Title
A Property Rights Framework for Transit Services

Permalink
https://escholarship.org/uc/item/36f657t2

Authors
Klein, Daniel B.
Moore, Adrian T.

Publication Date
1995-12-01
A Property Rights Framework for Transit Services

Daniel B. Klein
Adrian T. Moore

Working Paper
UCTC No. 303
The University of California Transportation Center

The University of California Transportation Center (UCTC) is one of ten regional units mandated by Congress and established in Fall 1988 to support research, education, and training in surface transportation. The UC Center serves federal Region IX and is supported by matching grants from the U.S. Department of Transportation, the California Department of Transportation (Caltrans), and the University.

Based on the Berkeley Campus, UCTC draws upon existing capabilities and resources of the Institutes of Transportation Studies at Berkeley, Davis, Irvine, and Los Angeles; the Institute of Urban and Regional Development at Berkeley; and several academic departments at the Berkeley, Davis, Irvine, and Los Angeles campuses. Faculty and students on other University of California campuses may participate in Center activities. Researchers at other universities within the region also have opportunities to collaborate with UC faculty on selected studies.

UCTC's educational and research programs are focused on strategic planning for improving metropolitan accessibility, with emphasis on the special conditions in Region IX. Particular attention is directed to strategies for using transportation as an instrument of economic development, while also accommodating to the region's persistent expansion and while maintaining and enhancing the quality of life there.

The Center distributes reports on its research in working papers, monographs, and in reprints of published articles. It also publishes Access, a magazine presenting summaries of selected studies. For a list of publications in print, write to the address below.

University of California Transportation Center

108 Naval Architecture Building
Berkeley, California 94720
Tel: 510/643-7378
FAX: 510/643-5456

The contents of this report reflect the views of the author who is responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the State of California or the U.S. Department of Transportation. This report does not constitute a standard, specification, or regulation.
A Property Rights Framework for Transit Services

Daniel B. Klein
Adrian T. Moore

Department of Economics
University of California
Irvine, CA 92717

Working Paper
December 1995

UCTC No. 303
The University of California Transportation Center
University of California at Berkeley
Abstract: The paper shows how variations in systems of property rights explain diverse experiences of urban jitneys and buses. Scheduled bus service entails route specific investments and cultivation of a market. If these investments can be expropriated by interloping jitneys, scheduled service will be dissolved. Property rights in curbspace determine whether scheduled service will be preserved, and whether jitney services will co-exist. We analyze the dynamics of thick and thin transit markets, with and without curb rights. We develop a governance system of curb rights that would let bus operators appropriate their own investments in scheduled service, yet would avoid monopoly by letting jitneys and competing scheduled services operate along the same route. A property rights system dispenses with government ownership, franchise contracting, and regulation.

Acknowledgements: The authors would like to thank Pete Fielding, Pia Koskenoja, Charles Lave, James Nolan, Binyam Reja, and Ken Small for valuable comments. For financial support, the authors thank the California Department of Transportation (contract RTA-65V450) and the University of California Transportation Center.
A Property Rights Framework for Transit Services

I. INTRODUCTION

The U.S. transit sector has long been dominated by government ownership and regulation, and has been declining steadily in terms of ridership, and productivity (APTA 1993). To solve these problems, one might try to bring competition and entrepreneurship to the transit sector via privatization. Two types of privatization would be contracting out and free competition, but each has serious shortcomings.

Contracting out allows the public sector to maintain the planning decision of routes and fares, and the type of vehicle to be used, while putting production and operations in the hands of cost-conscious private companies. Small cities and counties have increasingly contracted out bus service. Large transit agencies receiving federal monies have a harder time putting through major contracting programs because of privileges granted to transit unions. Contracting appears to have reduced costs significantly (Teal 1988, 218; Perry et al 1988, 134), but contracts, even when competitively let, preserve transit monopoly and service regimentation. Transit agencies use various contracting schemes which, as Williamson (1976) and Goldberg (1976) have pointed out, tend in practice to resemble regulated monopoly.

The alternate proposal of some type of "free competition" promises on-the-road competition, perhaps in the form of freewheeling jitneys, which are smaller vehicles that pick up and drop off along a route but do not necessarily follow a schedule. The deregulation or "free competition" precept is incomplete, however, when applied to a service that operates principally on government property, namely the roadway, the curbspace, and the sidewalk areas where
passengers congregate to wait for the bus. Bus operators must invest in cultivating passenger congregations, and must be able to appropriate the value of their investment. Depending on how it is governed, "free competition" might mean parasitic interloping on routes, where jitneys run ahead of scheduled buses to pick up waiting passengers. Such interloping might undermine any scheduled service and inhibit development of transit markets. All this takes place on public property. Calls merely to privatize the buses and to deregulate bus operations have neglected crucial issues rooted in the management and utilization of the public domain.

Proposals to increase bus competition have ignored curbspaces as a fundamental resource of the industry. This paper argues that the rules -- or property rights -- governing passenger pick-up areas are in fact a determining feature of transit markets. We suggest that variations in curb rights explain the differences in transit markets seen in the United States and elsewhere. An appreciation of curb-rights issues leads to a more complete understanding of transit markets.

We proceed by first examining four case studies of transit markets with deficient property rights: the jitney episode in the United States, 1914-1916, jitneys and route associations in less developed countries, illegal jitneys in New York City, and the British experience of bus privatization and deregulation. These case studies help us to develop the logic of transit operations, and to formulate a theory of transit markets. Finally, we offer a property rights framework which promises to improve transit markets.
II. TRANSIT MARKETS WITH DEFICIENT PROPERTY RIGHTS:
FOUR CASE STUDIES

*The Jitney Episode of 1914-1916*

When the automobile came on the scene, so did freewheeling competition in urban transit. Jitneys, charging a nickel per ride, picked up waiting passengers along the routes of the electric streetcars. The jitneys were usually just the sedans of the day, serving as shared-ride taxicabs along loosely defined routes. They quickly became popular because of their flexibility and speed—almost twice that of the streetcars. They were more comfortable and less crowded, and sometimes would deviate from the main route to make courtesy drop offs. By 1915 jitneys operated in most major cities and reportedly numbered 62,000 nationally (Eckert and Hilton 1972, 295-296; Saltzman and Solomon 1973, 63).

