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INTO THE POSSIBLE EFFICIENCY MOTIVATION OF REGULATION**

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SPECIALIZED ASSETS AND TAXI REGULATION:
AN INQUIRY INTO THE POSSIBLE
EFFICIENCY MOTIVATION OF REGULATION

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I. INTRODUCTION

If economists worry about policies contradicting their recommendations, then next to tariffs, taxi regulation is surely their despair. Though regulated as a public utility throughout the cities of the world for decades and even centuries,¹ by general concensus among economists the provision of taxi service comes as close to meeting the assumption of the competitive model as the proverbial provision of wheat. A homogeneous product, large numbers of competitors, ease of entry and exit, and readily available (price) information seem to characterize the industry.² Indeed, what evidence there is suggests that large firms in this industry do poorly relative to small firms; economies of scale that are expected to characterize public utilities simply do not exist in the provision of taxi services.³ Why then are taxis

¹ A brief and interesting history of taxicabs is given in Gorman Gilbert and Robert E. Samuels, The Taxicab: An Urban Transportation Survivor (Chapel Hill: University of North Carolina Press, 1982), Chapter 2; the remainder of the book provides a survey of taxicabs and regulations in the United States. Interesting episodes of taxi regulation are given in Ralph Turvey, "Some Economic Features of the London Cab Trade," Economic Journal, LXXI (March 1960), 79-92; Ross E. Eckert, "The Los Angeles Taxi Monopoly: An Economic Inquiry," University of Southern California Law Review, XLIII(2), 1970, 407-53; and Edmund W. Kitch, M. Isaacson, and D. Kasper, "The Regulation of Taxicabs in Chicago," Journal of Law and Economics, XIV(2), (October 1971), 285-350.

² See, for example, David J. Williams, "Information and Price Determination in Taxi Markets," Quarterly Review of Economics and Business, XX(4), (Winter 1980), 36-43.

³ Kitch, et al., op. cit., present some evidence on Chicago taxicabs.

regulated? An answer popular among economists is that such regulation is just one more instance in which producers have in the name of quality service obtained entry restrictions, via medallion systems, providing windfall gains to the initial generation of owners. Economists contributing to the theory of rent seeking further suggest that in the competitive process to acquire a monopoly position, the rent seeker may incur costs equal to the value of the monopoly. Monopolization is therefore interpreted as a completely unrewarding process since it does not even increase the net wealth of the monopolist.

Yet, this explanation comes somewhat too easily, rather like the flip side of the coin which finds all business practices that are inconsistent with the perfectly competitive model to be monopolistic. After all, the consistent emergence of taxi regulation in different cities, in different countries, in different centuries, and thus in vastly different political environments should at least give pause to those making this facile judgment. The alternative offered here is to reexamine taxi regulation using richer models of the exchange and contract process than the orthodox competitive model that is generally invoked in examining the taxi industry. Such models, we hope to demonstrate, suggest that taxi regulation may indeed be necessary in the provision of taxi services. This demonstration in no way contradicts the possibility that once in place the regulatory apparatus will be influenced politically to operate in uneconomical fashion, but it does provide an alternative to the proposition that the sole

purpose of such regulation is to provide redistributions of wealth to rent seeking groups.

For present purposes, we will assume that taxi service is adequately characterized as chauffeured, point to point service on short notice demand. Our task is then to inquire into the economic function of regulation in providing such a service. The plan of the paper is, first, to consider the possible efficiency basis for regulation; second, to explain why restrictions on vehicle entry were not necessary in the days prior to mass production of the automobile; third, to understand how the technological change in the production of automobiles destroyed the effectiveness of the existing regulatory enforcement mechanism and led to an alternative means of enforcement: entry restrictions in the form of taxi medallions (or similar vehicle licensing arrangements).

II. A BASIS FOR REGULATION

A. Excessive Search

Each taxicab ride is a relatively unique service. The cost of providing a ride, ignoring the comfort or style of travel, will be a function of distance, duration, and destination. Duration, is only partially a function of distance, depending also on road and traffic conditions. Destination is of distinct importance from distance and duration because the probability of obtaining a return fare varies with destination. This means that the competitive price of a particular trip will be difficult to

estimate in advance. Riders would have to search out offers from multiple drivers before accepting a ride. Likewise, drivers might search for the most valuable riders, avoiding queues or other situations where riders could cheaply weigh alternative offers. Given that the demand by riders is generally for immediate service, the aggregate search performed by riders and drivers will tend to be extremely costly.¹

The extensive search requirements of a purely competitive (unregulated) taxi market will clearly limit the extent of exchange. In order to evaluate the efficiency of this search, alternative arrangements must be weighed. We suggest here that the gathering of information in the taxi market described above is highly redundant, and consequently, there is at least one possible alternative institutional arrangement which reduces excessive search costs but does not destroy valuable information. We further suggest that observed taxi regulation approximates

¹ Of course, riders can implicitly sort trips into more or less homogeneous categories and thus form some expectation regarding the relative price of some trips. For example, a trip from downtown to the airport should be less expensive than a trip of equal length to the suburbs, where the probability of obtaining a return rider is lower. However, the inability of riders to perfectly sort trips limits this method of obtaining information.

We do not assume that all rides are of uniform distance and duration and equal to the average ride. Such assumptions largely define away the search costs that are fundamental to our analysis. See, for example, Chanock Schreiber, "The Economic Reasons for Price and Entry Regulation of Taxicabs," Journal of Transport Economics and Policy, IX, No. 3 (September 1975) pp. 268-69.

this arrangement. Taxi regulation may therefore be socially efficient.

Conceptually, the attempt of the rider to reduce his costs of searching out the lowest priced taxi is analytically equivalent to his search for a taxi driver who places a relatively high value on the trip. The driver is considered the "buyer" of the right to deliver a trip. In order to increase his chances of acquiring the right to deliver a specific trip, the driver would offer a low fare relative to the offers of competing drivers who consider the trip less valuable (i.e., less profitable). The question then is whether it is efficient for drivers to competitively bid for each trip.

