

PARKING TAXES AS ROADWAY PRICES: A CASE STUDY OF THE SAN FRANCISCO EXPERIENCE

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This paper analyzes the effects of a 25 percent parking tax in San Francisco from October 1, 1970, to June 30, 1972. It develops parking price elasticity estimates for various types of parking facilities. Commuters were more sensitive to price changes than were shoppers, but the overall effect on the number of parking stall occupancies was slight. The effect on parking lot profitability was severe. The parking tax also had little influence on congestion, air pollution, and energy consumption. Downtown businesses other than parking lots were not harmed by the tax.

• ON OCTOBER 1, 1970, a 25 percent tax on parking went into effect in San Francisco. It was the largest citywide jump in parking prices ever experienced in the United States. All parking with the exception of residential, hotel, and metered parking was subject to the tax. The San Francisco parking tax was instituted not because of concern about traffic congestion, air pollution, or energy consumption but because the city and county of San Francisco needed revenue. A parking tax provided a convenient way of raising it. It was introduced in a package with a utility tax and a gross receipts tax. These were expected to raise \$15 million for the city. One-third was expected to come from the parking tax.

The parking tax generated the amount anticipated—\$5.5 million per year. An increase of 27 cents on the 1970-71 tax rate of \$12.82 would have been required to raise the same funds. The tax was for all parking operations throughout the city and county, except residential and metered parking. Metered parking was exempt because of the difficulties in refitting meters for odd rates. Residential parking facilities that were rented to tenants were also exempt. Parking station operators were responsible for collecting the tax and paying it to the government. Exemptions were later added for hotel guests and long-term storage by military personnel.

Support for the tax came from persons who wanted to avoid raising the personal property tax and from environmental groups who wanted to reduce the role of the automobile downtown. They argued that the tax would cause commuters to shift from automobiles to public transportation and would have little effect on shoppers; thus it would reduce traffic-related problems without damaging the economic life of downtown San Francisco.

Opposition to the tax came from parking operators who argued that the tax was excessive and put unfair hardships on the industry; from downtown merchants and businessmen who were concerned that retail activity would be reduced in the central business district (CBD); from citizens who were without ways other than the car for getting to work; and from doctors, lawyers, and other professional people whose offices were in the taxed area. In spite of these objections, the San Francisco Board of Supervisors voted to institute the tax, though some supervisors stated that they would reconsider their position as the effects of the tax became clear. On August 28, 1970, Mayor Joseph L. Alioto signed the tax package into law, noting:

Both the Supervisors and the Mayor are well aware of specific defects pointed out by critics of these new taxes. However, the significant thing is that these same critics offer no substitute whatever, despite the fact that San Francisco has the most narrow tax base of any big city in the entire country. In my conferences with the business community and other critics of the

new tax package, it finally became clear that they really advocated saddling all increased governmental costs onto the already overburdened property taxpayer. That approach we must reject, simply as a matter of fairness and equity. The property taxpayer cannot continue to be the only source for increased revenue.

On October 1, 1970, the parking tax went into effect. This paper will describe its effects on the parking industry, on traffic generally, and on the downtown area. Because it is a study after the fact, it is limited by the availability of data. Furthermore, these data permit a variety of interpretations because of other changes in transportation. Particularly significant was that construction on the Bay Area Rapid Transit (BART) System hindered traffic flow on Market Street and in some areas around it. This construction interfered with automobile, bus, and trolley travel. Other transport changes that may have had a bearing on the experience are

1. The San Francisco Municipal Railway (MUNI) fare increases from 15 to 20 cents on June 30, 1969, and from 20 to 25 cents on August 31, 1970;
2. The passenger ferry service between San Francisco and Sausalito that began on August 15, 1970; and
3. The increased transit service and patronage when Golden Gate Transit replaced Greyhound as the bus line from the Marin County corridor on January 3, 1972.

These developments, except the MUNI fare increase, which occurred 1 month before the parking tax took effect, increased the attractiveness of public transportation and may account for changes in travel behavior that appear to have resulted from the parking tax.

The 25 percent tax was eventually lowered to 10 percent effective July 1, 1972, because of opposition from affected individuals and business interests. The 25 percent tax had been in force for 21 months; the 10 percent tax is in force now.

EFFECT ON PARKING

Data given in Table 1 on parking in downtown San Francisco in 1966 indicate that equal quantities of lot and garage parking were available (1). Off-street parking provided nearly 50,000 spaces in San Francisco and on-street parking just over 11,000, most of which was for short-term use. Not all of the off-street parking was open to the general public; 20 percent of it, mostly in lots, was reserved for private purposes such as employee parking.