Streetcar companies immediately reported losses due to jitney competition, and many began laying off employees and cutting back on service. Jitneys not only interloped on streetcar routes, however. They also filled important market niches. Jitneys were used mainly for short trips and provided transportation to many people who would otherwise not have been served by the streetcars. Although jitneys charged less than the streetcars, their gross revenues far exceeded the streetcars' loss of revenue (Eckert and Hilton 1972, 296; Rosenbloom 1972, 5).

The jitneys were loosely organized and highly spontaneous. Most jitney drivers were independent, some between jobs or working part-time to supplement their income. Many were simply working people who picked up fares on the way to their regular job. Others were
teenagers who borrowed Dad's car to earn spare change after school (Eckert and Hilton 1972, 294). Jitneys adapted flexibly to changing demand conditions -- such as the weather, time of day, day of the week, special events, and so on. Despite the decentralized nature of jitneys, there began to emerge systems of custom, voluntary associations, and company fleets. These associations were formed to help drivers obtain insurance, share maintenance services, and protect them from hostile lawmaking, and in some cases to coordinate routes and schedules (Eckert and Hilton 1972, 295-297).

The electric streetcar companies saw the jitneys as an infringement on their exclusive franchises and lobbied the government to regulate the jitneys. The municipalities went along with streetcar demands, in part because they received tax revenue and free movement of police and fire department personnel from the streetcars (Hilton 1974, 37). Municipalities required jitney drivers to obtain substantial liability bonds, and to obtain operating permits. These measures and other anti-jitney ordinances proved fatal. The jitneys largely disappeared by 1917, after just two years of rapid growth and experimentation.

The jitneys posed a fundamental question of property rights: Is interloping on scheduled service a form of thievery or a form of legitimate competition? The answer of the authorities was "thievery," plain and simple. Instead of developing a framework that would accommodate competitive co-existence, freewheeling transit was stamped out in favor of large-scale monopoly.

*Transit in the LDCs: Jitneys and Route Associations*
Transit services similar to the 1915 jitney experience still operate on the streets of hundreds of cities throughout the less developed world. Takyi (1990, 171) describes the jitney's appeal to riders:

They charge relatively low fares and provide wide coverage across a city, often serving poor areas that get no other service. Their operations are flexible so they can add service at peak times and quickly cover new neighborhoods. Their small size and cheap labor enables them to profitably provide frequent service in smaller neighborhoods and along narrow streets, as well as work the main thoroughfares. With fewer passengers, they often make fewer stops and faster time.

These advantages also marked the American jitneys of 1915, but in that case regulations were imposed to undercut their competitive advantage. In the LDCs, laws are passed to prevent jitneys from interloping on official service and from establishing competing routes, but the rule of law is very attenuated and, as Takyi says (1990, 175), the jitneys "never operate legally." Takyi tells of "the loss of passengers at transit stops to jitneys during lean as well as peak periods."

As jitney service develops in thick transit markets, various curbside conflicts and confusions start to occur. Any operator that attempts to establish scheduled service will face an interloping problem. Some operators will headrun on the scheduled service, others will linger at the curb to fill up, disrupting traffic and taking ridership from the arriving vehicle (Roth and Shepherd 1984, 4; Diandas and Roth 1995, 27-28; Takyi 1990, 167, 175). Consumers may be reasonably well served, but problems of discoordination and lack of trust are often severe (Grava 1980, 285).
A common development is for the jitney operators to form a route association. These are informal organizations created to bring order and regularity to service, by creating an extralegal system of norms and explicit rules. The jitney literature suggests that route associations have in large measure governed transit services in Lima (De Soto 1989), Hong Kong, Istanbul, Buenos Aires, Manila, Calcutta, and Caracas (Roth and Shepherd 1984; Takyi 1990). The route association becomes a regulatory body, somewhat like government, but more local and entrepreneurial in nature. The association lays down rules against interloping and deviating from schedules. Also they fix fares on the route, though these may vary with time of day. Associations create a degree of order sufficient to control destructive conflict, but also the route associations operate as a cartel. Roth and Shepherd (1984, 42), De Soto (1989, 99), and Grava (1980, 282) report that associations function to limit entry.

Thus we arrive again at the issue of rights to waiting passengers -- or curb rights. Jitneys initially transgressed the curb rights of the formal bus operators, yet in time organized to establish curb rights for themselves. How, then, do they prevent new interlopers from transgressing their rights? The main answer seems to be physical intimidation and strong-arm tactics. Roth (1987, 224-25) notes that "the methods used by route associations to protect their territory can become criminal, unlawful, perhaps even homicidal." Sigurd Grava (1980, 282) speaks of route enforcement by means "considerably beyond the law" by "district strongmen, ... local bosses, criminal gangs, powerful families, brotherhoods of operators or otherwise legal associations." As is common in black markets everywhere, outlaw entrepreneurs employ violence to maintain their territory. De Soto (1989, 102) tells of route associations in Lima appointing "dispatchers" to
monitor compliance with rules, and bribing the police to accost and harrass "pirates" who are trying to invade their route.

Once route associations have organized their operations, they often turn to the government for official recognition. Through a long effort of lobbying, bribery, petition gathering, and so on, the route association often acquires official status, and are granted permits or licenses. Along with official recognition, however, come political obligations and regulations. Transit history in Colombo (Diandas and Roth 1995) and Lima (De Soto 1989) shows a cycle of transit governance: once the decentralized private operators gain official recognition they are hamstrung by regulation and suffer invasion by a new generation of interlopers. Without curb rights, established officially or otherwise, orderly scheduled fixed-route service does not last.