If drivers have particular tastes about the types of trips (e.g., short trips, trips with no return fare, or trips during rush hour) or the types of riders (e.g., smokers, rider characteristics associated with refusal to pay, riders in poor health, or senior citizens) they prefer to reject or to accept, then any duplication in search among drivers for a given fare is not socially wasteful. These search activities are necessary to satisfy the distinct preferences of each driver.¹ Thus, if drivers disagree on the cost of a given trip (including the

¹ Given the unique time preferences and opportunity costs among taxi riders, the resulting variance in the personal valuations riders assign to similar trips is likely to result in greater search relative to that undertaken by taxi drivers.

peculiar attributes or quality of the rider), competitive bidding among drivers for the same rider would be socially efficient.

If, however, experienced drivers had no special tastes about types of trips, and all would agree on the cost of a particular trip (i.e., if taxis are profit-maximizing firms with identical costs for any particular trip), there would be no social gain from the aggregate search performed by all potential drivers relative to the one search by the driver who ultimately won the trip. While these search activities consume real resources, they represent wealth transfers between drivers and riders with no allocative effects. Thus, there appears to be no social value of such competitive bidding oversearch by taxi drivers because it seems highly probable that most experienced drivers would agree on the net value of any specific trip given its distance, duration, and destination. Under these conditions, there is an opportunity to save real resources by reducing the oversearch activities of drivers and customers.

B. Average Pricing

One possible solution to the oversearch or redundant production of information that we have identified in the taxi market is to divide trips into relatively homogeneous sets and to charge a fixed price for any trip within a set. A fixed price per mile (preset by riders) would be an example of this strategy: trips are grouped by distance, and a rider will pay the same price for trips of equal distance even if the probability of the driver obtaining a return fare is dramatically different between the two

trips. The advantage of this strategy is that riders could cheaply estimate the price of any particular trip without searching among alternative drivers. In this way, the rider would not expect to gain a lower fare by refusing the offer of the first driver and searching for another. As long as the rider has less than perfect information about the cost of any trip, however, drivers have an incentive to search out the over-valued trips. Thus, as long as the cost of providing trips in each class differs from the preset price, the delineation of additional trip classifications will not eliminate the oversearch activities of drivers. Drivers will continue to search for over-valued trips and riders will continue to sort trips into narrower classifications.

If, on the other hand, the average price fixed for each group of trips were somehow set on behalf of all taxi drivers, then drivers would earn a normal rate of return if they accepted all riders at random. Although some trips in a given group would be underpriced and unprofitable (low quality), other trips in the same price group would be overpriced and profitable (high quality). Thus, although all drivers may voluntarily agree to

implement an average pricing scheme,¹ each has an incentive to cheat on such an agreement by refusing to haul riders on unprofitable trips and by queueing for profitable trips.² Furthermore, the transaction cost of the rider offering a driver (or group of drivers) a price premium to assure that he will never be refused a ride is cost prohibitive. Consequently, while such a pricing rule has been identified as viable in certain private contracting situations, it does not appear to be viable in the case of taxis.³ This leads us to suggest that a third

¹ In an unregulated taxi market, competing taxi firms may initially attempt to establish their own uniform pricing scheme. Since the rides in each trip classification are not perfectly homogeneous, most trips will be valued too high or too low relative to the average price. Customers will therefore have an incentive to search for the under-priced trips offered by each firm. If, for example, Firm A under-prices short trips and over-prices long trips and Firm B does the opposite, customers will search out Firm A for short trips and Firm B for long trips. Both firms will suffer losses. The ultimate effect is likely to be a uniform pricing schedule posted by all taxi firms in the market. The costs of enforcing such a pricing scheme, however, may be too high relative to the costs of third party enforcement.

² A similar incentive exists under a collusive agreement: if any member of the agreement can secretly cut his price, he will gain larger profits than by honoring it. See George J. Stigler, "A Theory of Oligopoly," Journal of Political Economy, LXXII, No. 1 (February 1964), 44-61.

³ For a discussion of oversearch activities in the marketing of tuna, see Edward C. Gallick, Exclusive Dealing, and Vertical Integration: The Efficiency of Contracts in the Tuna Industry, FTC Industry Study, August 1984, forthcoming; Edward C. Gallick and Benjamin Klein, "Exclusive Dealing, Specialized Assets, and Joint Ownership: A Study of Tuna Fishing Contracts," UCLA Working Paper, 1984; Roy W. Kenney and Benjamin Klein analyze over-searching in the wholesale marketing of rough uncut diamonds in their article, "The Economics of Block Booking," Journal of Law and Economics, XXVI, No. 3 (October 1983), 497-540. See also, p. 16, n. 1; infra.

party enforcer or regulator can serve efficiently in the taxi market.

We do not intend to imply that a taxi market cannot exist in the absence of regulatory enforcement of an average pricing scheme, but rather that in some circumstances regulation can increase the number and variety of taxi trips by reducing search costs. Clearly, search costs will vary in importance among different types of trips and different types of customers. Regulation will tend to be more valuable for trips within high density areas, during working hours, and between heavily used points that have taxi queues; and, it will tend to be less valuable in low density areas, at off-peak hours, and between idiosyncratic points. Also, note that where governmental institutions are less developed or relatively corrupt, intervention is less likely to be successful, customers and drivers are less likely to appeal to government for assistance, and regulation is less likely to be observed.

C. Holdups

Another possible basis for taxi regulation may be created, in part, by the immediacy of the demand for taxi service by nonlocal customers. Customers avail themselves of alternative modes of transportation on the basis of expected price. However, at the moment of purchase only one taxi may be available, and the driver may demand an unanticipated high price in view of his unique position. Had the customer known sufficiently in advance that this was the actual price that must be paid for the trip,

the customer could have planned to use an alternative mode of transportation. At that moment, however, the customer will find it costly to postpone the trip and search for another taxi or for another means of transportation. Consequently, the taxi driver can raise the price for the trip as long as it does not exceed the (opportunity) cost to the customer of postponing the trip or the search costs of locating another taxi or alternative means of travel, whichever is the lesser.

