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An Economic Analysis of Taxicab Regulation

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I. INTRODUCTION AND POLICY CONCLUSIONS

The taxicab industry is heavily regulated, mainly by local governments. Entry, fares, services, and quality are restricted in a substantial majority of large urban areas. However, a number of cities have recently deregulated entry, fares, and some aspects of service. This report provides an economic analysis of these taxicab regulations and experiences with regulatory reform.

The principal conclusion of this report is that no persuasive economic rationale is available for some of the most important regulations. Restrictions on the total number of firms and vehicles and on minimum fares waste resources and impose a disproportionate burden on low income people. A number of cities have achieved favorable results by deregulating entry and minimum fares in the radio-dispatched market segment, which typically accounts for around 75 percent of all cab trips. Similarly, there is no economic justification for regulations that restrict shared-ride, dial-a-ride, and jitney service.

By contrast, potential market failures provide a credible theoretical rationale for some other types of regulations, including fare ceilings and regulations dealing with vehicle safety and liability insurance. Most of the problems cities have experienced with taxicab regulatory reform can be traced to high fares at airport cab stands. There are several ways to deal with these problems, including revisions in the first-in-first-out queue system, improvements in fare posting requirements, increased cab line user fees, or lower fare ceilings.

Finally, some regulations might conceivably be justified on efficiency grounds because of distortions created by other taxi regulations. Fare regulations that underprice certain categories of trips might provide a "second best" rationale for prohibitions on service refusal, requirements to offer service at certain times or places, or minimum levels on the numbers of cabs operated by firms. However, surcharges for unprofitable services would be more efficient than such service requirements.

A. Arguments for Regulation

In analyzing taxicab regulations, it is useful to consider four taxicab market segments and five areas of regulation, because the merits of regulation differ substantially among them. The four segments are cruising cabs, cabs that wait at stands, radio-dispatched cabs, and cabs that provide service under contract. The five areas of regulation are: entry restrictions; fare controls; restrictions on the types of service offered, such as ride sharing; requirements to provide certain amounts of service; and quality regulations, which concern vehicle safety, driver qualifications, and liability insurance coverage.

Arguments for taxicab regulation are based principally on alleged market imperfections that might lead to market failure or inefficient resource allocation in one or more of the various taxi market segments. The resource misallocations involve over- or under-production of various taxicab services, production of service at too low a quality level, or unnecessarily high costs of producing a given output.

Ten potential sources of market failure are discussed and evaluated in the report. Three suggest that in unregulated markets taxi fares might be above the efficient level. First, in some market segments the transactions costs to riders of finding the cab with the lowest fare is high. This impediment to price competition may cause fares to be inefficiently high in the case of cruising cabs and cabs using stands at airports.[1] Second, drivers of cruising cabs may be in a position to price discriminate and extract unreasonably high fares from riders who face a high cost of finding another cab or from out-of-town visitors. Third, economies of scale might pose a barrier to entry that would permit taxi firms to charge inefficiently high fares for radio-dispatch and contract service. Since one or more of these arguments applies to each of the four market segments, one cannot reject the possibility that fare ceilings may increase efficiency.

A fourth potential market imperfection arises in the cruising cab segment. Economists have not developed a model of the cruising cab segment that determines a unique equilibrium fare and service combination. It remains a theoretical possibility that the fare that would be established in an unregulated cruising cab market segment could be above or below the efficient level and that regulation of fares could increase efficiency.

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[1] If fares are regulated, similar impediments to quality competition may provide a rationale for minimum quality regulations.

This argument provides the only potential rationale for fare regulations that go beyond fare ceilings to restrict fare competition. However, we conclude that impediments to price competition in the cruising cab market eliminate the possibility of fares below the efficient level.

Fare regulations themselves are a fifth potential market imperfection. If fares are regulated, some categories of trips may be priced so low that they would involve losses for taxi firms. Firms might then refuse service even though most riders might be willing to pay enough to make the service profitable. This provides a possible second best rationale for a prohibition against service refusal and for requirements to provide service at certain places or times. Furthermore, because it may be prohibitively costly to enforce requirements for service provision when there is open entry for independent cabs, there may be a second best argument for imposing a minimum level on the number of cabs operated by a firm. However, it would be more efficient to allow surcharges for the unprofitable services.

A sixth potential market imperfection, informational problems, provides a rationale for quality regulations. Because it may be difficult or impossible for riders to judge some aspects of the quality of cab service, e.g., vehicle safety or liability insurance coverage, it may be efficient for governments to regulate these matters.

Three other potential sources of market failure might be suggested as rationales for entry restrictions, but upon analysis they do not justify taxicab regulations. First, it has been argued that, because taxicabs cause congestion and pollution externalities, restrictions on entry and cruising would increase efficiency. Our review of the evidence leads us to reject this conclusion. Second, it has been argued that pricing of public transit above marginal cost would justify restrictions on the number of taxis in order to divert riders back to public transit. We reject this argument; the existence of heavy transit subsidies makes it implausible that on average transit rides are priced significantly above marginal cost. Third, if taxi fares are set substantially above the efficient level, an inefficiently large number of cabs may be induced to enter the industry. If the high fares are taken as given, it might then be second best efficient to restrict the number of cabs. However, this is not a justification for entry restrictions but rather an argument for eliminating fare regulations or setting fare ceilings below existing fare levels.

The last of the ten potential sources of market failure, which is discussed under the heading "Waiting Time Externalities," suggests that in the absence of government intervention the number of cruising cabs would be below the efficient level. This provides an argument against entry restrictions.

Another argument used to support certain regulations is that they might reduce the cost of enforcing and/or increase compliance with other regulations that have an efficiency justification. It

has been suggested that entry barriers that enable incumbent taxi firms to earn above-normal returns provide governments with the threat of license suspension or revokation as a tool for obtaining compliance with other regulations. We reject this argument as a rationale for entry barriers because: (1) license suspension and revokation do not seem to be used to prevent violations of taxi ordinances; (2) entry barriers could have substantial offsetting efficiency costs; and (3) posting of bonds would be a lower-cost enforcement mechanism. It has also been argued that minimum firm size requirements, which would eliminate independent cabs and reduce the number of cab firms, would reduce costs of enforcing other taxi regulations.

B. Costs of Regulation

Although some forms of government intervention might be justified by market failures, we do not have empirical evidence that the relevant regulations that actually exist increase the efficiency of resource allocation. There are, in fact, reasons to doubt that existing regulations are efficient. One problem is that the analytical and informational problems involved in determining the efficient levels of the relevant policy variables are great. It is doubtful that regulatory authorities generally have the necessary expertise or information to determine these levels. Also, taxi ordinances and the government agencies that issue taxi regulations may not be motivated primarily by concern for market failure and achievement of an efficient resource allocation. It appears that taxi regulations have often been

designed to protect public transit systems and existing taxi firms from competition.

One of the important effects of entry restrictions is to enable taxi firms in a number of cities to exercise market power. For this and other reasons, taxi regulations are responsible for misallocation of resources. Some of the more obvious ways in which the allocation of resources under existing regulations is inefficient include: (a) the number of taxi rides taken is inefficiently low, because of regulations that raise fares, restrict the amount of service, and increase waiting times; (b) the cost of producing taxi trips is unnecessarily high, because of regulations that prevent ride sharing and increase deadheading and waiting in taxi lines; and (c) there are shortages of certain types of service because of the incentives provided by the structure of fares.

In addition to causing misallocation of resources, taxi regulations adversely affect the distribution of income. Low income people spend a larger percentage of their incomes on taxis than do high income people, and in many taxi markets consumption of taxi rides per capita is higher for low income people. As a result, entry restrictions, prohibitions on shared-ride service, and other regulations that increase fares and waiting times impose a disproportionate burden on low income people. Restrictions on the number of taxis also limit the employment opportunities of less skilled workers.

C. Experiences with Regulatory Reform

A survey of 103 U.S. cities found that during the past five years sixteen cities substantially relaxed entry controls while seventeen substantially relaxed fare regulations. Thus, cities have been quite active in taxicab regulatory reform.

Experience with open entry and fare competition in the radio-dispatch market segment has generally been favorable. This is apparently true in Seattle, Oakland, Berkeley, Spokane, Sacramento, and Charlotte. This is important, because typically about 75 percent of taxi trips are produced by radio-dispatched cabs.

The favorable effects of open entry in radio-dispatch market segments include increases in the number of taxi firms and decreases in the market shares of the largest firms, increases in the number of cab hours of service, reductions in fares and response times, and reductions in the amount of time city councils devote to licensing and fare setting.

Overall, there have been no widespread significant problems related to open entry in radio-dispatch market segments. While an increase in customer complaints was recorded in Indianapolis and Fresno, these can best be dealt with through driver qualification and vehicle safety requirements rather than restrictions on the number of cabs.

In marked contrast to the radio-dispatch segments, there have been many problems in cab stand market segments at airports following regulatory reform as a result of lengthening of the cab queues. These problems do not provide an argument in favor of

entry restrictions, however. Rather, they suggest that there would be significant efficiency gains from either increasing fare competition at airports or imposing or lowering fare ceilings on airport taxi service. Fare ceilings could be reduced until the taxi queue shortened to the desired length.

D. Outline of Report

The remainder of this report is divided into six sections. Section II provides an overview of the taxi industry and existing regulations. Section III presents the theoretical model of a taxicab market that underlies much of our analysis. Section IV discusses potential sources of market failure in the market for taxicab services. It also provides a discussion of the motivations behind taxi regulation and a brief history of taxi regulation. Section V analyzes the economic effects of taxi regulations on the structure of the industry and its performance, on the efficiency with which resources are allocated within the taxicab industry and between this industry and other activities, and on the distribution of income. Section VI reviews the experience of cities that have experimented with deregulation of taxicabs. Section VII briefly summarizes conclusions. Appendix A provides further details of the theoretical model of a taxicab market. Appendix B summarizes empirical estimates of the demand for taxi service.

II. THE TAXICAB INDUSTRY

A. The Role of the Taxi

The taxicab industry provides a significant fraction of urban public transportation services.[2] In some urban areas, the taxicab is the only form of public transportation. Nationwide, in 1970 fleets operating fully licensed taxicabs produced 2.4 billion passenger trips, or 40 percent as many passenger trips as did urban transit bus and rail systems. These taxi fleets employed at least 111,000 people, and they generated 35 percent more passenger revenue than did urban transit systems. These figures do not include independent cabs, livery vehicles (which are licensed to provide radio-dispatch and contract service but not to accept street hails), or unlicensed taxis. There are no reliable figures for the latter types of cabs, but Wohl estimates that there were about half as many independent as fleet cabs.[3]

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[2] The taxi industry would play a larger role if regulations restricting entry and shared-ride services were eliminated. See Section V.

[3] Wells and Selover, 1972, p. 8-6, and Wohl, 1975, p. 150. Tolley et al., 1984, p. 9, cite a 1977 estimate that the annual total number of cab rides was 2.2 billion. Rosenbloom, 1983, p. 1, reports that taxis carry more passengers than do public transit systems. However, Wainwright, 1984, reports that prior to deregulation taxis accounted for only 5 to 8 percent of total transit person trips in Portland, Seattle, and San Diego. In Chicago in 1971, there were 327 livery vehicles plus 300 or so illegal cabs operating in ghetto areas, in addition to 4,600 fully licensed cabs. Kitch et al., 1971, pp. 291-92. In New York City in 1971, there were about 15,000 livery vehicles in addition to 11,800 fully licensed cabs. Kirby et al., 1974, p. 106. In 1982, estimates of the number of livery and illegal cabs in New York City ranged from 8,000 to 40,000. Regulation, March-April 1982, p. 13, and Reason, May 1982, p. 12. Kirby et al., 1974, p. 15, reports that Pittsburgh and Cleveland

(footnote continued)

Around 1970, taxis accounted for 5 to 47 percent of trips for airline passengers using 16 major airports.[4]

There are a number of substitutes for taxicab service. For passengers, there are privately owned automobiles, carpools, rental cars, public transit, limousine and van services, privately operated shuttle services, and (in a few areas) dial-a-ride and jitney services.[5] For parcels there are messenger services. The empirical evidence concerning the substitutability of these alternatives for taxi service is summarized in Appendix B.

B. Market Segments

It is useful to distinguish between four taxicab market segments, because they differ in the probable benefits and costs of various forms of regulation, and because the regulations imposed on them differ. The segments are defined by how cabs and users make contact: (1) cruising cabs, (2) cabs that wait at stands, (3) radio-dispatched cabs, and (4) cabs that

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(footnote continues)

also had unlicensed cabs. In 1978, Toronto had 2,387 licensed cabs; estimates of the number of illegal cabs ranged from under 100 to 600. Palmer, 1983, Ch. 3, pp. 28, 35. There were also unlicensed cabs operating in minority neighborhoods in Atlanta prior to open entry in 1965. Rosenbloom, 1983, p. 11.

[4] Webster et al., 1974, Table 6-1.

[5] Some observers have suggested that regulation of taxicabs in Los Angeles caused a significant increase in demand for rental cars. Wohl, 1975, p. 152, and Kirby et al., 1974, p. 288. See also Coe and Jackson, 1983, pp. 10-12. For a discussion of jitney service, see Sections IV and V below.

carry riders or goods under contract. While it is useful to distinguish between these segments, it is also important to recognize that regulations imposed on one segment may impact on others.

1. Cruising Cabs

The operation of cruising cabs is profitable only in the downtown areas of large cities, where there is a high density of potential riders at random locations.

2. Taxicab Stands

The operation of stands is often profitable at airports, train stations, hotels, and similar locations that produce predictable streams of riders. Stands may also be profitable in areas where densities are insufficient for cruising to be profitable, e.g., Los Angeles.[6] Stands can be expected to replace cruising when it costs less for riders to walk to a limited number of known locations than for cabs to search for passengers waiting at unknown locations, or when cruising is prohibited.

3. Radio-Dispatched Cabs

A third taxi segment involves response by radio-equipped cabs to telephone requests for service. This type of service exists in most cities, including many without public transit, and is used heavily by lower income people who do not own cars.[7]

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[6] Eckert, 1970.

[7] See Section V.D for a discussion of the income levels of taxi riders. In some cities, radio-dispatched cabs handle parcels as well as passengers.

4. Contract Services

A final taxi segment involves transportation on a regular basis of people or packages under individually negotiated contracts.[8] In a few cases taxi firms provide dial-a-ride services for special population groups under government contracts.[9]

5. Relative Sizes of Segments

Apart from large cities with dense downtown areas and major airports, the taxi industry is heavily dominated by the radio-dispatch segment. Wells and Selover (1972, pp. 8-24) examined cab service in 194 communities and found that in the median one, which issued only 20 taxi licenses, 86 percent of all taxi trips originated from telephone requests.[10] In 1981 in Seattle, 66 percent of trips originated from telephone requests, 33 percent from cab stands, and 1 percent from street hails.[11]

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[8] For a discussion of services in this category, see Kirby, 1980, pp. 11, 15.

[9] In London, Canada, taxi firms have contracts with the post office and the school system. Palmer, 1983, Ch. 3, p. 12.

[10] Similarly, Webster et al., 1974, p. vi, found that in 27 communities in 1970, a median 88 percent of trips originated from phone requests. In San Diego prior to deregulation, telephone hails account for 73 percent of taxi trips. Wainwright, 1984. In Portland in 1978-79, phone orders accounted for 70-90 percent of taxi trips, and contracts accounted for 10 percent. In 1984, cruising was negligible, and contract services accounted for about 20 percent of business. Gelb, 1982, p. 38; Wainwright, 1984.

[11] Gelb, 1983b, p. 93. Prior to deregulation, the radio-dispatch segment accounted for 80-85 percent of trips. Gelb et al., 1980, p. xi.

In 1977 in Dallas, 78 percent of taxis were summoned by telephone while 22 percent were hailed in person.[12] In 1978 in Los Angeles, about 30 percent of business originated at cab stands, and there was little cruising.[13] In 1978 in Washington, D.C., however, less than 25 percent of taxis had radios, and on average even these cabs obtained only a minor share of their business through dispatchers.[14]

C. Firm Organization

Taxi service is provided by both fleets and independent cabs. Independents generally operate in the cruising market segment or at taxi stands, while fleets operate in all four market segments discussed above.[15]

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12 Eisenberg and Barker, 1980, p. 8.

13 Palmer, 1983, Ch. 3, p. 63.

14 Palmer, 1983, Ch. 3, pp. 42-47. Palmer reports that in Sarnia, Canada (population 50,000) in 1978, cruising accounted for no more than 5 percent of business, contracts accounted for about 15 percent, and radio-dispatch service accounted for the rest (p. 53). In London, Canada (population 250,000), cruising and stands accounted for no more than 20 percent of taxi business; the remainder was radio-dispatch and contract service (p. 14). By contrast, radio-dispatch service accounted for no more than 50-55 percent of business in Toronto (p. 31).

15 Independents sometimes provide radio-dispatch service by leasing dispatching. Fleets have stopped picking up passengers at airports in some cities that have opened entry. See Section VI.

Firms operating fleets can be divided into three types based on the relationship between owners and drivers. Some fleets hire drivers on a commission basis. Other fleets lease vehicles to drivers, typically for a fixed amount for a shift or longer period of time.[16] Still other fleets are operated by associations of owner-drivers who share dispatch and other services. The trend in the industry is away from the first type of relationship and toward the third.

D. Forms of Regulation

Since about 1930 the taxicab industry has been characterized by pervasive government regulation, although a number of cities relaxed regulations in the last five years.[17] In general, the extent of regulation increases with city size. A substantial majority of large cities have strict controls on entry, fares, and service. By contrast, some small communities have virtually no taxicab regulations.[18]

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16 Some cities prohibit leasing, at least in part as a result of pressure from drivers' unions.

17 The imposition of regulations on the taxi industry during the 1930s is described in Section IV.B.2. Regulations governing contract services are usually less restrictive than those imposed on the other market segments. In Portland, Oregon, package delivery by taxis is unregulated.

18 Insurance requirements are nearly universal. Dipalma, 1978, pp. 38-39, and Taube, 1978.

Although at least ten states regulate taxicabs, typically through public utility or similar commissions,[19] most regulation of taxis is done by municipal governments. In addition, airports often regulate taxicabs.

In the remainder of this subsection, we describe the forms of regulation that exist in large U.S. cities.[20]

1. Entry Regulation

A substantial majority of large cities limit entry into the taxicab industry by restricting the number of vehicles and/or the number of firms licensed to provide taxi service. Some cities impose additional barriers to entry by giving existing firms a right of first refusal for new taxi licenses or by requiring that firms provide some minimum amount of service. There are also franchise requirements at some airports and taxi stands.[21]

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[19] Colorado, Connecticut, Delaware, Kentucky, Montana, Nebraska, Nevada, Pennsylvania, and Rhode Island regulate entry and fares while Maryland and New Mexico regulate entry. Kirby et al., 1974, p. 63; Gilbert and Samuels, 1982, p. 186; Eckert, 1973, p. 94; Dipalma, 1978; Shaw et al., 1983, v.1, pp. 7-11. Massachusetts also regulates taxis.

[20] Regulations in New York, Chicago, and Los Angeles are documented in Regulation, March-April 1982, pp. 11-13, 36; Kitch et al., 1971; and Eckert, 1970. General descriptions of taxicab regulations are also available in Kirby et al., 1974, pp. 63-76, and Gilbert and Samuels, 1982, Chapters 5 and 10.

[21] In a survey of 103 cities with populations of 50,000 or more, Shaw et al., 1983, v.1, pp. 29-32, found that 87 percent restricted entry in some manner: 30 percent had a fixed number of licenses; 9 percent had a fixed ratio of licenses to population; 25 percent required a showing of public convenience and necessity to obtain a license; 6 percent had franchise requirements; and 17 percent had minimum service standards.

In some cities, the number of licenses has changed little, if at all, since it was first restricted in the 1930s. (See Table 1 for recent data on the number of licenses.) For example, New York City limited the number of fully licensed cabs to 13,566 in 1937, and in 1982 it limited the number to about 11,800.[22] Boston limited the number to 1,575 in 1930, and the limit was unchanged in 1980.[23] Chicago limited the number to 4,108 in 1934, reduced the number to 3,000 in 1937, and then (following a temporary collapse of entry barriers following World War II) limited the number to 4,600 in 1963, with no further change since that date.[24] Detroit limited the number to 1,310 in 1946 and had the same number in 1983.[25]

In some cities, the taxicab regulatory authority can issue additional licenses following a demonstration of public convenience and necessity by the applicant. However, even where such provisions exist, regulatory authorities have commonly denied all applications for additional licenses.[26]

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22 Regulation, March-April 1982, p. 11. Of these permits, 4,969 were reserved for independents and 6,818 were reserved for fleet cabs.

23 Gilbert and Samuels, 1982, p. 70.

24 Kitch et al., 1971, pp. 327, 339. The 1963 limit on the number of cabs was the result of a bargain between the city and the cab companies.

25 Rosenbloom, 1968, p. 413; and Table 1.

26 In New Orleans, the taxi ordinance limits the number of cabs to 1,640 and allows no flexibility beyond that point. In Chicago, until recently the regulatory authority could issue

(footnote continued)

Table 1

Taxicab Licensing

City	1980 Population[a]	1970 Licensing Policy[b]	1983 Number of Vehicle Licenses	1970 Licenses/1970 population	1983 Licenses/1980 population[c]	1983 Licenses/1977 Hotels[d]	1983 Licenses/ 1977 Hotel Receipts[e]	1983 Licenses/ 1982 Air Passengers[f]
New York	7,072	N	11,787	1.5	1.7	31.9	16.6	677
Chicago	3,005	N	4,600	1.4	1.5	21.0	12.5	275
Los Angeles	2,967	C	1,500	0.4	0.5	4.0	6.3	93
Philadelphia	1,688	C	1,600	0.9	0.9	30.2	22.9	417
Miami (Dade)	1,626	N	1,528	1.3	0.9	2.7	4.3	155
Houston	1,595	C	1,829	0.4	1.1	10.7	10.2	216
Detroit	1,203	N	1,310	0.9	1.1	12.8	24.2	274
Dallas	904	C	900	0.6	1.0	7.2	6.2	92
San Diego	876	n.a.	900	0.4	1.0	5.1	6.2	329
Phoenix	790	C	325	0.2	0.4	2.6	4.2	82
Baltimore	787	N	1,100	1.3	1.4	33.3	n.a.	579
San Antonio	786	n.a.	481	0.8	0.6	4.5	7.7	288
Indianapolis	701	n.a.	326	0.6	0.5	4.0	n.a.	26
San Francisco	679	N	711	1.1	1.0	3.1	2.2	68
Memphis	646	n.a.	300	0.6	0.5	3.5	4.6	137
Washington, D.C.	638	Open	8,600	11.3	13.5	98.9	38.7	1,206
Milwaukee	636	N	400	0.6	0.6	9.5	11.2	256
San Jose	629	n.a.	150	n.a.	0.2	4.3	6.3	100
Cleveland	574	C	240	0.7	0.4	4.7	5.7	95
Columbus	565	C	390	0.7	0.7	7.8	7.7	317
Boston	563	N	1,525	2.5	2.7	46.2	16.4	215
New Orleans	558	C	1,608	2.5	2.9	18.1	9.8	564
Jacksonville, Fla.	541	n.a.	225	0.5	0.4	3.5	7.0	230
Seattle	494	C	570	0.6	1.2	6.4	8.0	124
Denver	492	n.a.	507	0.6	1.0	4.8	5.3	45
St. Louis	453	C	1,500	2.0	3.3	35.7	37.7	261
Kansas City, MO	448	N	530	1.1	1.2	8.0	7.4	206
Atlanta	425	Open	1,450	3.8	3.4	21.0	9.3	84
Pittsburgh	424	C	500	1.1	1.2	25.0	n.a.	109
Oklahoma City, OK	403	n.a.	231	n.a.	0.6	3.2	4.9	183
Cincinnati	385	n.a.	380	n.a.	1.0	15.2	n.a.	238
Ft. Worth	385	n.a.	185	n.a.	0.5	4.3	6.5	38
Minneapolis	371	N	248	0.6	0.7	6.5	n.a.	48
Portland, OR	366	n.a.	250	n.a.	0.7	3.1	n.a.	135

n.a.: not available.

[a] Population in thousands for the political jurisdiction, i.e., the central city, except Dade County. In New York City, licensed cabs are concentrated in Manhattan, which had a population of 1,428 thousand.

[b] N: Number of vehicles restricted.
C: Franchise requirement, possibly with restriction on total number of vehicles.

[c] Licenses per 1000 population.

[d] Licenses per hotel, motor hotel, and motel (establishments with payrolls).

[e] Licenses per million dollars in hotel, motor hotel, and motel receipts (all establishments).

[f] Licenses per million enplaned air passengers.

Sources:

Population: U.S. Department of Commerce, Bureau of Census Statistical Abstract of the United States: 1982-83, 1982, Table 26. Data are for 1980.

Licensing Policy: Kirby et al., 1974, p. 77. Data circa 1970.

Number of Vehicle Licenses: International Taxicab Association, Rate Sheet, May 1983; District of Columbia Public Service Commission. Data are for 1983.

Number of Hotels, Motor Hotels, and Motels and Hotel, Motor Hotel, and Motel Receipts: U.S. Department of Commerce, Bureau of the Census, 1977 Census of Service Industries.

Enplaned Air Passengers: U.S. Civil Aeronautics Board, Airport Activity Statistics of Certificated Route Carriers. Data are for 1982.

In some cities, the number of licenses is limited not to a specific number but by a ratio of licenses to population, e.g., between 1930 and 1977 Seattle limited the number of licenses to 1 per 2,500 residents, although this ratio was exceeded in practice and was about 1 per 1,700 in 1970.[27] Similarly, Miami limited the number of cabs to 1 per 1,500 residents, but the actual ratio was about 1 per 800 residents in 1970.[28]

In addition to limiting the number of cabs, some cities have regulations that limit the entry of new firms. First, while all cities seem to allow existing firms to renew their vehicle licenses automatically, some cities do not allow existing firms to sell these licenses to new firms. For example, Chicago recently made licenses non-transferable. In such cases, a new firm can enter only if the number of licenses is increased or an existing firm decides not to renew its licenses. The latter is unlikely as long as existing firms are able to earn an above-normal rate of return, even if a new firm could do better.