*Illegal Jitney Vans in New York City*

Black-market jitneying is not restricted to the less developed countries. In New York City and Miami, jitney vans have operated extensively, interloping at public bus stops and establishing routes of their own. People who ride the illegal vans give a number of reasons for preferring them to the city buses.¹ By far the most often mentioned is that the jitneys are faster and even cheaper than the city buses. Jitneys also provide a more comfortable ride, with no standing, and many riders enjoy having a driver that speaks their native language. Finally, many riders say that riding the jitney is safer than the public bus. Since jitneys come more often, riders do not have to wait as long at the bus stop, which is a good place to get mugged (Levine and Wachs 1986). Also, jitney drivers will not pick up passengers who are drunk and disorderly, or who otherwise bother or
threaten the other passengers. Jitney riders, who are mostly minorities, appreciate being able to escape the forced association with all comers that a public bus entails.

Extreme cases of interloping jitneys may develop where market conditions are favorable and enforcement efforts not yet mobilized. To persist once enforcement begins, interloping must expand to the point where the individual illegal operator finds safety in numbers, like someone taking part in a riot. This jitney outbreak either persists as a significant force or disappears. In most U. S. cities, either market conditions have not favored illegal jitneys or enforcement has been effective. A notable instance of such jitney outbreaks is New York City (on Miami's jitneys, see Klein et al 1995).

Modern jitney operation in New York City was prompted by the transit strike in 1980. Illegal jitneys emerged to provide local service and feeder service to the Long Island Rail Road station in Jamaica (southeast Queens). As Boyle (1993, 3) explains, "[t]he jitneys thrived along busy bus routes ... because of the high numbers of people congregated at the bus stops along these routes." Boyle reasons that jitney service has developed especially in neighborhoods of Caribbean immigrants, because those riders became accustomed to relying on jitneys in their native lands. Although the strike had long been settled and regular bus service reinstated, enforcement against the jitneys had been only "sporadic" (Boyle 1993, 3). Jitneys reached the "take-off" point to self-sustained operation. The authorities face the dilemma of cracking down on services which are well regarded by paying customers and treated sympathetically by reporters and news commentators.

To operate legally the vans would have to obtain special permits and a special insurance policy and undergo multiple inspections each year, and the driver would need a special license.
The vans could then pick up and discharge passengers only by pre-arranged appointment, and of course not use city bus stops. It is estimated that between 2,500 and 5,000 vans flout these laws (Boyle 1993, 4).

A public transit executive claimed that each year the jitney vans were diverting $30 million in revenue from public transit (Machalaba 1991). Transit police have been assigned to areas near bus stops to crack down on the interlopers. *The New York Times* reports as follows: "In the 18-months ended December 1991, a special task force issued 6,542 civil notices of violation against the vans and 11,773 criminal summonses, ... [and] 251 arrests" (Mitchell 1992). Still, the vans are thought to be uncontrollable. A police officer remarks that two or three vans sail by for every one he tickets. Most vans are driven by Caribbean immigrants, and who pay small regard to the summonses. *The Wall Street Journal* (Machalaba 1991) reports that over a one year period the van drivers have been assessed fines over $4 million, but the city collected only $150,000.

Considerations of racial flash-points dampen the will to go beyond current enforcement measures, which amount to random delay and hassles for the drivers and their patrons.

The New York jitney experience shows again that unsubsidized private enterprise can supply fixed-route transit, even when having to cope with enforcement efforts against them. We see also that property rights to waiting bus passengers, and the degree of enforcement, is a fundamental component in such operations.
Bus Privatization and Deregulation in Britain

The 1985 Transport Act deregulated the British bus industry everywhere except London.\(^3\) (In London competition is required only as competitive contracting; there is no on-the-road competition.) All publicly owned bus companies were reorganized as private corporations. The Act requires operators to register the commencement of, or changes to, bus service at least 42 days in advance. The only grounds for local government to refuse to allow a service is serious safety or traffic congestion problems. Besides privately registered routes, local authorities can supplement services by putting unserved routes out for competitive tender.

Deregulation permits only scheduled services; it does not permit unscheduled services, such as jitneys. This restriction, along with the strength of the rule of law in Britain, ensures that there have been no freewheeling jitney activity, and no interloping as seen in the less developed countries.

On-the-road competition was initially strong, but has tapered off to a rather low level (Dodgson 1991, 125; Hibbs 1993, 52). Besides on-road competition, however, is the question of contestability, or the ability of potential entry to discipline incumbent firms. Mackie, Preston, and Nash (1995, 232) and Dodgson and Katsoulacos (1991, 265-6) suggest that contestability is constrained by the sunk costs of establishing a scheduled service, and the "economies of experience" held by incumbent operators. Another constraint of contestability, which they do not mention, is the ability of an incumbent firm to react quickly to a competitive challenge. Contestability theory suggests that if an incumbent firm can quickly and easily reduce its fares when a competitor challenges it, would-be entrants might be reluctant to enter, even in a market
with high fares (Bailey 1981; Bailey and Friedlander 1982). The challenger can no longer expect
to grab market share by offering a lower price, and the incumbent has the advantage of
experience, reputation, and, in most cases, size.

In fact, it has been very rare in the British experience for firms to compete by offering
lower fares (Dodgson and Katsoulacos 1991, 271-2). Rather, real bus fares increased 17 percent
between 1987 to 1994 (White 1995, 198). Instead of competing by offering lower fares, firms
chose to offer more frequent service than their competitors. Free competition does not
necessarily generate price cutting, as has also been found in deregulated taxi markets (Frankena
and Paulter 1986; Teal and Berglund 1987). It seems that information and coordination problems
between drivers and potential riders may push transit markets toward a single, or focal, rate of
fare.