The ability of the taxi driver to charge extortionate prices is not necessarily reduced with the introduction of the mileage meter. Rather, the form of the excessive pricing merely changes. Under the fee-per-mile pricing scheme, the trip price is not known in advance, only the price per mile is known. When the customer accepts a ride from the driver, the implicit (and sometimes explicit) understanding is that the driver will take the most expeditious route. Once in the cab, however, the customer may find it costly to withdraw his order if the driver reneges on his promise to select the most efficient route. In effect, the order becomes specialized to the driver once the trip is begun. Although the rider can always terminate the trip, the cost of doing so will depend on the cost of searching for an alternative taxi or mode of transportation (i.e., on the availability of alternative suppliers at a specific moment in time). Thus, the value to the rider of avoiding the termination of the trip prior to its anticipated destination is potentially appropriable by an unscrupulous taxi driver. Although the

initial waiting time of the rider may be reduced, the driver has an incentive to take a more circuitous (and timely) route and thereby increase the distance and the fare posted on the meter.¹ Such opportunistic behavior is sometimes referred to as a holdup.²

Although the transaction costs of explicit contracting to assure the performance of the taxi driver appear to be prohibitive, the use of implicit contracting may reduce the hold-up incentive of the driver.³ In contrast to explicit contracts which are enforced by a third party, implicit contracts or guarantees are market enforced by the threat of termination of

¹ This malincentive is strongest when the uniform price regulation (e.g., fixed fee per mile) results in the queuing of taxis for riders. In this case, longer trips are preferred by drivers because the alternative is to wait for the next customer.

² See Benjamin Klein, Robert G. Crawford, and Armen A. Alchian, "Vertical Integration, Appropriable Rents, and the Competitive Contracting Process," Journal of Law and Economics, XXI (October 1978), 297-326; Benjamin Klein, "Transaction Cost Determinants of 'Unfair' Contractual Arrangements," American Economic Review, LXX (May 1980), 356-62; and Oliver E. Williamson, Markets and Hierarchies: Analysis and Antitrust Implications, (New York: The Free Press, 1975), Chapter II.

For a discussion of extortionate pricing, see Victor Goldberg, "Regulation and Administered Contracts," Bell Journal of Economics, VII (Autumn 1976), 426-48. Chanoch Schreiber has found that cruising taxis tend to charge excessively high prices. His study of this taxicab market is summarized in three of his articles in the Journal of Transport Economics and Policy: "The Economic Reasons for Price and Entry Regulation of Taxicabs," IX (September 1975), 268-93; "The Economic Reasons for Price and Entry Regulation of Taxicabs: A Rejoinder," XI (September 1977), 198-204; and "The Economic Reasons for Price and Entry Regulation of Taxicabs," XV (January 1981), 81-83.

³ The distinction between explicit and implicit contracts is further explained in Klein, Crawford, and Alchian, 303-07.

future business if opportunistic behavior occurs.¹ The rider, for example, could offer the driver a future premium (or stream of extra payments) sufficient to assure contractual performance. If the driver reneges on his contractual promise, all future business is immediately withdrawn and all expected future premiums are foregone by the driver. As long as the rider and driver both agree that the present value of the future premiums exceeds the present value of the short-run (or possibly one-time) gain from holding up the rider, the opportunistic behavior of the driver will be eliminated.²

Because this market enforcement mechanism requires repeat purchases by each rider vis-a-vis the driver, its usefulness is likely to be limited to local customers. It is these local,

¹ A model of how a market enforcement mechanism can assure contract performance is presented in Benjamin Klein and Keith B. Leffler, "The Role of Market Forces in Assuring Contractual Performance," Journal of Political Economy, LXXXIX (August 1981), 615-41.

² The institution of tipping can be interpreted as a means of assuring contractual performance. It provides the customer with an opportunity to evaluate the performance of the supplier. If performance is at least satisfactory, tipping facilitates the payment of premiums to the supplier who honors his (implicit) contract with customers. If, on the other hand, performance is less than contracted, the customer is in a position to withhold a portion of the contracted payment (i.e., the tip). Consequently, the system of tipping, by making a portion of the contract price contingent on the customer's ex post personal evaluation of the service, reduces the size of the potential holdup. See David E. Sisk and Edward C. Gallick, "Tips and Commissions: A Study in Economic Contracting," Working Draft, 1984 (Typewritten).

repeat-purchase customers who provide the necessary incentive for service. Local customers will become aware of the reputations of competing taxis and can thereby avoid taxis with bad reputations or, alternatively, offer such taxis a lower price.

But a large proportion of taxi customers are strangers or visitors in town who can not easily identify the reputable taxis. Moreover, visitors are unlikely to make repeat purchases and consequently are not in a position to withdraw future business if the taxi driver is found to be disreputable. It is, of course, possible that only a portion of customers need be aware of reputations and withdraw business from a firm in order to drive it out of the market. In the case of taxis, the withdrawal of business by local customers alone might be sufficient to drive a taxi into bankruptcy even though outsiders are unaware of any breach of performance. However, taxi drivers are usually able to distinguish locals from visitors and can accordingly avoid cheating local customers who could more easily detect circuitous routes. It therefore appears that selective cheating of non-local customers may be viable even in the presence of reputable taxicab companies.

The average pricing rule already suggested as a means of reducing excessive search (pp. 7-9) would also reduce the hold-up potential of non-local riders. Since the average price would be public information, the ability of the driver to charge above-average prices would be severely limited. Thus, attempts to

over-charge customers would be more easily detected, opportunistic drivers could be punished by their employers, and opportunistic taxi companies could be avoided by customers.

III. REGULATION

A. Fundamental Regulations

Regulatory intervention to establish a single price or price schedule appears to be the historical standard in most taxi markets. Prior to the development of the mileage meter, the price was normally fixed for some central or downtown area but was negotiable for trips outside of this area. Clearly, within the uniform price area, shorter trips would be overpriced and longer trips underpriced; however, such average pricing reduced search costs. As the fixed price area becomes larger, the disparity in profitability between short and long trips within the area will become greater, causing shorter distance riders to drop out of the market. This loss of ridership must be weighed against the gains to reduced search costs made possible by a fixed price.

In addition, cost is not likely to increase uniformly with distance. Destinations beyond some central region offer lower probabilities of finding a return fare, so expected costs will increase rapidly as the trip extends into the suburbs. Loss of short distance riders and increasing driver costs as the fixed price area is extended suggests that limiting the fixed price to the central city was consistent with efficiency.

After the turn of the 19th century, the development and introduction of the mileage meter witnessed a change of price regulation from distance to mileage. The meter generally worked to provide a minimum fee for picking up a passenger plus some fee per mile. Modern meters are also adjusted to partially compensate for time so that slower trips have a somewhat higher price per mile. Clearly, this system of average pricing allows a finer sorting of trips than was available in the era prior to the mileage meter. Each distance is in a different category and to some extent the categories are adjusted for time as well. Nonetheless, the problem of destination remains: trips of equal distance and duration are unequally profitable if the destination differs in the probability of obtaining a return rider.