(footnote continues)

additional licenses only if the ratio of operating expenses to gross revenues in the industry fell below 84.5 percent. Kitch et al., 1971, pp. 287-288.

27 Zerbe, 1983a, p. 1.

28 Rosenbloom, 1968, p. 413. Limits on the ratio of cabs to residents also existed in Cleveland, Milwaukee, and New Orleans in the early 1970s and in Portland, Oregon, prior to 1979. Kirby et al., 1974, p. 67, and Gelb, 1982.

Second, some cities give firms that are already in the taxi industry an advantage over new firms in obtaining any additional licenses that are issued. Eckert (1970, p. 420) and Kitch et al. (1971, p. 288) report that in 1970 taxicab ordinances in Los Angeles and Chicago specified that all new licenses were to be issued to existing firms in proportion to the number of licenses they already held. New firms could obtain licenses only if all existing firms declined them.

Third, in addition to, or in some cases instead of, limiting the total number of taxicabs licensed, regulatory authorities have directly limited the number of firms licensed to supply taxi service. The number of firms franchised varies. As of 1966, three and four firms respectively were franchised in Phoenix and Pittsburgh. In 1979, two and three firms respectively were franchised in Fort Worth and Dallas.[29] In several cities only one firm was given a franchise, even when the regulatory legislation did not limit the number to one. For example, in the late 1960s only one firm was franchised in Philadelphia, in Tucson, and in each of six zones in Los Angeles.[30]

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[29] Rosenbloom, 1968, p. 413, and North Central Texas Council of Governments, 1979, p. xvii-4. Other cities with franchise systems as of 1970 are identified in Table 1.

[30] Eckert, 1970, p. 407, and Rosenbloom, 1968, p. 413. Arizona opened entry in Phoenix and Tucson in 1982. According to Gilbert and Samuels, 1982, p. 93, the owner of the Los Angeles fleet went bankrupt in 1976, and its licenses were scattered among individual owners. Palmer, 1983, Ch. 3, p. 67ff., describes post-1976 developments in Los Angeles. The area formerly served by the (footnote continued)

It is also common for monopoly franchises to be given for taxi service originating at taxi stands, rail stations, and airports. For example, Los Angeles grants exclusive franchises for use of taxi stands, and Dade County has an exclusive franchise for the airport. In some cases, franchises are sold to the highest bidder, e.g., the Pittsburgh airport franchise. However, the exclusive rail station franchise was ended in Washington, D.C., in 1972, and exclusive airport franchises were ended in Seattle in 1977 and in Dallas/Fort Worth in 1979.[31]

(footnote continues)

bankrupt company was divided into seven zones, between one and six franchises were granted in each zone, and maximum restrictions were imposed on the number of cabs that can be operated by the three largest firms. In the case of Philadelphia, a franchised firm that had 1,480 cabs in the late 1960s went bankrupt in the 1970s, and the "remnants of the firm have been sold to a new operator who is attempting to settle the firm's ten million dollars of outstanding claims, an attempt which will include selling 208 of the firm's taxi certificates." Gilbert and Samuels, 1982, p. 93. We do not know why the firms in Los Angeles and Philadelphia went bankrupt; entry restrictions generally lead to economic profits for taxi firms. As of 1978, only one firm was franchised in the Orange County South area of Los Angeles; similarly, only one firm was franchised in most cities in Orange County North.

31 Eckert, 1970; Metropolitan Dade County, 1979; Kirby et al., 1974, p. 69; Gelb et al., 1980, p. 29; Eisenberg and Barker, 1980, p. 12. Zerbe, 1983b, reports that the exclusive franchise at Seattle's railway station was ended in 1979 and reimposed in 1982. New York, Washington, D.C., and Minneapolis do not have exclusive airport franchises.

Some governments have prohibited taxicabs from entering into exclusive service contracts with hotels.[32]

While entry restrictions of the types described above are usual in large cities, there are exceptions. Washington, D.C., and London do not have entry restrictions. As of the late 1960s, Atlanta and Honolulu did not have entry restrictions.[33] Since 1979, at least thirteen cities have relaxed their entry restrictions; their experiences with deregulation are discussed in Section VI.

2. Fare Regulation

Almost all large cities regulate taxi fares. First, regulatory authorities usually specify the way in which fares are computed, e.g., by use of a meter and/or by a zone system.[34] Second, regulatory authorities in most cities specify what the

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32 Metropolitan Dade County, 1979. Toronto prohibits exclusive taxi stands, apart from seven stands reserved for independents. Washington, D.C., allows such concessions. Palmer, 1983, Ch. 3, pp. 33, 46.

33 Rosenbloom, 1968, p. 413; Kirby et al., 1974, p. 77. Atlanta had no entry restrictions in 1976, when there were about 1,900 cabs, but now restricts the number of taxis to 1,500 and requires new companies to have at least 25 cabs. Olson and Kuehl, 1976, p. 52.

34 In a survey of 103 cities with populations over 50,000, Shaw et al., 1983, v.1, pp. 47-50, found that 77 percent regulated fares in some manner; 50 percent set fare levels and 27 percent set fare ceilings; a few of the cities that set ceilings also set floors. In 1974, taxis in 95 percent of communities with populations of 100,000 or more and 65 percent of communities with populations under 100,000 used meters. Some of the smaller

(footnote continued)

fares must be, leaving no scope for fare competition. However, in some cases, they specify only ceilings on fares.[35]

In meter systems, regulations normally cover the initial "flag drop" charge, the charge for additional mileage, and the charge (if any) for time delays.[36] In zone systems, regulations cover the fares for trips within and between various combinations of zones and charges for waiting time. In addition, in both meter and zone systems, regulations cover senior citizen discounts

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(footnote continues)

cities may not have required meters. Webster et al., 1974, p. 4-3. Zone fares are used in Washington, D.C., where meters are prohibited. Zone or grid systems, which are similar, seem to be used for shared-ride taxi service in several cities including Little Rock, Arkansas; El Cajon, California; Westport, Connecticut; Davenport, Ohio; Hicksville, New York; Xenia, Ohio; Arlington, Virginia; and Madison, Wisconsin. Some small communities have flat fares. Jitney services, such as that on King Avenue in Chicago, and shared-ride taxi services between airports and downtown areas, such as that in Boston, sometimes have flat fares per rider. Newman and Lave, 1982, p. 4, and Kirby and Miller, 1975, p. 372. The New Orleans airport prohibits use of meters and requires flat fares per trip.

35 San Francisco switched from mandatory to maximum fares in 1978, Portland and San Diego did so in 1979, and Anchorage and Tampa did so in 1983. In San Francisco, fares below the maximum must remain in effect for at least 15 months, and no fares below the maximum have been charged. In San Diego, the ceilings were set quite high and flag drop and per-mile charges both varied from $.80 to $1.50. In Portland, the ceilings were set at lower levels and rates charged have been at the ceilings. Gelb, 1980, p. 46, and Shaw et al., 1983, v.1, p. 54.

36 Some meters are designed so that they switch from a mileage basis to a time basis when the cab is moving at less than a certain speed. In New Orleans, the regulated fare structure includes a charge of $.20 per minute when the cab is moving at less than 15 miles per hour.

(if any) and the extras (if any) that can be charged for additional passengers, rush hour service, late night service, weekend service, radio-dispatch service, service to a destination outside the municipality, bad weather, and parcels and luggage. Where ride sharing is allowed, regulations also cover how the separate parties are charged. There is considerable variety among cities in actual practice on these extras, e.g., the fare for a party of two ranges from the same as the fare for one person to twice as much. Some cities have rush hour and late night surcharges while others do not. These differences in fare structures have two important implications. First, they affect both supply of and demand for service. Second, they complicate the task of comparing average fares across cities.[37]

Where fares are regulated, rate setting is usually undertaken on the basis of a target operating ratio, i.e., ratio of total operating expenses to gross revenue. Less commonly, a rate of return criterion is used.[38]

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37 According to Webster et al., 1974, p. 2-9, time delay charges may add 20 percent or more to the basic fare in dense urban areas such as New York City or Chicago. Simple tabulations based on drop and mileage charges ignore this.

38 Kirby et al., 1974, p. 74, refers to four cities with operating ratios before taxes and interest of 90 to 96 percent. In Chicago, until the late 1970s the taxicab ordinance provided for fare increases when the operating ratio was above 86 percent; however, around 1970 the ratio was above this. Kitch et al., 1971, p. 289.

In contrast to the detailed fare regulations that exist in most large cities, Seattle imposes only four requirements: taxis are required to use meters; firms must file their rates with the city and cannot change them more than four times per year; in the case of cabs regulated by the county, fares must be conspicuously posted; and trips originating from the airport are subject to fare ceilings.[39]

3. Service Restrictions

Taxi firms in many jurisdictions are prohibited from providing certain types of service. For example, most jurisdictions prohibit shared-ride service, including variations such as dial-a-ride service and jitney service (where the vehicle operates along a semi-fixed route). Apart from direct prohibitions, shared-ride service is restricted by requirements to have the first passenger's permission to pick up a second, requirements that the cab use the most direct route, requirements to use meters (a zone fare system facilitates shared-ride service), prohibitions against discounting fares for shared-ride service, prohibitions against the display of destination signs, and restrictions on vehicle size and number of passengers. However,

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[39] It is relevant that street hails account for only 1 percent of taxi trips in Seattle. Gelb, 1983b. Apparently, while taxi firms in Albuquerque must post fares and file them with the state regulatory commission, the fare level is not regulated. Dipalma, 1978. Shaw et al., 1983, v.1, pp. 53-54, lists other cities that do not control fares: Berkeley, Spokane, Des Plaines (Ill.), Springfield (Ohio), Tacoma, Charlotte (N.C.), Madison, Phoenix, Sacramento, Tucson, Kansas City (Mo.).

several cities that have deregulated entry into the taxi industry have also legalized share-ride service and special fare systems, e.g., San Diego.[40]

In some cities or areas, taxis are prohibited from cruising or from picking up passengers who hail them on the street. In New York City, fully licensed or medallion cabs are allowed to accept street hails while livery cabs are not.[41]

4. Service Requirements

Most jurisdictions require taxi firms to provide certain types or levels of service.[42] Taxi firms are often required to provide service to all customers within the jurisdiction who call for or hail their cabs, regardless of origin and destination.[43]

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[40] Citizens League, 1981. Pickrel and Rogers, eds., 1978, p. 42, report that ordinances restricting ride sharing existed in 35 of the 50 largest cities. In 1979, shared-ride taxi service was available in at least 28 communities (including Washington, D.C.) and for at least seven special services. Virtually all used flat or zone fare systems, and none used meters. Newman and Lave, 1982, p. 4. Shared-ride service was legalized in Chicago in 1981. Chicago cabs offering this service are designated by a special insignia and are permitted to use zone fares. Reason, May 1982, p. 12. For a discussion of restrictions on jitney service, see Eckert and Hilton, 1970.

[41] Other prohibitions and restrictions on service apply to whether cabs can offer package delivery service and use of cab stands. In Berkeley, each firm is limited to a maximum of 25 cabs. Knight et al., 1983, p. 43.

[42] In New Mexico, taxi firms under the jurisdiction of the state regulatory commission, principally firms in Albuquerque, must obtain approval for abandonment of part or all of their services. Dipalma, 1978, p. 35.

[43] This is difficult to enforce, and hence complaints about refusal of service are common. These complaints are discussed in Sections V.A.7 and V.A.10.

Firms may also be required to have a minimum number of cabs and to operate those cabs a minimum number of hours per day and days per year.[44] Los Angeles requires that taxi firms answer their telephones within 45 seconds and that cabs pick up customers within 15 minutes of the call.[45]

5. Quality Regulation

There are a number of common taxicab regulations that impose minimum levels on the quality of service or of the inputs used to produce service. Thus, there are regulations concerning vehicle

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[44] Portland, Oregon, and Cleveland require a 24-hour a day dispatch capability and a minimum of 15 and 25 cabs, respectively. Portland also requires city-wide operation and 10 cabs in operation at all times. Gelb, 1982, pp. 4, 17. Atlanta and Dallas require new cab companies to have at least 25 and 50 cabs respectively. Los Angeles requires a minimum ranging from 5 to 80 on number of cabs as a condition for a franchise. Palmer, 1983, Ch. 3, pp. 69, 72. New York City requires cabs to run two nine-hour shifts each day, but many cabs evidently do not comply. Regulation, March-April 1982, p. 13. Fresno requires 24-hour a day dispatching and a minimum of $160 per day per vehicle in documented revenues. Paratransit Services, 1983, p. 10. Charlotte requires 24-hour a day dispatching. Shaw et al., 1983, v.2.

[45] Palmer, 1983, Ch. 3, pp. 70-71. The city places test calls and imposes fines for violations. Tests in 1978 found compliance rates of 30 to 80 percent. San Diego requires that all firms have 24-hour a day dispatching and that they respond to at least 80 percent of calls within 15 minutes, a maximum of 15 percent in 15 to 30 minutes, and a maximum of 5 percent in 31 to 45 minutes. These standards are not in fact met. Gelb, 1983a, p. 134.

design, condition, age, and safety, driver qualifications, and liability insurance coverage.[46]

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[46] The driver qualification regulations involve age, fingerprinting, driving record, criminal record, physical and mental health, character, knowledge of city geography, driving skills, and fluency in English. Dipalma, 1978, p. 46. In addition to the types of regulations described above, regulations are often imposed on a variety of other matters. Some cities prohibit leasing of cabs from the licensee-owners to drivers. Some cities permit owners of taxi licenses to sell them, sometimes with restrictions on who is eligible to buy them; other cities do not permit such sales. Some cities regulate the external appearance of cabs, including identification. Some impose record-keeping and receipt requirements. Many require periodic inspection of meters. Regulatory authorities also charge fees for franchises, for vehicle licenses, and for picking up passengers at airports.

III. THEORETICAL MODEL OF A TAXICAB MARKET

This section explains the theoretical model of a taxicab market that underlies the discussion of several issues in this report.[47] The model is intended to capture the principal characteristics of the cruising cab segment, but it is useful in analyzing some regulatory issues in the other market segments as well.

The principal characteristic that distinguishes this model from models of other competitive markets is the role of waiting time. From the point of view of consumers, expected waiting time is clearly an important consideration in deciding whether to take a cab. One way to incorporate consumers' concern with waiting time into the model is to treat it as a quality variable. In this case, a reduction in waiting time increases the demand for taxi service (i.e., shifts the demand curve for taxi service to the right). Another way to incorporate waiting time is to add the dollar value of waiting time to the fare to get the "full cost" of a taxi trip to the consumer. In this case, a reduction in waiting time leads to a movement down the demand curve. We adopt the first of these approaches because it is more appropriate unless all people place the same dollar value on waiting time.

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[47] Versions of this model can be found in several articles on the cruising cab market segment, viz., Orr, 1969, Douglas, 1972, De Vany, 1975, Schreiber, 1975, Abe and Brush, 1976, Beesley and Glaister, 1983, and Tolley et al., 1984. Similar models appear in the public transit literature, e.g., Frankena, 1981, 1982, 1983.

While waiting time can be treated as a quality variable from the point of view of the consumer, from the point of view of each individual cab firm in a competitive market waiting time is quite different from the quality of most products. In most markets, each firm decides what quality output to produce. However, in the cruising cab market, expected waiting time depends on the total number of vacant cabs, and (unless it is large relative to the entire market) an individual firm cannot offer a longer or shorter expected waiting time to customers.

One reason for emphasizing waiting time is that government regulation of taxicabs is likely to affect waiting time. For example, a restriction on entry into taxi markets might be expected to raise both fares and waiting times. If fare regulations limit the impact of entry restrictions on fares, the impact on consumers of a limitation on the number of cabs would be felt principally in longer waiting times.

The basic assumptions underlying the model are: (1) Apart from waiting time, all aspects of cab service quality are exogenously determined and uniform across cabs. (2) The number of taxi rides demanded depends on the fare and on the expected waiting time for a cab. (3) All cabs charge the same fare. (4) The expected waiting time for a cab depends on the total number of vacant cabs. (5) The cost of operating a cab is a constant per hour. (6) In the absence of regulations limiting entry, cab firms earn zero profits, i.e., a normal rate of return.

In the usual competitive market, such demand, cost, and equilibrium conditions determine market price and output uniquely.[48] But in a cruising cab market, there is a range of fare and service combinations at which the market would be in equilibrium. That is, there is a range of ways in which revenues per cab hour could equal the cost per cab hour of service. Thus, the typical cab might just cover its costs in the following three situations, or in other situations between these:

(1) Low fare, high occupancy rate: the fare is low, the total number of cab hours of service is very low, average waiting time is very high, and the total number of rides produced is low. The number of rides produced per cab hour of service is high.

(2) Medium fare, medium occupancy rate: the fare, the total number of cab hours of service, and average waiting time are at medium levels. The total number of rides is high. The number of rides produced per cab hour of service is at a medium level.

(3) High fare, low occupancy rate: the fare is very high, the total number of cab hours of service is low, average waiting

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[48] In conventional competitive markets where quality is a variable, the price and quantity at each quality level would normally be uniquely determined. In the special case where willingness to pay for higher quality and the cost of producing it are equal, the equilibrium would not be unique, but the possible equilibria would be equally efficient. This is different from the situation here, where only one quality level can be produced at any one time, since waiting time is a property of the aggregate equilibrium, and the different equilibria would not be equally efficient.

time is at a medium level, and the total number of rides is very low. The number of rides produced per cab hour of service is low.

The various possible zero-profit equilibrium fare and service combinations for a cruising cab market can be summarized by the "zero-profit locus" in Figure 1, where the fare (F) and the total number of cab hours of service (S) are on the axes.[49] The various combinations of fare and service that would result in any given number of cab rides can be represented by an "iso-rider" line, two of which are drawn in Figure 1. The number of rides along R^1 is greater than that along R^0.

The lowest and highest fares at which cabs could break even would be at points A and G respectively, which might correspond to the first and third situations described above. Given the breakeven constraint, the number of cab hours of service would be maximized at point D. Given the iso-rider lines, the number of cab rides would be maximized at point B, which might correspond to the second situation above. The average waiting time would be minimized at a point between D and G, such as E.

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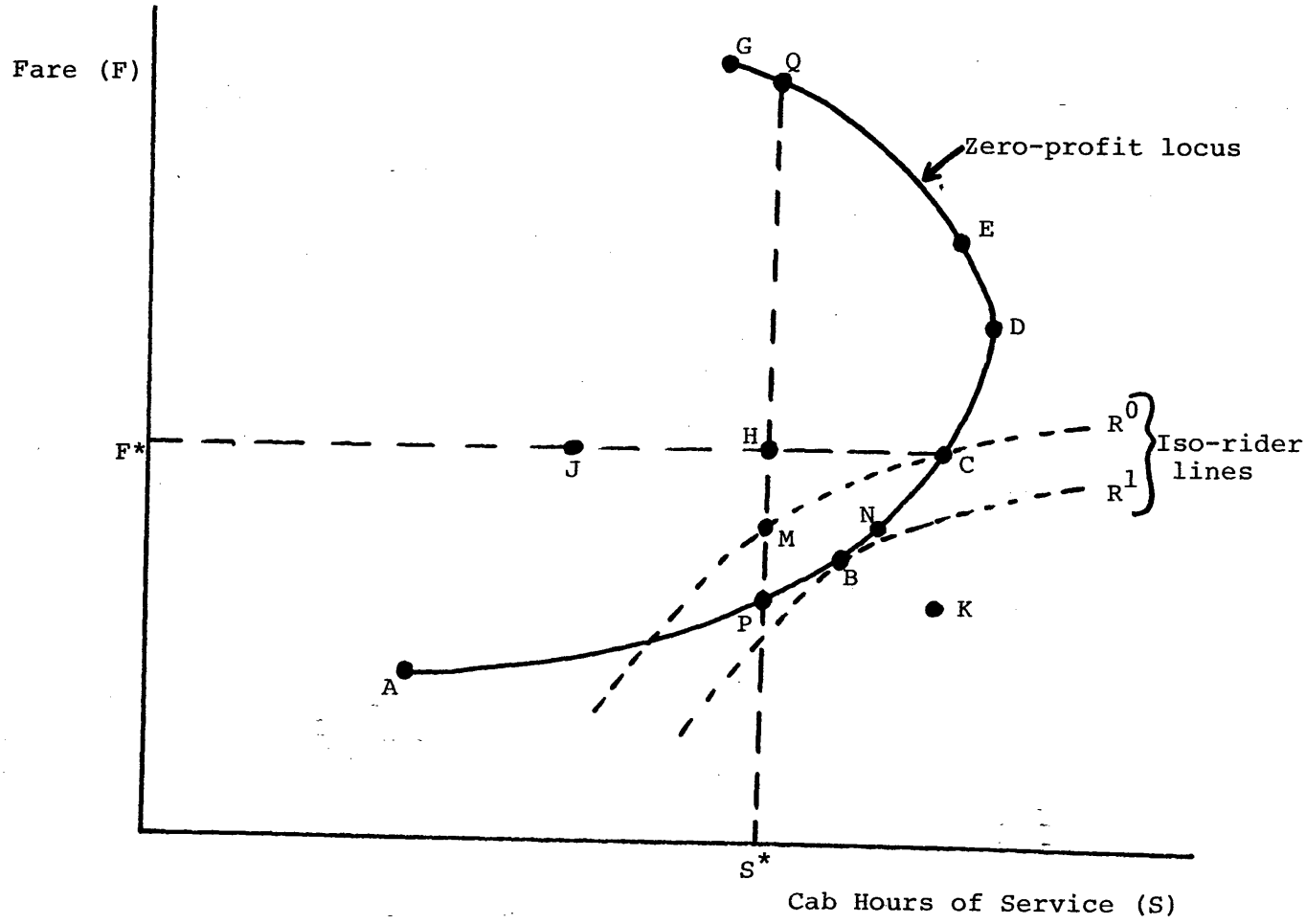
[49] Mathematically, the zero-profit locus gives the solutions to the equations $FR - cS = 0$, $R = f(F, V)$, and $V = S - bR$, where F is the fare, R is the number of rides, c is the cost per cab hour of service, S is the total number of cab hours of service, $f(.)$ is the demand function, V is the number of vacant cab hours of service, and b is the fraction of an hour required to produce a ride. The zero-profit locus in fare-service space would be roughly elliptical, and hence for a given fare there would be two equilibrium service levels. However, the lower service level would be unstable, so given any fare there would be a unique stable service equilibrium. Frankena, 1981, p. 339, n. 10. Figure 1 shows only the stable equilibrium portion of the zero-profit locus.

Figure 1

Model of a Taxi Market in Fare-Service Space



At fare-service combinations to the left of the zero-profit locus, such as H, firms in the taxi industry would earn positive profits, i.e., rates of return greater than the competitive level available in other activities. If entry were restricted and the right to operate a taxi could be sold or leased, medallions would command a price or rental equal to the present discounted value of these profits.

If the government imposed a mandatory fare equal to F* but did not impose entry restrictions, firms would enter the industry until profits equalled zero, and the equilibrium would be at C. If the government limited the maximum number of cabs and hence the maximum number of cab hours of service per hour to S*, the industry would operate along line APMHQG; the point at which it would operate would depend on the fare. If the government limited the maximum number of cabs to S* and set the fare at F*, the taxi industry would operate with fare and service combination H.

From the point of view of the taxi industry, there is some fare-service combination such as J at which joint profits would be maximized. If the government gave a single taxi firm a monopoly franchise and did not control the fare or service level, the firm would operate at J. If there was more than one firm, the firms might be expected to encourage the government to impose entry restrictions and fare regulations that would move the industry away from the zero-profit locus toward point J.

From the point of view of the economy as a whole, within the framework of this model the efficient position for the taxi industry would be somewhat to the right of the zero-profit locus, at a point such as K. Such a point is not attainable by the industry without a subsidy, however. A competitive taxi industry would not expand to the efficient level because there is an external economy. An increase in the number of taxis in service increases the number of vacant cabs and hence reduces the average waiting time for all riders and the average social cost of production for rides. It follows that when there are a number of taxi firms and one of them adds a cab, that firm cannot capture all the social benefits of the addition in capacity. As a result, given the efficient fare, there will be less than the efficient amount of service in the absence of a subsidy. This "waiting time externality" is discussed further in Section IV.A.8.

The model discussed here does not consider the external diseconomy involved in road congestion. Congestion externalities will be discussed further in Section IV.A.1. In theory, a negative congestion externality could at least partially offset a positive waiting time externality, in which case the efficient point would lie to the left of K. However, in Sections IV.A.1 and IV.A.8 we suggest that consideration of congestion externalities would not have much effect on the location of the efficient point, in which case the efficient allocation still would not lie

to the left of the zero-profit locus when both congestion and waiting time externalities are taken into account.

With this qualification, suppose that K represents the "first best" efficient allocation. In the absence of a subsidy, the industry would be constrained to operate on the zero-profit locus. Subject to this constraint, the "second best" efficient allocation would be at a point such as B.[50]

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[50] In this discussion, B happens to be the point at which the number of rides is maximized as well. In general, the two points need not coincide. For a discussion of some of the assumptions that determine the relationship between efficiency and ridership maximization, see Frankena, 1983.

IV. RATIONALES FOR REGULATION

A. Potential Sources of Market Failure

An important contribution of economic analysis is the theorem that in the absence of market imperfections the forces of supply and demand will produce an efficient allocation of resources without government intervention. It follows that in order to justify government regulations in markets for taxicab services, one must begin by identifying imperfections in those markets that would lead to market failure. The market failure might take the form of over- or under-production of various taxicab services, production of the wrong qualities of service, or unnecessarily high costs of producing a given output. Whether any particular government regulation is justified depends on its success in increasing the efficiency of resource allocation, i.e., creating benefits that exceed its costs.