Under the British reforms, registering a scheduled service does not secure one a right to
the congregating passengers at the curb. One bus operator can interlope, in a manner of speaking,
by registering his own scheduled service just minutes before the scheduled service of another.
Since the law does not proscribe schedule matching, local authorities are obliged to allow it.
Many British bus operators avail themselves of this strategy, which we call schedule jockeying
(Dodgson 1991, 126; Dodgson and Katsoloucos 1991, 269; Savage 1993, 146; Gomez-Ibanez
and Meyer 1990, 13). Since the established firm has no window of security from the schedules of
competitors, congregations of passengers waiting at the curb can be snatched up by competitors
offering comparable fares. Waiting time so dominates passengers travel decisions that any
reputation and amenity advantages an incumbent may offer are not likely to keep waiting travelers
from taking the first bus to arrive (Weisman 1981; Wachs 1992; Dobson and Nicolaidis 1974).
Incumbent bus companies, however, quickly learned to monitor the registration of new services by competitors using this strategy, and often promptly respond in kind. The 42-day registration period makes it easy for firms to see each other's changes in service and to respond, in a potentially endlessly regress. In the face of a mutually destructive battle, the incumbent has often responded by simply scheduling service so frequently that the challenger cannot expect to get enough riders to make a go of it. This practice, known as route swamping, has been very common (Dodgson 1991, 126; Dodgson and Katsoloucos 1991, 269; Savage 1993, 146; Gomez-Ibanez and Meyer 1990, 13). It has a strategic effect in the immediate contest, and in signaling the willingness to use route-swamping against future challenges. The ability of incumbent firms to quickly and easily change their schedules in reaction to entry, by virtue of the 42 day registration period, constrains contestability in the same way that easily and quickly adjustable prices do in standard contestability theory.

Large incumbent firms often conclude a route swamping conflict by buying out small rival firms. These types of mergers are quite common, as are mergers between firms that do not directly compete against each other (Mackie, Preston, and Nash 1995, 235; Savage 1993, 147). Many of the latter mergers have been in the form of holding companies, with their subsidiaries often geographically dispersed (Gomez-Ibanez and Meyer 1990, 12-13). The result has been a clear trend towards oligopolistic and even monopolistic operations in the industry, another important unexpected outcome of deregulation (Banister and Pickup 1990, 81; Savage 1993, 147). In many counties just a few firms control over 80 percent of the market (Banister and Pickup 1990, 81). Small operators have been progressively squeezed out of the competitive market, while finding more success in the tendered contract market.
The literature offers a plethora of explanations for the concentration of the industry. Hibbs (1991, 4) suggests economies of scope and management efficiencies. Mackie, Preston, and Nash, (1995, 235-36) and White (1995, 202-3) point to financial advantages of larger firms, managerial economies of scale, and purchasing power. Gomez-Ibanez and Meyer (1990, 12-13) argue that holding companies offer many advantages, including very low costs and the ability to move vehicles and managers from subsidiary to subsidiary as market conditions dictate. They add that firms with large networks have a distinct advantage in the growing use of single-rate unlimited-travel fare cards. Nash (1988, 110) indicates that larger firms enjoy considerable economies of scope in scheduling buses and avoiding long layovers between runs. Finally, Dodgson and Katsoulacos (1991, 267) advance the notion that to some extent the managers of formerly public firms may have retained their old habits of output maximization, even though they are inappropriate for the new goal of profit maximization. The issue of integration calls to mind yet another explanation. Dodgson (1991, 124) and Nash (1988) point out that there has been a steady decline in inter-operator ticket availability. White (1992, 56) mentions one case where the removal of schedule coordination and inter-operator ticketing led to a 20 percent reduction in ridership.

Although we think that there is merit to many of these theories, we think that the issue of curb rights is fundamental to the peculiar form of deregulation in Britain. If we accept that the ability to swamp a route is necessary to combat schedule jockeying, it is easy to see advantages in larger firms with broader networks. As Gomez-Ibanez and Meyer (1990, 13) point out, a larger company has more supervisors, drivers, and buses at its disposal, which they can shift about to swamp a route where competition has commenced schedule jockeying. A larger firm will also
have greater financial flexibility to maintain such "fighting fleets" (Dodgson and Katsoulacos 1991, 267, 270). Indeed, the very largeness of the firm presents a formidable warning, signaling to potential entrants that entry can and will be met by swamping. Although British deregulation of buses has led to large reductions in costs and public subsidization (White 1995, 194; Mackie, Preston, and Nash 1995, 238; White 1992, 50), it has also yielded a surprising degree of industry concentration, with lackluster competition. Our theory of schedule jockeying and route swamping, rooted in the issue of curb rights, helps to explain these results.

III. A THEORY OF TRANSIT SERVICES

The experience of America in 1915, of illegal interloping today, and of some LDC transit markets suggests that jitneys have market advantages on both the supply side and the demand side over scheduled bus service. Since jitney service follows a route but not necessarily a schedule, independent jitney operators enjoy efficiencies in being highly flexible with respect to their own schedules and the hour-by-hour market conditions (depending on weather, congestion, etc.). They enjoy flexibility in negotiating traffic conditions and in making small deviations from the route. On the demand side, passengers are generally quite happy to ride a jitney which charges the same fare and goes to the same destination. The headrunning jitney displays several advantages. It is available "now," whereas the bus is yet to arrive. The jitney vehicle is a smaller, faster, and probably more pleasant vehicle to travel in. Furthermore, it may offer deviations, perhaps at an extra charge. The bus is cumbersome and dreary; the jitney is entrepreneurial, more personalized, and even somewhat charming. On the other hand, waiting passengers may prefer to
wait for the scheduled bus because it offers more certainty and trustworthiness, and it is perhaps more comfortable than the jalopy jitney (Grava 1980, 285). In what follows we assume that passengers generally prefer to ride in the headrunning jitney which charges the same fare as the scheduled service.

If, in the presence of scheduled service, the jitney cascade enjoys inherent market advantages, we can see that a fundamental issue affecting the fate of scheduled service is whether or not jittneys are given free run of the streets. It is the issue of curb rights that separates the traditional bus service in the United States from the jitney experience in 1915, illegal jittneys in the United States today, and some of the LDC transit experience. In the latter cases, jittneys flourish. Exclusive curb rights are not fully established for the scheduled service, either because jitting is legally permitted, or because it is prohibited but not effectively policed against.