A regulated average price creates two malincentives and requires two complimentary regulations which, from historical observation, also appear to be standard. The first malincentive is due to the fact that, as discussed above, with average pricing some trips are profitable and some unprofitable. This provides an incentive for drivers to reject unprofitable trips and to queue for profitable trips. It is not surprising therefore that one regulation which has generally accompanied taxi regulation is

the requirement to haul all customers.¹ A second malincentive, is due to the fact that regulators must set price based on the average costs of taxi operation. A driver can thus increase

¹ The transaction costs of negotiating an alternative agreement whereby the driver promises to accept all trips by the rider within a given time period appear to be prohibitively high. An example where exclusive supply contracts reduce excessive search in the marketing of U.S. landed tuna is provided in Gallick, Exclusive Dealing, Chapter II. Each harvest is initially inspected, sorted, and weighed at the processor's dock. The captain is paid on the basis of the weight and specie of the catch. Although larger fish are more valuable because they require less processing time, U.S. landed tuna are not sorted by size (except for unusually small fish which were also illegal until mid-1970). Rather than sort the catch into numerous size categories (as done in Japanese markets), U.S. harvests are sold as "run-of-the-catch". Exclusive dealing arrangements prevent the captain from searching out the larger (more valuable) tunas within each category and offering them to a competing processor. Additional search costs are thereby avoided by determining a single price for each category (specie) based on the average value of all tunas within the category. Similarly in the marketing of rough diamonds, the Central Selling Organization of the De Beers group pays independent mine owners on the basis of the number of stones provided per classification, the variance in value within each category notwithstanding. The exclusive supply requirement (in addition to controlling total supply) prevents the producer from searching out the higher valued stones within each category for sale in the open market. See Kenney and Klein, 500-02.

The incentive to use exclusive dealing arrangements to reduce oversearching is also evident in the marketing of agricultural products by cooperatives. Sunkist Growers, Inc., for example, is a grower-cooperative marketing organization that has marketed the majority of the industry's citrus fruit since at least the 1930s. Fresh grade fruit (such as oranges or lemons) is sorted into a limited number of grades and growers are paid according to the number of units harvested per grade, despite any remaining within-grade quality differences. The packinghouse and its affiliated growers, however, must exclusively contract with Sunkist to market all the fruit of the affiliated growers throughout the contract year. Additional grading, inspection, and negotiation costs are thereby avoided by exclusively dealing on the basis of the average within-grade quality over the contract period.

profits by lowering taxi quality (e.g., inadequate heating and air conditioning, poor suspension, inferior or damaged seats, and less leg room). This practice will be viable because regulated pricing reduces rider search. If riders were negotiating price on each trip and thus taking alternative bids from multiple taxis, they could simultaneously value some aspects of vehicle quality. Given, however, that regulation reduces the need to search for price, the value of searching solely for vehicle quality is not likely to be worth the cost. As a consequence, a second complimentary regulation that must accompany average price regulation is vehicle standards regulation.

It is important to note that given the two complimentary regulations, it was sufficient for the regulatory authority to set the average fixed price as a maximum only. Hauling all customers and maintaining vehicle quality jointly insure that, if the average price is regulated at a level which offers a normal rate of return, a taxi service which was priced below the maximum would be unprofitable. One problem with vehicle standards regulation, however, is that it retards innovation. This was not a problem in the era of the horse drawn carriage or in the early era of the automobile, but after World War I when technological change came rapidly, such standards often had to be of a more

limited nature. As a consequence, a price minimum was often set on taxi trips.¹

B. Additional Experience

The recent taxi deregulation experiment in Seattle indicates that a set of regulations may be necessary for some types of taxi service.² Deregulation has not been successful for the 40 percent of the market served primarily by independent (taxi) drivers. In 1979 Amtrak, for example, switched from a single franchisee taxi service for the railroad station to open entry. Long lines developed, drivers loitered in the station in search of riders, and independent drivers clashed with the lower-priced (major) taxi fleets. More severe problems were observed at the

¹ Given that regulators set price with some consideration of a standard quality vehicle (or service), there was a greater incentive in the modern period for some drivers to lower vehicle quality and capture profits. Such an incentive could substantially increase the costs of enforcing the uniform pricing rule. This malincentive could be reduced either by setting vehicle standards or by setting a minimum price. Given that the automobile technology in the U.S. was changing so rapidly during this period, it would appear that setting a minimum price, rather than specifying standards, was the less costly alternative.

It is not surprising, therefore, that in the Chicago market, a price minimum was imposed within a few years after the introduction of the medallion system. Although Kitch, et al., interpret the enactment of a minimum price regulation as evidence that the medallion system was a monopolizing device, our explanation suggests an efficiency motivation.

² Richard O. Zerbe, "New Trips for Taxicabs: Deregulation in Seattle," Washington Public Policy Notes, Institute for Public Policy and Management, University of Washington, II (Summer 1983); and "Seattle Taxis: Deregulation Hits a Pothole," Regulation (November/December 1983), 43-48. Insufficient information is provided in the report to determine why deregulation appears to have worked in the case of radio-dispatched cabs.

Seattle-Tacoma airport. Customers have complained about the differences in rates quoted by competing drivers.¹ The system of assigning cabs to the cab lines encourages drivers to search for high paying customers; a cab that refuses, or is refused by, a customer is allowed to go to a holding area instead of to the end of the line, so it soon returns to the front of the line.

Drivers also refused to accept short trips. Lastly, it was found that the new entrants (drivers) were less knowledgeable and therefore unable to select the most efficient routes.

Consequently, a movement toward reregulation is now apparent. City officials passed an ordinance that requires cabbies operating in the city to post their fares on the outside of their taxis. Amtrak officials re-franchised taxis beginning in mid-1983. Meanwhile, some hotels began to guarantee fixed prices from the hotel to major locations. In addition, the Seattle-Tacoma Port Authority, which regulates airport taxis, has established a maximum rate schedule.

The experience of the New York City taxi market also suggests that some regulation may be warranted.² Throughout the

¹ Zerbe suggests that protests over the fare discrepancies rather than the amount of the fare indicates that customers would pay a premium to have uniform rates; see his "Deregulation Hits a Pothole," 46. Yet, the market was unable to determine a uniform pricing scheme.