This section provides a discussion of ten imperfections that might occur in markets for taxicab services as well as a proposed rationale for entry restrictions based on enforcement costs for other regulations. We consider whether each imperfection is important empirically and whether each would justify some kind of government intervention. We conclude that restrictions on entry, on minimum fare levels, and on shared-ride service are not justified by these imperfections.

On the other hand, potential market imperfections might provide a justification for other forms of government intervention, including requirements that taxi firms post fares,

ceilings on fares, and regulations dealing with matters such as vehicle safety and liability insurance coverage.

1. Congestion and Pollution Externalities

a. Congestion

Taking the level of non-taxi traffic as given, the operation of taxicabs on congested streets slows down other road users, increasing their time and money costs of travel. Taxis impose congestion costs not only when they are engaged but also when they cruise, when they stop to pick up and discharge passengers, and when they wait at stands located on public streets. Since taxicabs and their users do not pay for the congestion costs they impose, it has been argued that the number of taxi rides produced and the amount of cruising under congested conditions would be inefficiently high in the absence of government intervention. It has been suggested that restrictions on entry and cruising would increase efficiency.

The economics literature dealing with congestion suggests that passenger cars impose marginal congestion costs of over $.25 per mile when they use congested urban streets. For example, Dewees (1978, 1979) estimates the marginal congestion costs imposed by an additional morning rush-hour automobile trip on a number of different roads in an area similar to one about seven miles from downtown Toronto. The costs range from zero to over one dollar per vehicle mile. The marginal congestion costs, on average, were 25 cents per vehicle mile for all automobiles

combined, 38 cents per vehicle mile for inbound automobiles, and 4 cents per vehicle mile for outbound automobiles. At mid-day the marginal congestion costs averaged 1.4 cents per vehicle mile for inbound automobiles.[51]

If road users are not charged for the marginal congestion costs they impose, the use of congested streets will be inefficiently high. Economists have often suggested that in theory the most efficient form of government intervention to correct this market failure would be imposition of road user charges that would vary with the extent of congestion.[52]

For a variety of political and economic reasons, governments do not in fact impose such congestion charges. The question is whether the efficiency of resource allocation would be increased in this situation by restrictions on the number of taxicabs and/or on cruising without restrictions on other types of road vehicles.

A limitation on the number of taxicabs or on cruising would reduce the amount of congestion cabs themselves cause, but there are several reasons to doubt that the benefits of such restrictions would outweigh the costs, or even that congestion would decline. Such restrictions would have costs in the form of increased travel costs for potential taxi riders, but offsetting

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[51] These estimates assume a value of travel time of $3.75 per vehicle-hour. For a more extensive summary of the literature on congestion costs, see Frankena, 1982, Chapter 2.

[52] Id.

benefits might be negligible, for three reasons. First, while there would be an inefficiently large number of private automobiles, it is not clear that there would be an inefficiently large number of cabs or excessive cruising in the absence of government intervention. Another market imperfection, discussed below in the subsection entitled "Waiting Time Externalities," would cause underproduction of taxicab services, particularly by cruising cabs. The market failure due to waiting time externalities would at least partially offset any market failure due to congestion externalities insofar as the number of taxicabs and the amount of cruising are concerned.

Second, a restriction on the number of cabs or on cruising would lead to an increase in road use by private automobiles, and this would cause an at least partially offsetting increase in congestion. A reduction in the number of cabs and in cruising would lead to an increase in the time and money cost of travel by cab, which would divert some cab riders to private automobiles. Furthermore, any decrease in the amount of congestion would reduce the cost of travel for private automobiles and encourage their use of roads.[53]

Third, a restriction on the number of cabs would reduce use of taxis in parts of the city and probably at times of day for which congestion is not a serious problem. In such situations, a

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[53] In New York City and London, traffic speeds increased significantly during taxi strikes, but this reflected very short-run responses. Kirby et al., 1974, p. 96.

restriction on the number of cabs or cruising would yield no congestion-reduction benefits.

In addition, the extreme version of the congestion argument, namely that free entry would lead to downtown areas clogged with taxicabs, is refuted by the experience of cities such as Washington, D.C. and London, which have not restricted entry, and of the thirteen or more U.S. cities that opened entry in 1979-1984.[54]

If a city does conclude that the number of cruising cabs is inefficiently high, the problem would be inefficiently high fares. The appropriate policy would be a reduction in the maximum permissible fare, not a restriction on entry.

The preceding discussion has been concerned with general congestion of urban streets. A different, local congestion problem arises at cab stands at some airports and rail stations. In such cases, cabs impose delays on each other and on other traffic, and occasionally cabbies use force to allocate limited space.[55] Sometimes, the origin of the problem is high fares,

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[54] Kirby et al., 1974, p. 97. For another report criticizing the congestion argument for entry restrictions, see Palmer, 1983, Ch. 3, p. 5. Palmer also notes that free entry works well in Sarnia and Windsor, Ontario, which have populations of 50,000 and 250,000 respectively (p. 79).

[55] Palmer, 1983, Ch. 3, p. 2, reports that in Los Angeles in the 1920s cab drivers fought over waiting space in front of certain buildings. Zerbe, 1983b, p. 46, reports that following a switch to open entry at the Seattle Amtrak station in 1979: "Long taxi lines developed, taxis spilled out of the assigned areas, some drivers left their cabs (blocking access for Amtrak employees and passengers, as well as fellow cabbies), and some loitered in the
(footnote continued)

which attract a large number of cabs. In these cases, the efficient policy would be to reduce fares, not to restrict entry. In some cases, the problem is that a scarce resource, space for taxicabs, is not priced. In these cases, the efficient policy might be to charge user fees at congested cab stands, not to restrict entry.

This subsection has concluded that congestion externalities do not justify restrictions on entry or cruising. It should be added that elimination of regulatory barriers to shared-ride taxi service might reduce congestion.

b. Air Pollution

Schreiber (1975) argues that air pollution externalities provide a justification for restrictions on the number of taxis and on cruising similar to that provided by congestion. If the level of air pollution per vehicle mile or hour was not subject to control, the arguments would be similar, except that the marginal pollution damage per vehicle mile is considerably less than the marginal congestion cost on busy streets.[56]

(footnote continues)

station aggressively seeking passengers. Independent drivers clashed with drivers of the lower-priced 'major' cab fleets." However, similar problems have been reported at the Chicago airport, which does not have open entry. Chicago Tribune, March 7, 1984.

56 Frankena, 1982, Chapter 2.

Small (1977) estimated that on average air pollution costs would be at least 0.4 cents per vehicle mile in U.S. urban areas for a car without emission controls.[57] In another study, Dewees (1974) suggests a figure of about 1 cent per mile as the average air pollution cost in urban areas for a car without emission controls. Zerbe and Croke (1975) estimate that in Chicago the average air pollution cost imposed by cars, some of which had pollution control devices, was less than 1 cent per vehicle mile.[58]

In any event, it makes little sense to restrict road use, particularly by one category of users, to deal with air pollution. A more efficient approach would be to reduce the amount of pollution per vehicle mile or hour through emission standards or charges. Furthermore, air pollution standards are already imposed on automobiles, and additional measures might reduce efficiency.[59]

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[57] This is a lower-bound estimate because it assumes that the cost of illness and death is equal to direct medical expenditures plus forgone earnings, and because it does not include a number of forms of damage, such as the effects of lead emissions, discomfort, and household cleaning costs. Also, this is an average cost; according to Small, "it is certainly plausible to argue, for example, that damage of at least several cents per mile is caused in high-density central business districts by automobiles in slow-moving congested traffic."

[58] The pollution damage figures in these three studies are in current dollars from the mid-1970s.

[59] Langenfeld, 1983, concludes that the costs exceed the benefits from existing automobile air pollution standards.

2. Overpricing of Public Transit

If two goods are close substitutes in consumption and the first is priced above marginal cost, then the efficiency of resource allocation may be increased by pricing the second above marginal cost as well. The inefficiently high price for the first good would encourage inefficiently high consumption of the second unless the latter's price was also raised. It has been argued by Schreiber (1975) that taxi and transit rides are close substitutes and that transit rides are priced above short-run marginal cost. If this is true, transit use would be too low and taxi use would be too high. The efficient policy would be to reduce transit fares. A second best policy would be to raise taxi fares.[60] If neither of these policies is adopted, it is possible that a restriction on the number of taxis would increase efficiency.

Since public transit is heavily subsidized, it is implausible that on average, for various categories of public transit rides, prices are above marginal cost. Where transit fares do not vary with time of day, transit rides during off-peak periods when the transit system is not congested probably are priced above marginal cost. However, transit rides during peak periods when the transit system is congested probably are priced below marginal cost. And where transit passes are used, all rides for passholders are priced below marginal cost. As a

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[60] If transit were priced below marginal cost, a symmetric argument could be made for setting taxi fares below marginal cost.

result, it seems likely that transit fares are below as often as they are above marginal costs, and that it would not be efficient to restrict taxi service on the grounds that transit is mispriced.[61]

3. Indeterminacy of Cruising Equilibrium

Section III describes a version of the model of an unregulated cruising cab market that has been used by a number of economists. In a cruising cab market, there is a range of fare and service combinations, shown by the "zero-profit locus" in Figure 1, at which the market would be in equilibrium.

Some of the models of the cruising cab market have added a further behavioral assumption that would determine the fare/service equilibrium uniquely, or restrict its range, without government regulation. Orr (1969) makes an arbitrary assumption about the equilibrium service level.[62] Douglas (1972) and Schreiber (1975) suggest that, because of the high cost to consumers of searching for lower fares, fare competition would be limited and the equilibrium would be at an inefficiently high fare level, e.g., where the level of vehicle hours of service would be maximized (point D in Figure 1). Coffman (1977) and Williams (1980a, b) challenge this view but do not present a

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[61] For a discussion of efficient transit fares, see Frankena, 1982.

[62] Orr assumes that there is a "normal" ratio of engaged passenger miles to vehicle hours of taxi service.

complete model.[63] Beesley and Glaister (1983) simply assert that the equilibrium will coincide with the allocation that is most efficient given the zero-profit constraint, i.e., point B in Figure 1.

Thus, economists have not provided a model of the cruising cab market that would justify the conclusion that the forces of supply and demand would lead to an efficient fare and resource allocation. For reasons that are discussed in the following subsection, the fare in an unregulated cruising cab market might be inefficiently high, but it would not be inefficiently low. Thus, while this problem might justify a fare ceiling, it would not justify minimum fare regulation.

4. Impediments to Price Competition

Standard models of competitive markets assume that each firm faces a demand curve that is perfectly elastic at the market price. Such firms maximize profits by producing the level of output at which marginal cost equals price, which is efficient. If firms face demand curves that are not perfectly elastic, they maximize profits by charging prices above marginal cost, and industry output is inefficiently low. In this case, a government price ceiling might increase efficiency.

The demand curves facing individual taxi firms will not be perfectly elastic with respect to price, even when each firm is

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63 Douglas, Schreiber, Coffman, and Williams are discussed in the following subsection.

small relative to the market, if potential riders cannot costlessly select the cab with the lowest fare. If it is not worthwhile for potential riders to incur the search costs required to find and use a cab offering a lower fare, or if lack of information or opportunity would prevent riders from doing so, cabs will not have an incentive to offer lower prices. Such impediments to price competition might arise in the cruising cab market and at taxi stands at places such as airports.[64]

If fares are regulated but quality is not, a similar argument might apply to quality competition. That is, firms might be able to reduce quality below the efficient level without causing riders to turn down the first cab. In this case, driver and vehicle quality regulations might increase efficiency.[65]

a. Cruising Cabs

Consider a model of a cruising cab market similar to that developed in Section III but with additional behavioral assumptions adapted from Douglas (1972) and Schreiber (1975, 1977, 1981). Suppose that each cruising cab is owned by an independent firm, that cabs are free to choose any fare system they wish, and that cabs commit themselves to a fare structure prior to making contact with potential riders. Once a contact is

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64 Wainwright, 1984, notes that following deregulation of fares in San Diego and Seattle, fleets concentrating on radio-dispatch service charged lower fares (for 5 mile trips) than did independent cabs concentrating on street-hail and cab stand service.

65 See Gallick and Sisk, 1984. Of course, this should also be considered as an argument against fare regulation.

made, the rider has a choice between taking this cab, waiting for another cruising cab, and withdrawing from the cruising cab market segment (e.g., taking a bus or phoning for a cab).

Consider first the rider's choice between taking the first cab and waiting for another. A rider will accept the first cab as long as the excess of its fare over the expected fare that would be paid after waiting is less than the value of the expected waiting time. Suppose that initially there is a uniform fare for all cabs at a level that is low enough so that the average waiting time for a cruising cab is significant and it is rare for two vacant cabs to be within the view of a potential rider at one time. In this situation, each cab would have an incentive to raise its fare a bit since a small fare differential would not cause the loss of riders to other cruising cabs. No cab would have an incentive to cut its fare, since a rider would not turn down a cab that charged the uniform fare in order to wait for another cab.

In this model there would be an incentive to raise fares until average waiting time was reduced to a short interval. At some point, the fraction of riders who have more than one vacant cab in sight might become significant, and further price increases would be deterred by the resulting loss of riders.

Schreiber has argued that the result would be an inefficiently high fare in the cruising cab market segment unless the government imposed a fare ceiling. The inefficiency would involve having too many cruising cabs and too few passengers.

The welfare loss caused by this market failure would be limited by the fact that other forms of taxi service that are not subject to the same problems of achieving workable price competition could substitute for cruising service. In the cruising cab market segment it is costly for riders to locate cabs offering lower prices, and hence cabs do not have an incentive to lower prices. However, Coffman (1977) and Williams (1980a, b) point out two ways that taxis could offer lower priced services. First, taxis offering lower prices could wait at stands, where riders could find them at the cost of some additional walking compared to use of cruising cabs. Second, radio-dispatched taxis offering lower prices could be summoned by telephone, at the cost of some additional waiting. Nevertheless, one might argue that a government price ceiling for cruising cabs could increase efficiency even in this situation, since it might obviate this replacement of the cruising cab market.

Another way that the problems of price searching in the market for cruising cabs might be limited would be by formation of fleets of distinctively marked cruising cabs. A fleet would have a greater incentive to charge lower fares than would individually operated cabs for three reasons. First, because its cabs could be identified easily, a fleet would reduce search costs for riders looking for a lower fare. Second, the larger is the number of cabs charging a lower fare, the lower will be the expected cost to riders who turn down higher priced cabs. Third, a fleet might attract to the cruising market a group of riders

who are unwilling to pay the higher fare charged by other cabs and who will wait until a fleet cab appears. As a result, unlike an individual cab, a fleet could get more riders by charging a lower fare. Coffman and Williams suggest that competition from fleets would prevent the type of market failure suggested by Schreiber.

b. Taxi Stands

Another situation in which price searching by riders and hence price competition among cabs might be limited is at taxi stands at locations such as airports. Price searching might be limited for three reasons. First, at airports many riders are from other cities and might not be aware that taxi fares are not uniform. Second, cab stands designed for a first-in-first-out allocation system, which makes sense when fares are set by the government, might not allow price shopping. Third, where permitted by law, some hotels sell exclusive service contracts to taxi firms. Eckert (1970) describes how Los Angeles has enforced exclusive cab stands and restricted the formation of competing stands.

Evidence on deregulation of taxi fares discussed in Section VI suggests that problems stemming from limited price competition have occurred at airports. To some extent, these problems may be transitional. If many cities deregulated their taxi industries, travellers would no longer be ignorant of the possibility that taxi fares are not uniform. Nevertheless, these problems might

justify fare-posting requirements or fare ceilings. However, as an alternative to fare ceilings, it might be possible to redesign taxi allocation systems at airports so that consumers would be able to locate the lowest priced cab. For example, airports with holding areas for cabs could send the lowest priced cabs to the terminal rather than sending cabs on a first-come basis.[66]

5. Bargaining over Price

The preceding subsection considered the cruising cab market segment under the assumption that cabs commit themselves to a fare structure before making contact with riders. However, cabs might be prepared to bargain. It has been suggested that cab fares should be regulated in order to deal with two problems that might arise if cabs were free to negotiate fares.

The first problem with negotiated fares is that riders and drivers might have an incentive to devote resources to gathering information about fares, searching for low fares (in the case of riders) or high fares (in the case of drivers), and bargaining over fares. Palmer (1983, Ch. 3, pp. 2-3) and Gallick and Sisk (1984), have argued that one rationale for regulating fares is to reduce these transactions costs.

The second problem with negotiated fares is that drivers might exploit riders in bargaining over fares. Fare ceilings would prevent such exploitation. This argument is based on the

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[66] Quality competition would still be difficult, and mandatory minimum quality standards might be required.

assumption that the driver might be in a position to extract an unreasonably high fare, either because the rider might be faced with a high cost of finding another cab, or because a significant share of taxi riders are visitors to the city who would not have the information necessary to bargain effectively. However, Beesley and Glaister (1983) have noted that the rider might also be in a position to impose a low fare because the driver would be faced with the cost of finding another rider.[67]

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[67] If exploitation of riders is a significant problem, one potential remedy would be to require cabs to post their fares or use meters. However, if cabs then discounted their fares in dealing with informed customers, a posting requirement would have little effect; cabs could simply post the fare they would have asked initially in the absence of the posting requirement and bargain as before. Taxis could be required to charge posted fares, but enforcement of an ordinance against discounts might be difficult. If posting of fares is not effective, it is conceivable that a fare ceiling would have benefits. Preventing exploitation of riders might be justified on equity grounds, but an efficiency argument can also be made. Suppose entry into the taxi industry is unrestricted and that taxi service is available at constant cost. If taxi firms act as first-degree price discriminators and extract all consumer surplus from riders, the extra revenue will cause the industry to expand beyond the efficient level, where the marginal social benefit and the marginal social cost of service are equal.

6. Economies of Scale

Economies of scale exist when the average cost of production declines as a firm's output increases. If the output range over which average cost declines is large relative to the size of the market, the number of firms in the industry may be small and firms may be able to charge prices above marginal cost without inducing entry. If so, industry output will be inefficiently low. In this case a price ceiling that prevents firms from exercising their market power could increase the efficiency of resource allocation.

There appear to be no important economies of scale in the case of markets for cruising taxis and markets where taxis wait at stands for customers to arrive, e.g., airport and hotel service.[68] Thus Eckert (1970, p. 431) argues that "small taxi companies can compete with fleets provided cruising is profitable or legal access to open stands is inexpensive relative to the gain."[69]

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[68] Turvey, 1960, p. 86; Meyer et al., 1965, p. 356; Beesley and Glaister, 1979, p. 3 and footnote 3; De Vany, 1977, p. 35; Palmer, 1983, Ch. 3, p. 3. Brown, 1973, concluded that larger firms can obtain lower prices for inputs such as gas, oil, and tires. However, independent taxis should obtain the same prices by organizing purchasing cooperatives. Two of the other potential market imperfections discussed in this section might provide an incentive to organize taxi fleets. First, in the absence of fare regulations, there might be an incentive for cruising cabs to form fleets offering lower prices. Second, taxi fleets could develop reputations and overcome potential problems arising from imperfect information about quality.

[69] However, taxi firms do enter into exclusive contracts with hotels, etc., for operation of taxi stands.

Where entry is not limited, independently owned cabs generally operate in significant numbers.[70] In New York City, some medallions are reserved for fleets while others are reserved for independents. The fact that the price of independent cab medallions is 20 percent higher than that for fleet cab medallions[71] suggests that scale economies are not important for cruising cabs.

On the other hand, there are significant economies of scale in radio-dispatch operations. First, economies would arise because of indivisibilities in the inputs used in dispatching, management, and advertising.[72] Second, a larger fleet would be

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[70] In New York City in 1930, prior to entry restrictions, 47.5 percent of cabs were independents. Schreiber, 1975, p. 273. Even if one observed a market dominated by a small number of large fleets, this alone should not be taken as evidence of market power as long as there were no barriers restricting entry by new firms if prices were raised above the level that would offer a normal rate of return. Gilbert and Samuels, 1982, pp. 93-94, suggest four factors that might discourage formation of large taxi firms using employee-drivers even if there were economies of scale. First, they speculate that it might be more difficult politically for a large firm to win approval of a fare increase because of its visibility. However, a large firm might be more effective at lobbying. Second, large firms are likely to be targets for union activity, which might raise labor costs. Third, firms that hire employee-drivers are subject to minimum wage laws and employment taxes. Fourth, large firms may find it more difficult to understate income for tax purposes. However, large firms can escape the second and third problems by leasing cabs to drivers, and associations of owner-drivers operating fleets could escape all these problems.

[71] Gilbert and Samuels, 1982, p. 92. One source attributes the price difference to the higher cost of labor to fleets due to unionization. Regulation, March/April 1982, p. 36.

[72] Indivisibilities exist when there are minimum feasible quantities for inputs, e.g., one dispatcher or one phone line.
(footnote continued)

able to provide service with less customer waiting time and less vacant cab hours or miles, because a rider calling a random cab company would be more likely to call one with a cab nearby if fewer dispatch systems controlled a given total number of cabs.[73] There are also economies of scale in negotiating for and providing contract services.

These economies of scale in radio-dispatch and contract operations would be more likely to cause problems of market power and inefficient resource allocation in small urban areas than in large ones.[74] In addition, market power would not be a significant concern in areas where "hit and run" entry from neighboring jurisdictions is feasible or where good substitutes, such as public transit, exist.

Where there is market power, it may be efficient to impose a price ceiling on the service for which there are economies

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(footnote continues)

Palmer, 1983, Ch. 3, p. 31, reports that cab firms in Toronto and London, Ontario, had one dispatcher per 60 to 90 cabs in peak periods. Taxi firms also provide direct phone lines at hotels, hospitals, stores, and bars.

[73] Gelb, 1983b, p. 96, reports that average response time as well as service refusal rates for radio-dispatch service in Seattle varied inversely with fleet size.

[74] For a statement of this argument, see Palmer, 1983, Ch. 3, p. 10ff. Palmer suggests that a city with 250,000 people can support only 2 or 3 radio-dispatch/contract taxi firms. In some cases, government regulations may give an advantage to fleets. For example, Texas permits taxi companies in sound financial condition with more than 25 cabs to self-insure. North Central Texas Council of Governments, 1979, p. xvii-14.

of scale. In the case of taxis, this would be dispatching, management, and advertising. Where fleets are not vertically integrated, the prices that should be subject to maximum controls are those charged by the fleet organization to owner-drivers. However, maximum fares for taxi rides may achieve similar results.

7. Informational Problems

It may be difficult or impossible for riders to judge some aspects of cab service quality before they ride. Some of these aspects of quality can be judged by a rider on the basis of experience, however. Even for a single trip, drivers have an incentive to supply these aspects of quality because riders can adjust the size of the tip. This might be true of driver behavior.[75] Also, provided that a significant share of riders are repeat users or are able to learn about reputations, there will be an incentive to form fleets and to supply these aspects of quality in order to develop reputations and obtain business. This might be true of driver behavior, some driver qualifications, and some aspects of vehicle condition.

There are some aspects of quality that even regular riders might find difficult to judge, however, e.g., vehicle safety. Others might take a large effort for riders to determine, e.g., liability insurance coverage. In these cases, regulations governing quality might increase efficiency by reducing information

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75 See Gallick and Sisk, 1984, p. 7.

costs and/or preventing inefficiently low quality service.[76] Thus, certain taxicab regulations might be rationalized by consumer protection arguments, as a substitute for information disclosure.

8. Waiting Time Externalities

An increase in the number of taxis in service increases the number of vacant cabs and hence reduces average waiting time for all riders and the average social cost of production for rides. It follows that when there are a number of taxi firms and one of them adds a cab, that firm cannot capture all the social benefits of the addition in capacity. As a result, even if there are no barriers to entry there will be less than the efficient amount of service.[77]

One solution to this potential market failure would be to subsidize taxi service. A similar argument is widely accepted as a justification for public transit subsidies.[78]

In Section IV.A.1 we concluded that congestion externalities would not provide a justification for entry restrictions in the taxi industry. Consideration of waiting time externalities further weakens the argument for entry restrictions, because

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[76] Eckert, 1970, p. 452, suggests that liability insurance requirements save consumers the costs of collecting information concerning which taxis and drivers are bonded.

[77] This point is made by Beesley and Glaister, 1983, and by Tolley et al., 1984, p. 22.

[78] Mohring, 1972. See also Douglas and Miller, 1974b.

allowing for both negative congestion externalities and positive waiting time externalities, there is no a priori reason to believe that an unregulated market would oversupply taxi service in general or cruising in particular.

9. Inefficiently High Taxi Fares

Taxi fares might be inefficiently high for two reasons. First, they might be set at a high level by the taxicab regulatory authority. Second, in the absence of a fare ceiling at the efficient level, some of the potential sources of market failure discussed above might lead to high fares. As a result, high fares might be an important distortion in taxi markets, and efficiency gains from reducing fares might be large. However, if inefficiently high fares must be taken as given, then restrictions on the number of taxicabs could conceivably increase efficiency.[79]

a. An Extreme Example: An Airport

Consider the situation that seems to exist at some airports. Taxi fares are set at very high levels. At these fares, cabs are willing to wait a long time to get a passenger. Entry is restricted, and hence cabs earn an above-normal rate of return, but the number of cabs is sufficient that passenger waiting times are zero.

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[79] A technical discussion is provided in Appendix A. Very brief statements of this argument appear in De Vany, 1975, pp. 93-94, and Schroeter, 1983. A longer exposition appears in Tolley et al., 1984, pp. 27-32.