Where interloping is both prohibited and effectively policed against, bus companies will invest in establishing routes and schedules, in publicizing the information, and in running the service in an incipient market, because they will be able to appropriate the value of these efforts at bringing people out to the curb. Although transportation economists have found that there are no economies of scale in merely expanding bus service (Viton 1981; Shipe 1982; Hensher 1988), they have neglected the issue of the appropriability of the investment in setting up and cultivating a route. We maintain that there are specific investments made in cultivating a route and schedule, and that the appropriability of this investment depends on curb rights. We assume that because jittneys enjoy inherent market advantages, if they are free to interlope, they will dissolve any scheduled service. Without the "anchor" of scheduled service, however, it might be that fewer riders will congregate at the curb and thus fewer jittneys ply the route.
Another distinction of fundamental importance is whether ridership on the transit route is potentially heavy enough to sustain the cascade of jitneys in the absence of scheduled service. If the market is potentially thick, we may get the outcome in which there is no scheduled service, yet jitneys ply the route spontaneously because they have confidence in finding congregating passengers, and passengers congregate at the curb because they have confidence in finding jitneys plying the route. In an inherently thin market, however, this outcome, even if it were to exist at a point in time, cannot be sustained: there will not be an adequate number of congregating passengers for jitney service to be frequent, and consequently waiting times for unscheduled jitney service will be too long to induce passengers to congregate. Because the coordination problem of unscheduled service is severe in thin markets, service might disappear altogether.

The dynamics of thick and thin markets can be shown diagrammatically. Figure 1 shows the case of a potentially thick market. There are no exclusive curb rights, and hence no scheduled service. The horizontal axis measures the number of jitneys per hour that ply the route. The vertical axis measures the number passengers who congregate at the curb per hour. The thick curve shows the number of jitneys that would come out to serve the route given a number of congregating passengers. This jitneying function shows that no jitneys serve the route when there are no congregating passengers, but then as congregation grows, the jitneys expand at an increasing rate. As passenger congregations become even heavier, however, the rate of increase in jitneying declines, because of congestion problems. The thin curve shows the number of individuals who would come out to congregate at the curb, given a number of jitneys serving the route. It also starts at zero, then rises at an increasing rate, but, since there are only so many people who have any demand at all for jitney service, the curve eventually flattens out.
Figure 1

Interactions Between Congregating Passengers and Cruising Jitneys in a Potentially Thick Market
The curves show the mutual dependence of the two sides of the market. If only 60 people congregate per hour, over the course of a week, then the jitney response, read off the jitneying function, is about 6.7 per hour. The next week, people expect about 6.7 jitneys per hour, and the congregation function shows that therefore only about 50 people will congregate. The next week, jitney operators expect only 50 people per hour, and the jitney function shows that therefore the jitneys come out in even smaller numbers, and so on. For a point to the lower-left of point Y, the system degenerates down to no market at all -- point Z. At point Z, a stable equilibrium, it would indeed make no sense for any jitneys to ply the route, or for any individual to wait for a jitney.

If somehow a critical mass develops beyond point Y, the system will maintain life. If, for example, eight jitneys per hour were to ply the route, that would induce significant congregations, which would induce even more jitneys, and the system would bounce up to the other stable equilibrium at point X. Ten jitneys per hour induce exactly 100 congregating passengers, and 100 congregating passengers induce exactly 10 jitneys. This is the realization of potential in a thick market.

Figure 2 presents the thin-market scenario, but also assumes that the market begins with scheduled bus service. This is the case of the "dissolving anchor." With scheduled service and no jitneys, the number of passengers corresponding to point A wait for the bus. This degree of passenger congregation is the "anchor" provided by scheduled service. Assume that for some reason jitneying suddenly becomes possible -- perhaps because of a public transit strike. Jitneys begin to headrun on the scheduled service, and many passengers are willing to take whichever vehicle comes first. The relationship between the upper congregation function (with scheduled
Figure 2

Interloping Jitneys Dissolve the Anchor of Scheduled Service and Destroy the Market
service) and the jitneying function implies that the system will be driven to point B, where 9 jitneys ply the route and 100 passengers wait for service. Passengers and jitneys like this outcome, but there is one problem: the scheduled bus is now not getting enough ridership, and it pulls out. The anchor dissolves. Now passengers are less enthusiastic about congregating at curbside, for two reasons. First, they do not have the guarantee of anchor service, so they may have to wait longer, or with more uncertainty, for a jitney. Second, without scheduled service, there is no longer a focal schedule for arrival times at the stops. Jitney arrival times become less predictable. Hence, when an individual goes to the curb he goes with less certainty of when a jitney will arrive, and waits longer at the curb. The decrease in passenger enthusiasm is shown by the shift downward of the congregation function. Nine jitneys per hour now attract much fewer passengers. This in turn reduces the number of jitneys, which in turn reduces the number of passengers, and so on. Finally the system settles at point Z, for zilch. Thus, the progression is as follows: We begin at point A with scheduled service; jitneys come to interlope and the system moves to point B, the anchor is dissolved, and then the system moves to point Z, or market disintegration. In a thin market the jitney cascade cannot be sustained.

[Figure 2 here.]

