

# THE IMPACTS OF TAXICAB DEREGULATION IN THE USA

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The deregulation movement has affected virtually every private transport industry in the United States. The railroad, airline, motor trucking and intercity bus industries have been deregulated, in varying degree, by federal legislative changes enacted over the past six years. Sometimes the result has been a fundamental transformation of the industry, with major impacts on industry structure, pricing and service practices, productivity and profitability. The industry, its customers, or both have benefited as a result. But in other industries the impact of deregulation has been both less far-reaching and less favourable to producers and consumers. The urban taxicab industry is a notable example. Several large US cities have wholly or partially deregulated their taxicab industries, with little apparent advantage to providers or users. This paper explains why taxicab deregulation has so far been a relatively disappointing policy in the USA.

## TAXICAB DEREGULATION: RATIONALE AND EXPECTATIONS

### Taxi regulation: origins and practices

In most cities, the taxicab industry was brought under municipal or state regulation during the late 1920s and 1930s, largely because of the extremely competitive conditions stimulated by the Depression. The low costs of entering the taxicab industry, at a time when other employment opportunities were extremely limited, resulted in much new entry, widespread price competition, considerable turnover of operators, and generally unstable market conditions (Gilbert and Samuels, 1982). The established companies in the industry were then, and have continued to be, the main supporters of economic regulation.

Regulations are not uniform among cities, but they commonly encompass entry, price and service. Typically, (1) entry is restricted, on the basis of either "objective" criteria (such as a ratio of taxicabs to population) or standards of convenience and necessity; (2) maximum and minimum rates are prescribed; and (3) companies must meet certain service standards, such as 24-hour availability of service, radio dispatch capability, and a certain level of response time. In most

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cities where taxicabs are regulated, there is little or no new entry into the industry except by the purchase of licences or permits from existing operators. In addition, a single set of rates usually prevails.

Deregulation of the taxi industry has taken the form of eliminating or relaxing restrictions on rates, on entry, or on both. Service standards have sometimes been retained. Cities that have recently deregulated either fares or entry include San Diego, Seattle, Sacramento, Kansas City, Oakland, Fresno (CA), Charlotte (NC), Portland (to a limited extent), and (as part of a statewide deregulation), all the cities in Arizona, the most prominent of which are Phoenix and Tucson.

### **Theoretical arguments for and against price and entry freedom**

There has been substantial theoretical debate over the impact of price and entry freedom on taxi prices. Douglas (1972) and Shreiber (1975) have argued that, in the cruising cab market, the complex interaction between service quality, quantity supplied, and price will produce upward pressures on price. The explanation is that a consumer will have an incentive to take the first cab encountered, because the waiting time for the next cab is unknown, and so is its price. Under these circumstances, where consumers cannot engage in efficient comparisons of price and quality, producers have nothing to gain by lowering prices.

Williams (1980a, 1980b) and Coffman (1977) have criticised this model as unrealistic, suggesting that three factors – taxi fleets, cabstands, and telephone orders – undermine the analysis. Taxi fleets which can advertise low prices represent a means of overcoming the problem of information to consumers. Cabstands represent a locational alternative to cruising, and seemingly permit easy and relatively timeless comparison of price. Telephone orders also permit comparison of price, with little or no extra waiting time. As Shreiber (1977, 1981) notes, however, fleets offer a medium for information on price only if they are large in proportion to the total size of the industry. Otherwise, the consumer's chance of encountering a low-price cab is still low. As for cabstands, he points out that at most stands the operating rule is first in, first out, and the consumer faces formal or informal demands to take the first cab in line. This obviously militates against price competition.

Williams (1980b) has asserted that oligopolistic pricing in the telephone order market can be avoided by allowing open entry, as single cab owners can enter the market at low prices. However, this is an extremely unrealistic model, as effective competition in the telephone order market requires a relatively large fleet to cover a whole area effectively. Thus the telephone order industry is likely to be relatively concentrated. Foerster and Gilbert (1979) review several possible models of regulation and industry structure, and explicitly consider the case of a deregulated, concentrated industry, but are unable to reach any conclusions about its level of price, though output is expected to be lower than where there is competition (which could lead to either higher or lower prices).

This brief review of previous analyses of taxicab pricing indicates that there is no universal agreement that effective price competition is possible. Economists nonetheless appear to be in general agreement that economic regulation (that is,

regulation of pricing and entry) is unwarranted (except in the pure cruising cab situation presented by Douglas and Shreiber). (See Frankena and Pautler (1984) for a more extensive review.) There does not, however, appear to be any objection to regulating quality of service for reasons of safety and protection of consumers.

### The rationale for deregulation

The rationale for taxicab deregulation is threefold. First, it is alleged that restrictions have enabled incumbent firms to charge higher prices than those which could prevail in a non-regulated industry. Some economists point to positive licence prices as *prima facie* evidence of higher than competitive rates (Frankena and Pautler, 1984). In virtually every large city where the taxi industry is regulated, licences *do* have a positive value; this indicates that monopoly power existed at some time.

Second, if the taxis in the industry are too few, as they may be under regulation, the increase in industry size which follows deregulation should improve the level of service to the consumer. In theory, additional taxis should reduce response times for telephone orders and make it easier to obtain a cab through a street hail.

Third, most cities which regulate taxis allow only a single type of service, namely, exclusive ride taxi (ERT) service, in which a single user or party of users has exclusive control over the vehicle for the duration of the trip. Because this is a low-productivity type of service responsive to demand, it commands a premium fare. Shared ride taxi (SRT) service, in which unaffiliated individuals with different origins and/or destinations share the vehicle, is prohibited in most areas, even though its higher productivity would permit lower taxi fares. Thus another rationale for deregulation is to allow taxi companies to provide a greater variety of price-service options than is the norm in a regulated industry.