In this situation, removal of entry restrictions without a reduction in fares would lead simply to a lengthening of the taxi line and a drop in the occupancy rate until average revenue equals average cost per hour. From society's point of view, costs would increase, but there would be no benefits. Thus, given the fare, an entry restriction would be second best efficient. From an income distributional point of view, taxi owners would lose and no one would gain from removal of entry restrictions.

b. Another Example: Airline Regulation

Prior to airline deregulation, the Civil Aeronautics Board set US domestic interstate airline fares at an inefficiently high level but did not limit airline flight frequency or various aspects of quality. Since fares were high relative to the marginal cost of providing the efficient service, airlines competed for passengers by adding extra flights and increasing service quality (e.g., meals) even though passengers' marginal willingness to pay for the extras was less than the marginal social cost. Given the high fares, constraints on the number of flights, etc., might have been second best efficient. Unlike the airport taxi example, the second best constraints would have made

consumers worse off in the airline regulation case. However, airlines would have gained more than consumers would have lost.[80]

c. Radio-Dispatch and Cruising Segments

Subsection (a) explains the relevance of the problem discussed here to the airport segment of the taxi market. A less extreme version of the problem could conceivably arise in the cruising and radio-dispatch segments as well.

Suppose the government sets the fare well above the efficient level in the latter market segments. In the absence of entry barriers, cabs will enter until profits are zero, even if the cost of additional cabs is greater than the willingness of consumers to pay for the resulting reduction in waiting time. Given the fare, an entry restriction could therefore be second best efficient because it would prevent dissipation of rents. Elimination of such an entry barrier would be inefficient. Although consumers would unambiguously gain from removal of entry barriers because waiting times would decline, owners of taxi firms would lose more than consumers would gain. Tolley et al. (1984, pp. 28-31) report some simulations that suggest that under some assumptions deregulation of entry without a reduction in fares might reduce efficiency in each of the major taxi market

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80 See Douglas and Miller, 1974a, b. In the case of airlines there are no important barriers to fare competition and no significant economies of scale. Hence, the inefficiency caused by high airline fares could clearly be solved by ending fare regulation. The effect of taxi fare deregulation is less straight-forward.

segments (cruising, dispatch, and airport). Further simulations suggest that the problem is likely to occur at airports, is conceivable but by no means certain in the cruising segment, and is unlikely in the radio-dispatch segment.[81]

10. Mispricing of Taxi Trips

A number of the preceding subsections have suggested rationales for fare regulation. An attempt to regulate fares may price some categories of trips so low that they would involve losses for taxi firms. Firms would have an incentive to refuse service in such cases even though most of the riders involved might be willing to pay enough to make the service profitable. This problem is an argument against fare regulation, but if fares are regulated it provides a possible rationale for prohibitions against service refusal and for requirements to provide service at certain places or times.

While some mispricing of this sort may be unintentional and random, it is sometimes suggested that as a matter of social policy cities may deliberately set unprofitably low fares (or avoid surcharges) for certain categories of trips, e.g., during periods and at places where demand is low.

The efficient policy would be to permit (or impose) fare surcharges for the unprofitable categories of trips. If this is

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81 Additional simulations were carried out by George Tolley and Charles Kahn under a Federal Trade Commission contract.

not done, a second best policy would be to provide an explicit subsidy for the service in question. A prohibition against service refusal or a requirement to provide certain services involves a cross-subsidy, i.e., a tax on some categories of trips to finance a subsidy for other categories, and would be (at best) a third best policy.

It is sometimes argued that a prohibition against service refusal or a requirement to provide certain services would not be effective without barriers to prevent the entry of independent cabs. Suppose a city has adopted a fare structure that makes off-peak service unprofitable. If there are no restrictions on entry by independent cabs, it might be difficult to get any firm to offer the unprofitable off-peak service. First, it might be costly to enforce a requirement that independent cabs operate at unprofitable times, since it would be difficult to monitor the times that independent cabs operate. Second, if independent firms are free to enter and to operate only at high demand times, they will drive profits down to a normal level at these times (behavior that is referred to in the industry as "cream skimming" or "cherry picking"). As a result, it would not be possible to induce larger firms to provide service at unprofitable times because they would not be able to balance the resulting losses with above-normal profits at any other time. If larger firms

were required to provide unprofitable services, they would go out of business.[82]

This rationale for entry barriers is weakened by the fact that requirements to provide service may not be effective even with such barriers. Complaints about service refusal are common in regulated cities. Low-income, minority neighborhoods frequently are not served by licensed cabs and depend on unlicensed, gypsy cabs.[83]

11. Enforcement of Taxi Regulations

The arguments in the preceding subsections have suggested that a number of taxicab regulations, including fare ceilings, prohibitions on service refusal, and insurance and vehicle quality requirements, might be justified on efficiency grounds. It has been suggested that additional regulations may be justified to reduce the cost of enforcing these regulations.

Gallick and Sisk (1984) suggest that entry barriers that enable incumbent taxi firms to earn above-normal returns, particularly transferable medallions, would reduce the cost of enforcing regulations. They argue that it would be less costly for the government to obtain compliance by firms that depend on

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82 In their study of cities in England, Coe and Jackson, 1983, p. 11, found that the experience of only one district among the six that had no entry barriers gave any support to the hypothesis that lack of entry barriers would lead to a lack of cabs at non-peak periods.

83 See footnotes 3 and 127.

license renewals to continue earning above-normal profits than to obtain compliance by firms that stand to lose little if their violations cause them to be excluded from the industry.

There are three problems with this argument that lead us to conclude that it does not justify entry restrictions. First, some cities with entry restrictions do not use suspension or revocation of licenses to enforce other policies. For example, Kitch et al. (1971) report that cab companies violated Chicago ordinances requiring use of 75 to 90 percent of licenses and prohibiting service refusal and yet did not lose their licenses in spite of the fact that medallions were worth over $15,000.[84] Second, even if entry barriers reduce enforcement costs and/or increase compliance rates, it is not obvious that the resulting benefits would be significant when compared to the efficiency costs that would result from restricting entry into the taxi industry. It seems likely that the benefits of increased cab service and competition that result from open entry would greatly exceed any benefits from reduced enforcement costs under a medallion or other restricted entry system. Third, the alleged enforcement advantages of a restricted entry system could be achieved without entry barriers if cab firms were required to post bonds that would be forfeited in the event of violations of taxi regulations.

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[84] Kitch et al., 1971, pp. 292-297. The review of the history of taxi regulation in Section IV.B.2 makes it clear that the enforcement cost argument was not originally used to motivate entry restrictions.

It might also be suggested that restrictions that would reduce the number of taxi firms, including franchise and minimum size requirements, would reduce the costs of enforcing various taxi regulations. One must, however, weigh the advantages of lower enforcement costs against the inefficiency that would result from limited competition.

12. Conclusion

Under some circumstances, because of market imperfections certain regulations could increase efficiency: requirements that cabs post fares, fare ceilings, and minimum standards affecting the quality of service, including vehicle safety and liability insurance coverage. In addition, if fares are regulated in such a way that certain categories of service are unprofitable, prohibitions against service refusal, requirements to provide service at certain times and places, and requirements that firms operate some minimum number of cabs may be second best efficient. However, restrictions on entry, minimum fare controls, and restrictions on ride-sharing (including dial-a-ride and jitney service) reduce rather than increase efficiency.[85]

If fares are much above the efficient level, and if they do not decline significantly when entry restrictions are removed, then removal of entry restrictions might conceivably be

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[85] Palmer, 1983, Ch. 3, pp. 77-87, argues for deregulation of entry with continued regulation of fares, provided fares are set efficiently. He also suggests that it might be best to limit fare regulation to ceilings.

inefficient. However, one could conclude that removal of entry restrictions would be efficient if one of the following was established:

(1) Fares are not very much above efficient levels, and fares will not increase to inefficiently high levels as a result of elimination of entry restrictions and other revisions in taxicab regulations. This condition might not be met for three reasons. First, fares might be very much above efficient levels. Second, elimination of entry restrictions and hence above-normal profits might induce regulatory authorities to raise regulated fares to inefficiently high levels.[86] Third, if elimination of entry restrictions is accompanied by elimination of restrictions on fares, taxi fares might increase because of some of the market imperfections discussed above.

(2) Fares are very much above efficient levels, but they will decline significantly toward the efficient level as a result of elimination of entry restrictions and revisions in fare regulations. Fares might decline because of a reduction in the regulated fare (or replacement of the regulated fare by a fare ceiling at a lower level). Alternatively, fares might decline because of price competition among taxicabs. This is particularly likely in the radio-dispatch market segment.[87]

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86 Douglas and Miller, 1974a, b, suggest that regulation of airline fares without restrictions on flight frequencies had this effect, which they called the "ratchet effect."

87 See the discussion of the effects of deregulation in Seattle in Section VI.

B. Regulation in Practice

Although theoretical justifications can be offered for some taxicab regulations, there are four reasons for skepticism concerning whether such taxi regulations would generally increase efficiency in the real world. First, regulation has inevitable administrative costs for governments and cab companies. In recent years complaints about administrative costs have focused on the process of changing regulated fares.

Second, the analytical and informational problems involved in determining the efficient levels of the relevant policy variables are great. It is one thing to argue that market imperfections might lead to an inefficiently high taxi fare. It is another to figure out what fare would be efficient. Many of the agencies that regulate taxis (e.g., police departments) have no economic expertise. Verkuil (1970, p. 693) reports that "rate regulation in New York is completely haphazard."

Third, most regulations impose an inefficient uniformity on the market. For example, it might be efficient to have different qualities of cab service available at different fares. However, fare or quality regulations might lead to a homogeneous service. Also, fare regulations and requirements to use meters are likely to interfere with efficient variations in fares between peak and off-peak periods, between different parts of the city, and between radio-dispatch and cruising service, and they are apt to interfere with the market's ability to reallocate resources in response to changes in costs and demand.

Fourth, and probably most important, the evidence suggests that taxi ordinances and the government agencies that regulate taxis may not be motivated primarily by concern for market failures and achievement of an efficient resource allocation. This is apparent from the fact that a number of common regulations (e.g., restrictions on entry, minimum fares, and ride sharing) have no persuasive efficiency justification. The following subsection discusses some of the apparent motivations behind taxi regulations other than prevention of market failures.

1. Motivations for Regulation

a. Protection of Public Transit and Taxis

An important motivation for taxi regulation, particularly for restrictions on entry and on the range of services offered, has been protection of public transit systems and existing taxi firms from competition.[88] Entry restrictions enable taxi owners to earn a return on their investments that is greater than that available in other activities. This conclusion is supported by the review of the history of taxi regulation in the following subsection and by the data on medallion prices in Table 5.

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[88] Taxi regulations protect the owners of taxi companies; there is no reason to expect the drivers to benefit unless they are also owners. On the contrary, if the supply curve for drivers is upward sloping, drivers would be made worse off by regulations that reduce the derived demand for their labor. This matter is discussed further in Section V below. Palmer, 1983, Ch. 3, p. 11, reports that in 1977 in London, Ontario, the "City Council was initially hesistant about increasing fares until it was pointed out to them that a taxi fare increase would generate additional bus ridership, reducing the necessary subsidy to the bus system."

b. Promotion of City Image

To some extent, taxi regulations may have been used to create taxi systems that would appeal to high-income business people and tourists visiting the city, as well as to high-income local residents. To the extent that local business interests and high income people have more political power than lower income people, taxi regulations may have been used to create a transportation system more appropriate for people on expense accounts than on fixed incomes.

There is some evidence that regulation of taxicabs in Atlanta and San Diego may have been supported mainly by non-taxi businesses concerned with the convention trade. Paratransit Services (1983, pp. 6-7) reports that:

> "In the 1970s, Atlanta emerged as a major commercial and convention center. These changes alerted the business community that Atlanta's taxicab industry was a key element in creating a progressive and attractive image for the city. These concerns were highlighted by frequent visitors' complaints about taxicab service. In fact, the concern among business leaders was so great that the Atlanta Chamber of Commerce donated staff resources to draft a new ordinance.[89]

c. Self-Interest of Regulators

The nature of taxi regulations may also have been influenced by the self-interest of regulators, according to Eckert (1973). Economists modeling bureaucracies and regulatory agencies often assume that the decision makers are utility maximizers who pursue economic efficiency only to the extent that it contributes to

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89 Atlanta's experience with open entry and regulation is discussed in more detail in Section VI.

their own utility. Thus, they predict that these agencies may sacrifice efficiency in order to increase the level of regulation where this would lead to an increase in salaries. Alternatively, they predict that these agencies may sacrifice efficiency in order to minimize their work load.

This framework has been applied to taxi regulators by Eckert (1973), who hypothesizes that the form of taxi regulation will be different when there is a permanent regulatory agency run by career bureaucrats (e.g., a police department) than when there is a regulatory commission consisting of unpaid members appointed for limited terms. This is because of the different incentives of the two types of officials. He hypothesizes that career bureaucrats will have an incentive to increase their salaries, and hence the sizes of their bureaucracies and the amount of regulation, while appointed commissioners will have more incentive to simplify their jobs and hence reduce the number of taxi firms they deal with. He finds, inter alia, that regulatory commissions are more likely to grant monopoly franchises, to set up exclusive cab stands, to impose uniform rates, and to disallow leasing of cabs. All of these regulations limit the number of parties that the commissions must deal with.[90]

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90 In each comparison, Eckert finds statistically significant differences between bureaucracies and commissions. However, Eckert's results are not particularly strong and the dividing line between commissions and bureaucracies is not bright. In addition, usable data exist on only six commissions in the set of 33 cities. Eckert, 1970, uses this model to rationalize taxi regulation in Los Angeles in the 1920s and 1930s.

d. Quality of Taxi Service

It is sometimes argued that a combination of minimum fare regulations and entry barriers is justified to raise the quality of taxi service.[91] The argument is that this combination would increase the profitability of taxi rides but prevent the dissipation of profits through entry of additional cabs. If the number of cabs was large enough so that cabs were not fully utilized, cab firms would allegedly have an incentive to increase the quality of their vehicles and drivers in order to attract more riders.

There are serious problems with this argument. It would apply only to aspects of quality that riders can readily evaluate and only to taxi market segments in which cabs are able to compete on the basis of quality, e.g., vehicle appearance in the radio-dispatch segment. However, there is no reason to expect the unregulated market to under-supply quality in these cases. Thus, if the regulations being considered here did in fact increase quality, one would expect such increases to be inefficient, i.e., not worth their cost.[92]

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91 Gallick and Sisk, 1984 suggest this justification for minimum fare regulations. They do not suggest entry barriers in this context.

92 Regulations that held up airline fares led to inefficiently high levels of service, which people did not want to pay for. Douglas and Miller, 1974a, b.

These regulations would do nothing to deal with the two potential quality problems we identified earlier as possible justifications for government intervention. The first problem might occur where fares are subject to ceilings and search costs limit quality competition (e.g., in the cruising cab segment and at airport cab stands).[93] The second problem might occur in the case of aspects of quality that riders cannot evaluate, or can evaluate only at a high cost.[94] While quality might be under-supplied in both these situations, regulations that would increase the profitability of cab service would not provide firms with an incentive to increase the quality of service in such cases. Thus, these regulations would not be a substitute for direct quality standards.

In any event, it is obvious from the high market prices of medallions (see Table 5 below) that a large share of the excess taxi firm profits that result from entry barriers are not used to increase the quality of service, even when there are minimum fare regulations.

e. Other Suggested Justifications for Regulation

It is sometimes suggested that taxi licensing is motivated by government revenue considerations, but this is refuted by the low license fees charged. These fees capture only a small share

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93 See Section IV.A.4 above.

94 See Section IV.A.7 above.

of the above-normal returns earned in the taxi industry. Revenue is not a significant consideration except in the case of exclusive franchises at airports, which are occasionally sold to the highest bidder.[95]

It has been suggested that taxi regulations reduce accident rates or costs. However, special concern about accident rates for taxis beyond that for other road vehicles appears to be unjustified; taxis do not have a higher accident rate per mile than do other automobiles.[96]

It has been argued that taxi regulations reduce criminal activity on the part of drivers and associated law enforcement costs. While this might be true for regulations concerning driver qualifications, this does not provide a rationale for other taxi regulations.[97]

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95 Kirby et al., 1974, p. 69.

96 Kirby et al., 1974, p. 97. Regulations concerning matters such as driver qualifications and vehicle condition that affect the safety of third parties, including pedestrians, could be rationalized on externality grounds. However, such third-party externalities do not provide a persuasive reason for safety regulations affecting taxis to be different from those governing all drivers and vehicles. On the other hand, it might be efficient to have stricter enforcement of safety regulations for taxis, because the benefits of enforcement would be greater for vehicles that travel more miles per year.

97 For discussions refuting some of the common misconceptions about the benefits of taxi regulation, see Kirby et al., 1974, esp. pp. 92-99, and Kitch et al., 1971, esp. pp. 302-316.

2. History of Taxi Regulation

Prior to 1929 there were three major types of government regulations affecting taxis: (1) maximum fare regulations; (2) consumer protection regulations requiring posting of fares and/or use of meters,[98] licensing of drivers, and insurance coverage; and (3) restrictions on jitney operation, including prohibitions against ride sharing, which were imposed around 1915 to protect streetcar systems from competition.[99] However, there were few (if any) direct restrictions on entry into the taxicab industry or minimum fare requirements that would have limited price competition.[100]

This situation changed dramatically between 1929 and 1937. Many cities passed ordinances that established commissions to regulate the taxi industry and imposed restrictions on entry, minimum fares, and various other requirements. By 1932, eight states had authorized their commerce commissions to regulate taxicabs as common carriers.

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[98] Although a requirement to use meters can be rationalized as a measure to protect consumers from being overcharged, a major political motivation for the requirement was to protect public transit by restricting ride sharing in taxis.

[99] Eckert and Hilton, 1972, provide a detailed discussion of the restrictions imposed on jitneys.

[100] Gilbert and Samuels, 1982, Chapter 5. The 1925 entry restriction in Los Angeles, which is discussed below, is an exception.

While some commentators have suggested that this movement was a response to conditions during the Depression, it appears to have begun during the late 1920s, following taxi fare reductions and a number of fare wars. However, the trend accelerated during the early 1930s, when both car prices and wages dropped. Many unemployed workers entered the taxi industry using rented cars, and as a result taxi fares, occupancy rates, and revenues per cab declined. Pressure for restrictions on the taxi industry came from the American Transit Association, public transit firms, the National Association of Taxicab Owners (which passed a resolution favoring entry and minimum fare controls), and the established taxi fleets.

State and local regulation of entry and fares in the taxi industry coincided with the extension of federal regulations to interstate transportation. The Motor Carrier Act of 1935 imposed federal regulation on entry, routes, and rates in the motor truck and intercity bus industries, and the Civil Aeronautics Act of 1938 imposed federal regulation on the airline industry.

According to Eckert (1970), in 1925 Los Angeles began to restrict entry of new taxi firms on the basis of public convenience and necessity, although this legislation lapsed temporarily during 1928-31. At the same time, Los Angeles established exclusive taxi stands, required use of taximeters, and prohibited advertising of fares. In 1929 it began to restrict the number of vehicle permits. Beginning in 1931 it offered all new permits to existing firms and authorized no new

firms to enter the industry, in spite of applications. Yellow Cab began to establish a monopoly position in 1934 by buying out other firms. Legislation also established maximum and minimum fares. As far as the timing of regulation in Los Angeles is concerned, Eckert (1970, p. 433) notes: "The Depression brought on spurts of intense price competition as the demand for taxi service declined and some firms failed, but all of this followed, rather than preceded, the erection of nearly all significant entry barriers."

Kitch et al. (1971) report that entry restrictions were first imposed in Chicago in 1929. The legal barriers were dropped temporarily in 1931, but no new licenses were issued in spite of applications, and entry controls were reimposed in 1934 by a regulation providing that licenses would be issued only after a showing that they were required by public convenience and necessity. Yellow and Checker bought out other companies during the 1930s. A requirement that taxis use meters was imposed in 1922, and there was a fare ceiling, but in the late 1920s and early 1930s, the ceiling was not binding. In 1934 minimum fare controls were imposed "to eliminate price competition and make taxicab operations more profitable" (pp. 304-05).

Rosenbloom (1968, p. 413) reports that in 1930 Boston limited the number of taxis to 1,575, and no additional licenses had been issued by 1980. Zerbe (1983, p. 1) reports that Seattle also imposed entry restrictions in 1930. The number of taxis was

restricted to one for every 2,500 residents, and fares were specified.

According to Schreiber (1975) and Gilbert and Samuels (1982, p. 66), New York City did not regulate entry or fares, except for a requirement to use meters, until 1937. In 1937 the Haas Act limited the number of taxis to 13,566. No new licenses have been issued since, and as a result of retirement of licences during World War II, the number is now about 11,800.

Efforts to impose entry restrictions and requirements for taxi meters on the Washington, D.C., taxi industry were blocked by Congress.[101]

In 1932-36, there were 93 U.S. cities with populations in excess of 100,000. Table 2 shows how the number of these cities with three types of taxi regulations increased between 1932 and 1936. In addition, as of April 1932 at least 53 cities with populations over 25,000 required taximeters, seven required specially built taxi vehicles, and eight others mandated design features for vehicles.[102] Gilbert and Samuels (1982, p. 73) note: "The taximeter requirement made the taxi operators providers of exclusive-ride service. Unable to provide shared-ride service, taxis could no longer compete with mass transit modes. This was welcomed by the mass transit operators."

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101 Transit Journal 80, January 1936, p. 25, and Eckert, 1973, pp. 93-94.

102 Gilbert and Samuels, 1982, p. 71.

Table 2

Taxi Regulations in U.S. Cities with Populations over 100,000

Type of Regulation	Number of Cities	
	Jan.1,1932	Jan.1,1936
Taxis licensed only after proof that public convenience and necessity requires additional service	33	57
Fixed ceiling on number of permits	$\geq$2	n.a.
Minimum fare regulation	20	34
Taxis required to have insurance or be bonded	66	73*

n.a.: not available

*Four more granted certificates of public convenience and necessity only to financially responsible operators.

Source: Transit Journal 80, January 1936, pp. 23; Gilbert and Samuels, 1982, p. 71.

A contemporary account dealing with 1932 describes in detail how taxi regulations proliferated during this period:

> Briefly the developments of the year may be summarized as follows: Codes, setting forth in detail the regulations for every phase of taxicab operations, were prepared and adopted in three cities with a population of more than 100,000 during 1932. Ten cities enacted laws placing taxis under the jurisdiction of a Public Service Commission or a Taxicab Board, eight required a showing of convenience and necessity before issuing licenses, four required permits or licenses and fourteen adopted measures intended specifically to limit the number of cabs in operation. To drive out the cut-rate cabs and to end rate wars, three cities increased the minimum rate of charge, fifteen established a minimum rate, and two adopted a uniform rate. Seven cities specified a maximum fare, and most of these also set a minimum rate. Flat rate taxis were dealt several serious blows, for three cities eliminated the zone system and fourteen required the installation and use of taximeters. Eleven cities made it compulsory to carry liability insurance, one increased the amount of insurance to be carried, two asked for posting of bonds, and three required a privilege tax or increased the license fee. Measures were passed in six cities to reduce cruising on the streets.[103]

The discussions of the early 1930s emphasize that the motivation behind the regulations was "to drive many cut-throat cabs, operating without authority, from the streets" and to enable the organized cab fleets and transit companies to increase their profits.[104] Restriction of entry was not motivated by a concern for congestion or pollution externalities.[105]

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103 Transit Journal 77, March 1933, p. 84.

104 Transit Journal 77, March 1933, p. 84.

105 Transportation Center, 1958, pp. 61-63.

V. ECONOMIC EFFECTS OF REGULATION

This section discusses the effects of taxicab regulations on industrial structure; on fares, service, costs and related variables; on the efficiency of resource allocation; and on the distribution of income. It also discusses medallion prices and the inferences that can be drawn from them. The discussion here is based on the experiences of cities under regulation as well as the experience of Washington, D.C., with open entry. Evidence from cities that have deregulated in recent years is discussed in Section VI.

A. Effects on Industrial Structure

Four of the taxicab regulations described in Section II.D restrict the number of firms in the taxicab industry and contribute to the development of market power:

1. Franchises

Some cities and airport authorities use franchise requirements to limit the number of firms in the taxicab industry. Exclusive franchises create monopolies.[106]

2. Numerical Restrictions on Taxicabs

If the regulatory authority puts a ceiling on the number of taxicabs, a small number of firms may be able to acquire enough

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106 In Houston, which franchises taxi firms, one company has 80 percent of the licenses.

licenses so that they have market power,[107] even though some licenses may be owned by independent operators. According to Eckert (1970, p. 407), Cleveland provided an example of this sort of market; one company controlled all outstanding licenses.[108] In 1971, Chicago provided another example; two companies with common ownership had 80 percent of the licenses.[109]

However, restrictions on the number of taxicabs do not always lead to market power, i.e., the market may continue to be composed of a large number of firms, each of which is sufficiently small that it continues to act as a price taker, even though each firm may earn an above-normal rate of return.

One way to demonstrate that a firm is exercising market power and that the fare/service combination observed does not result from licensing alone would be to show: (1) taxi medallions command a positive price, and (2) the firm in question is not using all the licenses it has. This situation existed in Chicago in the 1960s and mid-1970s, when Yellow and Checker left a significant share of their licenses unused; in Cleveland in 1978, when the monopoly firm held 576 licenses but operated only

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107 Where the fare is determined exogenously, market power would involve a marginal revenue from vehicle hours of service that is less than the average revenue.

108 Other information indicates that one firm has owned all licenses since 1934.

109 Kitch et al., 1971. Checker Taxi owns 80 percent of Checker Motors, which owns Yellow Cab.

240 cabs; and in Kansas City, Missouri, in 1982, when the city's largest cab operator held 200 inactive permits.[110]

3. Allocation of New Licenses

In addition to restricting the number of taxicabs at any given time, regulatory authorities sometimes have explicit policies regarding the allocation of any additional licenses granted. These allocation schemes can contribute to the anti-competitive impact of regulation.[111]

4. Firm Size and Service Requirements

Municipal government requirements that all taxi firms operate at least a certain number of cabs act as barriers to entry and hence may reduce competition in the taxi industry.

B. Effects on Industry Performance

Government regulations, and the exercise of market power created by those regulations, can be expected to change the nine

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110 Reason, August 1983, p. 16. Kitch et al., 1971, pp. 293-94, 296-97, 299. There may be other examples; according to the review of the industry by Wells and Selover, 1972, p. 8-8, "until recently, most companies experienced driver shortages of as much as 20 percent...This means that many firms have not been able to fully utilize their taxicab fleets." Since it is difficult to imagine how there could be a driver shortage, failure to fully utilize a fleet suggests monopoly restriction of service unless medallion prices are zero.