² Schreiber, "Price and Entry Regulation of Taxicabs," (1975), 276-79. Although the theory in the study applies to the cruising taxi market, the data seem to reflect the operation of most taxis in the city.

unregulated period (prior to 1937), there was reportedly a surplus of cabs, a continuing expansion in the number of cabs, a low cab occupancy rate, and consistently high taxicab fares. Price and entry regulations were instituted in March 1937, with the passage of the Haas Law. The medallion system of restricted entry was started and uniform rates were imposed on all taxis. By 1941, the problem of surplus cabs was significantly reduced and the rate of cab occupancy was increased; yet, cab availability remained satisfactory until 1963. A shortage of cabs apparently arose in 1963 and was not resolved until 1971, when the regulatory authority increased fares and permitted livery cars to answer hails and cruise for passengers in certain areas of the city. The study concludes that the shortcomings of the New York City system of price and entry regulation is a result of poor administration, and not of any inherent deficiencies with a system of regulation.¹

It should not be surprising, on the other hand, that livery services in Chicago were exempted from all of the above regulations.² Liveries were commonly used for long distance travel, with or without a (hired) driver, for a price negotiated several days in advance of the planned trip. Given the numerous factors which might affect the cost or value of each trip (e.g., type and condition of vehicle, quality of driver, number of days, weather

¹ Ibid., p. 279.

² Kitch, et al., p. 1, n. 1, supra.

and road conditions, and etc.), it is quite plausible that competitive bidding is efficient. In this case, the duplicative search costs incurred by both customers and livery owners are not likely to be socially wasteful of real resources because competing bidders would not agree on the value of a given livery service. Consequently, there is no social gain from incurring the costs of classifying the various trips and setting a uniform price for each class. If sorting the trips into classes is unnecessary, so is the requirement that the supplier accept all customers.

In addition, the ability of the livery owner to hold up the customer is reduced by negotiating the price several days in advance. Relative to taxi service, alternative suppliers are more likely to be available to the livery customer. Perhaps more importantly, the use of implicit contracts to assure the performance of the supplier can be expected to be more effective in the provision of livery service than in the provision of taxi service to visitors from out of town. This is because livery customers tend to patronize the suppliers in their own regions and can therefore withdraw their future business if the livery owner reneges on a promise. Consequently, contract enforcement is less costly in the supply of livery service than in the supply of taxi service to out-of-towners. Hence, in the case of livery service, the efficiency motivation for a price maximum or for any of the other regulations listed above is not apparent.

IV. REGULATION AND ENTRY RESTRICTION

A. Litigation versus Regulation

We have argued that the brand-name, repeat-purchase mechanism will not serve to assure average pricing, the hauling of all customers, or service by the most expeditious routes. This is not to argue that taxi services will not exist in the absence of regulation, but that the variety of taxi trips offered would tend to decline in an unregulated market. Nor do we wish to argue that there is no conceivable amount of private investment in brand-name capital which would be sufficient to assure this desired performance. (One might for instance speculate on the possibility of a nationally franchised taxi service, analogous to one of the fast food chains such as McDonald's.) Rather, we wish to raise the possibility that regulation is a low cost method of assuring contractual performance in the taxi market. We realize that while regulation may be low cost, it is not costless.

Clearly, an alternative third party mechanism for the enforcement of these rules is the courts. We believe, however, that the courts are inadequate for this purpose because the setting of an average price is a technical, not a legal problem, and more importantly because of the high costs of litigation. Customers who are injured by refusals to haul, over charging, and holdups are likely to find the costs of a trial to be prohibitively high. The damages sustained in most cases would be small and extremely difficult to prove in a court of law. A regulatory

agency, however, can operate with far more discretion than the courts. In taxi markets, the regulatory authority could set penalties on the basis of the number of consumer complaints. Moreover, the lodging of a complaint (by phone or by letter) is a relatively costless action for the dissatisfied customer.

As a general rule, taxi regulators can penalize operators by suspending or revoking their (conditional) right to operate. Costly licenses, such as medallions and occupational licenses, which cannot be used if suspended or revoked by the regulatory authority represent assets which, in effect, can be impounded.

B. Medallions As Enforcement Mechanisms

Contrary to much received economic analysis, the taxi medallion does not represent a perfect private property right to enter and operate a taxi, but is part of an explicit contract with the regulatory authority. A conditional right to enter and to operate a taxi is granted by the taxi authority in exchange for (1) a commitment from the owner to obey the existing taxi regulations and (2) the right of the taxi authority to suspend the right of the taxi to be operated if the driver is found in violation of a regulation. If the owner is found in violation of a regulation, the taxi can not be operated for a period of time as determined by the regulatory authority. The owner does not have the option to employ another driver and thereby continue to operate the taxi. The medallion system of enforcement therefore

restricts the use of the taxi and indirectly limits the behavior of the driver.¹

Thus, the medallion serves as collateral offered by the taxi driver to assure that he will comply with the regulations established within a jurisdiction. In this sense, the medallion is like a brand-name capital asset. The owner of the medallion can expect to earn a normal return on his investment as long as he does not violate his contractual commitments (i.e., any of the regulations in the jurisdiction).

Under the medallion system, suspension of the right to operate the taxi imposes a cost on the owner. Consider the following numerical example. Let the current market value of the taxi and the medallion be \$15,000 and \$50,000, respectively. A one-month suspension without a medallion requirement would simply remove the taxi from the market for the month and the owner could seek to employ the taxi in its next best use. At a 10 percent rate of return, the foregone earnings on the taxi would equal:

$$\frac{.10}{12 \text{ mo.}} (\$15,000) = \$125/\text{mo.}$$

The cost of the suspension would be somewhat less if the taxi could be employed in another use, as is often the case. If a medallion was required to operate a taxi, the additional cost of the one-month suspension would be:

¹ For simplification, the driver is assumed to be the owner of the taxi.

$$\frac{.10}{12 \text{ mo.}} (\$50,000) = \$417/\text{mo.}$$

In our example, the medallion requirement increased the penalty from \$125/mo. to \$542/mo., an increase of over 300 percent. Thus, the medallion requirement allows the regulatory authority to appropriate some of the return to the medallion and thereby to impose a larger fine within a given time period.¹

It is worth noting that when a medallion is suspended, other drivers benefit since they obtain more customers. Other drivers will thus enforce the suspension by reporting (and even physically confronting) a driver operating a taxi without a valid medallion. If fines were used in place of medallions, enforcement would be more difficult. If operators were fined for violations, it would be difficult for them to pay the fines without operating their taxis to gain the ability to pay the fines. If fined drivers were then legally able to work, other drivers would have no incentive to help the regulatory authority collect these fines. The medallion system circumvents this issue of ability to pay by attaching the driver's assets rather than by demanding payment out of current income.