The expectations of deregulation follow directly from the rationale for it. Economists have predicted that the elimination of entry and pricing controls would lead to an increase in the size of the industry, reductions in rates, improvements in response times, and the development of new price-service options (Frankena and Pautler, 1984). These results are expected to be observed primarily in the telephone order market, which in most large cities comprises 70 to 80 per cent of the overall market for taxi service. (In small cities, it represents 90 per cent or more of the market.) In addition, in the handful of American cities where street hails constitute a large portion of the taxi market, these results are expected also in the cruising cab portion of the industry.

### SOME UNEXPECTED RESULTS OF TAXICAB DEREGULATION

Among cities which have deregulated, at least to the extent of allowing free entry into the taxi industry, published data are available on the impacts in San Diego, Seattle, Oakland, Fresno, Phoenix and Tucson. In addition, local officials in Sacramento, Kansas City and Tacoma provided at least some quantitative information on entry, exit and prices. These nine cities represent the primary data base

for assessing the impacts of deregulation; they also represent the entire universe of large (250,000 population or more) American cities which had undertaken significant deregulation by 1985. (Some of these cities have since re-imposed some entry or price controls.) The primary focus in this analysis is on San Diego, Seattle, Sacramento, Phoenix, Tucson and Kansas City, as they all deregulated both entry and prices and reasonably good data were available on the impacts.

In all six cities, taxi licences were worth at least several thousand dollars before the repeal of entry controls. In each city, the telephone order market constitutes at least 70 to 80 per cent of the total taxi market, and in Tucson it is more than 90 per cent of the market. Unfortunately, deregulation has not occurred in any of the handful of American cities where street hails predominate, so the results of this analysis do not necessarily apply to them.

In the several cities where the taxicab industry has been deregulated, the results have been only partially consistent with theoretical expectations. In general, taxi prices have not fallen in real terms; in only one case has an improvement been noted in level of service, and no important price-service innovations have been implemented. Moreover, though there has invariably been a substantial increase in the number of taxi firms after deregulation, and this has reduced market concentration, the large incumbent firms still dominate the industry in all but one of the cities which have allowed open entry. The telephone market segments generally resemble geographical oligopolies with a fringe of marginal competitors. Thus internal conditions are not fundamentally different from those prevailing in the regulated era. These results are now examined in more detail, with the focus on five aspects: entry and exit, level of service, prices, productivity and innovation.

### **Entry and exit**

As Table 1 indicates, the size of the taxi industry in cities freed of entry control has increased by at least 18 per cent in every case, and usually by one-third or more. Except in Phoenix, where two new large fleets have been established since deregulation, most new entrants have been individual owner operators or small companies (a large fleet is defined as 25 or more vehicles controlled either by a company or by an association of owner-operators). Seattle, with three large operators before deregulation, has had no new large fleets. Most new entry is concentrated on cabstand markets at airports and large hotels, which can be served without radio dispatch capability; these represent a guaranteed source of passengers, though taxis wait in long queues. Only a few cities require radios in all cabs (Sacramento, Oakland, Kansas City). There appear to be no serious problems in obtaining radio frequencies, so this has not represented a deterrent to entry into the telephone order portion of the industry.

Even modest requirements can have a substantial deterrent effect on new entry. Portland had only one new entrant under rules requiring a minimum fleet (initially 10 and later 15 taxis) and service for 24 hours a day, including radio dispatching (Gelb, 1982). Service standards (but not minimum fleets) have apparently held down new entry in Kansas City, which has the lowest open entry rate of any open-entry city.

TABLE 1

*Change in Size of Taxi Industry since Deregulation*

<i>City</i>	<i>Increase in Number of Taxis</i>
	%
Seattle	33
San Diego	127
Sacramento	56
Kansas City	18
Phoenix	83
Tucson	33
Oakland	38

Source: Gelb, 1983a, 1983b; Teal *et al.*, 1984; Personal communications with city officials in Kansas City, Sacramento, San Diego and Seattle.

Exit data are scarce, but available evidence indicates substantial turnover among small companies and independent drivers, little turnover among medium and large new firms, and no exit by a large incumbent firm since deregulation. Turnover is concentrated among small operators (usually one-cab operators) serving cabstand and street hail markets, which quickly become oversaturated after deregulation. In the airport market in Phoenix 40 per cent of independent cabs apparently left the industry during the 15-month period after deregulation (Teal *et al.*, 1984). Within 18 months of the establishment of an entry moratorium in San Diego, one-third of all taxi operators not affiliated to the two largest fleets applied to transfer licences (often to other operators of fleets) and thus to leave the industry.

#### Level of service

Little empirical evidence is available on changes in level of service to users after deregulation, and theoretical arguments are of little use in explaining outcomes. Service improvements do not inevitably follow new entry, as some analysts have argued (Frankena and Pautler, 1984). Response time – the most important level-of-service measure in the telephone market – depends on the number of cabs controlled by a radio dispatch company and the demand for its cabs, not on the total number of vehicles in the city. Unless the new entry occurs in the telephone order market, response times will be only marginally affected. Moreover, if the size of large radio dispatch firms declines in approximate proportion to their ridership loss after deregulation, response times may be unaltered (best case) or increase (worst case) because of losses in economies of density. Because there were queues of taxis, there was no waiting at airport cabstands even under regulation.