We suggest a typology of fixed-route urban transit, shown in Figure 3. Restrict your attention at present to the first two columns. The top-left cell represents unsubsidized buses with exclusive monopolies on routes with moderate to thin patronage. There, exclusive rights are established: there is no interloping and no competition. Therefore the "anchor" (or scheduled service) is preserved. In this case there are some potential problems. The chief problem is inadequate competition and inert monopoly: the incumbent anchor knows that entry is unlikely,
<table>
<thead>
<tr>
<th>THIN MARKET</th>
<th>THICK MARKET (potentially)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Exclusive Route for the Scheduled Service Provider</strong></td>
<td><strong>No Exclusive Rights for Scheduled Service</strong></td>
</tr>
<tr>
<td>Anchor Service Preserved</td>
<td>Interlopers Dissolve any Anchor</td>
</tr>
<tr>
<td>Possible Problems: inadequate competition and inert monopoly</td>
<td>Possible Problems: market destroyed</td>
</tr>
<tr>
<td>Anchor Service Preserved</td>
<td>Interlopers Dissolve any Anchor, but a Cascade of Jitneys Offers Low-Cost, Unscheduled Service.</td>
</tr>
<tr>
<td>Possible Problems: inadequate competition and inert monopoly</td>
<td>Possible Problems: low quality, irregularity, unreliability, untrustworthiness</td>
</tr>
</tbody>
</table>

**Figure 3**

A Typology of Fixed Route Urban Transit
and consequently shades on service or increases fares. Another problem is that potential operators will waste resources seeking the "rent" associated with monopoly privilege (Tullock 1967).

[Figure 3 here.]

In the bottom-left cell the story is not much different. Again, anchor service is preserved because interloping is not tolerated. Because the market is thick, it would be better able to support multiple scheduled services, more frequent service and more consumer choice, but still competition is not tolerated. The problem of inert monopoly is more severe.

Moving to the next column, we come to the cases where there are no exclusive rights at all, either because they are not granted or not enforced. The entire route is essentially a pure commons. Assume that there is no impediment to headrunning or interloping. In a thin transit market, shown in the top-middle cell, interlopers will headrun on any scheduled service and collect the waiting passengers. This is the case of the dissolving anchor. The lack of property rights in the waiting passengers in this case results in the "tragedy of the commons" (Hardin 1968). The entire market may be destroyed, for, once the anchor has dissolved, people no longer wait and jitneys no longer ply the route.

The case of the thick market is shown in the bottom-middle cell. In this case the lack of curb rights may not be a serious problem. Indeed, any anchor will be dissolved, but the market may not need an anchor. The reader may visualize the lower congregation function and the jitneying function in Figure 2 intersecting in the same manner that the two functions do in Figure 1. In this case the market is thick enough to sustain the cascade of jitneys, and riders will be satisfied by flexible, low-cost, and frequent service. This outcome was sometimes found in the
American jitney experience of 1915, a few markets in America today (both illegal and legal), and many of the LDC transit markets. In any country, however, there are possible problems with the jitney cascade outcome, such as low quality, irregularity of service, high uncertainty over terms, and lack of trust.

Pause to consider a case that does *not* fit into the typology, a case that would go between the first and second columns. In the British deregulation experience, bus operators enjoy neither exclusive monopolies (column one) nor operate on a pure commons (column two). Rather, free competition is permitted among providers who register schedules in advance. The situation is not that of the pure commons, since freewheeling is not permitted. The British example suggests that nuanced approaches can be fashioned to go between the two extremes, exclusive monopoly and pure commons. We will pursue this idea and propose a property rights framework that refines rights along a route and avoids monopoly.

The cases considered so far have assumed that any scheduled provider could enter the market, and that those that do receive no subsidies. Let us turn now to the case in which scheduled service *does* receive subsidies (notably government subsidies, but much of the reasoning will work also for cross-subsidies), and charges low fares. Where subsidized service is combined with exclusive curb rights, we get cases similar to those we have placed in the first column of Figure 3. The scheduled service, because it charges low fares, is now even more immune to interloping, so the "anchor" again is preserved. The likely problems are inadequate competition and the familiar problems attendant to government subsidization.

The cases of subsidized, low-fare service *without* exclusive curb rights are shown in the third column of Figure 3. Interlopers are free to headrun on the scheduled service, but in this case
it is to no avail because waiting passengers figure that they will keep waiting for the scheduled bus, which offers a lower fare. For example, in Los Angeles in 1983 private jitneys were allowed to operate on thirty public transit routes. Matching the 85 cent public bus fare, they were successful initially, but promptly withdrew once the city lowered bus fares to 50 cents (Teal and Nemer 1986).

In a thick market, shown in the bottom-right cell, the low fares of the scheduled service again will attract riders, but demand might exceed supply. One of the present authors has witnessed transit operations in Shanghai, where low-fare buses are packed sardine-style, and a rich cascade of jitneys and taxis cater to the excess demand. In this case, jitneys survive even though they charge higher fares, because of excess demand, and because of superior quality (less crowding, speedier service, etc.) Further, jitneys charge according to trip distance, so someone traveling a short distance might find the jitney fare competitive to the undifferentiated bus fare.

To transcend this typology, imagine a decision to privatize and deregulate, such as Britain faced in 1985. If we eliminate public transit and subsidization, there remains the first two columns of Figure 3. These two options represent the horns of a dilemma. In one case a provider of scheduled service has an exclusive monopoly over the entire route. Because competition is absent, there is little incentive for service improvement and innovation, and fares will be higher. In the other case, no exclusive rights exist at all. The anchor of scheduled service would be dissolved by jitneys, and markets may never come to be. If policymakers are confined to choosing between these two horns, they should choose on the basis of whether the market is thin or thick. If the market is thin, they should choose exclusive monopoly because the alternative results in no service at all. If the market is potentially thick, they should choose not to grant exclusive rights to
the route, and simply allow the jitney cascade to burgeon. This will bring freewheeling service and competitive energy to the market, whereas the alternative would be inert monopoly.

What would be even better, however, would be an option that avoids either horn of the dilemma, an option which entails a limited degree of exclusive rights, to prevent the anchor from dissolving, and yet permits freewheeling competition on the route.

IV. GOVERNANCE FOR BUS AND JITNEY SERVICES: CURB RIGHTS

The issue of scheduled service and interloping is like the problem of invention and imitation. Setting up scheduled service entails certain fixed costs: planning out routes and schedules, disseminating information, providing benches and shelters, and running the service before ridership has developed, regardless of the weather, and so on. The tangible achievement of this fixed cost is bringing passengers to congregate at designated sidewalk areas, just as the tangible achievement of an inventor's experiments or tinkering is a new device or process. If the provider cannot appropriate his investment, whether in creating passenger congregations or inventing a new device, because interlopers carry off the patrons or imitators copy the invention, then he will not invest in the first place. These situations call for a system of property rights.