Garages tend to be located in central areas and command higher rates than lots. The city and county of San Francisco are heavily involved in this high-rent segment of the parking market, owning about half of the garage parking in downtown. There is considerable variation in parking rates and use patterns. The highest rates are charged in the financial district and on the northwest side of the retail district. In 1965 these rates were about \$2.00 per day compared to 25 cents per day in lots near the Central Skyway (1). Parking properties also vary greatly in the types of trips they serve. The parking study reported that 9 percent of all vehicle-trips to the area were shopping trips, although it has been claimed that as many as 90 percent of the parkers in some garages are shoppers. It is misleading to speak of a single parking industry in San Francisco. Operations differ markedly in the rates they charge and the types of traffic they attract. Reports concerning the effects of the parking tax on parking operations therefore were varied.

Municipal Garages

Although construction financing for municipal garages often comes from private sources, the properties are operated under agreements with the city and county governments. Because these operations are public, they have the most complete data for past patronage and revenues. And, because rates at municipal garages are fixed by the city and county governments, they reflect only those price changes from the tax. Operators not bound by these rate controls frequently lowered their base rates and absorbed part of the tax themselves in order to lower patronage losses.

Table 1. Parking in downtown San Francisco, 1966.

Type	Number of Automobiles
Off-street parking	
Public lots	18,612
Public garages	21,558
Private lots	7,774
Private garages	1,670
On-street parking	
Metered	4,951
Unmetered	6,221
Total	60,786

Table 2. Parking price elasticities for municipal properties.

Property	Automobiles Parked				Elasticity ^a	
	1969-70	1970-71	1970-71 (adjusted)	1971-72	1969-70 to 1970-71	1969-70 to 1971-72
Civic Center Auto Park	121,599	123,132	123,642	103,842	-0.05	-0.96
Civic Center Plaza Garage	423,243	438,662	443,797	428,791	0.09	-0.19
Ellis-O'Farrell Garage	446,826	450,905	452,263	455,108	-0.07	-0.17
Fifth and Mission Garage	1,195,467	1,266,244	1,289,813	1,214,386	0.02	-0.18
Golden Gateway Garage	366,605	340,260	331,487	366,934	-0.58	-0.24
Japanese Cultural Center Garage	135,247	122,570	118,349	155,106	-0.72	0.36
Marshall Square Parking Plaza	54,298	49,998	48,566	44,697	-0.62	-1.12
Mission-Bartlett Parking Plaza	217,200	190,309	181,354	185,943	-0.93	-0.94
Portsmouth Square Garage	598,187	603,896	605,530	623,969	-0.07	-0.06
St. Mary's Square Garage	419,132	361,311	352,056	333,497	-0.91	-1.27
Seventh and Harrison Parking Plaza	149,484	101,143	85,045	101,753	-2.65	-1.97
Sutter-Stockton Garage	743,538	779,123	790,972	792,520	0.15	0.03
Union Square Garage	890,195	855,582	844,055	873,038	-0.36	-0.34
Total	5,761,021	5,683,135	5,666,929	5,679,584	-0.20	-0.31

^aSecular trend extracted.**Table 3. Parking price elasticities by type of garage.**

Fiscal Year	Basis of Estimate	Parking Price Elasticity	
		Commuter Garages	Shopper Garages
1970-71	Automobiles parked	-0.27	-0.08
1971-72	Automobiles parked	-0.26	-0.25
1970-71	Gross income	-1.50	-1.23
1971-72	Gross income	-1.29	-1.22

Table 4. Parking price elasticities during price reductions.

Basis of Estimate	Parking Price Elasticity ^a		
	Commuter Garages	Shopper Garages	All Garages
Automobiles parked	-0.91	-0.23	-0.38
Gross income	-2.19	-1.45	-1.63

^aFiscal year 1972-73 compared to fiscal year 1971-72.

During the 6-year period before the parking tax, the gross income of city garages rose by 33 percent and the number of autos parked rose by 18 percent. These correspond to annual growth rates of 4.9 percent for gross incomes and 2.8 percent for the number of autos parked.

Parking price elasticities have been computed for each of the municipal garages by using secular growth factors. The results, given in Table 2 (12, App.) indicate a wide variation among properties. Because of this variation, the discussion will center on averages for various parts of the parking industry to avoid fluctuation at the individual property level. Parking price elasticities based on the number of automobiles parked for total municipal properties are -0.20 for fiscal year 1970 to 1971 and -0.31 for fiscal year 1971 to 1972. These values are close to those observed during large-scale parking price changes in other areas (2). They support the idea that parking demand is inelastic and that only drastic parking price increases will create a sizable reduction in parking traffic. Revenues and profits, however, were found to be very sensitive to price changes.