TABLE 2

*Increases in Taxi Rates and Consumer Prices*

	<i>Increase in Taxi Rates</i>			<i>Increase in CPI</i>		
	<i>Oct. 1971 to Dereg.</i>	<i>Dereg. to Dec. 1984</i>	<i>Total</i>	<i>Before Dereg.</i>	<i>After Dereg.</i>	<i>Total</i>
	%	%	%	%	%	%
Seattle <sup>a</sup>	38.5	51.9	110.4	78.6	45.6	160
San Diego <sup>a</sup>	58.3	71.8	172.1	78.6	45.6	160
Phoenix <sup>b</sup>	66.0	36.1	126.0	139.6	9.0	160
Tucson <sup>b</sup>	122.5 <sup>c</sup>	28.4 <sup>c</sup>	185.0	139.6	9.0	160
Sacramento <sup>b</sup>	100.0	13.7	127.5	39.6	9.0	160

<sup>a</sup>Deregulation occurred in June 1979.

<sup>b</sup>Deregulation occurred in June 1982.

<sup>c</sup>Rate increase shown occurred 3 months before deregulation in anticipation of its effects; no subsequent rate increase except for waiting time charges.

Unfortunately, empirical evidence is very limited. The only industry-wide comparison of response times before and after deregulation was made in San Diego, and showed a decrease in average response time from 10 minutes to 8 minutes (Gelb, 1983a). On the other hand, trip refusal/taxi no-show rates have generally increased since deregulation. In San Diego, the refusal/no-show rate increased from 5 per cent to 18 per cent between 1976 and 1979, and in Seattle a refusal/no-show rate of 35 per cent was documented after deregulation (Gelb, 1983a, 1983b). The Seattle figure is inflated, because most telephone order customers call a large service company with a low refusal/no-show rate; but there is certainly no evidence that taxi patrons are less likely to be turned down.

### Taxi rates

In every city in this study taxi rates are now higher in real terms than before deregulation, often by a substantial amount.

Table 2 provides a comparison of rate increases before and after deregulation for five cities which have been deregulated for at least two years. As can be seen, in all five cities rates have increased since deregulation more rapidly than the consumer price index, whereas in no city did they increase as rapidly as the CPI when the taxi industry was regulated. This comparison may be unfair, as in every city except Sacramento rates increased sharply at the point of deregulation, partly because a rate increase was overdue under the regulated regime. How much

TABLE 3

*Changes in Fare Levels in Regulated and Deregulated Cities*

	<i>Mean Fares</i>		<i>Median Fares</i>		<i>Increase in Mean Fares</i>	<i>Increase in Median Fares</i>
	<i>Oct. 1971</i>	<i>Dec. 1984</i>	<i>Oct. 1971</i>	<i>Dec. 1984</i>		
	\$	\$	\$	\$	%	%
7 Deregulated Cities	2.44	5.94	2.41	5.70	145	137
6 Deregulated Cities*	2.52	6.06	2.60	6.05	143	133
14 Regulated Cities	2.22	5.15	2.17	5.12	133	136

\* Excludes Kansas City because of the short time since deregulation occurred.

of the increase was due simply to “catch up” with past inflation is difficult to determine from these data alone, so other comparisons are necessary. Three different analyses of rates were performed.

First, the overall increase in rates was analysed for 7 deregulated cities and 14 regulated cities of over 250,000 population for which data were available in the Far West, Southwest, and Rocky Mountain regions. (Fresno, Oakland, and Los Angeles were excluded because of anomalies.) Data from annual surveys by the International Taxicab Association and Houston Yellow Cab covered the period from October 1971 (the earliest date for which comprehensive data are available) to December 1984. This time period encompasses several major impacts on fare decisions – gasoline price increases, severe inflationary pressures, and the transition to driver leasing in the taxi industry.

Rates were computed for a four-mile telephone order trip by a large radio dispatch company; averages were used if company rates varied (this occurs only in the deregulated cities). The results are shown in Table 3. During this 13-year period, mean rates increased slightly more in the deregulated cities than in regulated cities, while median rate increases were approximately the same. The evidence that rate increases, on the average, were at least as high in the regulated as in the deregulated cities indicates rather convincingly that deregulation does not *necessarily* result in lower fares.

A second analysis of taxi rates in the deregulated cities before and after deregulation compares the annual trends in four-mile fares with the CPI and a cost index. The index was constructed by equal weighting of the private transport cost index and the index of retail workers’ wages (about 50 per cent of the cost of taxi service is the cost of driver labour). The results are shown in Table 4 for five cities which have at least two years’ experience with deregulation. (Comprehensive data were not available from Tacoma.)

These results indicate that, on a trend line basis, rates have increased in real terms in three of the five cities, have remained relatively stable compared with

inflation in Seattle, and have fallen by 3 to 4 per cent in Sacramento. Overall, the inflation-adjusted rates in the five cities increased by 5 to 6 per cent over the trend established before deregulation. It bears noting that December rates were used as representative of the entire year, though more accurate comparison would use an average of monthly rates. Unfortunately, this information was not available for all five cities. The increase shown thus may be slightly inflated, but not by a magnitude sufficient to reverse the finding. Again, these results appear to refute the notion that deregulation will invariably lead to lower real taxi rates.

Finally, Table 5 presents a third analysis of rates — the results of time series inflation-adjusted fare comparisons both for the five deregulated cities and for the 14 regulated cities selected for comparison. For the regulated cities, before and after rates were calculated with first June 1979 and then June 1982 as the dividing point, and then were averaged together.