Think of the two extremes in patent policy. At one extreme is the policy of granting to inventors no patent protection whatever; other manufacturers are free to use the concept. This policy allows vigorous competition in the manufacturing and marketing of the item once it has been invented. The policy reduces, however, the incentive to invent. Now consider the other extreme: Every invention enjoys full and exclusive patent protection for all time. This would give
strong incentives to invent, but the inventor of every transistor and ball-point pen would forever enjoy exclusive monopoly control over the concept. It is obvious that a policy of limited patent protection would be superior to either of the two extreme policies.

Yet in urban transit policy, governments have kept to the two extremes. In the U. S., local governments create exclusive monopolies for scheduled bus service by prohibiting competition on the same route. This grants monopoly power and chokes off product differentiation and discovery of opportunity. It inevitably brings regulation and subsidization, generating a bureaucratic and highly politicized operation. At the other extreme are jitney markets in some LDC cities, where there is no curb right protection and jitneys roam free. This arrangement might be tolerable in thick markets, but in thin markets the jitney cascade will dissolve any form of scheduled service, leaving travellers without service.

The answer lies in a system of curb rights that both guarantees some exclusivity to those who successfully cultivate passenger congregations, and gives play to the jitney cascade. There is no specific system of curb rights that is necessarily best for all transit conditions. An important part of our idea is that each case is unique, and that local officials ought to use their knowledge of local conditions to create a suitable curb-rights system.

A simple case would combine a scheduled service provider with the jitney cascade. Figure 4 is a schematic diagram showing curb rights as they are demarcated in both space and time. Consider first just the spatial component, where exclusionary zones are separated by a distance. Focusing attention exclusively on the column at the 8:00 hour. This column shows four curb zones. When we speak of "curb zones" or "curb rights," it should be understood that we mean not only the curb, but also adjoining space on the sidewalk and road -- in other words, a complete
## Spatial Demarcation of Curb Rights

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Commons</td>
<td>Commons</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>3</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>4</td>
<td>Commons</td>
<td>Commons</td>
<td>B</td>
<td>B</td>
</tr>
</tbody>
</table>

**Temporal Demarcation of Curb Rights**

<table>
<thead>
<tr>
<th>Time</th>
<th>PEAK</th>
<th>OFF-PEAK</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00 am</td>
<td>8:15 am</td>
<td>3:00 pm</td>
</tr>
<tr>
<td>3:30 pm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A denotes a curb right held by Company A
B denotes a curb right held by Company B

**Figure 4**

**Property Right Assignments to Curb Zones**
bus stop. The column shows how Company A is granted two exclusionary curb zones where no
other operators are allowed to pick up passengers. Think of each exclusionary zone as being 200
feet in length, with the bus-stop situated at the mid-point. Company A has every incentive to
invest in creating passenger congregations at its bus-stops. It would establish a route and
schedule, and be free from interloping. Yet along the same route jitneys meeting minimal safety
and insurance requirements would operate, picking up passengers at non-exclusive zones, or
commons. At the commons, passengers have an alternative to Company A, since most anyone
may stop and offer service (including Company A).

[Figure 4 here.]

The plan depends crucially on the exclusionary rights of such curbspace being
enforceable. We cannot say with certainty that such enforceability is feasible, but there seems to
be good grounds for optimism. Today it is only in very exceptional instances, such as in New
York City and Miami, that the curb rights of official services are transgressed at all. In Britain
where the scheduled service is typically unsubsidized, there is no interloping. Americans are
predominately law-abiding, and local government can mobilize to protect curb rights. We
recommend, furthermore, that the holder of the curb rights be made responsible for monitoring its
"property." We propose that curb rights violations be treated as a private tort, not a municipal or
criminal crime. We envision the curb right holder doing such things as setting up enclosed video
cameras to watch for repeated "trespass." The video footage of local jitneys trespassing on its
curb space would be plain evidence and make identification rather easy. It is now common for
enforcement of property rights and contract to rely on undercover operatives and video evidence
(Turner 1995). Suit could be brought against riders of trespassing jitneys. Company A could
then put up signs at its bus-stops: "Mounting an unauthorized vehicle in this zone is a trespass and subject to civil suit." The traveller would find this reasonable, since he could simply exit the exclusionary zone to wait legally for a jitney. By creating a sense of curbspace proprietorship and fair competition, both jitney operators and passengers would be likely to respect curb rights.

The jitney commons zones are designated in Figure 4, but it might not be necessary to pre-establish such zones. It might be sufficient to say that jitneys cannot pick up in the A zones, and to let their own locations emerge spontaneously. Local officials may wish to manage the emergence of such pick-up spots, to avoid sidewalk congestion or to provide focal points, but if certain places seem to be emerging as workable jitney spots, the local officials ought to smile on the development. They may wish to alter parking or standing rules at such spots, and perhaps even provide turnouts, benches, and shelters. Imagine a McDonald's restaurant emerging as a jitneying point, where travellers can buy breakfast and organize shared rides. If the McDonald's began to charge for day-time parking or to cooperate in announcing or arranging jitney departures, this ought to be regarded as legitimate private enterprise. Local officials would not act as regulators, but as creators and enforcers of property rights.

We have discussed the spatial demarcation of curb rights, but the notion of exclusionary zones may also be defined according to time intervals. Consider now the two peak-period columns, at 8:00 and 8:15. These illustrates the idea that curb zones may be exclusive for Company A during fifteen minute intervals, but then they become the "property" of Company B. This system may make enforcement more difficult, but time-elapsed video evidence still could show curb rights violations. This principle of exclusionary intervals speaks to the central failing of the British experience of bus deregulation, which permits providers to schedule their service just
before the competition's. This leads to schedule jockeying and route swamping, which disrupt service and diminish competitiveness in the industry.