111 As we noted in Section II.D, in Los Angeles, Yellow Cab had a right of first refusal for new licenses. In Chicago, a 1963 ordinance tightened an agreement made in 1937 and provided that 80 percent of any new licenses would be allocated to Yellow and Checker, so that their dominant position would be preserved in the event of expansion of the industry. Kitch et al., 1971.

aspects of industry performance discussed below. Much of the economics literature on the taxi market is designed to provide predictions about the nature of these effects, particularly effects on fares, cab hours of service, waiting time, and number of rides. Section III describes the formal model of the taxi industry that underlies this discussion.

1. Fare Level

In the absence of mandated fares, most taxi regulations would affect fares. One would expect restrictions on the number of firms, the number of taxicabs, and shared-ride service to lead to higher fares. However, since virtually all cities regulate fares, this effect is not automatic. A city could restrict entry and yet prevent fares from rising, in which case the impact of entry restrictions would be felt by consumers through increased waiting times. Alternatively, a city could mandate a high fare without having other taxi regulations.

There are reasons to believe that regulation has led to higher fares. First, some cities determine fares on the basis of target revenue-cost ratios and rates of return. In these cases, regulations that raise costs or restrict shared-ride service would lead to higher fares, at least in the radio-dispatch market segment in large cities, where price competition is workable. Second, some cities appear to ratify whatever fare taxi firms

request.[112] In these cases, regulation tends to raise the fare to the joint-profit maximizing level. Third, we computed taxi fares for various hypothetical trips in a sample of cities. Table 3 shows the fare for a three-mile trip taken by one person, based on flag-drop and mileage charges. Table 4 compares the fares for various trips in Washington, D.C., based on Washington, D.C.'s zone fares and meter rates in several other cities.[113] Fares in Washington, D.C., which has free entry and a high ratio of cabs per capita (see Table 1), are lower than those in other large cities.[114]

2. Number of Cab Hours of Service

Numerical restrictions on licensing directly reduce the number of taxicabs in service, at least during peak periods, and other entry barriers limiting the number of firms would probably

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112 Eckert, 1970, p. 427, and Kitch et al., 1971, p. 289. Palmer, 1983, Ch. 3, p. 64, reports that fares and revenues per shift were high in Orange County South, California, which franchised only one taxi firm.

113 The figures in Tables 3 and 4 ignore extra charges for idle time, additional passengers, rush-hour travel, etc. Since extra charges vary among cities, the ranking of cities depends to some extent on the omission of these extras. Some of the difference among fares in different cities is explained by the length of time that has elapsed since the last fare increase. Delay in fare increases helps to explain why fares in some cities that have mandatory fares are below those in San Diego, Phoenix, and Seattle, which do not have minimum fares.

114 In Table 4, fares for Washington, D.C., are actual fares. Fares for other cities are based on meter rates for the airline distance of the trip, which is less than the road distance. As a result, fares in other cities are understated.

Table 3

Ranking of Cities by Fare for Three-Mile Taxi Trip by One Person, 1984[a]

City	Fare ($)
Los Angeles	5.90
Pittsburgh	5.00
San Francisco	4.90
Boston	4.75
Philadelphia	4.74
San Diego	4.60
Portland	4.50
Phoenix	4.45
Seattle	4.40
San Jose	4.40
Miami	4.20
Minneapolis	4.15
Denver	4.05
Ft. Worth	4.05
Columbus	4.00
Cleveland	3.95
Cincinnati	3.90
New Orleans	3.90
Houston	3.85
Atlanta	3.80
Jacksonville	3.80
Milwaukee	3.75
Kansas City	3.70
New York	3.70
Memphis	3.65
Chicago	3.60
Detroit	3.60
Dallas	3.60
San Antonio	3.45
St. Louis	3.15
Oklahoma City	3.15
Indianapolis	3.10
Baltimore	2.70

[a] Fares are based on flag-drop charge plus mileage charge only.

Source: New Orleans: FTC Survey.
Baltimore and Oklahoma City: International Taxi Association, Rate Sheet, May 1983.
Other Cities: Joseph M. Chernow, Houston, Texas.

Table 4

Fares in Washington, D.C., and Eight Other Cities, 1984[a]

Description of Trip				
Origin	RFK Stadium	Japanese Embassy	Japanese Embassy	Capital
Destination	Wisconsin and M	Capital	White House	White House
Zone Lines Crossed	3	1	1	0
Airline Distance (mi.)	5.21	3.07	1.59	1.54
Fare ($)				
Washington, D.C.[b]	3.90	2.45	2.45	1.70
Los Angeles	9.10	6.10	3.90	3.90
San Diego	7.40	4.80	3.00	3.00
Seattle	7.20	4.60	2.80	2.80
Minneapolis	6.75	4.35	2.75	2.55
New Orleans	6.30	4.10	2.50	2.50
New York	5.60	3.70	2.40	2.30
Chicago	5.60	3.60	2.30	2.30
Baltimore	4.10	2.80	1.90	1.90

a Fares for other cities are meter rates for airline distance.

b Add $.65 for phone hails vs. street hails.

c Washington's zone system can cause trips of equal length to be priced differently if a different number of zone lines are crossed. This accounts for the $.75 difference in the price of a 1.54 mile ride versus a 1.59 mile ride.

Sources: D.C. fare and zone data: District of Columbia, Public Service Commission, Taxicab Zone Map.
New Orleans: FTC Survey.
Baltimore: ITA Rate Sheet, May 1983.
Other Cities: Joseph M. Chernow, Houston, Texas.

reduce the number of cabs in service below the competitive level. Studies of Chicago and Los Angeles suggest that firms with monopoly power reduced the number of cabs below the number licensed.[115]

The fact that entry restrictions have in fact reduced the number of taxicab licenses is clear from Table 1. These data reveal that the cities without entry restrictions (Atlanta in 1970 and Washington, D.C. in 1970 and 1983) had the highest ratios of taxicab licenses per resident.[116] Similarly, in 1970

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[115] Kitch et al., 1971, and Eckert, 1970. The conclusion that monopolization would lead to a reduction in the number of cabs in service is not a necessary result of profit maximization provided fares are not effectively regulated. An industry organized as a monopoly may produce a higher quality of output than the industry would produce if it were perfectly competitive. Sheshinski, 1976, and Spence, 1975. In formal models of public transit or taxicab markets, the number of buses or cabs enters as quality does in the Sheshinski and Spence models. Frankena, 1982, Appendix C.

[116] Differences in the ratios of taxicab licenses per resident in cities with and without entry restrictions overstate differences in the number of cab hours of service per resident for two reasons. First, where entry is restricted, the number of cab hours of service per licensed cab is generally higher. See also footnote 3 above. In Washington, D.C., many cabs are in service only a few hours per day. Palmer, 1983, Ch. 3, p. 42, reports that 65-70 percent of taxi owners drive only part time. McGrath, 1976, pp. 238-39, reports that in Washington, D.C., 85 percent of taxis are operated part-time and that on average drivers operate their vehicles 4.33 hours per day. Second, these data include only fully licensed cabs. In some cities where entry is restricted, particularly New York City, livery cabs and vehicles operating illegally as cabs without licenses provide a significant number of cab hours of service. Kirby et al., 1974, pp. 76, 78, 87. Gelb, 1983a, b. On the other hand, in some cities (e.g., Chicago) firms with monopoly power leave many of their cabs idle, and hence Table 1 overstates the number of cabs for these cities. Kitch et al., 1971.

Honolulu did not have entry restrictions and had a high ratio of licenses (4.3 per thousand).[117]

Other regulations (e.g., fares) can be expected to affect the number of cab hours of service by changing the incentive to enter the industry.[118] In at least some cases, fare regulations do not provide for an efficient peak/off-peak fare differential, and hence they do not provide an incentive for an efficient increase in the number of cabs in service at rush hour.[119] Although Washington, D.C., now imposes a $.65 surcharge on taxi trips during the afternoon rush hour, there was no such surcharge in the early 1970s. Discussing that period, Kirby et al. (1974, p. 15) report that "even with free entry conditions, Washington, D.C., suffers from an undersupply of taxicabs in the rush hours, largely because the fare structure fails to reflect the increased costs of operation during those hours. While the number of

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117 Rosenbloom, 1983, p. 6. Meyer and Kain, 1970, p. 86, state, without presenting supporting evidence, that "removing entry barriers and other controls might expand the number of taxis by as much as two and a half times in most American cities."

118 See the model in Section III, Figure 1.

119 In most cities, taxis use meters that charge for time delays, and hence the fare per mile is higher when streets are congested. However, this does not necessarily produce an equal or higher revenue per hour at rush hour, which would be necessary to cover costs. Also, some cities do not allow meters to charge for time delays, and some cities use zone systems where fares do not vary with time of day.

taxicabs operating is at a maximum during the middle of the day, passengers search in vain for a cab at 5:00 P.M."[120]

3. Waiting Time

Any regulatory policy that affects the number of cabs or the demand for their services will affect the average waiting time. In general, taxi regulations, particularly entry restrictions, have probably led to an increase in average waiting time.[121] Restrictions on cruising have presumably done the same.

4. Number of Trips

Any regulatory policy that affects the fare or waiting time will affect the number of taxi rides demanded. Taxicab regulations have probably increased average fares and/or waiting times, at least for radio-dispatch service, and therefore reduced the number of taxi trips. Kirby et al. (1974, p. 284) report that the number of taxi rides per capita in Washington, D.C., where entry is not restricted and fares are low, is over four times as high as in San Francisco, a comparable size city where entry is restricted and fares are higher.

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120 Inefficient fare structures and monopoly power created by entry barriers can reduce the amount of taxi service. Cities may attempt to counteract these adverse effects of their regulations by imposing additional regulations requiring taxicab firms to provide certain minimum levels of service. See Section IV.A.10.

121 Kirby et al., 1974, p. 92. However, a city could use regulations to reduce waiting time if it set a high fare and did not restrict entry.

5. Quality of Service

Regulations concerning driver qualifications, vehicle safety, and insurance coverage, would increase the quality of taxi service.

In addition, high regulated fares combined with entry restrictions could encourage taxicabs to compete for customers by offering higher quality service, e.g., more comfortable cabs. However, one would not expect cruising cabs or cabs using first-in-first-out stands to compete on the basis of quality, and cabs would not compete on the basis of aspects of quality that consumers cannot evaluate. A study of cities in England concluded that restrictions on the quantity of taxi service do not noticeably increase quality of service as measured by passenger complaints but do lead to operation of higher-value vehicles.[122]

In cruising cab and airport cab stand market segments, maximum fare regulations could also lead to lower quality even if the maximum fares are not set at inefficiently low levels.[123] Of course, inefficiently lower mandatory fares could lead to low quality service in all market setments.

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[122] Coe and Jackson, 1983. See Section IV.B.1.d. Airline deregulation did lead to a decline in quality, e.g., no-frills service; this was presumably efficient.

[123] See Section IV.A.4.

6. Cost of Producing Cab Service

Regulations that increase the quality of service would increase the cost per hour of operating a taxicab. Fare regulations based on a rate-of-return criterion could do the same by encouraging inefficiently high use of capital.[124]

Other regulations increase the cost of producing taxi rides by reducing the utilization rate of taxis, i.e., reducing the percentage of hours and miles taxis are occupied. For example, taxicab licensing prevents cabs licensed in one jurisdiction from picking up passengers in another jurisdiction. Thus, a cab licensed in jurisdiction A can pick up a passenger in jurisdiction A and bring him/her to a destination in jurisdiction B, but must then return empty. This "deadheading" is common in metropolitan areas that are fragmented into independent political jurisdictions and in cities where a company has an exclusive franchise on picking up customers at the airport.[125] Deadheading increases the cost of producing taxi trips, and typically the extra cost is passed on to customers in the form of higher fares, including fare surcharges, higher waiting times, or refusal of service.[126]

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124 Averch and Johnson, 1962.

125 De Vany, 1977, p. 5.

126 Metropolitan Dade County, 1979, and De Vany, 1977, pp. 31-32. De Vany, 1977, pp. 22-23, provides an estimate of the cost of deadheading and refers to a 50 percent surcharge in San Francisco.

Requirements that taxicabs operate at least a certain number of hours per day or days per year or provide service to a certain area would raise the costs of entering to serve high-demand periods or areas. Effectively, operation of taxicabs in high-demand periods and areas would be taxed and the proceeds would be used to cross-subsidize operation of taxicabs in low-demand periods and areas.

Requirements that companies given exclusive franchises maintain at least a certain fleet size may reduce utilization rates and increase costs. The same is true when regulated fares are set at a high level that attracts a large number of entrants to the industry or to long cab lines.

Restrictions on shared-ride service increase the cost of taxi service per passenger mile. Taxicab regulations also involve administrative costs for regulatory authorities and cab companies.

7. Allocation of Cabs

The taxi industry does not produce a homogeneous service. Rather, service is differentiated by the way cabs and riders make contact (e.g., cruising, ranks, dispatch), by location, by trip length, and by time of day. Regulations may cause distortions in the allocation of resources for one type of service without similar effects on others, and regulations may affect the allocation of resources among various service types.

For example, restriction of entry into the taxi industry could reduce significantly the number of cabs available during peak periods but have little effect during off-peak periods.

Also, given an overall limit on the number of taxis, regulations governing the structure of fares can have important effects on how the available cabs are allocated among services. Schroeter (1983) analyzes the effects of fare structure on the allocation of cabs between airport service and radio-dispatch service. He shows that regulations may lead to an inefficiently high allocation of service to the airport. The problem is that fares for airport service may be so high relative to those for radio-dispatch service that cabs will be willing to wait in a long queue to pick up riders at the airport.

The structure of regulated fares also leads to an inefficiently low supply of, or refusal to supply, certain types of service.[127] Most of these problems arise because regulated fares do not vary appropriately where there are variations in marginal costs among different categories of trips.

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127 Service refusal in Chicago, Washington, D.C., and New York City is discussed in Kitch et al., 1971, p. 291, Olson and Kuehl, 1976, p. 67, McGrath, 1976, p. 241, and Regulation, March/April 1982, p. 13.

For example, when taxis must wait in queues for passengers, taxis may refuse to accept riders who want to take short trips.[128] Where there are no surcharges for radio-dispatch service, taxis sometimes do not respond to phone hails.[129] When fares are uniform, taxis may refuse to pick up passengers who they think will give small tips or who want to go to areas where cabs are unlikely to find a return fare or that are not safe.[130] Where there are no rush hour surcharges there may not be an adequate incentive for part-time drivers to provide rush hour service even where licensing restrictions would not prevent entry. Taxis may in fact be withdrawn from service at rush hour if reduced search time for passengers, elapsed time premia, and rush hour

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128 New Orleans and Seattle have separate airport taxi queues for long and short trips. On the other hand, where cabs do not have to wait in line for passengers and there is an excess demand for cabs, prevalent fare structures may make cabs prefer short trips because of the flag-drop charges. Verkuil, 1970, p. 679, reports a shortage of cabs for long trips at rush hour in New York City.

129 Kirby et al., 1974, p. 106.

130 Eckert, 1970, p. 451, reports that in Los Angeles there was a shortage of cab service in residential areas because fares did not vary with cost and demand conditions. He suggests a surcharge to provide an incentive to supply service to such areas. Low income areas may experience the greatest reductions in service as a result of uniform fare regulation combined with entry restrictions. Kitch et al., 1971, p. 291, refers to "the persistent refusal of many drivers to carry passengers into the poor black areas of the city" in Chicago. Palmer, 1983, Ch. 3, p. 91, reports that certain areas of Los Angeles, Washington, D.C., and Toronto also received poor service because of uniform fare structures.

surcharges do not compensate for the extra congestion.[131] Or they may be withdrawn from service at night and weekends if there are no surcharges to compensate for the higher cost to the cab of searching or waiting for passengers.

The structure of fares may also distort the demand for service. In the absence of rush hour surcharges, riders will have an inadequate incentive to travel during off-peak periods. Since parties of two or more people travelling together cost virtually no more to carry than a single rider (as long as ride sharing by independent parties is not allowed), surcharges for extra passengers may discourage efficient group riding. Regulations that interfere with charging lower fares for each party using shared-ride service discourage efficient ride sharing.

It seems probable that entry restrictions lead to a shift from cruising service to radio-dispatch service. Such restrictions would increase the opportunity cost of cab search time relative to passenger waiting time. They would also reduce the density of taxi rides and hence the profitability of cruising service compared to radio-dispatch service.[132]

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131 Kirby et al., 1974, p. 15, and McGrath, 1976, p. 241, report that prior to approval of evening rush hour surcharges, Washington, D.C., suffered from an undersupply of taxicabs during rush hour.

132 This is consistent with the low market share of radio-dispatch service in Washington, D.C., which does not have entry restrictions.

8. Types of Service

Government restrictions on the types of services that taxis can provide and prohibitions on some services that would substitute for conventional taxi service reduce the range of services available.

For example, some cities prohibit cruising. This may or may not reduce road congestion (see Section IV.A.1) and presumably increases passenger waiting times.

Many cities prohibit, or impose regulations that effectively eliminate, shared-ride service. Even in the absence of other restrictions, this increases the cost of taxi service, although it also increases its speed and privacy. A prohibition on shared-ride service reinforces any limit on the number of cabs by preventing more intensive use of cabs.

Prohibitions on shared-ride service and other regulations prevent taxis from operating as jitneys.[133] Recent studies suggest that in some situations jitneys would be more efficient than conventional taxi or bus service.[134] Jitneys do operate in

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133 As a matter of historical interest, jitney operation was deliberately made unprofitable by a variety of government regulations around World War I. See Eckert and Hilton, 1972.

134 Boyd, Asher, and Wetzler, 1978. See also Meyer et al., 1965, p. 356.

a few cities where they are tolerated,[135] and flourish in a number of cities in Latin America, the Middle East, and the Far East.[136]

9. Effects on Other Markets

As we discussed in Section IV.A, taxi regulations may affect levels of road congestion, air pollution, and public transit use.

C. Effects on Efficiency of Resource Allocation

A basic question in evaluating a regulation is whether the total benefits of the regulation would exceed the total costs, where benefits and costs are measured with reference to willingness to pay on the part of all affected parties. The relevant effects have been described in Sections V.A and V.B.

Suppose that the government of a jurisdiction without taxi regulations is considering imposing an ordinance that would restrict entry into the taxi industry and significantly reduce the number of taxis. It is reasonable to expect that this would

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135 Anaheim (linking tourist attractions), Atlantic City (on Pacific Avenue), Baton Rouge (between downtown and a suburb), Chattanooga (in low income areas), Chicago (on King Drive), Cleveland, Indianapolis (along major bus routes during peak periods), Los Angeles (competing head-to-head with public transit), Miami (between downtown and a suburb), Pittsburgh (between downtown and low income areas), San Diego (which had minimal regulation), and San Francisco (on Mission and Third streets) Kirby, 1980, p. 12; Reason, September 1981, p. 17, October 1982, p. 15, and April 1983, pp. 17-18; Kitch et al., 1971, p. 293; Eckert and Hilton, 1972, p. 323. Kirby et al., 1974, Chapter 9, describes several of these services. In Chicago, Checker Cab reportedly was interested in introducing a fleet of 15-passenger jitney vans to operate over abandoned bus routes and in parallel with city buses between 9 p.m. and 5 a.m. with a $1.50 fare, but Chicago ignored the proposal. Reason, September 1981, p. 17.

136 Kirby et al., 1974, pp. 182-85.

lead to a decline in the total number of vehicle hours of taxi service (in spite of an increase in the number of hours of service per vehicle); an increase in the average waiting time; an increase in fares; service refusals; and a decline in total ridership.[137]

How would one determine the efficiency of the proposed regulation? On the cost side, there are several items: (a) for trips that would continue to be made by taxi, there would be an increase in waiting time cost; (b) for trips that would be made by another mode, there would be an increase in cost compared to what the cost would have been by taxi; (c) for trips that would no longer be made by any mode, the excess of what people would have been willing to pay for the trips above their cost would be lost; and (d) there would be costs of establishing and administering the regulation.

On the benefit side, there would be a reduction in the use of resources by the taxicab industry because of an increase in the vehicle occupancy rate.[138] There might also be a reduction

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[137] In computing the effects of regulatory policies, it would be useful to have information on (i) the elasticity of demand for taxi rides with respect to taxi fares and waiting time, (ii) the cross elasticities of demand between taxi rides and other urban transportation modes, and (iii) the value of waiting time. The median of seven available estimates of the fare elasticity of demand for taxi rides is -0.8. The available evidence on (i) - (iii) is summarized in Appendix B.

[138] These costs and benefits are shown graphically in Tolley et al., 1984, Figure 2-3.

in road congestion and air pollution, but it is not clear that this would occur.[139]

Other things equal, these costs of regulation would be greater in cities that do not have transportation modes that substitute closely for the regulated taxis. Thus, the costs will be greater if public transit service is poor or nonexistent. The costs will be lower if illegal, unregulated "gypsy" cabs are tolerated.

There is virtually unanimous agreement among economists that existing combinations of restrictions on entry into the taxi market, minimum fares, and ride sharing are inefficient and the source of significant welfare loss, including consumer injury.[140] Some of the more obvious ways in which the allocation of resources under existing regulations is inefficient include: (a) the number of taxi rides taken is inefficiently low, because of regulations that raise fares, restrict the level of taxi service, and increase waiting times; (b) the cost of producing taxi trips is unnecessarily high, because of regulations that prevent ride sharing or that increase deadheading and the length of taxi

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[139] This justification for taxicab regulation was criticized in Section IV.A.1. Certain effects of regulation are neither aggregate benefits nor costs. Aggregate benefits and costs consist exclusively of changes in the output levels of goods and services that people care about and changes in the levels of scarce inputs that are used to produce them. Thus, the fare increase itself and the resulting change in total expenditure on taxis do not count as benefits or costs.

[140] An exception is Gallick and Sisk, 1984.

lines; and (c) there are shortages of certain types of service because of the incentives provided by fixed fare structures.

There are, however, few empirical estimates of the welfare loss due to regulation. Beesley and Glaister (1983, p. 611) calculate the welfare effects of reducing the regulated fare and introducing licensing that would restrict the number of cabs in London, England. They estimate that a 10 percent reduction in the fare with continued free entry would have produced a net social gain of $721 (at the 1984 exchange rate) per hour in 1978. They estimate that a 20 percent reduction in the number of cabs below the free entry level would have caused a net social loss of $2,744 per hour. Assuming these two effects occur 10 hours per day, 250 days per year, the annual amounts would be $1.8 million and $6.9 million respectively.[141]

De Vany (1977, p. 32) provides a calculation of the gains from eliminating the unnecessary deadheading that resulted from the former exclusive airport franchise in Dallas/Fort Worth. His calculations suggest a gain of at least $0.7 million per year (as of 1977) from this action alone.

In spite of the limited number of empirical estimates of welfare losses, comparisons of Washington, D.C., as well as Atlanta and Honolulu as of 1970, with cities with entry barriers

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[141] Tolley et al., 1984, p. 11, estimate the annual welfare loss from entry restrictions in the U.S. taxi industry at $62 million. However, this estimate should not be given much weight, because it arbitrarily assumes that free entry would reduce fares by 11 percent and not affect average waiting time or the cost per cab ride.

(see Section V.B) and comparisons in cities before and after deregulation (see Section VI) provide suggestive evidence that entry barriers are inefficient.

No studies evaluate the efficiency of regulations aimed at quality, e.g., vehicle condition, driver qualifications, and insurance requirements, and economists generally have not criticized them.[142]

D. Effects on the Distribution of Well-Being

Arguments based solely on efficiency or total benefits and costs do not consider distributional effects. It is important to establish who the gainers and losers from regulation are.

1. Losers

a. Consumers

The principal losers from regulation of the taxi industry are consumers of the services whose prices and/or waiting times increase and consumers of types of services that are not offered as a result of regulation. Consumption of taxi services varies among income groups, and regulation therefore has different effects on the average members of different income groups.[143]

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142 The regulations that were used to eliminate jitneys around 1915 are an exception; these are criticized by Eckert and Hilton, 1972.

143 There are other patterns apart from those by income, e.g., people aged 60 and over take more taxi trips per capita than do younger people. Webster et al., 1974, p. 3-3.

The income distribution of taxi users probably varies from one type of service to another and among cities with different levels of population and public transit service. For example, on average, users of cruising cabs and airport service probably have higher incomes than do users of radio-dispatch service.[144] On average, users in large cities probably have higher incomes than do users in small cities. This is a plausible result of different patterns of automobile ownership and transit availability.[145] And on average, users in cities with good public transit service probably have higher incomes than do users in other cities.[146]

Data indicate that lower income people spend a larger percent of their incomes on taxis than do higher income people.[147] Other sources indicate that in many cities consumption of taxi rides per capita, and not simply the share of income spent on

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[144] According to Schroeter, 1983, p. 91, describing Minneapolis in 1979, "the view within the industry and among municipal regulators seems to be that the typical daytime radio dispatch trip serves welfare recipients on shopping or health care visit trips."

[145] In small cities, high income people have a very high level of automobile ownership and would seldom use taxis, while low income people who do not own cars would use taxis because public transit service is poor or not available.

[146] Apart from people with disabilities and emergency situations, only people with a high value of time would ride taxis if transit service was very good.

[147] Frankena, 1979, for Canadian cities, and Weaver and Herrin, 1974, Table 3, for elderly people in Champaign-Urbana.

taxi rides, is higher for lower income people.[148] Allred et al. (1978, p. 22) cite several studies that reach this conclusion: a 1964-70 national study of major urban areas, a 1963 Boston study, a 1969 Brooklyn study, a 1970 Pittsburgh study, and a 1976 study of eight small- to medium-sized urban areas in North Carolina.[149] A 1977 Dallas study reported by Eisenberg and Barker (1980) also reached this conclusion.[150]

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148 Regulations will be regressive if they increase waiting time, if the value of time is proportional to income, and if low income people take more trips per capita. However, regulations that increase waiting time may deter proportionately more high income people from using cabs.