Table 5 indicates that in regulated cities fares actually increased at a lower rate than the inflation-adjusted trend. Thus the higher average rates in the deregulated cities are not reflective of trends in the overall taxi industry. Owing mainly to driver leasing, the regulated industry has apparently been able to maintain slightly lower real fares during the past five years than during the earlier period. In only three of the 14 regulated cities did inflation-adjusted fares increase after 1979 relative to the trend established between 1971 and 1979. This comparison suggests that taxi rates may have increased as much as 10 per cent more in the deregulated cities than they would have done under continued regulation.

The three analyses of rates indicate that deregulation has not produced appreciably lower rates in most telephone order markets, and that it appears to be associated with somewhat higher fares. Price competition under deregulation has proved to be the exception rather than the rule, in spite of expectations that it would act as a deterrent to higher rates. Seattle and San Diego are the exceptions: the second largest company in each of these cities offers fares at least 15 per cent below those of the largest company. Despite traditional price theory (which assumes perfect information), these lower prices have not stimulated price reductions by competitors, and the low-price companies have not increased their market shares.

No price competition has occurred in Tucson, Kansas City, Tacoma and Sacramento. In Phoenix, one large new company has a slightly lower drop rate than Yellow Cab, but charges identical mileage fares. But another large new company sets mileage charges 17 per cent higher. In other cities, prices in the telephone order market have tended to become uniform, just as before deregulation. It was only in Fresno, California, that pricing chaos occurred: the many small entrants (with no large radio dispatch company to impose pricing discipline) pushed widely varying rates as high as \$3.50 per mile. This experience led the city to reinstate price and entry controls (Paratransit Services, 1983), though price controls alone (without entry restrictions) would have sufficed. Clearly it was the combination of price and entry deregulation, in the context of a particular market environment, which led to this outcome.

In cabstand markets, the upward trend of rates has been even more pronounced than in the telephone order market; this is shown in much higher rates at the San Diego, Seattle and Phoenix airports. (Airports are by far the largest cabstand



TABLE 4

*Telephone Order Rates Before and After Deregulation  
Indexed by Inflation Rate*

	<i>CPI Adjustment</i>			<i>Cost Index Adjustment</i>		
	<i>Average Annual Fare Index</i>			<i>Average Annual Fare Index</i>		
	<i>Before Dereg.</i>	<i>After Dereg.</i>	<i>After/Before Ratio</i>	<i>Before Dereg.</i>	<i>After Dereg.</i>	<i>After/Before Ratio</i>
Seattle	0.870	0.898/0.861 <sup>a</sup>	1.032/0.990 <sup>a</sup>	0.868	0.905/0.867 <sup>a</sup>	1.043/0.999 <sup>a</sup>
San Diego	0.885	1.016	1.148	0.883	1.025	1.161
Phoenix	0.879	0.910	1.035	0.878	0.924	1.052
Tucson	1.029	1.152	1.120	1.024	1.165	1.138
Sacramento	0.887	0.848	0.956	0.886	0.862	0.973
Average <sup>b</sup>	0.910	0.957	1.050	0.908	0.969	1.065

1971 is base year for fares, CPI, and cost index. All indexes are computed for December of year.

<sup>a</sup>Most common fare/average fare weighted by size of companies.

<sup>b</sup>Average use lower after/before ratio for Seattle.

TABLE 5

*Average Annual Inflation-Adjusted Indexed Fares  
in Regulated and Deregulated Cities*

	<i>Fares Adjusted by</i>					
	<i>CPI</i>			<i>Cost Index</i>		
	<i>Before</i>	<i>After</i>	<i>After/Before</i>	<i>Before</i>	<i>After</i>	<i>After/Before</i>
Deregulated Cities	0.910	0.957	1.050	0.908	0.969	1.065
Regulated Cities <sup>a</sup>	0.960	0.930	0.969	0.960	0.939	0.978
Regulated Cities <sup>b</sup>	0.956	0.905	0.947	0.955	0.920	0.963
Regulated Cities <sup>c</sup>	0.958	0.918	0.958	0.958	0.929	0.970

(1971 = 1.0)

<sup>a</sup> Uses June 1979 as after/before point.

<sup>b</sup> Uses June 1982 as after/before point.

<sup>c</sup> Average of (a) and (b)

markets.) For example, median mileage rates for airport-based cabs in Phoenix range from 17 to 33 per cent above the charges of the largest radio dispatch company. In both San Diego and Seattle, airport rates are also above telephone rates, and airport authorities have finally imposed a rate ceiling to control excessive charges by some operators. These ceilings are meant to protect uninformed consumers from excessively high fares when rates vary substantially.

### **Productivity**

In every city where the taxicab industry has been deregulated, there has been a significant decline in taxicab productivity as measured by the number of daily trips per cab and trips per shift. As Table 6 shows, daily trips per taxi have dropped by at least one-third in the four deregulated cities where sufficient data were obtainable. (These are only first or second year results; in some cities the reduction is much larger at the present time, since the size of the industry increased after the first year.) If market demand remains stable or falls after deregulation, this decline in productivity is a natural consequence of the increased number of taxicabs sharing the same or fewer passengers. There is no empirical evidence that demand has increased in any deregulated city; and data from Phoenix, San Diego and Seattle indicate a reduction in the number of taxi patrons as a result of taxi price increases (Teal *et al.*, 1984; Gelb, 1983a, 1983b).

Decreases of this magnitude in productivity have serious economic consequences for taxi drivers. The shift from predominantly employee drivers to lease drivers or owner drivers means that there is no minimum wage guarantee from a taxi company. But fares have not increased in real terms enough to offset the reduction in trips per day. The average taxi driver thus earns a lower income (often for more hours of work) than before deregulation (Gelb, 1983a, 1983b). In San Diego, for example, the real earnings of drivers in the largest company in the city have fallen by 30 per cent since deregulation, and this company has the highest productivity in the industry.

