eventually led to their approval and support.

As discussed earlier, the newly formed NYTDI program was poorly received by the taxi industry, and students in the preprogram focus groups were less than enthusiastic about having to complete the 20-hr curriculum before getting a hack license. The acceptance of the program as a useful introduction to the

taxi business by its severest critics may be related to the following factors. First, students placed great value on the teachers, current and former taxi drivers, who served as role models and mentors. Second, the school's flexible curriculum was modified as needed to provide usable information; for example "taxi geography," which stressed route decisions as well as map-reading skills, was designed solely for the NYTDI program when standard geography proved to be unrelated to taxi driving. Finally, all member organizations agreed that the total program experience, not the test, was an optimum way for new drivers to integrate and polish the skills needed to be effective when on the road. Although fleet managers were unable to identify achievements of the school, they suggested that the teachers screen and select new drivers.

One issue on which all parties—applicants and fleet and minifleet managers—agreed was that the negative image of the industry was unfair. Drivers received little positive recognition or respect for their efforts to be independent and self-supporting. The driver's concern with his poor image, mentioned repeatedly during focus group sessions, appeared to relate to the communications barrier between driver and passenger. Although the new drivers were highly motivated to succeed, the marked differences between passengers and drivers inhibited the establishment of a dialogue and caused communications problems that often led to frustration and anger on both sides. Applicants repeatedly said that nobody talked about courteous drivers but that a driver who ripped off a passenger made headlines. They resented the public's constant criticism and what many believed was biased reporting by the media. For example, the public has no idea of the many rules and regulations that a driver must follow, from filling out a trip sheet to the number of passengers allowed in a vehicle. Failure to comply with any regulation leads to fines, hearings, and, in the worst case, revocation of the license.

In summary, there has been a major change in the composition of the work force entering the taxi industry. A majority of the incoming drivers are new immigrants who often have difficulty finding a good paying job due to a lack of the communications skills required in many service industries. As students stated in the focus groups, taxi driving was often the best and, for some, the only available job that enabled them to earn a living wage in New York City. The establishment of the NYTDI program was a first step in preparing drivers to provide the higher level of service demanded by the public and the regulating agency. The taxi training program has started to professionalize the industry by focusing on upgrading the many skills involved in driving a cab, a step in the right direction.

CONCLUSIONS

The Smith Committee's decision to require all new applicants for a hack license to successfully complete the NYTDI program was a first step in professionalizing the taxi industry. Key factors that enabled NYTDI to develop a successful training program follow: (a) The school is independent of both industry and the local regulatory agency; (b) teachers are recruited from industry, have had experience as taxi drivers in the city, and have above-average teaching skills to bring the many pieces of

the program together; (c) the curriculum is designed to fit the particular locale in which the school is located, rather than employing a "boiler plate" program and prepackaged educational materials; and (d) the curriculum has been updated to reflect changes in statutes, traffic patterns, and landmarks. A school that builds on these principles will produce better drivers, who ideally will gain more satisfaction from their jobs in this necessary service industry.

Taxi managers point out that major changes within the industry, essentially leasing and driver backgrounds, have changed the driver-manager relationship. Under leasing arrangements the taxi driver is responsible for the leasing fee, gasoline, union dues, and so on. There is enormous pressure to earn the up-front costs so as to generate an income. The hours of work are long and onerous. Typically drivers work six 12-hr shifts per week. It should also be noted that drivers are personally responsible for benefits and vacation time under leasing arrangements. The public's notion that drivers make enormous amounts of money is not valid. Informal and off-the-record discussions with drivers indicate that an optimum annual income is \$30,000 net with an average ranging from \$20,000 to \$25,000.

Focus group findings during this study repeatedly demonstrated that incoming drivers were unhappy and ashamed of the negative image fostered by the media and the public. Of equal concern was the danger in dealing with an unknown public. The small number of women in the industry may well be related to this element of danger.

It was recommended that the taxi industry seek to improve the public image of the drivers as well as that of the industry. TLC has recently added a public relations professional to their staff. However, much remains to be done. The public has scant knowledge of how the industry operates and the myth that persists has no relation to the drivers working the streets today.

The demographic data conclusively demonstrate that the incoming taxi drivers are largely foreign born and speak many languages other than English. However, those working on this study who came to know the drivers were impressed to hear them express, even in halting English, their desire to provide for themselves and their families by performing work that was often grueling but that allowed them to be independent and self-supporting. Recent arrivals from every part of the globe talked about how they expected to handle the vagaries and demands of driving in New York City. These were indeed self-starters who were determined to "make it." As newcomers to the city, despite diverse languages and backgrounds, they effectively managed to complexities involved in driving a cab, such

as obeying rules, dealing with all manner of passengers, selecting a route, and arriving at the right destination. That's the real story, which is consonant with the American dream.

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