149 A 1956 Chicago study and a 1969 New York City study did not support this conclusion, but the Chicago study was based on average incomes in different areas of the city rather than individual incomes, and the New York City study ignored gypsy cabs and radio-dispatched livery vehicles.

150 See also Kirby et al., 1974, pp. 113-120, and Webster et al., 1974, pp. 3-1 to 3-13. A study of the occupational characteristics of taxi users based on data from Chicago in 1956, Pittsburgh in 1963, and the New York Tri-State area in 1969 concluded that in large cities "taxis are ridden mostly by housewives (family income probably well above average), and white-collar workers, particularly in the professional and managerial categories. Most riders are white, of working age, and their rides are either to home or to work. On the other hand, significant percentages fall outside these categories. Service and household workers often ride cabs to noncentral area destinations, and the Pittsburgh Area Transportation Study indicated substantial ridership (26 percent) by students and unemployed, retired, and incapacitated persons." Wells and Selover, 1972, pp. 8-14. It is important not to misinterpret the latter evidence. In determining the distributional effects of reducing the cost of taxi service, one should be concerned with the ratio of expenditures on taxis to income for different groups, not the share of total taxi rides for different groups.

b. Workers

If the supply of drivers to the taxi industry is less than perfectly elastic, then regulations that reduce the number of vehicle hours of taxi service will reduce the wages of taxi drivers, making drivers worse off. If the opportunity cost of workers who do not get jobs as drivers as a result of the regulations is less than what they would have been able to earn as drivers, then such regulations will make these other workers worse off as well. Most of the workers in question are low skilled, and existing taxi regulations therefore restrict employment opportunities for low income and minority urban workers.[151]

On the other hand, Eckert (1970, p. 436) suggests that monopolization of the Los Angeles taxi market as a result of government regulations led to sharing of monopoly profits with the unionized drivers. He reports that Yellow Cab's drivers were the highest paid in the nation in 1961. Even if Eckert is correct, however, this argument would not apply in most cities; Gilbert and Samuels (1982, p. 95) report that unions have not been very successful in organizing the taxi industry.[152]

In Minneapolis, a city ordinance specifies that drivers are to receive a certain percentage of fares. This could lead to a sharing of excess profits with drivers.

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151 Meyer and Kain, 1970.

152 The exceptions are large fleets, including those in Chicago and New York.

c. Taxpayers

There are a number of government programs that provide subsidies for taxi service for certain users, e.g., Seattle provides 40-60 percent subsidies to elderly or disabled riders with low incomes. Taxi regulations that raise fares increase the cost of these programs to governments and hence taxpayers.

2. Gainers

The principal gainers from regulation of the taxi industry are the people who obtain or obtained licenses, medallions, and exclusive franchises at prices below their market prices or the present discounted value of future above-normal profits. Many of these people have already sold their medallions or shares in taxi companies. Some current owners of taxi medallions or shares in taxi companies purchased them in the recent past at market prices that fully reflect their current value; these people have not gained from regulation.

E. Inferences from Medallion Prices

Prices for taxi medallions (see Table 5) are in the range $9,000-$25,000 in many large cities with entry restrictions and run as high as $60,000 in New York City.

The existence of positive medallion prices is evidence that entry restrictions have raised the rate of return in the taxi industry above the competitive rate in the rest of the economy, and that taxi regulations have led to an inefficient allocation of resources. Assuming a real (after removing the effect of

Table 5

Prices of Taxicab Medallions

City	Type of License	Year	Price ($000)	Source
Atlantic City	Jitney	1972	$3	Kirby et al., 1974, 169,177.
Boston	Taxi	1983	$32-$33	Wainwright, 1984.
Cambridge, Mass.	Taxi	1983	$20-$25	Wainwright, 1984.
Chicago	Taxi	1970	$15 or more	Kitch et al, 1971, 299.
Dallas	Taxi	1976	$3	Olson and Kuehl, 1976, 53.
Houston	Taxi	1983	$10-$12	Wainwright, 1984.
Indianapolis	Taxi	1980	$.4-$.5	Gilbert and Gelb, 1980, 11.
London, Ontario	Taxi	1978	$2.5-$3.5	Palmer, 1983, Ch. 3, 13, 20, 31.
Miami	Taxi	1979	$18	Metro. Dade County, 1979.
Minneapolis	Taxi	1983	$8-$12	Minn. Star Tribune, 17 Jan. 1983, B1, 27 Jan. 1983, B1.
Newark	Taxi	1983	$9	Wainwright, 1984.
New Orleans	Taxi	1976	$3	Olson and Kuehl, 1976, 53.

Table 5 (continued)
Prices of Taxicab Medallions

City	Type of License	Year	Price ($000)	Source
New York City	Taxi[a]	1983	$50	New York Times, 16 Feb. 1983, A30.
	Taxi[b]	1983	$60	
Oakland, Calif.	Taxi	1979	$2-$3	Wainwright, 1984.
Portland, Ore.	Taxi	1979	$3-$9	Kirby, 1980, 23.
San Diego	Taxi	1979	$8-$15	Colman, 1980, p. 21; Wainwright, 1984.
	Taxi	1983	$1-$2	Wainwright, 1984.
San Francisco	Jitney	1972	$2-$2.5	Kirby et al., 1974, 169, 177.
	Taxi	1983	$15-$20	Tolley et al., 1984, p. 72
Seattle	Taxi	1967-1979	$1-$12	See Section VI.
Somerville, Mass.	Taxi	1983	$25	Wainwright, 1984.
Toronto, Ontario	Taxi	1978	$26.5	Palmer, 1983, Ch. 3, 13, 20, 31.

[a] Fleet.

[b] Independent.

inflation) annual interest rate of 10% and a perpetual license, a medallion price of $20,000 implies excess after-tax profits (i.e., revenues minus all opportunity costs but excluding the cost of the medallion) of $2,000 per cab per year.[153]

While these medallion values are likely to be correlated with the welfare loss from regulation, the magnitude of the efficiency loss from regulation is not measured by the medallion price. For example, in the absence of a limit on the number of cabs, there can be no medallion values; yet, regulation of fares and service could cause efficiency losses. Even if there is a limit on the number of cabs, a regulation that raises the cost of producing taxi service without yielding any benefits to riders causes an efficiency loss, but there is no corresponding profit for producers or medallion value. Also, if the demand for taxi service is very insensitive to price, regulations that cause a small reduction in the supply of taxi service will result in a large increase in fares, profits per taxi, and medallion prices. Nevertheless, the change in the allocation of resources caused by the regulations, and the welfare loss from this misallocation of resources, would be small relative to the transfer that occurs from consumers to suppliers.

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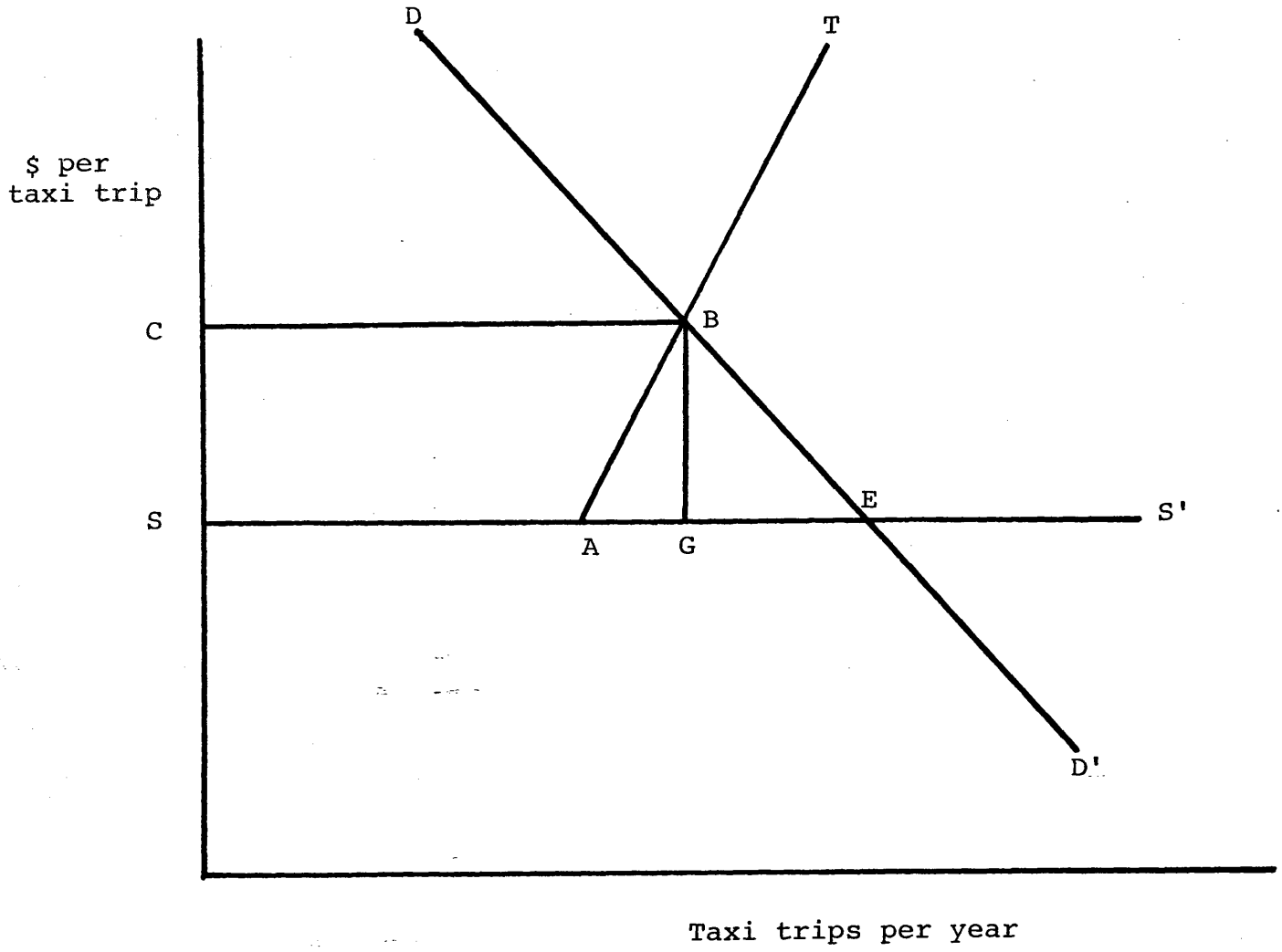
153 Palmer, 1983, Ch. 3, pp. 21-25, computes that the internal rate of return before taxes on taxi licenses in London, Ontario, in 1977 was 16 percent per year. In 1983, Chicago taxi medallions were leased for $8,600 per year. This would be the annual excess profits per cab before taxes and the $200 annual license fee. Campbell v. City of Chicago, Civil No. 83-C-3884 (N.D. Ill., E.D., filed Sep. 22, 1983).

A graphical analysis of a simplified taxi market (which ignores the role of waiting time) may be useful in clarifying this last point. Suppose that in Figure 2 the demand for taxi the trips is given by DD', the supply in the absence of regulation of number of cabs is given by SS', and the supply with a restriction on the number of cabs is given by SAT. Suppose also that there is no regulation of fares. Then the equilibrium points without and with the restriction on cab numbers would be E and B respectively. The combined annual rental value of the medallions when the number of cabs is limited would be the area SABC; this is also the annual amount of above-normal profits that would accrue to the taxi industry as a result of the restriction on entry. The annual welfare loss for the economy as a whole due to the regulation would be area ABE. ABE is the sum of ABG, which is the increase in the cost of producing trips that would still be produced, plus BEG, which is the excess of willingness to pay over the cost for taxi trips that would no longer be produced. Depending on the shapes and positions of the curves, SABC may be much larger or much smaller than ABE.

If one is comparing two cities, the welfare loss is not necessarily greater in the city where either the medallion price per cab or the combined value of all medallions is greater. Similarly, a regulatory change that increases the price of medallions does not necessarily increase the welfare loss due to regulation. For example, starting from a position of free entry, with the fare fixed at the efficient level, a restriction on the

Figure 2

Model of a Taxi Market with Entry Restriction



number of cabs would raise medallion prices, and tighter restrictions would raise them even more. In this range, the medallion price would be positively correlated with the welfare loss. However, if the entry restriction was made severe enough, or if service restrictions were added, the medallion price might fall again because profits per cab might be low with a very small number of cabs, high waiting times, and a low number of rides demanded. In this range, medallion prices would be negatively correlated with the magnitude of the welfare loss for a city.

In spite of this last point, the cases one would observe would probably lie in the range where the magnitude of the welfare loss would be positively correlated with the medallion price or the combined value of all medallions. Because the pressure for regulation comes largely from the taxi industry itself, one would not expect regulation so burdensome that it would reduce medallion prices.[154]

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[154] Eckert, 1970, Kitch et al., 1971, and Gelb, 1980, pp. 78-79. To allow for differences in city size, one might hypothesize that the welfare loss due to regulation of taxi cabs would be positively correlated with the product of the medallion price and the population of the city, or the combined value of all medallions.

VI. REGULATORY REFORM

At least a dozen U.S. cities have opened entry into their taxi industries; most of these cities have deregulated other aspects of the industry as well. This section reviews the available evidence concerning the economic effects of these experiences with regulatory reform. In subsection A we discuss motivations for deregulation. In subsection B we discuss the effects of regulatory reform.

A. Motivations for Regulatory Reform

In a survey of 103 U.S. cities, Shaw et al. (1983) found that during the past five years 24 cities made major changes in their entry and fare regulations. Sixteen cities relaxed entry controls while three tightened them. Seventeen cities relaxed fare regulations, with 13 moving to elimination of controls over fares and four moving from mandatory to maximum fares. Thus, cities have been quite active in taxicab regulatory reform.

Shaw et al. found that cities have been motivated to review their taxicab ordinances by one or more of the following: a cab or bus drivers' strike, bankruptcy of a large taxicab company, requests for fare increases, or an antitrust suit or concerns related to the Boulder decision. These things focused attention on taxicab regulation.

Shaw et al. found that city councils that adopted regulatory reforms generally did so in the expectation of benefits related

to one or more of the following: (1) a reduction in the burden on public officials resulting from regulation, including determination of the number of cabs, licensing of companies, and setting of fares;[155] (2) increased competition, increased service, increased quality, lower fares, and service innovation; (3) the favorable experience of Seattle and San Diego with regulatory reform.

B. Effects of Regulatory Reform

Section V analyzes the economic effects of taxicab regulation. That discussion implicitly suggests the types of effects that we would expect from regulatory reform. In the present subsection we summarize the experience of cities that have undertaken regulatory reform under the headings used there.[156]

The experiences of these cities with regulatory reform relate to two segments of the taxi market: radio-dispatched cabs and cabs that pick up passengers at stands, primarily at airports. There is evidence about the operation of the cruising cab segment under open entry from Washington, D.C., but as far as we can determine, none of the cities that deregulated cabs in

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[155] Shaw et al., 1983, v.1, pp. 82-83, found that "regulation of taxicabs consumes much time in City Council meetings because of the need to determine the number of vehicles or companies allowed to operate and the fares that should be charged. Fare setting has become especially burdensome because inflation in the mid to late Seventies forced companies to request frequent fare changes. Councils are often confused as to how to set fares."

[156] Support for the conclusions reached in this subsection will be found in the reviews of the experiences of the individual cities.

recent years has a significant cruising cab segment. Because the rationales for and effects of regulation vary among market segments, we discuss experience with regulatory reform separately for radio-dispatched cabs and cabs that use stands at airports.

The reported experience of various cities with regulatory reform may differ from what we would predict on the basis of Section V for three reasons. First, some regulations may not have been binding prior to regulatory reform. For example, in some cities the ceiling on the number of cabs may not have been much different from the number that would have existed under open entry. This was probably true in Indianapolis. Second, some cases of regulatory reform involved only partial deregulation or replacement of one entry barrier with another. This was true in Portland. Third, in some instances the evidence on the effects of regulatory reform comes from sources that may be biased.

In attempting to transfer lessons from the cities discussed here, it is also important to keep in mind that no very large city with a very high medallion value has deregulated.

1. Radio-Dispatched Market Segment

In this subsection, we discuss the effects of regulatory reform in the radio-dispatched market segment, which typically accounts for about 75 percent of all taxi trips. However, most deregulated cities do not distinguish formally between firms operating in the different market segments, and the reports we have used often do not distinguish explicitly between them. Con-

sequently, some of the results discussed here relate to all segments combined.

a. Industrial Structure

In virtually all cities, after open entry the number of firms in the taxi industry increased and the market shares of the largest firms decreased. In some cities, new fleets entered the radio-dispatch segment. This was true in Oakland, where two new fleets operated 76 and 14 cabs respectively, and in Sacramento, Portland, and Charlotte where new fleets operated 27, 15, and 14 cabs respectively. In San Diego, two fleets expanded from 23 and 12 cabs to 106 and 38 cabs respectively. In Phoenix, new firms accounted for 20 percent of radio-dispatch trips. In most cities, there was also a significant increase in the number of independent owner-operators. Although some of these independents subscribed to radio-dispatching service (e.g. San Diego and Charlotte require that all firms have radio-dispatching), most focused on cab stands, including airport service.

b. Fare Level

In most cases open entry was accompanied by deregulation of fares, by replacement of fixed fares with maximum fares at a higher level, or by increases in fixed or maximum fares. In almost all cases for which information is available, fares increased, sometimes quite substantially, at the time of open entry.[157] However, this does not imply that open entry or deregulation of fares caused

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[157] Jacksonville, Florida, and Charlotte, N.C., are exceptions. Relaxation of entry and fare regulations evidently was not accompanied by a fare increase.

fares to increase. In general, fares had not been increased for some time prior to regulatory reform, and they would have been increased even if there had been no change in the taxicab ordinance.

The important question, therefore, is whether over a sigificant period of time following regulatory reform fares were above or below the level that would have been predicted in the absence of regulatory reform. In Seattle, there is evidence that deregulation of both entry and fares led to lower fares in this sense in the radio-dispatched market segment.

Apart from overall fare levels, it does not appear that fare gouging on individual trips was a significant problem in the radio-dispatched market segment following regulatory reform. Only for Fresno did we find allegations about price gouging.

Differences among the fares charged by different companies appeared in some cities, principally because the independent cabs serving stands commonly charge higher fares than do radio-dispatched fleets.[158]

c. Number of Cab Hours of Service

The number of cabs, and evidently the number of cab hours of service, increased in virtually all cities that adopted an open entry policy. The range of the increase was wide, reflecting the extent to which entry restrictions were binding prior to regulatory reform and the extent of deregulation. Thus, at one

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158 It should be added that Wainwright, 1984, concluded that "unregulated fare setting does not appear to bring about cut-throat price-cutting behavior" in any of the market segments.

extreme, in San Diego, the number of cabs more than doubled. At the other extreme, in four cities the number of cabs did not increase: Indianapolis, Fresno, Spokane, and Charlotte.

In general, there was probably a proportionally larger increase in the number of cab hours of service at cab stands than in the radio-dispatched market segment, but the level of radio-dispatched service generally increased.

d. Waiting Time

Data on passenger waiting times are available for San Diego. A 50 percent increase in the number of licensed cabs (in all market segments combined) in the first two years of regulatory reform was accompanied by a 20 percent drop in average waiting time in the radio-dispatched market, from 10 minutes to 8 minutes. Average waiting times at major cab stands became negligible.

In other cities, the increases in cab hours of service following open entry must have led to reductions in waiting times (unless one argues that real fares fell enough to generate considerable amounts of additional ridership). There are, in fact, reports that waiting times for radio-dispatch customers declined significantly in Seattle. On the other hand, there are reports that waiting time did not change in Oakland and Berkeley in spite of an increase in the number of radio-dispatched cabs and firms. The latter report is surprising, and it is important to note that it is based on interviews after the fact.

It may be possible to make inferences about waiting times from taxi ridership data. If ridership increases or remains

constant following open entry, and if fares have not fallen relative to the cost of living, this would suggest that waiting time has decreased (and/or that something else riders care about, such as "quality", has improved). Reports concerning ridership suggest that waiting time decreased (and/or quality increased) in Oakland, contrary to the direct reports about waiting time.

e. Number of Trips

There are contradictory reports concerning whether ridership increased or decreased in Seattle following regulatory reform and the associated changes in fares and service levels. In San Diego, non-airport use of cabs and jitneys increased modestly, but airport use apparently declined. In Portland, there was evidently a small increase in ridership; in Oakland and Tucson, there was no significant change in ridership; and in Phoenix ridership declined.

These reports compare ridership following regulatory reform to the levels immediately before, not to the levels that would have been expected given fare increases and other changes that would have occurred in the absence of regulatory reform. Thus, where ridership declined, the explanation was presumably the increase in fares that accompanied regulatory reform. Some fare increases and ridership declines would probably have occurred even witout regulatory reform in these cases.

f. Quality of Service

The report on regulatory reform in Oakland and Berkeley concluded that open entry led to a reduction in average vehicle age,

and it found that new entrants devoted more resources to maintenance than did incumbents.[159] However, there were reports that vehicle quality declined and/or average vehicle age increased following regulatory revision in Seattle, San Diego, Indianapolis, and Fresno.[160]

g. Cost of Administering Cab Regulations

There are a variety of reports concerning the effect of regulatory reform on the costs of administering taxi ordinances. There are reports that these costs fell in Sacramento, were unchanged in Atlanta, increased by a minor amount in Oakland and Berkeley, and increased in Seattle, San Diego, and Indianapolis.[161] On average, these reports probably understate the decrease (or overstate the increase) in administrative costs because they seem to ignore the reduction in costs borne by city councils that are freed from entry and fare regulation and consider only costs borne by the bureaus responsible for licensing, inspection, etc. Also, some of the reported increases in administrative costs are due simply to the fact that more resources are required to inspect and license the larger number

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[159] Relaxation of entry barriers had similar effects in Jacksonville.

[160] Coe and Jackson, 1983, p. 12, found no quality problems resulting from regulatory reform in England. It should be kept in mind that a reduction in quality is not necessarily inefficient. It is conceivable that quality was above the efficient level in some regulated cities. See Section IV.B.1.d.

[161] Interviews suggested that these costs fell in Jacksonville and Charlotte but increased in Sacramento.

of cabs operating after regulatory reform. One report that does merit attention is that in Indianapolis the cost of enforcing insurance and driver qualification requirements increased and compliance rates decreased because of the increased number of independent owner-operators.

h. Allocation of Cabs

There are reports that since regulatory reform radio-dispatch companies have not responded to a substantial percentage of phone calls in Seattle and San Diego. However, comparable non-response rates prior to regulatory reform are not available.

For only one city is there any report of a decline in any category of service following regulatory reform. There is a report that cab service in minority neighborhoods declined in Altanta. However, no evidence is provided to support this report, which is implausible since minority neighborhoods were being served by unlicensed, not licensed, cabs prior to open entry. There is no reason that open entry would make such service unprofitable.[162] By contrast, a study of regulatory reform in San Diego found no evidence to suggest that taxi service to the city's ethnic minority areas changed significantly, and studies reported that there was no change in the geographic distribution of service in Oakland and Portland. In San Diego, taxi-type service improved in some areas because of the introduction of jitneys.

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[162] Fares were not deregulated and hence could not have fallen as a result of deregulation.

i. Types of Service

Several cities legalized shared ride and jitney services. Jitney services were introduced in San Diego, but no shared ride services were introduced in other cities. This might be explained by the fact that these cities are not very densely populated and as a result jitney service might not be profitable.

j. Congestion

Apart from local congestion at airports and railway stations, there are no published reports of increased congestion due to taxis in the cities that deregulated. Surprisingly, Gelb reports a decline in total taxi miles driven in Seattle and San Diego.[163]

k. General Reactions to Regulatory Reform

In most cases regulatory reform was motivated by problems that arose under regulation, and reform was generally supported by the local or state government. In several cities, including San Diego, Oakland, Indianapolis, and Milwaukee, open entry was preceded by the bankruptcy and/or closing of the largest taxi fleet, sometimes following a drivers' strike.[164]

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163 Gelb, 1983a; 1983b, p. 92.

164 There were also bankruptcies of the principal fleets in some other cities, including Los Angeles, San Francisco, and Philadelphia. While firms may go bankrupt for many reasons with or without regulation, the significant number of bankruptcies in regulated cities during the 1970s should be kept in mind in evaluating open entry.

In several cities, the reaction to regulatory reform in the radio-dispatch segment was reportedly favorable, although incumbent taxi firms were universally opposed to open entry. Examples of cities with favorable experience are Seattle, Oakland, Berkeley, Spokane, Sacramento, and Charlotte.[165]

In some other cities, there have been more negative reactions. In Indianapolis and Fresno, there are reports of substantial numbers of customer complaints. In these cities open entry did not lead to an increase in the number of cabs. Thus, presumably entry restrictions were not binding constraints prior to regulatory reform, and neither city could have expected major short-run benefits from open entry. Both cities ended open entry after a brief experiment.

Three other cities, San Diego, Atlanta, and Portland, have increased entry restrictions again. Apart from airport problems, there is no evidence of customer complaints in these cities. Support for reregulation came primarily from non-taxi businessmen concerned with the image of their city (rather than with achievement of an efficient allocation of resources) and from the taxi industry itself.

Overall, there have been a number of favorable effects and no widespread significant problems related to open entry in radio-dispatch market segments. The problems that have been

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165 Jacksonville also has had a positive experience with relaxation of entry and fare controls.

observed could be dealt with through driver qualification and vehicle safety requirements without restrictions on the total number of cabs.

2. Airport Service

By contrast to the radio-dispatch segment, there have been many problems in the cab stand market segment, principally at airports but also, in the case of Seattle, at the railway station. Such problems have been documented in some detail for Seattle, San Diego, and Phoenix, and there are briefer reports of problems in Atlanta, Spokane, and Sacramento.