### **Innovation**

Experience has shown consistently that deregulation has not led to the development of innovative taxi services. Exclusive ride taxi service remains the only service offered in the deregulated cities. The city governments in San Diego and Seattle developed zone maps for shared ride taxi service, but none of the operators in these cities actually initiated shared riding. In the Arizona cities, no such services have been developed despite the removal of all regulatory barriers. Resistance to shared ride service stems from a legitimate doubt whether there would be sufficient densities of demand and from the operators' view that it would lead to a net reduction in revenue, reducing revenue per passenger without generating significantly more passengers. Taxi operators in some of the deregulated cities have offered discounts for certain types of trips, or to certain types of travellers, most notably elderly persons making city-subsidised trips. However, the discounts tend to be small (10 per cent is typical), and the practice is also found in some regulated cities.

TABLE 6

*Trends in Taxi Productivity after Deregulation*

<i>City</i>	<i>Trips per Shift</i>	<i>Trips per Cab</i>
	%	%
Phoenix	-23 <sup>a</sup>	-34 <sup>a</sup>
San Diego	N/A	-37 <sup>a</sup>
Seattle	-35 <sup>b</sup>	-48 <sup>b</sup>
Tucson N/A	-33	-38 <sup>a</sup>

<sup>a</sup> One year after regulatory change.

<sup>b</sup> Two years after deregulation (based on trip sheets which may be incomplete).

Sources: Gelb, 1983a, 1983b; Teal *et al.*, 1984.

## EXPLAINING THE RESULTS OF THE DEREGULATION EXPERIENCES

Deregulation has led, as expected, to substantial increases in the size of the taxi industry in terms of the number of "firms" (some of which consist of a single driver and vehicle) and of assets (value of the additional vehicles). The market share of the firms operating in formerly protected markets has fallen because of the new entrants. However, taxi rates have also increased in real terms; there is little evidence of a higher level of service in the telephone order market segments; and there has been no implementation in urban taxi markets of innovative price-service combinations. Moreover, the productivity of the industry has decreased significantly since deregulation, and this has led to reductions in the real income of drivers. What explains the lack of significant benefits, and why have simple competitive models of the taxi market failed to predict accurately the impacts of taxi deregulation?

The emphasis placed by industrial organisation principles on actual conditions in markets (and on the distortions which monopoly power creates in real-world markets) proves more useful than simple micro-economic theory for analysing the impacts of taxicab deregulation. Simple models of competitive behaviour involving atomistic producers selling to completely-informed consumers are often used (Frankena and Pautler, 1984), but these theoretical generalisations of ideal types provide no useful or interesting explanations for the results observed in the dominant taxi markets – telephone orders and cabstands.

Recent literature (see Bailey and Friedlaender (1982) for a survey) has proposed that transport firms produce a multi-product output – travel between each

origin-destination pair is a separate "product" – and may enjoy economies of scope. In the transport industries, economies of scope are often associated with the advantages of serving a network – the single firm can produce a given level of output of each of several product lines (travel between various origin-destination pairs) more cheaply than a combination of separate firms each producing a single product at the given output level. This may explain market structure in the telephone order taxi market, since firms must be of a certain size and number of cabs to cover an entire city network with an acceptable response time – trips may originate in any part of the city. Airport taxi markets, on the other hand, focus on a single origin – a major traffic generator – and can sustain a small-size firm.

### Explaining price changes after deregulation

From the perspective of simple economic theory, the most puzzling result of taxi deregulation is the absence of price reduction (in real terms) in all cities except Sacramento, and the actual increases in real rates in most of the deregulated cities. Some economists flatly predicted that taxi prices would fall after deregulation (Frankena and Pautler, 1984) both because taxi licence values would fall to zero and because firms would have an incentive to use price as the basis for competition for patrons.

There are several factors which explain why taxi prices have not usually fallen – some are supply factors and others relate to demand. The supply factors are: (1) "monopoly" profits under regulation were less than might have been expected, (2) the change to deregulation has not generated a competitive industry structure in the telephone order market, and (3) there is no apparent cost basis to substantiate price reductions in the taxi industry. Several demand factors militate against lower taxi fares: (1) demand for taxicabs is apparently characterised by imperfect information and strong name recognition, (2) the demand for taxi service may be inelastic, (3) per capita demand for taxis is either stable or in a long-term decline, and (4) leasing partially insulates taxi firms from the ultimate consumer taxi market. These factors are discussed below.

### Supply factors

*Monopoly profits and taxi rates.* Under regulation, the "monopoly profits" attributed to entry restriction (which create positive licence values) typically appear to be quite small. A Seattle study indicated that the positive value of licences could potentially cause rates to be 5 per cent higher than under deregulation with a zero licence value (Zerbe, 1983). Since, in rate-setting proceedings, regulators do not explicitly allow capitalised licence values to be reflected in fares, it is not clear how much, if any, of this cost is extracted from taxi patrons. Furthermore, there was little turnover of licences among large companies who were rate setters (which means licence values were capitalised long ago, if at all), and operating ratios were approaching 100 (the companies in these cities were only marginally profitable); it is therefore unlikely that rates reflected much of the capitalised licence values. Thus, in the industry as a whole, there was little or no monopoly "cost" reduction to generate taxi rate reductions.