Some confusion in the interpretation of medallions has arisen because regulatory authorities generally have not

¹ The alternative of longer suspensions of the taxi from operation may tend to disrupt consumer service and the revocation of the medallion may represent too extreme an action to be utilized as a regular practice. In fact, the emergence of brokers who deal in medallions may act to protect medallion owners from unscrupulous regulators.

explicitly set the medallion price, but have instead set the number of medallions. Regulation which limits the number of medallions has lead some observers to assert that medallions are overly restrictive. What appears to be preferred is that the medallion price be regulated and entry be "open" to anyone willing to purchase a medallion. However, one need simply contemplate a downward sloping demand curve for medallions in order to understand the unique correspondence between price and quantity. If, say, at a regulated price of \$50,000 in some market, 100 medallions would be purchased, then initially setting the number of medallions at 100 would ultimately drive the market price to \$50,000.¹ Thus, it doesn't matter whether price is set and buyers are allowed to purchase the desired quantity or quantity is set and buyers are allowed to bid the price to market clearing levels. The purchase price of a medallion is a cost of entry which can limit entry just as effectively as a quota.

Regulatory authorities generally restrict the number of medallions but issue new medallions periodically on the basis of ridership, population, profitability, and other demand-related indices. By maintaining these indices constant, the quality of service and the real value of the medallion is held constant over

¹ If the regulated price was set at \$50,000, entry will occur until the declining number of trips per taxi reduces the present value of the medallion to its market price.

the long run. For example, if ridership increases so does profitability, and thus the value of owning a medallion increases. By issuing new medallions, ridership and profitability are reduced, and the market value of a medallion declines toward its original level.

Practical and historical considerations generally lead regulators to adopt the quota system rather than the fixed price system. Practically, it appears easier to simply issue new medallions when the demand indices increase, rather than to attempt to estimate the exact price of a medallion which would induce sufficient entry to hold the indices at desired levels. Historically, as already explained, the medallion system was first instituted as a quota system; only after the introduction of such a system would it be possible for regulators to estimate a desirable level at which to fix the medallion price.

C. The Introduction of Medallion Systems

Historically, the introduction of medallion systems followed World War I, when the availability of the inexpensive, mass produced automobile wreaked havoc on existing taxi regulations. Prior to that time, average pricing rules and requirements to haul were enforced without medallion systems.¹ Again, this has been taken as further evidence that medallion systems were

¹ Recall the justification for regulation, pp. 14-18, supra.

introduced solely to blockade entry. However, this view fails to take account of the fact that prior to medallion systems, occupational licensing restricted entry. We believe that it was the technological change in automobiles that necessitated a change in the mechanism of regulatory enforcement from occupational licensing to vehicle licensing, in the form of medallions.

Coaches and vehicles used as taxis in the earlier era were specialized vehicles. They represented (on an industry level) nonsalvageable production assets designed and built to serve in the taxi trade. The difference between the purchase price and the immediate resale price of the taxi is a sunk cost. This capital element in the production of taxi service appears to be significant since (outside the taxi industry) the early vehicles used as taxis were primarily owned and operated by the rich. Consequently the value of a used vehicle would be heavily discounted relative to a new vehicle which represented the ultimate market of affluence.¹ It is on this basis that we believe taxis

¹ In addition, the cost of continuing possession could also be substantial. That is, in addition to the initial acquisition (sunk) cost, the difference between the value of the cab now and the present value of its resale value in the future (e.g., at the end of one year) is likely to be significant. This is based on three underlying factors: (1) taxi drivers are notorious for abusing their taxis, (2) the institution of used car dealers did not exist, and (3) the market for taxi repairs was not well developed. If the cost of continuing possession falls sharply in the early years and then declines more gradually, the cost of continuing to own a cab may exceed the depreciation allowance implicit in the (regulated) price of taxi service. Consequently, the taxi owner may incur another cost if he sells his cab within the first few years of possession.

(footnote continues)

represented industry-specific assets. A substantial reduction in the return to such specialized assets would likely result if switched to a use outside the taxi industry. It was therefore not vehicles that could cheaply move in and out of the taxi business, but drivers.

Given the specialized nature of the taxi in the days prior to the mass production of the automobile, the effectiveness of regulatory enforcement largely depended on the ability to penalize drivers who cheated on their contractual commitments with the regulatory authority. Contractual performance on the part of drivers was assured through the institution of occupational licensing. The license required up to one year of study and apprenticeship.¹ This was a costly investment, with little or no use outside the taxi industry. Thus, suspension or revocation of the license effectively impounded the investment (implicit in the license) and imposed losses on the driver.²

Consequently, taxi drivers would not enter the business on a short-term basis. If fined by the regulators for infractions of the rules, they would likely pay the fine in order to

(footnote continued)

The distinction between the costs of acquisition, continuing possession, and operating are explained and illustrated by Armen A. Alchian and William R. Allen, Exchange and Production: Theory in Use (Belmont, California: Wadsworth Publishing Co., 1969), 287-90.

1 Cite.

2 Recall that the driver is assumed to be the owner of the taxi.

remain in operation. If serious infractions caused their right to operate to be revoked entirely, then they would suffer a nontrivial loss. As long as this loss equalled or exceeded the present value of the gains from violating a regulation, serious infractions were unlikely to occur.