Airport taxis have charged high and/or different fares following deregulation, evidently because of the difficulty of achieving a workable degree of price competition at taxi stands that continue to operate on a first-in-first-out basis. Higher fares have led to inefficient lengthening of cab lines and short-haul refusals. Attempts by drivers to circumvent the queue and holdups in the queue when consumers have not accepted the first cab have contributed to disputes among drivers. The increased number of cabs and the resulting incentive to avoid the queue have increased administrative costs for airport authorities. Consumers have complained about vehicle quality, driver behavior, and all the other problems just described.

These problems do not provide an argument in favor of entry restrictions. Rather, they suggest that there would be significant efficiency gains from redesigning airport cab stands to increase fare competition or from imposing or lowering fare

ceilings on airport taxi service. Fare ceilings could be reduced until the taxi queue shortened to the desired length. In fact, some airports (San Diego, Seattle) have responded by imposing fare ceilings. It is not necessary to respond, as some airports (Phoenix) have, by limiting the number of taxis that can pick up passengers, or, as other cities (Atlanta, San Diego) have, by abandoning open entry in the entire city.

3. Additional Considerations

Two additional matters relating to deregulation deserve consideration. First, in many cases the individuals who lose as a result of deregulation are not the same as the ones who gained from regulation, because many of those who gained have long since sold their medallions or shares in taxicab companies.[166] Elimination of medallion values of $9,000-$25,000 or more could wipe out the savings of independent owner-drivers, cause them to default on loans, and/or drive them into bankruptcy. Since local governments probably would be unwilling to compensate these losers, this issue is a serious political barrier to deregulation.[167]

Second, the process of deregulation would involve real costs during a transitional period. These costs include resources

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166 Tullock, 1975; Regulation, March-April, 1982.

167 However, when deregulating trucking, Congress allowed trucking firms to take a tax deduction for the loss in value of their operating licenses. Public Law No. 97-34, Economic Recovery Act of 1981, Section 266.

expended by the government to deregulate and resources expended by the taxicab industry to oppose deregulation. In order to justify deregulation on efficiency grounds, the present discounted value of the benefits of deregulation must exceed these costs.

4. Case Studies of Regulatory Reform[168]

a. Seattle

In 1979 Seattle eliminated most of the regulations that restricted taxicab entry, fares, and service. The ceiling on the number of taxis was removed; the exclusive airport franchise was ended; regulations that controlled fares were dropped, although a maximum fare was subsequently set for airport service; required minimum levels for service hours per day and days per year were removed; and shared-ride service was authorized. However, regulations concerning safety and driver qualifications were tightened.[169]

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168 Apart from these cities, Milwaukee and Tacoma deregulated entry in 1979 and 1981, respectively. Jacksonville, Fla., substantially relaxed entry barriers. Additional cities that have deregulated fares but not entry are: Des Plaines, Ill. (1981), Springfield, Ohio (1981), St. Petersburgh, Fla. (1981), Madison, Wisc. (1982), Kansas City, Mo. (1983). San Francisco switched from mandatory to maximum fares in 1978, and Anchorage and Tampa did so in 1983. Dayton, Ohio, and Fayetteville, N.C., regulate entry but control only maximum fares. El Paso, Texas (1981) and Norfolk, Va. (1982) may have deregulated in some way. Shaw et al., 1983, v.1, pp. 53-54. There has reportedly been at least partial deregulation of taxis in Honolulu and Santa Barbara. Reason, August 1983, p. 16.

169 Gelb et al., 1980.

Prior to deregulation, entry restrictions were tight enough that medallions sometimes sold at fairly high prices. Zerbe (1982, p. 2) reports that medallion prices varied between $2,500 and $12,000 during the 12 years prior to deregulation; four other sources cite medallion prices between $1,000 and $10,000 shortly before deregulation.[170]

After removal of entry restrictions, the price of medallions fell to zero;[171] the number of city-licensed cabs increased from 421 to 516 (March 1984), but the number of cab hours of service increased by a substantially lower percentage than did the number of cabs because of a decrease in the intensity of use of cabs; the number of airport-licensed cabs increased from about 35 to 208. The number of taxi firms increased from 57 to 85.[172] The share of cabs held by the three largest firms declined from 70 to 54 percent. The number of small fleets with 4 to 13 cabs each increased from 9 to 23. The share of cabs operated by independents increased.[173] No shared-ride services were introduced.

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170 DOT, 1980, pp. 79, 83; Gelb et al., 1980, p. xvi; Colman, 1980, p. 21; Wainwright, 1984. For contradictory statements, see Gelb, 1980, p. 45, and Kirby, 1980, p. 23.

171 DOT, 1980, p. 79, and Zerbe, 1983a, p. 3.

172 Gelb et al., 1980; Gelb, 1983b; Zerbe, letter to Pautler, April 20, 1984.

173 Zerbe, 1983b, p. 44; Gelb, 1983b, p. 31.

The available evidence suggests that average passenger waiting time for radio-dispatched cabs decreased substantially.[174]

According to Colman (1980, p. 24), immediately after deregulation the fare for an average trip increased by about 35 percent. Drop and mileage charges increased from $.80 and $.70 to $1 and $1 respectively for the largest companies. This increase was about the same as the increase in the consumer price index since the last fare increase was approved.[175]

Using a longer time period, Zerbe concluded that as a result of deregulation, in early 1984 radio-dispatched fares were 14 percent lower than they would have been if regulation had continued. By contrast, non-radio-dispatched fares were 8 percent

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[174] Zerbe, 1983a, p. 3, and 1983b, p. 44. See also Gelb, 1983b, p. xiv. Paratransit Services, 1983, p. 34, reports that most of the additional cabs congregated at the airport.

[175] Colman, 1980, p. 24, reports that in the short-run there was a slight increase in taxi ridership following deregulation. Since the real fare increased in the short-run, this supports the observation that waiting time declined. By contrast, Gelb, 1983b, p. xv, reports that during the first two years of open entry recorded ridership dropped by 25 percent in spite of a 20 percent increase in the number of licensed cabs. The drop in recorded ridership might be a result of reduced recording of riders, due in part to growth of independent cab companies. Also according to Gelb, 1983b, p. xxxvi, a 1977 report suggested ridership was declining prior to deregulation. In any event, 26 percent of resident riders claimed to be making more trips by taxi in 1981 than a year earlier while only 10 percent claimed to be making fewer trips by taxi. Gelb, 1983b, p. xxix.

higher than they would have been. Non-radio-dispatched fares averaged 27 percent higher than radio-dispatched fares.[176] On average, when weighted by vehicle numbers, fares were about 5 percent lower than they would have been without deregulation.

Zerbe reports that deregulation led to no problems in the market for radio-dispatched taxis, where price competition worked well. Gelb (1983b, pp. 94-95) reports that in 1981 thirty-six percent of a sample of survey phone calls resulted in either service refusal (28 percent) or no-shows (8 percent). However, these data are misleading, because the percentage of refusals was only 10 percent for the three large fleets. Customers refused by other companies could call these, and they would learn to do so.

Gelb (1983b, p. xxviii) reports that the median vehicle age increased from 4 to 6 years, but also that there was no reported increase in taxicab accidents or passenger complaints about vehicle maintenance or safety.

Gelb (1983b) reports that some of the administrative costs associated with taxi regulation increased, but the amounts were small and the explanation was primarily that there were more vehicles and meters to be inspected and safety regulations were tightened. Also, the burden of licensing and rate setting for the city council was reduced.

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[176] Zerbe, letter to Pautler, April 20, 1984. See also Zerbe, 1983b, p. 44.

Zerbe reports that deregulation led to a number of problems in the market in which taxis are chosen from a cab line, primarily at the airport and rail station, where price competition was difficult. The airport has continued to assign cabs in the way it did when fares were uniform. Taxis are called into the loading area one by one, according to their place in the line. A cab that refuses or is refused by a customer goes not to the end of the line but to a holding area and soon returns to the head of the line.[177] In the airport market there was a large increase in fares, taxi lines increased considerably in length, taxis refused to carry passengers short distances, there was a substantial variance in fares among taxis, there were many consumer complaints about fare discrepancies, and there was an increase in threats and minor violence among drivers.

Zerbe suggests that high fares in this market were a result of the low fare elasticity of the probability that a customer would reject the first cab in line. Many customers are travellers who do not know the distribution of fares or are on expense accounts, and hence their decisions may not be highly sensitive to the fare level. The high fares led to a large number of cabs, long cab lines, refusals to serve short trips, and quarrels among drivers concerning positions in the taxi queue, but did not lead to an above-normal rate of profit because of free entry.

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[177] Zerbe, 1983b, p. 46.

The airport responded to the lengthening cab lines by increasing the taxi permit fee from $100 to $360 per year and by imposing a maximum fare. The problem of short haul customers was solved by creation of a separate cab line for them. These measures evidently reduced the number of cabs at the airport and the number of complaints.

Paratransit Services (1983, p. 34) reports that the burden of regulating taxis increased at the airport. Enforcement costs increased (to $71,542 in 1981), and the airport installed a closed-circuit television system ($14,000).

Zerbe suggests that the explanation for the variance in fares was that some cabs that served the airport also served other markets where demand was more elastic. Because they were apparently constrained to apply the same fare structure to all services, perhaps simply because they used the same meter for all trips, they charged lower fares than those that served only the airport. This variance led to consumer complaints. Imposition of a maximum fare substantially reduced the number of complaints, presumably because it led to reductions in the highest fares.

Zerbe concludes that in 1982 the airport fare was still above the competitive level and that resources were still wasted because of long cab lines. He suggests a reduction in the maximum fare.

There was a statement by a member of the taxi industry that vehicles deteriorated after deregulation in Seattle,[178] and Zerbe (1983b, p. 46) reports that "at the airport, as at the cab lines downtown, the quality of the ride deteriorated. Drivers were less knowledgeable, cabs dirtier. Some deterioration in quality results from open entry: new entrants are likely to know less about the area. And some is to be expected when prices drop in a deregulated market. As the airline case demonstrated, price and entry regulation leads to greater competition on the basis of quality".[179]

However, Gelb (1983b, p. xxxi) reports that "[o]verwhelming majorities of both residents and visitors gave positive ratings to the overall quality of Seattle taxi service." Eighty-seven and ninety percent, respectively of residents and visitors rated the overall quality of taxi service as good or excellent in 1981. Ten to 15 percent of residents thought taxi availability, promptness of service, and quality of drivers had increased, while 4 to 9 percent thought they declined. However, 16 percent thought the condition of vehicles was worse while 10 percent thought it was better. Others thought there was no change or did not know.[180]

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178 DOT, 1980, pp. 78-79.

179 Zerbe, 1983b, p. 46, also reports a number of incidents involving cabs at the Amtrak station. See footnote 55 above.

180 Gelb, 1983b, p. 117.

b. San Diego

In 1979 San Diego removed the existing ceiling on the number of taxi permits and began issuing a fixed number of additional licenses per month. Regulations that controlled the fare were replaced by a fare ceiling that was high enough so that it was not binding for most firms. The fare ceiling was eliminated in 1980, but in 1983 it was reimposed, this time at a level 20 percent above the city average fare. Firms must file fares, but they can discount filed fares and thus are free to bargain. Shared-ride taxi service based on zone fares and jitney service based on per person fares were authorized.

Prior to deregulation, there was a long waiting list for taxi licenses, and medallions sold in the range of $8,000-$15,000 (see Table 5). Between 1979 and 1983 the number of licensed cabs more then doubled, from 409 to 915; the number of cab hours of service increased but by a lower percentage than the number of cabs because cabs were used less intensively; the number of companies increased from 68 to 310; the number of licenses held by the largest fleet remained constant while the share declined from 68 to 31 percent; the second and third largest fleets increased from 23 and 12 to 106 and 38 cabs, respectively; and the number of smaller fleets operating 4 or more cabs increased from 7 to 16.[181]

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181 Gelb, 1983a, and Paratransit Services, 1983, Figure 3.

Average response time for radio-dispatched cab fleets initially increased from 10 minutes in 1978, prior to deregulation at a time when there were 409 cabs, to 13 minutes in November, 1979, when there were about 480 cabs. However, this deterioration was temporary. Average response time declined to 8 minutes in November, 1980, when there were about 625 cabs.[182] The most active cab stands became crowded after deregulation, and "passenger waits at busy cabstands were quickly reduced to seconds."[183] Taxi-type service has improved in some areas because of the introduction of jitneys. There was no evidence to suggest that deregulation led to a deterioration of service in ethnic minority areas.

Between July, 1979, when mandatory fares were replaced by a ceiling, and December, 1981, the weighted average fare for a 3.75 mile, non-airport trip increased by 47 percent, compared to a 51 percent increase in the consumer price index. By comparison, the

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182 Gelb, 1983a, p. 133. Reason, August 1983, p. 16, reported that response time appeared to have declined dramatically as a result of regulatory reform. Gelb, 1983a, p. 133, reports that in November, 1979, eighteen percent of calls were refused by the dispatcher (8%) or resulted in no-shows (10%). In a 1976 survey, the figure was only 5 percent. However, the figures are not comparable. In 1976, the people who ran the survey disclosed to cabs that the survey was taking place. This was not done in 1979. Also, in 1979, a disproportionate number of the survey trips were short to save expenses. Thus, the 1976 figure is biased downward and the 1979 figure is biased upward.

183 Gelb, 1983a, p. 139.

weighted average fare for a 7.4 mile airport trip increased by 36 percent between August, 1979, and December, 1981.[184]

There was significant variation among fares charged by different firms, largely because radio-dispatch firms charged less than independents that operated primarily at cab stands. Evidence concerning illegal price gouging involves only anecdotes.[185]

Between August 1979 and August 1980, the number of recorded non-airport taxi vehicle trips was unchanged and the number of riders increased by 6 percent. Simultaneously, the number of recorded airport vehicle trips declined by 16 percent and the number of riders dropped by 37 percent. There is no obvious explanation for the drop in recorded airport trips, since airport fares increased less than non-airport fares; however, reduced waiting time was probably less important for airport trips. In any event, there are two problems with these data. First, as the structure of the industry changed, the percentage of unrecorded trips may have increased. Second, these ridership data do not include use of jitneys, which were increasing in number.[186] By 1983, twelve companies operated 36 vehicles as jitneys, serving

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184 Gelb, 1983a, pp. xxiii, 89.

185 Gelb, 1983a, pp. xvii, xxvi, 83.

186 Gelb, 1983a, p. xxvii. DOT, 1980, p. 77, reports that the number of taxi trips increased after deregulation.

shopping areas, hotels, the airport, military bases, and nearby La Jolla.[187]

Deregulation freed the city council from the time consuming tasks of certifying need for service and setting fares. Because the number of cabs increased, costs for the bureaus in charge of administering the taxi regulation increased by 58 percent between 1978 and 1981. However, this represents a decline in cost per cab, particularly after allowing for inflation.[188]

Although there are no data on vehicle age prior to regulatory reform, between 1980 and 1981 average vehicle age increased.[189]

Deregulation led to a number of problems at the San Diego airport, which continued to use a first-in-first-out taxicab queue in spite of allowing firms to charge different fares. There were long cab lines, short-haul refusals, disputes as a result of attempts by drivers to pick up passengers without waiting in line, and complaints about high fares and the variance in fares among cabs.

The San Diego airport responded by letting cabs carrying short-haul riders by-pass the queue; raising the permit fee to $200 per year; hiring seven full-time starters; limiting fares

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187 Reason, August 1983, pp. 16-17. Prior to deregulation, 8 companies operated 27 limousines. Gelb, 1983a.

188 Gelb, 1983a, pp. 200-201.

189 Gelb, 1983a, p. 137.

for trips leaving the airport to a range of 20 percent more or less than the weighted average city rate; and restricting the number of cabs that can wait at the airport. These measures substantially relieved the airport problems.

The percentage of taxi users that rated taxi service good or excellent increased from 75 percent (residents) and 86 percent (visitors) to 82 and 92 percent respectively between 1978 and 1980. Also, between 17 and 34 percent of residents reported that several service attributes (promptness, driver courtesy, vehicle condition, availability during the day and at night) improved between 1979 and 1980. Only 2-6 percent reported they became worse, 39-48 percent reported they remained unchanged, and 24-38 percent answered "don't know."[190]

Nevertheless, in 1983 the city imposed a one-year moratorium on new permits.

c. Oakland and Berkeley

1. Oakland

In mid-1979, Oakland's largest taxi firm, Yellow, closed following a drivers' strike, and as a result the level of taxi service in the city declined.[191] In response, the Oakland municipal government increased the fixed fare by 41 percent for a

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190 Gelb, 1983a, pp. 165-167.

191 This summary of the experience of Oakland and Berkeley with regulatory revision is based on Knight et al., 1983.

three-mile trip and replaced its policy of limiting entry on the basis of public convenience and necessity with open entry.[192]

Both before and after regulatory reform, most taxi riders were people with low incomes. Almost all taxis in Oakland were summoned by telephone. Cruising and cab stands, including airport service, were relatively unimportant. Thus, none of the problems associated with regulatory reform at airports in some other cities appeared in the Oakland case.

Prior to regulatory reform, medallions sold for $2,000-$3,000, and there was a waiting list for new taxi permits.[193]

Open entry led to a substantial increase in the number of permits issued and in the number of active cabs. The number of permits increased from 224 in 1979 to 303 in 1982. However, since only about 100 cabs were active in 1979, the percentage increase in the number of active cabs was probably greater than the percentage increase in the number of permits.

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192 The fare increase is based on flag-drop and mileage charges. Oakland did not change its prohibition against shared-ride service.

193 Wainwright, 1984. Few permits were transferable, however. A reading of Knight et al., 1983, tends to suggest that fares were low, and that as a result only about half of the cabs licensed were active, the ratio of cabs to population was low, the quality of cabs was deteriorating, and Yellow Cab failed. However, the three-mile fare of $3.40 was not particularly low by national standards in 1979 (compare to Table 3 for 1984), it is not clear that the companies that continued in business after the 1979 fare increase improved the quality of their cabs (although new entrants evidently used better vehicles), and the scant evidence does not suggest that waiting times were particularly high prior to the regulatory revision.

Most of the new cabs were accounted for by the entry of two new radio-dispatch fleets with 76 and 14 permits respectively. The two-firm concentration ratio (based on number of permits, including those held by Yellow prior to its closure) declined slightly from 62 to 58 percent while the four-firm concentration ratio increased from 74 to 87 percent. The number of permits held by independents and small firms actually declined.

Open entry led to an increase in average vehicle quality, because new entrants used newer vehicles than incumbent firms did and kept their vehicles better maintained.[194]

Knight et al. conclude that the increase in service did not reduce the response time for radio-dispatched cabs or passenger waiting times.[195] However, it is difficult to reconcile this conclusion with their finding concerning ridership. Initially, taxi ridership declined following the suspension of operations by Yellow and the 41 percent fare increase, but it gradually

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194 Knight et al. report that prior to regulatory revision the quality of vehicles and service was declining visibly, there were many complaints regarding the poor and unsafe condition of Yellow's vehicles, and none of Yellow's vehicles passed city inspection. However, Wainwright, 1984, remarks that "there appears...to be some evidence that profitability is declining (after regulatory reform) and with it the condition of taxicabs."

195 There are no data on waiting times; these findings are based on impressions gathered in interviews more than a year after regulatory reform occurred. Drivers may have caused response times to rise in some cases by misreporting their locations to dispatchers in an attempt to obtain additional business. If so, this may have been a response to a change from employee-drivers to leasing of cabs by drivers, rather than an effect of open entry.

increased back to the original level as the level of cab service increased. Since ridership had generally been declining in previous years, it is difficult to explain why it increased as additional cabs were put into service unless passenger waiting time declined, although the increase in average cab quality could have been partially responsible. In any event, there was a decline in the ratio of ridership to cab hours of service.

Knight et al. report that "open-entry has not led to service problems from the sort of irresponsible operations which opponents often claim result from open entry."[196] They report that when ridership fell in response to the rate increase in 1979, there may have been some increase in the number of accidents because of fatigue as drivers worked longer hours in an effort to maintain their incomes. However, some firms reacted by limiting driver hours per day, and the problem was only temporary.

Regulatory reform did not lead to a significant increase in administrative costs. There were minor increases related to the larger number of permit applications and cabs to be inspected, but these were offset by additional application and renewal fees.

Following regulatory reform, there was no change in the geographic distribution of cab service within Oakland.

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196 Knight et al., 1983, p. 53.

Overall, the reaction of city officials and the public to regulatory reform was mildly positive. It was not a major issue. As one might expect, incumbent firms opposed open entry.

2. Berkeley

The Berkeley case is closely related to the Oakland one. Not only are the cities adjacent, but the large majority of the cabs serving Berkeley prior to regulatory revision were also licensed to serve Oakland.

Berkeley deregulated both entry and fares in 1980, shortly after the changes in Oakland.[197] Prior to deregulation, Berkeley imposed only maximum fares rather than fixed fares as in Oakland. However, since all firms charged the maximum fare, fares were the same in Oakland and Berkeley. After Oakland raised its fares in 1979, many of the cabs that had been serving Berkeley moved to Oakland, while other cabs charged the Oakland fares in Berkeley even though this violated the taxi ordinance. After Berkeley removed the fare maximum in 1980, virtually all firms increased their fares to the Oakland level. This fare increase reduced ridership to some extent.

Open entry led to an increase from about 75 permits in mid-1980 to 91 permits in May 1983.[198] However, because of the close

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197 Berkeley also legalized shared-ride and jitney service and dropped the requirement to use meters, but no new services or fare systems were introduced.

198 Wainwright, 1984.

links between the Oakland and Berkeley taxi companies, these numbers do not accurately describe the supply of cabs in Berkeley. The number of cabs serving Berkeley was well below 75 in 1979-80, and the number presumably increased following the fare increase and open entry in 1980. As in Oakland, Knight et al. concluded that after open entry customer waiting times did not decline significantly, vehicle quality improved, and city administrative costs remained virtually unchanged.

d. Phoenix and Tucson

1. Phoenix

Prior to July, 1982, the state of Arizona restricted entry into the taxicab industry in the state's cities through certificates of public convenience and necessity and fixed fares. In July, 1982, regulations restricting entry and fares were ended, and the state continued to regulate only driver qualifications, safety standards, and insurance coverage.

Teal et al. (1983) studied changes in the taxicab industry during the first year following regulatory reform. In Phoenix the number of cabs in service increased from 250 in 1981-82 to 325 in July, 1983. A large number of independents and other small firms entered the market and emphasized service at the airport, where radio-dispatch capability is not necessary. The share of cabs operated by the largest firm, Yellow/Checker, fell from 90 to 42 percent. Yellow/Checker virtually stopped picking up riders at the airport because of long (2 to 3 hour) average

taxicab waiting times in the airport queue. However, Yellow-Checker and the one other company that existed prior to deregulation still provided 80 percent of all radio-dispatched trips in July, 1983.

Fares in Phoenix had not been increased for some time prior to regulatory reform and were low compared to those in similar cities. Thus, it was not surprising that fares rose immediately after deregulation. In addition, fares became non-uniform, with the smaller firms that emphasized airport service charging more per mile than the radio-dispatched fleets. Flag-drop charges remained at $.85 for most firms, but the mileage charge increased from $.85 per mile to a range of $1.20 to $2.00 per mile, and the waiting time charge increased from $7.50 to $12.00 per hour. Yellow/Checker's fare for a four-mile trip increased by 33 percent, but the increase over the pre-deregulation base was higher for other firms and hence for airport service. However, airport limousine fares and contract rates for dial-a-ride bus service declined significantly.

The first-in-first-out queue system limited price competition at the airport. This helps to account for the higher average level of fares on airport service and for the variance among fares charged by different cabs. The high average fare presumably accounts for the high average taxicab waiting time, which for a short time led drivers to charge a $10 to $20 minimum fare per trip (rather than to refuse short-haul trips, as cabbies have sometimes done at other airports). In July 1983 the city

and the airport authority reregulated to some extent. They imposed driver certification and vehicle safety requirements (additional to those imposed by the state), imposed requirements for meters and fare-posting, and banned solicitation of business in passenger terminals by taxi and limousine drivers. These requirements reduced the variance among taxi fares, but they also reduced competition between taxis and limousines.

The increase in taxi fares following deregulation led to a drop in taxi ridership of about 12 percent between June 1982 and June 1983, in spite of the increase in the number of cabs in service. As a result, there was also a drop in trips and revenue per cab hour.

The changes in regulation made it possible for cabs to offer new types of service, such as jitney service, but no such services were offered. The explanation is probably that jitney service is uneconomical in Phoenix because of low densities and high automobile ownership.

2. Tucson

Teal et al. report qualitatively similar results from regulatory reform in Tucson. However, because fares had been increased shortly before deregulation, the increase in fares was much smaller in Tucson, and as a result ridership did not fall. The number of cabs rose from 60 to 97, fares increased (16 percent for Yellow Cab) due to an increase in waiting time charges, and the share of the firm that had a monopoly prior to

deregulation fell. Net revenue per cab is low ($35 per 10 hour day). Variance among fares charged by different companies did not occur.

e. Other Experiences with Regulatory Reform

This section reviews the experiences with regulatory reform of several cities on which we have less information than was available to us on the cases reported above.

1. Atlanta

Atlanta switched from restricted to open entry in 1965, but then switched back to restricted entry in 1981. Fares were not deregulated.[199]

Open entry led to an increase in the number of licensed cabs from about 700 to about 1400 in the short run, but evidently most of the additional cabs had previously operated as unlicensed "cars for hire" in minority neighborhoods. However, by 1970 the number of cabs increased to about 1900.[200] Along with the two other major cities that then had open entry policies (Washington, D.C., and Honolulu), Atlanta had one of the three highest ratios of cabs to residents among U.S. cities. (See Table 1.) When entry controls were reimposed in 1981, Atlanta specified a

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199 Unless otherwise indicated, the discussion of Atlanta is based on Paratransit Services, 1983, pp. 6-8.

200 Kirby et al., 1974, Table 7.

maximum of 1,500 cabs to be reached by attrition. In 1983, the number of cabs was close to 1,500.