We have argued that in a thin market, giving free play to the jitney cascade could possibly dissipate all service. Off-peak periods often correspond to thin markets. The off-peak times in Figure 4 shows an arrangement that precludes jitneys but accommodates competition on the route by granting exclusionary zones first to Company A and then to Company B. Instead of temporal alternation, local authorities might deem it wiser to have spatial alternation of A and B in the same column. Either way, this competitive arrangement would avoid monopoly, unless the two providers were to collude, and would give each incentives to invest in building its ridership. It forgoes, however, the creative and highly efficient input of the freelancers.

Now, look at Figure 4 and in place of the As and Bs envision dollar signs -- $$$. The authorities could set out exclusive curb zones and simply put them up for sale, say, in five-year leases. The leases could be sold at a set price or auctioned off. The curbspace holder, say Company A, could then run its buses with stops in its leased zones. Under this scheme the provider with the highest valuation for the curbspace gets the resource, as the individuals with knowledge of local opportunities and local advantages negotiate to make the most of the resource. Further possibilities emerge if the curb rights may be sublet or resold. Company A may then wish to authorize other carriers to pick up in its curbspace, and require a monthly rental payment. Or it could resell the lease altogether to a provider with a higher valuation of the curbspace. We can well imagine the emergence of professional curb-zone entrepreneurs who buy up available curb zones, sublet pick-up rights to carriers, and specialize in managing the bus-stops.
and monitoring and policing the curb rights. Firms operating curb-zones may also profit by
utilizing the advertising opportunities on transit benches and shelters (Weisman 1984).

The scenario of having a market in curb rights might raise the specter of holding
companies or "robber barons" buying up all the curb zones and exercising monopoly power over
the route. The local authorities could prevent this, however, in a variety of ways. In a thick
market the most powerful method is for them to reserve certain curb zones as jitney commons,
giving the jitney cascade play to compete with scheduled service. In a thin market with a
monopoly problem, authorities could see to it that competing service providers each have their
own curb rights.

IX. CONCLUSION

We have developed a theory of scheduled bus service which recognizes the importance of
generating passenger congregations. Furthermore, the investment in cultivating passenger
congregations must be appropriable, or protected from interloping. We have reviewed the
literature of numerous transit markets, showing that they tend to be gored by one of the two
horns of a transit dilemma. Some markets enable scheduled operators to appropriate the value of
passenger congregations, but this is achieved by granting exclusive rights, not only to the waiting
passengers, but to the entire route. Thus the first horn is transit monopoly. The other horn is the
pure commons, giving rise to freewheeling competition like that found in some LDC cities. In this
case there is no cultivation of passenger congregations for scheduled service, because interloping
will expropriate the investment. In consequence, thin markets are especially poorly served.
<table>
<thead>
<tr>
<th>Exclusive Route for the Scheduled Service Provider</th>
<th>Refined System of Curb Rights for Scheduled Service</th>
<th>No Exclusive Rights for Scheduled Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchor Service Preserved</td>
<td>Anchor Services Preserved. Potential for Competing Scheduled Services; Commons Provides Jitneying Opportunities.</td>
<td>Interlopers Dissolve any Anchor</td>
</tr>
<tr>
<td>THIN MARKET</td>
<td></td>
<td>Possible Problems: market destroyed</td>
</tr>
<tr>
<td>Possible Problems: inadequate competition and inert monopoly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>THICK MARKET (potentially)</td>
<td></td>
<td>Possible Problems: low quality, irregularity, unreliability, untrustworthiness</td>
</tr>
<tr>
<td>Possible Problems: inadequate competition and inert monopoly</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 5

A Typology of Unsubsidized Fixed-Route Urban Transit Incorporating the Property-Rights Solution
A nuanced approach based on property rights can navigate between the horns of this
dilemma. We can have the best of both cases, schedule service and freewheeling jitneys. Figure 5
revises Figure 3, by inserting our solution between exclusive monopoly and the pure commons
(and by eliminating the case of subsidized service).

[Figure 5 here.]

The type of governance suggested here is based on the idea of creating exclusive and
transferable curb rights, leased by auction. This way scheduled service would have exclusive
protection where its passengers congregate, while jitneys pick-up passengers at curb zones
designated as commons. Within the property rights framework based on curb rights,
entrepreneurs would be free, able, and driven to introduce ever better service, revise schedules
and route structures, establish connections among transit pieces and passenger interchange,
introduce new vehicles, and utilize new pricing strategies. Within a suitable framework of
property rights, the invisible hand would do in transit what it does so well in other parts of the
economy.
ENDNOTES

1. This paragraph is drawn from news reports of jitney riders. See Bonaspace 1993; Fried 1994; Garvin 1992; Machalba 1991; and Onishi 1994.

2. Boyle (1993, 1) states: "Transit and planning personnel in Chicago, Los Angeles, Atlanta, and Houston indicate that jitneys were not operating in any extensive or arranged fashion in their cities."


4. Indeed, many trips using more than one carrier are more expensive than the same length trip on one carrier. Hibbs (1991, 5) argues, however, that only a small number of trips involve a change of carrier. Yet, if firms really are unable to negotiate inter-operable ticket agreements, and this reduces ridership, there is an incentive for them to expand their network to minimize the inconvenience to riders.

5. It might be thought that once the scheduled service pulls out, the jitneying function would shift outward, because jitneys pick up passengers that had been taking scheduled service. This may not be so, because passengers are now more randomly dispersed over the course of the hour, due to the loss of schedule focus.
REFERENCES


Dodgson, J. S. "The Bus Industry and the Cases of Australia, The USA, and the UK." In


Hensher, David A. "Productivity in Privately Owned and Operated Bus Firms in Australia." In J.


White, Peter, R. "Three Years' Experience of Bus Service Deregulation in Britain." In *Privatization and Deregulation in Passenger Transportation*, eds Antti Talvite, David Hensher, and Michael Beesley. Helsinki: The University of Tampere, 1992, 43-60.