The introduction of the mass produced automobile and the widespread use of automobiles as a means of personal conveyance seriously undermined the effectiveness of the prevailing system of regulatory enforcement. One consequence of the technological change was to dramatically reduce the degree of nonsalvageable production assets in the provision of taxi service. One principal use of the modern automobile was for personal transportation. Anyone who owned an automobile for personal use could almost costlessly use the vehicle as a taxi. Conversely, the owner of a modern taxi could easily sell the vehicle for personal use. Given the high-valued use of the modern taxi, it no longer represented a highly specialized asset in contrast to the taxis in the earlier period.¹

In the earlier period, the taxi represented an industry-specific asset. Conceivably, a driver exiting the industry could sell his vehicle to another licensed driver. Yet, taxi drivers in good standing with the regulatory authority may refuse

¹ The acquisition cost of the automobile also dropped as vehicles serviceable as taxis were no longer primarily owned by the rich and a mark of affluence. In addition, the cost of continuing possession decreased in response to the emergence of used car markets and repair centers.

to purchase vehicles from violators.¹ In this case, the taxi becomes specific to the driver; the driver is therefore subject to a substantial loss if forced to use the vehicle outside the industry. The significance of the technological change is that it eliminated the specialized nature of the taxi. Consequently, it became less costly for unlicensed drivers to enter the market. If caught by the regulators, the vehicle could be shifted into another use at little, or no, cost. Thus, the regulatory enforcement problem in the modern period does not require that licensed drivers violate taxi regulations more frequently than in the earlier period. Rather, the regulatory problem is created by unlicensed drivers.²

The ultimate effect of the technological change was to increase serious infractions of existing regulations. Vehicles serviceable as taxis were now owned by large numbers of people whose primary source of income was outside of the taxi industry. It became possible then for large numbers of unlicensed drivers to enter and exit the markets rapidly. Such hit-and-run entry could occur at peak hours and on the more profitable routes, thereby undercutting the regulated price. The likely outcome of

¹ Alternatively, occupational licensure may preclude such transactions.

² More research is required to understand the institution of occupational licensure and how it was effected by the introduction of the mass produced automobile. Our understanding of the specialized nature of the early vehicles employed as taxis would be greatly improved if we could document the costs of re-selling a taxi, including any restrictions imposed by occupational licensure or by the regulatory authority.

this situation was the collapse of the efficiency-based regulations requiring that all customers be served and that a uniform price (i.e., a fixed price per mile) be charged. Taxis attempting to obey these rules would now be at a competitive disadvantage relative to the hit-and-run entrants.

The campaigns of professional cab associations for vehicle licensing during the late 1920s were a direct response to the disruption in the market created by hit-and-run entrants. Of course, this does not imply that the campaigns for entry restriction were motivated by concern for the public well-being. No doubt these efforts were an attempt to protect and enhance the wealth of member drivers, but it is a standard economic proposition that selfish efforts may indeed provide net social benefits in some circumstances.

D. A Possible Efficiency Motivation for Medallions

Our analysis suggests that the introduction of the medallion system can not be interpreted independently of the earlier forms of regulatory enforcement. Many economists who are critical of restrictions on entry have implicitly compared the present regulatory system to a theoretically ideal market which operates costlessly. It is on this basis that vehicle licenses are believed to impose additional costs on the market by restricting entry without providing additional benefits. We believe that such a conclusion may be unfounded for two reasons.

First, it is unclear whether the medallion system imposes additional costs on the market. The appropriate standard of

comparison is not a costlessly functioning market, but a market in which taxis represented industry-specific assets¹ and drivers required occupational licenses. Vehicle and driver entry costs, which are important determinants of the effectiveness of regulation, were substantial in the period prior to the introduction of medallions. Since the introduction of medallions and the reduction in the specialized nature of the taxi occur simultaneously, the ex ante net effect on vehicle entry costs is indeterminate.² Thus, it remains an empirical question whether entry costs significantly increased in the modern period of the mass produced automobile.

Secondly, restriction of vehicle entry may produce or maintain benefits that compensate for the costs it imposes on the market. Again, the proper standard of comparison is not a costlessly functioning market, but a market which is subject to search costs (such as the costs we have described in Section II). Given that some regulations can significantly reduce search costs, regulatory enforcement can be viewed as maintaining the cost saving potential of such regulations. In theory, medallions can serve as an enforcement mechanism and preserve the search cost saving generated by the regulation to average price all

¹ Since the cost of entry (and exit) due to the specialized nature of the taxi is a low-cost substitute for regulation of vehicle entry, it is considered part of the entry costs imposed by the regulatory authority.

² Further research is required to support our suspicion that the costs of occupational licensure also declined in the modern period.

trips and the regulation to haul all customers. Whether taxi regulation is, in fact, socially beneficial depends on the size of its associated benefits relative to its costs. This empirical issue is subject for another paper.

What we are suggesting, however, is that there exists a possible efficiency motivation for some taxi regulation including restriction on entry. We believe that, holding the variety and quality of taxi service constant, the costs of using a licensing system to enforce regulation may be less than the costs of private investment in brand-name capital. That is, in some taxi markets with no licensing, firm costs may be greater and the amount of service may be lower, holding variety and quality of service constant.

VI. ALTERNATIVE ENFORCEMENT SCHEMES

It should not be surprising that there are alternatives to the medallion system of regulatory enforcement. Turvey reports that the London taxi trade has no medallion system and therefore no entry restriction beyond certain regulations to protect customers, such as an insurance requirement.¹ Nevertheless, fares are regulated and drivers are required to accept all customers. The enforcement mechanism takes the form of a regulation that requires all taxis to have a shorter turning radius than a regular automobile. This evidently adds substantially to

¹ Turvey, "London Cab Trade," supra (at p. 1, n. 1).

the cost of the taxi and to the costs of entry into (and exit from) the taxi market. Because there is no demand for this feature outside of the industry, an owner whose license is suspended does not have an alternative use for this attribute of his vehicle. Thus, the turning radius regulation appears to have created a nonsalvageable production asset.¹ As long as the penalty imposed by the regulatory authority is not so severe as to drive the owner out of London (or to take the loss on the resale of his taxi), penalties in the form of a fine or suspension from operation are enforceable.

In the Washington, D.C. area, zoning is used instead of the medallion system. In the zone system, the region is divided up into geographic zones and the price is set on the basis of the pick-up and drop-off zones (e.g., within a zone a trip is a fixed price and an additional charge may be added each time a zone boundary is crossed). By varying zone size, trips can be finely sorted. For instance, if zones are made smaller for low population density portions of the region, then a driver will cross more zones when taking a rider to such a destination, and will be compensated for the lower probability of finding a return fare. Thus, zoning represents an alternative to the medallion system for fixing price which enables customers to estimate trip prices cheaply. In addition, because the trips are finely graded, there

¹ Further research is required to explain why taxis must be discounted if sold to competing London drivers. It may be the case that the license is nontransferable.

is less incentive for drivers to refuse to haul some passengers, and there is little incentive for hit-and-run entry.