Open entry also changed the structure of the industry. While five companies operated the 700 licensed cabs that were in service prior to open entry, after open entry the industry was composed primarily of independent owner-operators. When entry controls were reimposed in 1981, Atlanta specified that new entrants were required to have a minimum of 25 cabs. Perhaps for this reason, between 1981 and 1983 the number of cab firms declined from 55 to 25.

According to a 1976 report, in Atlanta "service is considered to be good," which "probably means that there aren't very many complaints about it."[201]

However, according to post-reregulation reports by Rosenbloom (1983) and Paratransit Services (1983), there were problems under open entry. Rosenbloom reports that under open entry there was a decrease in taxi service in minority neighborhoods and in other parts of the city, although there was an increase at the airport and major hotels. Rosenbloom also reports that there were complaints about severe problems at the airport, but the nature of the problems is not specified, and the only concerned party mentioned is the Chamber of Commerce. Paratransit Services reports that local business leaders and city

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201 Olson and Kuehl, 1976, p. 52.

officials, who were interested in creating a progressive image for the city, were concerned with the over-supply of cabs, the unstable business environment in the industry, poor quality of service, and frequent visitors' complaints about taxicab service. These problems motivated a return to entry restrictions.

These reports contain no evidence that local residents of Atlanta had complaints about taxi service under open entry. Also, there is no evidence that open entry was associated with higher administrative costs. In fact, under open entry one police sergeant was assigned to enforcement of the taxi ordinance. When entry was restricted in 1981, the enforcement staff was increased to 12.

2. Indianapolis

After limiting the number of licenses in the conventional manner, Indianapolis temporarily adopted an open entry policy during 1973-74.[202] Administratively this involved redistributing 219 of more than 300 licenses that had been revoked because they had been out of service for over 60 days.[203]

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202 The discussion of Indianapolis is based on Gilbert and Gelb, 1980.

203 A large company, Red Cab, which went bankrupt, had many licenses it did not use. No new licenses were issued during 1974-1980. A comparison of 1972 and 1983 market structures indicates that Yellow Cab grew substantially as did the independents as a result of Red Cab's demise. See Paratransit Services, Figure 5.

Apparently, licensing was not a binding constraint on the number of taxicabs before open entry. This would explain why the number of cabs evidently did not increase following open entry. There was an increase from 5 to 26 in the number of independent operators, but this change in the structure of the industry could be related to the bankruptcy of the largest firm as much as to open entry. Even after open entry was ended, entry barriers probably did not have much effect on the number of cabs; in 1980 a city official estimated that a medallion was worth on only $400-500.

Gilbert and Gelb (1980) report that complaints to the city about cab service tripled following open entry. It became more difficult to enforce insurance and safety regulations, in part because of the larger number of firms and apparently in part because with the larger number of independent cabs and increased turnover it became more difficult for the city to locate drivers, whose hours were irregular and whose places to business changed frequently. Rosenbloom (1983) reports that the quality of vehicle maintenance declined significantly. There were also reports of increased crime committed by drivers of independent cabs. It appears that at least some of these problems were a result of lax standards concerning driver qualifications rather than open entry and the increased number of independents.[204]

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[204] DOT, 1980, p. 62.

3. Portland

In 1979 Portland removed its population-based ceiling on the number of taxi licenses and legalized shared-ride service. However, entry still required a finding that the new supply was in the public interest and was restricted to operators with a 24-hour per day dispatch capability and a minimum of ten cabs ("sufficient cabs to provide citywide service").[205] Furthermore, in 1980 restrictions on entry were increased. The ratio of taxi licenses to population was again taken into consideration, and applicants were required to have a minimum of 15 cabs. According to Gelb (1982, pp. 32, 34), "these provisions effectively exclude small unaffiliated owner-operators and help to explain the very limited demand for new permits in response to the code changes enacted in Portland".[206] The few additional permits that were issued in 1979-80 required a considerable amount of time and effort.[207] Portland also retained regulations over maximum fares but raised the fare ceiling by 30 percent. In 1980 Portland

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205 Gelb, 1982, pp. 4, 17.

206 However, Gelb, 1982, p. 34, adds: "On the other hand, Portland operators say that the local taxi business has been declining over the past three years and that current ridership is insufficient to support existing taxicabs, let alone additional ones. The lack of demand for the remaining permits allowable under the old ceiling supports this view." Gelb also notes that one small taxi firm declined additional permits after its application was approved (p. 52).

207 Gelb, 1982, pp. 27-28.

tightened regulations for drivers and taxi firms. In short, regulatory reform was quite limited in scope.

Prior to the 1979 changes, the number of taxi licenses per capita (.33 per 1000) was low by national standards, and medallions carried a price of $3,000 to $9,000.[208] There were three taxi firms (all associations of owner-operators) with 113, 102, and 11 licenses respectively.

After the changes, another firm entered the taxi industry and acquired 15 licenses. The total number of licenses increased by 18, or 8 percent. There was no change in the geographic coverage of service. There was no significant new price competition (although one firm quotes point-to-point fares) or service innovation; prices were uniformly increased by the maximum permitted soon after the maximum fare was raised.

Gelb (1982, p. ix) states: "The original revisors' objective of inducing competition and service innovations was not realized. Given the limited nature of the regulatory changes and the city's later retrenchment, however, this is not surprising."

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208 Kirby, 1980, p. 23. Wainwright, 1984, reports that licenses were not transferable, that the total of 226 permits was 27 less than the maximum permitted by the taxi ordinance, and that there was no waiting list for medallions. Gelb, 1982, pp. X-XI, reports that before and after the regulatory changes the two large companies divided tne city and took or referred phone requests on a geographic basis, but more recent information indicates this does not occur.

4. Fresno

Fresno opened entry and decontrolled fares for eighteen months during 1979-81. Prior to deregulation, Fresno required a minimum of 25 trips per day per cab, a minimum of 5 cabs per firm, and twenty-four hour per day dispatching. After reregulating, Fresno required a minimum of $160 per day per cab in documented revenues, a minimum of 3 cabs per firm, and twenty-four hour per day dispatching.[209]

Deregulation evidently did not lead to an increase in the number of cabs. The number of cabs was 70 before open entry, 50 at the time open entry ended, and 45 in 1983 following reregulation.

The number of firms increased from 8 before open entry to 25-30 during open entry and then decreased to 20 in 1983 following reregulation.

It is reported that after open entry was instituted customer complaints tripled. Problems reportedly included price gouging, poor upkeep of vehicles, and confusion resulting from having over 25 color schemes for the different companies. Enforcement was reportedly difficult.

Reregulation was supported by cab companies and by the non-taxi business community. Following reregulation customer complaints reportedly dropped. Everyone interviewed by

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209 The discussion of Fresno is based on Paratransit Services, 1983, pp. 9-11, and Shaw et al, 1983, v.2, pp. 73-80.

Paratransit Services for their 1983 study viewed the Fresno experience with open entry negatively.

5. Spokane

Spokane deregulated entry and fares in 1980. However, it imposed minimum service standards and required that firms maintain an office or authorize an agent to maintain an office in the city.[210]

Deregulation did not lead to an increase in the number of taxicabs, which evidently declined from 100 prior to 1980 to 92 in 1982-83 and 80 in 1983-84. However, there was a significant change in the structure of the industry. Prior to 1980, Yellow cab held 96 of the 100 licenses. In 1983-84, it held 57 of the 80 licenses, while the remaining 23 licenses were held by independents. After deregulation, Yellow stopped serving the airport, and the independents concentrated there.

The Spokane taxi regulators report general satisfaction with open entry. By contrast, Yellow Cab, which opposed open entry, claims that the quality of service has deteriorated and that it receives a dozen complaints each week about price gouging, unsafe vehicles, and rude behavior on the part of the independent taxicabs at the airport.

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210 The discussion of Spokane is based on Paratransit Services, 1983, pp. 36-38.

6. Sacramento

Sacramento deregulated entry and fares in 1982. However, the city continues to require 24-hour per day dispatching, requires filing and posting of fares, and requires a minimum of three months between fare changes.[211]

Open entry led to an increase in the number of cab permits from 110 to 168. The three firms that held the 110 permits prior to open entry continued to hold virtually the same number of permits. The additional permits were held by one new firm with 27 cabs, four new firms with 2 to 10 cabs each, and 11 new independents.

Shaw et al. (1983, v.2, p. 86) report that fares have remained at resonable levels and that at least one company has introduced senior citizen discounts.

There was a substantial increase in the number of cabs serving the airport. The airport hired starters at four locations to call up taxicabs from a waiting area, but the airport management reports difficulty controlling the conduct of taxicabs. The airport charges $3 per trip for taxis leaving the airport to pay for the starters.

One of the motives for deregulation was to free the city council from the task of setting fares, and city officials report that they have in fact been freed from regulatory tasks that

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211 The discussion of Sacramento is based on Paratransit Services, 1983, pp. 24-27.

formerly occupied their time. However, administration of remaining portions of the taxi ordinance now requires more time because of the larger number of cabs and firms.[212]

Paratransit Services (1983) reports that, with the exception of the largest taxi firm that was in business prior to open entry, most people contacted in Sacramento were satisfied with open entry.

7. Charlotte

In 1982, Charlotte, N.C., opened entry, deregulated fares, and legalized cruising.[213] Firms are still required to file and post their fares, but they can set any fares they wish (subject to certain constraints on extras for additional passengers, late night service, etc.) and can negotiate to charge fares lower than those posted. Firms are still required to have 24 hour a day radio-dispatching and are required to have a depot on private property, adequate supervision of drivers, and a listed phone number.

After deregulation, the number of cabs remained unchanged, but the number of companies increased from four to five after one new firm entered with 14 vehicles. Fares did not increase.

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212 This was confirmed independently.

213 This discussion is based on Shaw et al, 1983, v.2, pp. 55-72.

According to Shaw et al. (1983, v.2, p. 72), "[a]lmost everyone involved in the regulatory process feels that the current taxicab ordinance is working well."

VII. CONCLUSION

Although a number of cities have recently deregulated, entry, fares, service types, and service quality in the taxi industry remain heavily regulated in most cities, mainly by local governments.

There is no persuasive economic rationale for some of the most important regulations. Restrictions on the total number of firms and vehicles and on minimum fares waste resources and impose a disproportionate burden on low income people. Similarly, there is no economic justification for regulations that restrict shared-ride, dial-a-ride, and jitney service.

However, potential market failures provide a credible theoretical rationale for some other types of regulations, including fare ceilings and regulations dealing with vehicle safety and liability insurance.

Finally, some regulations might conceivably be justified on efficiency grounds because of distortions created by other taxi regulations. Fare regulations that underprice certain categories of trips might provide a second best rationale for prohibitions on service refusal, requirements to offer service at certain times or places, or minimum levels on the numbers of cabs operated by firms. However, surcharges for unprofitable services would be more efficient than such service requirements.

Experience with open entry and fare competition in the radio-dispatch market segment has generally been favorable. This is apparently true in Seattle, Oakland, Berkeley, Spokane,

Sacramento, and Charlotte.[214] This is important because typically about 75 percent of taxi trips are produced by radio-dispatched cabs.

The favorable effects of open entry in radio-dispatch market segments include increases in the number of taxi firms and decreases in the market shares of the largest firms, increases in the number of cab hours of service, reductions in fares and response times, and reductions in the amount of time city councils devote to licensing and fare setting.

Overall, there have been no widespread significant problems related to open entry in radio-dispatch market segments. While an increase in customer complaints was recorded in Indianapolis and Fresno, these can best be dealt with through driver qualification and vehicle safety requirements rather than restrictions on the total number of cabs.

In marked contrast to the radio-dispatch segments, there have been many problems in cab stand market segments at airports following regulatory reform as a result of lengthening of the cab queues. These problems do not provide an argument in favor of entry restrictions, however. Rather, they suggest that there would be significant efficiency gains from either increasing fare competition at airports by altering the queue system or imposing or lowering fare ceilings on airport taxi service.

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[214] Interviews carried out by Federal Trade Commission staff suggest that partial deregulation in Jacksonville, Florida, also had favorable effects in the radio-dispatch market segment.

APPENDIX A

ELABORATION OF THE THEORETICAL MODEL

Figure 1 in Section III illustrates the theoretical model of a taxi market in fare-service (F, S) space. While this is useful for many purposes, for some purposes it is more revealing to use a diagram in which cabs hours of service (S) and number of taxi rides (R) are on the axes, as in Figure 3 below.[215] Given the model, points in (F, S) space can be mapped to points in (S, R) space, and the same letters (with prime signs) are used to designate corresponding points in Figures 1 and 3. The reader may find it helpful to refer to Figure 1 as well as Figure 3 while reading this appendix.

In Figure 3, suppose that J' is the point of joint profit maximization for the taxi industry. Around J' one can draw a family of iso-profit contours, such as the three solid elliptical contours that pass through points M', B', and K'. The profit level is constant along each contour and declines as one moves to contours farther from J'. Thus, suppose that profits are positive along the contour through M', zero along the contour through B', and negative along the contour through K'. Along the zero-profit contour, B' is the point where number of taxi rides is maximized, D' is the point where number of cab hours of service is maximized, and E' is the point where average waiting

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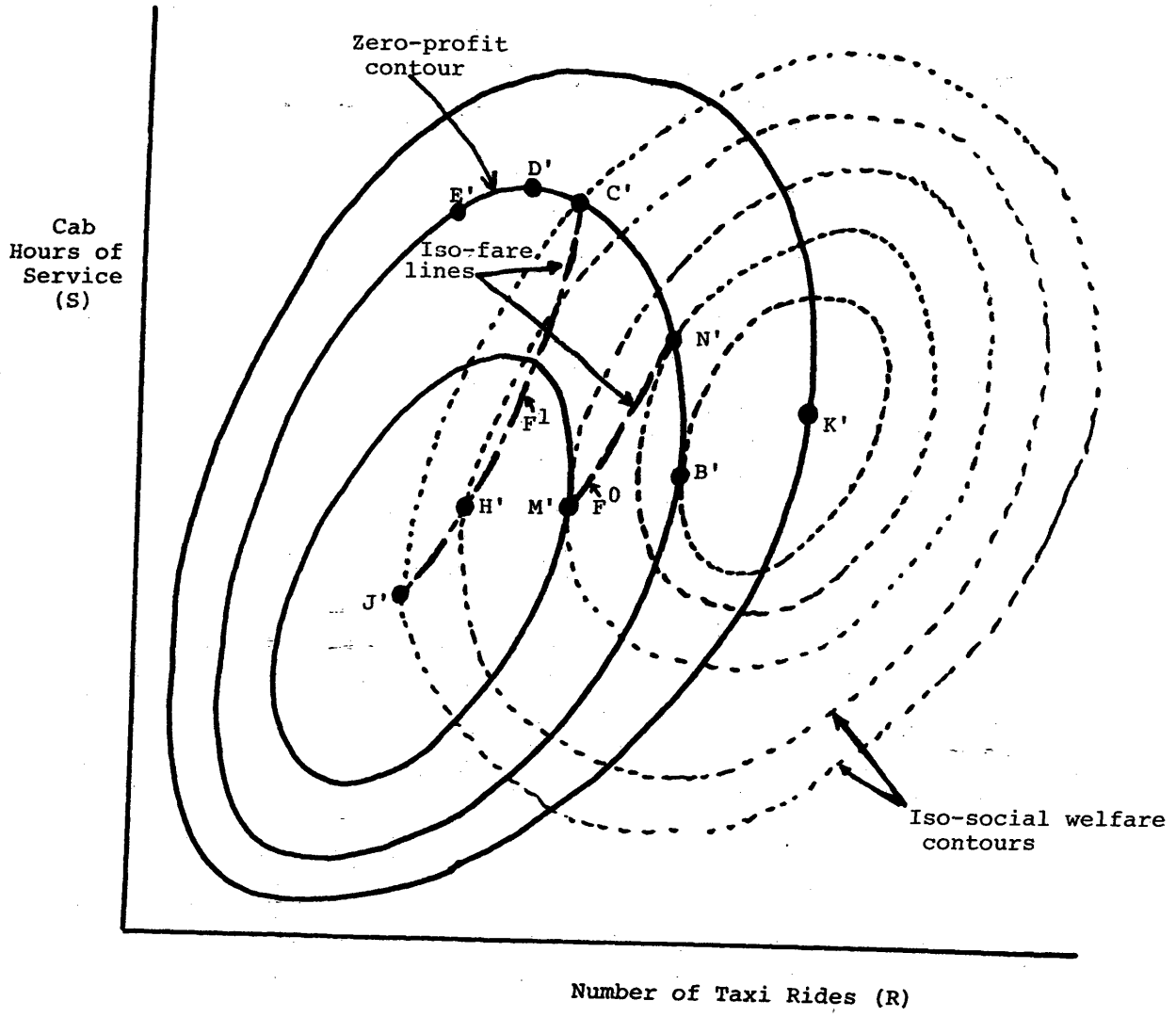
215 This figure is adapted from Sheshinski, 1976, and Frankena, 1982, Appendix C.

Figure 3

Model of a Taxi Market in Service-Rides Space



time is minimized. If entry is unrestricted, the industry will operate along the zero-profit contour. If entry is limited, the industry will typically operate at a point such as H' or M', where profits are positive.

Suppose that the efficient allocation of resources from society's point of view is at point K', where (for reasons discussed in Sections III and IV.A.8) the industry operates at a loss. Around K' one can draw a family of iso-social welfare contours, such as the five dashed elliptical contours that pass through points B', N', M', H', and C'. The social welfare level is constant along any given contour and declines as one moves to contours farther from K'. Figure 3 has been drawn so that the point that is "second best" efficient (i.e., on the highest iso-social welfare contour) given the zero-profit constraint is B'. B' also happens to be the point along the zero-profit constraint at which the number of rides is maximized, but in general the efficient and maximum ridership points will not coincide.

If the fare is held constant and service is increased, the number of cab rides will increase. For a given fare, the relationship between service and ridership is represented by an 'iso-fare' line, two of which are shown in Figure 3. $F1$ represents a fare higher than F^{O}.

Suppose the government were to set the fare at the second best efficient level but not limit entry. In that case, the taxi industry would operate at point B'. If the government chose a fare above the second best efficient level and did not restrict

entry, the industry would operate at a point along the zero-profit locus such as N', C', D', or E'. If the fare was set so that the industry would operate at N', a restriction on the maximum number of taxis would move the industry to a point such as M', on the same "iso-fare" line where both S and R would be lower. If the fare was set higher so that the industry was operating at C', a restriction on the maximum number of taxis to the same level as at M' would move the industry to point such as H'. If the industry was operating at H', a reduction in the regulated fare without a change in the maximum number of taxicabs licensed would move the industry to a point such as M'.

Suppose now that the government has imposed fare and entry regulations so that the taxi industry is operating at H'. There would be an efficiency gain if the government reduced the fare to the second best efficient level and eliminated entry restrictions, since the industry would then move to point B', which is on a higher iso-social welfare contour. In this case, there would be a smaller efficiency gain if the fare was reduced even if the entry restriction was not changed, since the industry would move from H' to a point such as M', which is on a higher iso-social welfare contour.

By contrast, elimination of the entry restriction without a reduction in the fare might reduce social welfare. Starting from point H', such a policy change would move the industry to point C', which happens to be on a lower iso-social welfare contour. While such a result is possible, it is not necessary. If the

industry started at point M' rather than H', elimination of entry restrictions without a fare reduction would move the industry to point N', which happens to be on a higher iso-social welfare contour.

APPENDIX B

EMPIRICAL ESTIMATES OF THE DEMAND FOR TAXI SERVICE

This appendix summarizes available information on (1) the elasticity of demand for taxi rides with respect to taxi fares, waiting time, and income; (2) the cross elasticities of demand between taxis and other urban transportation modes; and (3) the value of waiting time.

1. The Demand for Taxi Rides

a. Fare Elasticity

We have found seven estimates of the fare elasticity of demand for taxi rides in the literature (see Table 6). With the exception of some of the estimates reported by Fravel and Gilbert (1978), all estimates lie in the range between -0.6 and -1.4. The median estimate is -0.8.

These estimates have several shortcomings. The data and estimation techniques used fall considerably short of current standards for econometric work on demand functions. First, some of the estimates are based on very short time series for a single city. Some are based on data for a single firm in a city with more than one taxi firm; such estimates assume that market shares are constant. Some are based on the effect of a single fare change.

Second, the estimation techniques implicitly assume that fare changes are not accompanied by changes in the level of service and waiting times, which would affect the number of taxi rides demanded. This assumption is probably invalid. Unless the

Table 6

Estimates of the Fare Elasticity of Demand for Taxi Rides

Study	Data	Elasticity
U.K. Ministry of Transport (1953)	London 1951-52	-1.0 or less in absolute value
Kitch et al. (1971)	Chicago 1965	-0.8a
Wong (1971)	Washington, D.C.	-1.4
Fravel and Gilbert (1978)	14 firms nation-wide 1976-77	Range: -1.5 to +1.5 Median: -0.2
Brown and Fitzmaurice (1978)[b]	21 Pa. cities with populations of 12,000-129,000	-0.8c
Applied Economics Associates (1978)[b]	Seattle 1977	-1.0a
McGillivray (1979)[d]	Danville, Ill., population 143,000 1975-77	-0.6

Notes: [a]No test of significance.
[b]Cited in Fravel and Gilbert (1978).
[c]Not significant at 10 percent level.
[d]Shared-ride taxi service.

fare is initially very high, an increase in the fare will lead to a new equilibrium at which the waiting time is lower, particularly if entry restrictions are not binding. If an increase in fares leads to a reduction in waiting times, estimates of the fare elasticity of demand that assume that waiting time is constant will be biased downward in absolute value. Also, the estimates ignore tips. If the percentage tip varies inversely with the level of the fare, omission of the tip from the fare variable would cause a downward bias in the absolute value of the fare elasticity estimate.

Third, few of the estimates are accompanied by tests of statistical significance, and in other cases the estimates are not significantly different from zero at conventional levels. Thus, taken individually, the estimates carry little weight. However, the median of the estimates should be given some weight, subject to the qualifications listed above.[216]

We conclude that the available evidence is consistent with the hypothesis that the fare elasticity of demand for taxi rides is generally around -0.8 to -1.0. It should be added that there is no reason to believe that the fare elasticity is a constant independent of the fare level. Along a linear demand curve, the absolute value of the elasticity increases as the fare increases.

It should also be noted that if the fare were set at the level at which taxi firms would maximize joint profits, the fare

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[216] The variance of the median of the means from repeated samples is smaller than the variance of the means themselves.

elasticity would be greater than one in absolute value. If it were not for the downward bias of unknown magnitude in the elasticity estimates, one could speculate that at the times and places that the data for the studies listed in Table 6 were gathered, taxi fares were below the levels at which taxi firms would have maximized joint profits (holding the level of waiting time constant).

b. Waiting-Time Elasticity

There does not appear to be any direct information about the elasticity of the demand for taxi rides with respect to waiting time. It would, however, be possible to make some inferences about responses to changes in waiting times if we had an idea of the value that people place on their waiting time. For example, if an individual values waiting time at $10.00 per hour, a fare increase of $1.00 and a waiting time increase of 6 minutes would have the same effect on that person's demand for taxi rides. Valuation of waiting time is discussed below.

c. Income Elasticity

In Section V.D.1.a, we summarized evidence on the use of taxis by different income groups. In many taxi markets the income elasticity of demand for taxi rides is negative,[217] i.e., low income people take more taxi rides per capita than do high income people. Even though the evidence does not allow us to

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217 Of course, no good can have a negative income elasticity of demand at very low income levels.

conclude that the income elasticity of demand is negative in all cities (e.g., in large cities with a major cruising cab market), there is strong evidence that the income elasticity is uniformly lower than one, i.e., low income people spend a larger percentage of their incomes on taxis than do high income people.

2. Substitution Between Taxis and Other Services

Beesley (1979, p. 109) calculated the cross-price elasticity of demand for taxicabs with respect to transit fares over the period 1960 to 1976 in London to be 0.2.[218] Sketchy evidence provided by a 1970 citywide transit fare increase in New York City led one study to conclude that the cross-price elasticity of demand for taxi service with respect to transit fares was zero, but this is contradicted by a study of a 1948 subway fare increase which concluded that the elasticity in question was positive.[219]

De Vany produced evidence from simulations of bus/taxi competition at airports indicating that a substantial diversion of passengers occurs from cabs to buses if waiting time for taxis

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218 However, this estimate must be discounted somewhat because of problems calculating changes in taxi quantity.

219 Kirby et al., 1974, p. 125. In any event, there is no reason to believe this particular elasticity would be uniform across cities, since it would probably depend on relative time and money costs of travel by transit and taxi. Also, estimates of the cross-price elasticity of demand for taxi service are probably biased downward. The estimates do not allow for the fact that an increase in the demand for taxis leads to an increase in waiting times, given fare and entry controls.

is high. However, this result is based on assumptions rather than empirical observations about behavior. Estimates of limousine and taxi cross-price elasticities of demand for non-resident business travelers are on the order of 1.0 to 2.3.[220]

3. The Value of Waiting Time

There are no estimates of what consumers would be willing to pay to reduce the average waiting time for taxis.

Existing studies suggest that, for rush hour work trips, on average people value in-vehicle travel time by car and/or public transit at about one-third of their hourly wage rates. People value time walking to transit stops and waiting for transit vehicles at about two to three times this much.[221]

It is difficult to use these estimates to make inferences about willingness to pay to reduce waiting times for taxis, since the situations are different. The majority of taxis in most cities are hailed by phone, and people who call taxis may be able to use much of the waiting time productively. Thus, it is reasonable to suppose that on average people would not be willing to pay as much per hour to reduce the time they wait for taxis as they would be willing to pay to reduce the time they spend waiting at bus stops, or even as much as they would be willing to pay to reduce the time they spend riding in a car or bus. Also,

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220 De Vany, 1977, pp. 34-5, citing deNeufville et al., 1972.

221 Frankena, 1979, Chapter 2, and 1982, Chapter 2.

taxis are not used primarily for commuting to work. For people who use taxis, time is apt to have a lower value on average than time would have for work trips. On the other hand, the value of waiting time in the cruising cab market may be quite high, since rides often take place during work hours.

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