CAN PARKING TAXES HELP?

Damian J. Kulash, Jack Faucett Associates

Parking taxes have been advocated by many as a way to reduce automobile use and some of the unwanted side effects that accompany it. This paper looks at the role of parking in trip making and at motorist responses to parking price changes. It concludes that parking taxes would have little impact on problems stemming from automobile use because paid parking is associated with a small minority of all automobile trips, and motorists using such parking are not highly sensitive to its price.

•PARKING TAXES and surcharges have been advocated recently for a variety of purposes: They would help reduce peak-hour traffic congestion; restore users and extra revenues to public transportation systems; replace or defer additional highway construction; raise revenues for municipalities; and reduce problems of noise, air pollution, and fuel conservation, which are aggravated by heavy use of private automobiles. The degree to which a parking tax or surcharge can aid in achieving these goals appears to be exaggerated in much of the public rhetoric on this issue. This paper discusses experience to date with parking price policies and attempts to provide some empirical guidance on what their impacts are.

Although parking industry receipts totaled $500 million in 1967, this is a miniscule part of the economy derived from the automobile—only about one-fourteenth the size of the automobile service and repair industry and only one-fiftieth that of the automobile manufacturing industry. This is the case because few automobile trips made use paid parking.

In larger metropolitan areas, fewer than 1 trip out of 20 is made to or from the CBD where most commercial parking is concentrated (1). Consequently, most trips do not require that motorists pay for parking. Even trips to work generally escape parking fees. Only 7.3 percent of persons driving to work have to pay for parking (2).

Because not all paid parking is under municipal control, it is impractical to use parking facilities that currently charge fees as a basis for limiting automobile use. Table 1 (3) gives the percentages of paid parking under commercial control in some of the largest metropolitan areas. The commercial segment is from half to over 90 percent of all paid parking, and it may be more difficult to control than parking facilities owned and managed by local governments themselves.

THROUGH TRIPS

Trips passing through an area without parking would not be subjected to any form of parking control, even one affecting parking spaces that are currently free. This gap in parking controls tends to be a worrisome point when such policies are discussed, and it will be helpful to get some idea of exactly how large this loophole is.

The number of through trips is clearly tied to the size of the area in which parking controls are being applied. A metropolitan area as a whole may have few through trips, whereas travel in the downtown area may consist mainly of through trips. Through trips have long been thought to comprise about 50 to 75 percent of all vehicular traffic. Similar estimates have been cited in many places, but most of them date back to a series of about 100 parking studies sponsored by the Bureau of Public Roads (BPR) from 1945 to 1955 (4, 5, 6). These studies, however, were based on the restrictively defined CBDs, which were usually less than one-third of a square mile.

Table 2 gives several measurements of through trips based on larger CBDs than those used for the BPR studies. As expected, the through-trip percentages for these

Table 1. Percentage of commercial parking for selected U.S. cities.

City	Parking Spaces		1970 Population[a]
	Total	Commercial (percent)	
New York	395,973	80	7,895,000
Detroit	35,002	50	1,511,000
San Francisco	55,950	54	716,000
Washington, D.C.	51,995	82	757,000
Boston	42,536	59	641,000
Pittsburgh	36,439	50	520,000
Newark	8,245	61	295,000
Dallas	24,354	88	844,000
Seattle	24,839	56	531,000
Milwaukee	24,710	59	717,000
Atlanta	33,280	94	497,000

[a]Corrected by reference to the original tabulations.

Table 2. Percentage of through trips for large metropolitan areas.

City	Area of Measurement Zone (miles^2)	Through Trips as Percentage of Vehicular Traffic
London	6.0	20
New York City	7.0	50
Washington, D.C.	4.0	14
Boston	2.5	47
Newark	23.5	16

larger areas are smaller than the BPR-based estimates. Most proposed traffic restraint measures would apply to areas much larger than those given in Table 2 (7, 8, 9, 10, 11). Consequently, through traffic may not be a major problem. Assuming a traffic restraint zone about four times the area of the CBD, it would appear that through traffic makes up about 15 to 30 percent of all vehicular traffic in the zone.

MOTORIST RESPONSE TO PARKING PRICE CHANGES

Price elasticity is a convenient measure for describing how responsive parkers are to price changes. It is defined as the percentage change in the amount of parking that results from a 1 percent increase in price. Thus, a price elasticity of -0.1 would imply that one-tenth of 1 percent of patronage would be lost as the result of a 1 percent price increase.

This paper concentrates on three types of experience from which parking price elasticities can be measured: (a) before and after impacts of parking price changes, (b) cross-sectional differences related to parking price variations, and (c) surveys of hypothetical motorist reactions to parking price changes.

BEFORE AND AFTER EVIDENCE

New York City, Pittsburgh, and Baltimore are among the U.S. cities that have parking taxes. These taxes have generally been applied and raised gradually so that sharp before and after differences in travel patterns are not apparent. Probably the only place in the United States where a dramatic, areawide parking price increase has occurred is San Francisco. In October 1970, the city and county of San Francisco enacted a 25 percent parking tax that remained in force until it was reduced to 10 percent on July 1, 1972. Data from a number of city-owned garages indicate that a price elasticity in the range -0.38 to -0.20 (12) was descriptive of parker response there. This range describes both price increases (when the tax was enacted) and price reductions (when the tax was later reduced).

The elasticity suggests that parking volumes are fairly insensitive to price changes. For example, a price elasticity of -0.30, roughly in the middle of the range observed, would imply that a doubling of parking charges would only reduce patronage by 30 percent. However, there is also evidence of a considerable shift to cheaper, shorter term parking, which followed the imposition of the tax. As a result, garage revenues fell by far more than would be predicted by using the above price elasticity estimate.