*Industry structure and taxi rates.* Deregulation of the taxi industry is not usually accompanied by a transition from a monopoly or oligopoly to an industry structure better approximating pure competition, at least in the telephone order market. Rather, the change is from monopoly to oligopoly or from a tight oligopoly (with two or three firms) in the region to a looser oligopoly (with an additional one or two large firms and possible small competitive fringe). In Seattle, deregulation did not change the number of dominant firms (three).

These relatively small changes in industry structure among radio dispatch companies reflect the relatively high entry costs in the telephone order market in comparison with the cabstand markets. Costs for a new entrant include radio equipment, facilities, personnel and a fleet large enough to provide responsive city-wide service where there are thought to be "economies of scope". It is even more important that new entrants face competition with well-established companies with "economies of experience" (Button and Pearman, 1985), that is, names that are familiar (such as Yellow Cab) because of earlier monopoly franchises. With only a few competitors serving the market, there is little incentive for price competition – firms become price-makers instead of price-takers, and price leadership might result in somewhat higher prices.

*Cost and taxi rates.* Except for the elimination of positive licence values discussed above, there is no apparent cost basis for downward pressure on taxi fares after deregulation. Management can exercise little control over the cost of important factor inputs such as vehicles, fuel, insurance and tyres. Drivers' wages – about 50 per cent of the cost of service – are already among the lowest in the labour force. In contrast to the airline industry, where new entrants could produce a seat-mile at a much lower cost than established companies by paying lower wages and using labour more flexibly, there is no evidence that the unit costs of operating a taxi vehicle can be reduced by new entrants.

The only other source of cost savings which could generate lower taxi rates is increased vehicle productivity through shared riding. Because of the low area-wide demand densities for taxi service, improved vehicle utilisation is difficult to accomplish. Of the four deregulated cities where passenger demand data were available – San Diego, Seattle, Phoenix and Tucson – only Seattle has the necessary minimum demand density for areawide shared ride service of at least one telephone order trip per square mile per hour (during the business day), on the assumption of a 50 per cent demand by telephone order patrons for this service. Spatial concentration of demand is equally important to the feasibility of shared ride service, and both San Diego and Seattle do have areas (notably the central area) and nodes where demand is sufficient for SRT operations. But no operators have chosen to provide such service, either in these zones or on an areawide basis.

### **Demand factors**

*Imperfect information, product differentiation and taxi rates.* Research findings from San Diego and Seattle show that it is very doubtful whether taxi consumers possess the information on price and service offerings needed to establish a truly

competitive market for the telephone order portion of the taxi industry. Only slightly more than half of all resident taxi users in those two cities were aware that different taxi operators charged different prices, and only between one eighth and one quarter reported that they ever compared price in choosing among taxi operators (Gelb, 1983a, 1983b). As about 40 per cent of all resident taxi users took a taxi trip once per month or less, it is not surprising that so little price shopping occurred – respondents themselves reported that they used taxis so infrequently that they had little reason to compare prices.

The most frequently cited reason for choosing a particular operator was familiarity with the provider; this factor was cited more than five times as often as low price (Gelb, 1983a). Name recognition presumably discourages new entry into the telephone order business, and this allows the few existing suppliers to set prices higher than average costs. It is not necessary for all taxi users to price shop in order to create downward pressure on prices, but the fact that only a small minority do so contradicts the assumption of an informed group of consumers exerting countervailing market power. Moreover, there is little incentive for price comparison for the occasional taxi user, as transaction costs (in time and effort) are high in relation to the potential savings (less than \$1 for a \$5 to \$6 trip).

In the airport and hotel taxi markets, taxi patrons also encounter imperfect information – typically they are confronted with not more than one taxi to choose from, with little opportunity to compare rates. The existence of queues of taxis, reinforced by first-in, first-out rules (FIFO), eliminates the price competition normally expected in markets with large numbers of competitors.

*Price elasticity and taxi rates.* For some taxi patrons, price is of little consequence because they have high income, payment is by a third party (for example, business travel), or taxis are the preferred mode (some tourist markets). There is little evidence that the demand for telephone order service is price elastic. It has been estimated to be unitary or slightly less – 0.8 (Frankena and Pautler, 1984; Fravel and Gilbert, 1978; Kirby *et al.*, 1974). If these estimates are accurate, rational industry pricing strategy indicates that marginal rate reductions are less profitable than marginal rate increases, so severe price competition is likely to decrease revenues in the industry. Given an oligopoly-type market structure in the telephone order market, price inelasticity probably creates an upward bias in rates, or at least no incentive for rate reduction.

*Growth in demand and taxi rates.* Demand in the telephone order market is either stable or in long-term decline – it does not show the kind of significant market growth likely to stimulate new entry (and price competition) when coupled with an oligopolistic market structure. Demand for service in the remainder of the taxi market shows no significant potential for growth among either high or low income patrons – taxis face intermodal competition from rental cars, private automobiles, vans and limousines, and subsidised public transit.

*Lease arrangements and taxi rates.* Incentives under lease arrangements mitigate against serious rate competition and rate reductions. The taxi fleet operators' revenues and profits vary directly with the number of taxis leased (drivers pay a

fee per shift or per day), and companies must provide access to sufficient revenue-generating opportunities to attract and keep drivers. As drivers are responsible for their own operating expenses, profits vary with vehicle productivity and average fare per trip. Drivers, therefore, prefer trips which yield high average rates and low expenses. For its part, management must set taxi rates not so high as to reduce gross revenues from users, yet not so low as to produce sub-standard earnings for drivers. Management which pursues a strategy of low prices must demonstrate an ability to generate sufficient volume to compensate drivers through higher productivity for their lower revenues per trip. Seattle, Phoenix and San Diego companies asserted that their drivers would not tolerate significantly lower rates, and in the past had advocated higher rates. Most managers apparently believe that the road to profitability is not through lower rates.