VII. RENT SEEKING OR EFFICIENCY?

Although vehicles serviceable as taxis avoided entry regulation for decades and even centuries, the late 1920s and early 1930s saw a widespread introduction of medallion systems, stringently restricting vehicle entry. In such systems, an initial generation of taxi owners are issued vehicle licenses at apparently nominal fees, and further entry requires the purchase of an existing license from one of the initial owners. This medallion system has generally been interpreted by economists simply as a device to create monopoly profits via entry barriers.

The recent renaissance of rent seeking literature (initiated by Tullock and developed by Posner, Krueger, and others) has established that the granting of monopoly rights generally does not come free.¹ Indeed, this literature suggests that in the competition to win and maintain a monopoly position, rent seekers may well spend an amount equal to the expected present value of the monopoly. Thus, having acquired an exclusive right to sell some product or service, the producer earns no monopoly profit; rather, a monopoly price is charged but the price is only

¹ Gordon Tullock, "The Welfare Cost of Transfers, Monopolies, and Thefts," Western Economic Journal, V (June 1967), 224-32; Richard Posner, "The Social Cost of Monopoly and Regulation," Journal of Political Economy, LXXXIII (August 1975), 807-27; and Anne O. Krueger, "The Political Economy of the Rent-Seeking Society," American Economic Review, LXIV (June 1974), 291-303.

sufficient to earn the owner of the exclusive right a competitive return on his investment, including the investment in acquiring that right. The rent seeking literature has therefore interpreted monopolization as a truly unrewarding process since it does not even provide net wealth transfers to the monopolist. Yet, the monopolist would clearly resist the removal of the entry restriction for the price he paid for the exclusive entry right depended on his ability to sell at the monopoly price.

While this rent seeking view is important and useful in understanding the cost of monopoly, it fails to recognize the possible economic value of creating property rights to entry and to operation within a market. At least part of the misunderstanding relates to the failure of some observers to realize that rent seekers do not acquire complete private property rights in the entry restriction, whether it be a medallion, an occupational license, or a comparable entry certificate. Rather, such entry rights are usually subject to restrictions on performance set by the regulatory authority. Indeed, if the entry right is subject to appropriation if the holder fails to provide specific performance, then the presumption should be, pending further investigation, that the limitation of entry rights may be socially desirable. Of course, though the introduction of limited entry rights into a market may assist in its regulation, the regulation may itself be unnecessary or inefficient, but again this is a matter for investigation. In the case of taxi service, the institution of medallion systems did serve an important economic function.

VIII. CONCLUSION

This paper is probative in nature. We attempt to raise two fundamental questions: (1) Under what conditions might taxi regulation be efficiency motivated? and (2) How can such regulations be effectively enforced?

Our analysis suggests that if taxi drivers agree on the costs of making any given trip within some subset of all trips, the potential to save search costs exists by replacing the competitive (bidding) pricing mechanism with a fixed price or price schedule. In some markets, the transactors are relatively large and can easily internalize the saving in marketing costs by contracting at fixed prices. Such is the case in the marketing of U.S. landed tuna and in the marketing of rough uncut diamonds. In the taxi example, however, the transactors are small relative to the size of the market. Contracting between the riders and the driver is also especially costly because of the large number of riders relative to each driver, the inability of riders to schedule their trips in advance, and the costs of coordinating the trips contracted to a specific driver. Thus, even if drivers agreed to a uniform pricing schedule, each driver has an incentive to cheat on the pricing agreement. As a result, enforcement costs seem to be prohibitive and the potential saving in marketing costs is likely to be lost. Under these conditions, a regulation which sets a uniform price may be warranted. Equally important, such a regulation would be based on efficiency considerations.

A uniform price, however, may be insufficient to prevent some taxi drivers from refusing the unprofitable trips and only serving the profitable routes. In the markets for U.S. tuna and for wholesale uncut diamonds, this type of oversearch activity is constrained by exclusive dealing agreements. But in the market for taxi service, the transaction costs of negotiating and enforcing such arrangements are simply too high. Hence, a second regulation which requires taxi drivers to accept all customers is necessary if the potential cost saving produced under the uniform pricing scheme is to be realized. The requirement that taxi drivers must accept all fares is therefore quite consistent with efficiency.

In the days prior to the mass production of the automobile, the taxi was highly specialized to the taxi trade. That is, there were no high-valued alternative uses for a taxi outside of the industry. Movement of resources in and out of the market was less likely to occur in the form of physical capital (vehicles) than in the form of human capital (occupational licenses). It is no coincidence therefore that occupational licensure was instituted. It allowed the regulatory authority to penalize violators up to an amount equal to the cost of exiting the market (i.e., the value of the nonsalvageable production assets in the form of the taxi and the occupational license).

The introduction of the mass production of the automobile and the widespread use of the automobile as a personal conveyance substantially reduced the degree of nonsalvageable production

assets in the provision of taxi service. Consequently, an alternative enforcement mechanism was instituted. Operators were required to pledge assets (which are nonproductive in the classical sense) in order to signal their intentions to obey the regulations. The return to these assets could be appropriated by the regulatory authority if the owner was found in violation of any regulation. Thus, as long as the owner of the medallion observed the regulations (or equivalently, honored the terms of his implicit contract with the regulatory authority), the regulated price schedule would allow a competitive return on the cost of the medallion. In fact, the market value of the medallion is simply the present value of the earnings to the medallion implicit in the regulated price of taxi service. Obviously, unauthorized taxis would have an incentive to enter the market since the regulated price would yield excess profits on their investment which excluded the investment in the medallion. Under these circumstances, entry restrictions are consistent with efficiency. They are not necessarily a means of creating a monopoly right in an attempt to redistribute wealth to the initial owners of the medallion.

What we are suggesting, therefore, is that the possible efficiency grounds for taxi regulation be reconsidered. We are not arguing that the regulations we can integrate into our analysis are necessarily socially optimal. That will depend on the magnitude of the saving in marketing costs under uniform pricing and on the costs of establishing and maintaining the

regulatory authority. Given that some regulation is socially justified, the means of enforcing such a regulation must then be considered. It is in this context that entry restrictions may be found to be socially beneficial.