An extreme example of the shift in duration of parking after there were price changes can be found in Washington, D.C. When meters were introduced in a part of Washington, the number of parkers rose by over 250 percent (5). Hence, the assistance of meters in policing parking time limits overshadowed the price increase that accompanied their introduction. The San Francisco findings may reflect a similar phenomenon at work: If commuters were filling facilities early in the day before the tax became effective, the imposition of the tax may have forced more space into use for short-term shopper parking.

CROSS-SECTIONAL EVIDENCE

At the Civic Center in Los Angeles, county employees are given free parking, but federal employees pay about $15 a month to park. About 275 employees of the two governments were surveyed to see how their parking behavior varied (13). Forty percent of the federal employees and 72 percent of the county employees drove cars. From these figures, one can estimate that the parking price elasticity is -0.29, which closely agrees with the San Francisco findings.

Results of an extensive home interview survey were combined with parking price data to produce a comprehensive look at parking patterns in Washington, D.C. (14). A modal-split model was fitted to these data and was then used to predict the response to various levels of parking charges. These results lead to a parking price elasticity estimate of -0.41.

PARKING SURVEYS

There have been several surveys in Great Britian in which motorists were asked about how their parking behavior would differ with various price or availability conditions. Answers to such hypothetical questions are probably biased by the way the respondent thinks his responses will be used; however, they provide a type of data that would be difficult to measure directly.

Table 3 (15, 16) gives the parking price elasticities found in two of these surveys, which suggests that elasticities become greater (in absolute value) as the magnitude of the changes increases. For a survey in Liverpool (15, 0 to 1s. range), parking price elasticities by trip purpose were for work, -0.332; for shopping, -0.391; for other things, -0.272; and for all purposes, -0.273. Work trips were not as elastic as shopping trips—a result that agrees with earlier findings.

Table 3. Parking price elasticities based on survey results.

City	Parking Price Range	Elasticity
Liverpool (15)	0 to 3d./hour	-0.074
	3d. to 6d./hour	-0.259
	6d. to 1s./hour	-0.357
	0 to 1s./hour	-0.273
Oxford (16)	0 to 30d./day	-0.30 to -0.50
	30 to 50d./day	-1.22 to -1.54
	0 to 50d./day	-0.56 to -0.74

CONCLUSIONS

Forces promoting restrictions on automobile use are growing in their diversity and strength in the United States. Environmentalists are concerned with the volume of pollutants released in the air by automobiles, and the recent surge of interest in energy conservation has added further momentum to measures that curb travel. There is also the continuing dissatisfaction with highways—the problems of dislocated families, the ugliness that has accompanied much new highway construction, and the reluctance to lose more land from the tax roles. These forces together have led to a climate in which traffic restraint measures are being given more serious attention.

Parking taxes, in particular, have been widely advocated in response to this new climate. They are easy to implement and administer. The mechanism for collecting them is largely in place. Because of the relative ease of implementing and dismantling parking taxes, government agencies trying to control automobile use for whatever

reasons will likely consider them. However, it is apparent from public discussions and editorial positions advocating parking taxes that such taxes are seen as a panacea for urban problems and those of congestion, pollution, and energy consumption.

Most of this popular discussion overlooks two facts apparent from the experience reported here: (a) few urban automobile trips make use of paid parking, percentage-wise; and (b) those that do are not highly sensitive to the price of parking.

Suppose that an area levied a 100 percent parking tax on all paid parking and that parking facilities were prohibited from absorbing any of this tax themselves. The immediate response to such a step would be for prices to double and parking patronage to fall by 18.2 percent. [This result follows from the definition of elasticity: $\eta = (\Delta Q\, \overline{P}/\overline{Q}\Delta P)$ where η is the price elasticity (-0.3), ΔQ is the change in patronage (-18.2 percent), ΔP is the change in price (100 percent), $\overline{Q}$ is the average before and after patronage (90.9 percent), and $\overline{P}$ is the average before and after price (150 percent).] But all traffic does not use paid parking, and the drop in street traffic would be much lower than the loss of parking patronage. Inasmuch as under 10 percent of all automobile round trips use paid parking, the areawide reduction in traffic would be under 2 percent; this offers little relief to air pollution and fuel conservation problems.

The congestion effect would be somewhat greater, because most paid parking is concentrated in the CBD where many of the worst traffic snarls occur. In this paper, however, through traffic is high—50 to 75 percent—in downtown areas. In addition, 29.3 percent of downtown automobile trips are able to use nonmetered street parking or private lots and garages (17). Allowing for through traffic and exempt parking, the traffic reduction in the CBD would fall between 3.6 and 8.7 percent. Although such a reduction may be noticeable, it is not likely to be significant. Furthermore, it must be remembered that the force needed to motivate this reduction is an unprecedented 100 percent parking tax, and that the smaller taxes typically advocated would have correspondingly less effect.

The lack of parking tax effectiveness in reducing traffic volumes points to the need for a broader base of control. Fewer than 1 automobile trip in 10 uses paid parking. Clearly, this makes a poor level for trying to shift automobile usage generally. On the other hand, taxing all parking (not just paid parking) poses severe practical problems. How do you charge in shopping center parking lots or how can you bill for suburban street parking? Certainly there are some measures, such as more widespread use of parking meters, which can increase the scope of economic controls. But trying to extend that scope too far can become extremely clumsy and expensive. It is doubtful if there is any practical way of instituting parking charges that apply to more than half or even more than a quarter of all trips in a metropolitan area.

Parking taxes have been overrated by many as solutions to some problems of the automobile age. They may well have a role to play, along with other traffic restraint policies, in the reduction of congestion, but they promise very little help in alleviating the other unpleasant consequences of widespread automobile use.

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