#### **Practical effects of constraints on price competition**

This analysis indicates that actual price competition and rate levels in the various segments of the deregulated taxi market depend on many complex factors. For example, price competition among three dominant firms in Seattle resulted in no rate reductions except by one firm, and this has not increased its market share. It appears that price competition has only enabled the low-price firm to offset quality differences; one taxi company still transports 90 per cent of the city's subsidised taxi patrons, despite its higher fares (\$0.40 after subsidy for a four-mile trip). Presumably the subsidised passengers are cost-sensitive, in view of their relatively low incomes, so their choice of the more expensive provider implies a quality difference or name recognition. Information on the Seattle taxi industry confirms that the lower-priced company operates a much older fleet of taxis. Similarly, in San Diego the city's largest taxi firm transports nearly 60 per cent of the city's subsidised taxi patrons, even though it controls only 50 per cent of the taxis operated by large fleets (and only 30 per cent of the taxis in the industry), and its rates are as much as 25 per cent higher than those of its competitors.

#### **Explaining the non-price impacts of taxi deregulation**

Several of the factors which help to explain the price impacts of taxi deregulation are also relevant to explanations of the non-price impacts.

*Lack of service innovation.* The lack of service innovation under deregulation is largely attributable to four factors. First, the low demand for taxi service in most urban areas makes areawide shared ride taxi service extremely difficult unless demand can be significantly increased. But the price reduction which SRT makes possible would still leave the typical SRT fare between twice and four times as expensive as public transit. This suggests that increases in demand for taxis would be quite modest. Moreover, unless SRT replaced ERT as the typical form of service, demand densities for SRT would probably still be too low to allow for a profitable service.

Second, since the industry is predominantly organised around driver leasing, management has little or no incentive to develop SRT service. This would almost

certainly require a reduction in the number of taxi vehicles in order to boost vehicle productivity to the levels where shared riding is profitable (Simpson and Carberry, 1978). But management's income is a direct function of the number of taxis in service.

Third, service innovations other than shared riding, such as transit-like services, often continue to be restricted after deregulation. Even if they are allowed (as in the Arizona cities), they must typically contend with heavily subsidised competition from public transit. Only in San Diego have jitney services been established, and they survive because a large military market requires service to downtown San Diego from bases and ships.

Fourth, any major innovation (such as SRT) would require significant start-up costs (for advertising, for example). The initiating firm would bear these costs, but rivals could become free riders if the innovation stimulated demand. Unless the innovation was quite profitable (very unlikely in the taxi industry), the initiating firm might be the ultimate loser.

*Decline in productivity.* The decline in taxi productivity after deregulation is a natural consequence of an increase in the number of vehicles in the industry, stable or declining taxi demand, and the lack of productivity-enhancing service innovations such as SRT. These factors in combination inevitably reduce the productivity of the average taxi vehicle, and thus cause a decrease in drivers' incomes (despite fare increases).

*Little change in level of service.* The increase in the number of taxicabs – taxi supply – after deregulation is often assumed to translate into a higher level of taxi service, but empirical support for this assumption is limited to data for a single year in San Diego. The number of taxis serving the telephone order market increased significantly in San Diego, but only modestly in Seattle and Phoenix. Higher level of service for consumers must be purchased at a price, however; in this case it is lower net revenues for the average driver. Moreover, the decrease in response times in San Diego is at least partly attributable to Yellow Cab's desire, and ability, to maintain the pre-regulation size of its active fleet (though the number of daily shifts has declined somewhat). If Yellow Cab's fleet size had shrunk in proportion to its loss of riders, this reduction in waiting time might not have been possible. It is important to recall that the majority of new entrants do not regularly serve the telephone order market; the cabstand markets which are their focus were already well served before deregulation. Thus only a fraction of the additional cabs in the deregulated industries represent a potential source of improved service.

*Increases in industry size.* The increase in industry size in terms of numbers of firms is the single consistently documented impact of deregulation which was previously expected. This increase is most readily explainable by the low costs of entry into some market segments of the taxi industry. As noted previously, entry at the large fleet scale required by the telephone order market has been uncommon. In the seven deregulated cities, only three new companies have entered the industry with more than 25 taxis. Entry at this scale not only requires the accumulation of considerable capital, but also the ability to convince potential



investors and/or financial institutions (who would lend money to the prospective enterprise) that a worthwhile return on their funds is likely to be forthcoming. Given the marginal financial status of the taxi industry in most cities, this represents a formidable hurdle to the formation of new enterprises of significant size.

In contrast, in most cities individual entrepreneurs can enter the deregulated taxi industry (particularly the cabstand markets) with very little capital. Only Kansas City, Oakland and Sacramento have required new entrants to provide radio dispatch (San Diego initially did so, but subsequently allowed telephone beeper systems); but even this requirement can be technically fulfilled at low cost, and compliance is hard to determine. The sunk costs of becoming an independent taxi driver are modest – less than \$1000 for the FCC radio frequency and radio, while a used cab costs \$2000 or less (with a minimum down-payment of a few hundred dollars). In view of these low entry costs, the existence of “guaranteed” cabstand markets (particularly at the airports), the attraction of working for oneself, and ignorance about true market conditions, it is easy to understand the influx of independent operators after deregulation. Of course, entry at this scale essentially precludes an operator from competing in the telephone order market.

Though the increase in industry size, in the context of stable or decreasing demand, inevitably leads to a reduction in drivers' productivity and real earnings, the evidence indicates that this increase is durable. In no deregulated city has the number of taxis declined significantly after the initial increase, and in San Diego there is still a demand to enter the industry. Given the turnover which occurs among new entrants, this indicates a relatively large pool of potential entrants who are ignorant of market conditions in the industry and/or are willing to accept subsistence level earnings in order to be self-employed. Many of these persons eventually leave the industry, discouraged by the reality of low earnings and long hours, but others are willing to take their place. There are very few such opportunities in the economy for self-employment with minimal skills and minimal capital, relatively little of which represents a sunk cost.

*Market specialisation.* Because most of the new entry resulting from deregulation is concentrated in cabstand markets which by their first in, first out nature discourage price competition (Teal and Berglund, 1984; Frankena and Pautler, 1984), this increase in the number of operators has little or no impact on price trends in the telephone order market. But it has significant, and apparently permanent, impacts on industry organisation. In all deregulated cities the large radio dispatch companies have essentially abandoned the airport market (except for drop-offs) and most other large cabstand markets as well. These companies cannot afford to tie up their vehicles in unproductive waits at these locations if they are to serve their telephone orders efficiently. They now focus almost exclusively on the telephone order market and contract business. The new entrants, particularly independent owner-drivers and small companies, have largely taken over the cabstand market. Most of these operators do not regularly service the telephone order market, and obviously have a lower opportunity cost for waiting time than the large radio dispatch companies. Thus the industry

has become divided into two sub-industries which serve distinct markets.

Unfortunately, there is no evidence that this market specialisation has produced gains in efficiency. Operators who serve cabstands are the least productive in the industry and tend to have the highest prices (Gelb, 1983a, 1983b; Teal *et al.*, 1984). The radio dispatch companies have lost 10 to 25 per cent of their patrons as the result of having to abandon cabstand markets, and these were the least expensive trips to serve (as neither dispatching nor deadheading was required). The revenue loss from these trips is almost certainly greater than the cost reductions which are made possible by serving a reduced level of demand. This may well be a contributing factor to the absence of real price reductions after deregulation.

### CONCLUSIONS AND POLICY IMPLICATIONS

Taxicab deregulation cannot be demonstrated to have produced, in most cases, the benefits its proponents expected. Prices do not usually fall, improvements in service are difficult to detect, and new price-service combinations have not been developed. There is little evidence that either consumers or producers are better off. The one important exception is new entrants to the industry, who now have an opportunity to serve a market to which they were previously denied access. Even for them, however, deregulation is a mixed blessing. Many have been unable to survive in the more competitive unregulated environment, and those who have survived are apparently obtaining low earnings.

The analysis presented here indicates that these impacts are readily explained by basic concepts of industrial organisation, coupled with an understanding of the current market situation of the taxicab industry. Those who expected, on the basis of simple theoretical models, that deregulation would produce significant consumer and producer benefits (Frankena and Pautler, 1984), have not adequately examined the market environment and industry organisation for taxi service. The simple models fail to capture the important market imperfections, economies of scope, and "economies of experience" which characterise the typical telephone order market, which is the predominant taxi market in all but a handful of US cities. In addition to these market conditions, the phenomenon of driver leasing creates an intermediate market for taxi drivers, and this severely complicates any attempt to predict developments in the ultimate market (for taxi patrons) after deregulation. Finally, the typical inability of deregulation to make substantial changes in the local oligopolistic structure of the radio dispatch industry means that simple models of competitive behaviour are less applicable than concepts of industrial organisation.

The insubstantial benefit of taxi deregulation in most locales does not mean, however, that this has been a completely misguided application of market forces to transport service. If the policy goal is to allow competitive forces to supplant much of the need for utility-type regulation of the taxi industry, this can be achieved where required with a modified form of deregulation.

Two policies would appear to be the most promising. Each retains some control over price or entry, but not both. First, absolute entry *restrictions* can be replaced

by entry *standards*, based principally on the minimum size of the company. Entry controls of some type, instituted by airport or city authorities to control taxi markets at airports (or other crowded cabstands), are likely to continue, because severe congestion at airports is aggravated by disruption from taxicabs, with active solicitation of passengers by drivers.

This first policy would eliminate small companies or unaffiliated independent drivers from the market, but empirical results of deregulation indicate that this group adds nothing to the productivity of the industry. The fringe of independent drivers concentrates on markets already well served under regulation, so they only lengthen queues of taxis and force larger companies out of the airport market because drivers' productivity is so low. If larger companies in a city could serve both airport and telephone order markets, economies of scope might be realised. A minimum size would not impede entry into the telephone order market, because one-cab operations cannot serve that market now – independents co-operating on a radio dispatch could qualify as one firm if necessary.

An alternative policy would eliminate all entry controls (except for quality controls, such as safety regulations), but retain price controls, at least in the form of rate ceilings. This would allow new competitors to enter the industry, but local governments would not incur the risk of excessive increases in rates. This policy, in contrast to the first, would enable independent drivers and small companies to participate in the taxi market. Because they can only effectively compete in the airport/cabstand component of the market, this source of competition does not result in overall rate reductions. But the influx of new competitors does severely depress drivers' productivity and earnings, and also forces the large radio dispatch companies to largely abandon the (previously) inexpensive-to-serve airport/cabstand market, with consequent upward pressure on the rates for telephone order patrons. In addition, rate setting procedures of a utility type might still be required. In our view, therefore, the first policy is preferable.

These suggested reforms will probably be deemed inappropriate by those who believe that unrestricted markets will produce optimum results in the taxi industry. The market imperfections which exist even in a deregulated taxi industry, and the results of deregulation to date, argue for a more sophisticated view of this transport market.

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