If parking demand really is inelastic, it certainly would be profitable for parking operators to make substantial rate increases of their own. But parking space rental is a unique service—it can be purchased in quantities from several minutes to an entire day or more; and the price per unit varies with the quantity purchased. Parking rate increases can cause 2 types of reaction: discontinuing use of the service or shifting to a cheaper facility or a shorter term of occupancy.

Net revenues (revenues minus the parking tax) are good for determining occupancy patterns for municipal garages because the relationship between net revenues and duration of occupancy remained fixed for these garages during the study period. The average net revenues per parked car dropped during the period of the 25 percent tax and then rose again when the tax was lowered to 10 percent at the start of fiscal year 1972-73. The drop in net revenues could be because of a decrease in long-term parking relative to short-term parking; for example, a greater reduction in commuter parking than in shopping and other short-term parking.

Prices were assumed to rise by 25 percent, the amount of the tax. But, because of shifts in the types of parking, the average price for parking fell slightly, even though rates rose. Thus a very different set of elasticity estimates results from computations based on revenues or gross incomes. Revenue-based parking price elasticities are η -1.44 for fiscal year 1970 to 1971 and η -1.63 for fiscal year 1971 to 1972. These estimates, then, indicate that the parking market is in an elastic range, a finding in agreement with observed behavior.

When 2 different approaches to estimating parking price elasticities yield different results, a single elasticity measure is too simple an index to describe the changes that result from parking price changes. Discrepancies might be reduced by analyzing separately the behavior of commuters, shoppers, and other groups of parkers. But this study is severely limited in this area because it was done after the fact.

One step that was possible was separating garages whose patrons are commuters from garages whose patrons are shoppers. This was done by using the observations of parking personnel and an index of stall turnover. Parking price elasticities were computed on this basis; the results are given in Table 3. Shopper facilities show lower price elasticities in all cases than do commuter garages. However, there is still a large difference between elasticities based on the number of automobiles parked and those based on the gross income of parking facilities.

When the parking tax in San Francisco was reduced from 25 to 10 percent in July 1972, it was possible to examine changes resulting from prices being lowered. Elasticity estimates were computed for the price drop, and the results, given in Table 4, follow the same pattern as that of the previous findings. And, the gap between commuter and shopper elasticities is even wider than that observed during the price increase. These facts indicate that commuters were more likely to discontinue parking in municipal properties than were shoppers. A breakdown of parking by trip purpose and by duration of stall occupancy should be made if similar parking price changes are enacted elsewhere to gain a deeper understanding of traveler behavior.

Other Parking Operations

Municipal parking properties, which comprise mostly garages near key retail and employment concentrations represent a choice segment of the parking industry. Data on the rest of the parking industry in San Francisco are limited. In response to a request by the San Francisco Board of Supervisors, several parking operators furnished statements of revenues from parking operations before and after the tax. The properties accounted for about 20 percent of nonmunicipal garage operations in San Francisco and had revenue-based elasticities of -1.66 to -0.78 with a median of -0.97. These estimates are less elastic than those for municipal garages. One reason could be rate cutting, which would cause estimates of elasticities to be lower (in absolute value) than true values. Lots located several blocks away from areas of high activity showed the most elastic response. Analysis of all commercial operations is complicated by rate cutting, frequent lot openings and closings, and data limitations.

The simple elasticity computations made here assume that prices rose by the amount of the tax. Some operators, in an effort to keep revenues as large as possible after the tax, lowered their rates and absorbed part of the tax themselves. A few of these, though, had raised rates before the tax to recoup some of their future losses. In these cases, rate cutting is deceptive because rates had been unusually high. Fringe lots and lots located within walking range, but some distance from the CBD, appear to have cut rates the most; central garages, the least.

Many parking lots, especially low-rent ones, require very little capital investment over the costs of acquiring the land; and often the land is leased. Some operations exploit conditions such as short-term land vacancy before a planned building is constructed or a temporary change in zoning restrictions. These factors and changing demand patterns make low-rent parking a business where lot openings and closings are common. It is difficult, therefore, to make comparisons at different times.

The flexibility in rates and the opening and closing of lots create a need for a large volume of operating data on rates, occupancy, and revenues. Some data were available from parking operators in material sent to the Board of Supervisors. Obtaining additional information is difficult. For the most part, parking operators claim that detailed information for a period 2 or 3 years ago does not now exist.

Even if rate cutting is ignored, lots showed more elasticity than garages. If better rate-cutting information were available and estimates were revised accordingly, the differences would be even larger. Ten self-park lots operated by Savoy Auto Parks and Garages, Inc., showed a revenue-based elasticity of -1.72. Eight lots operated by S. E. Onarato Garages showed -2.23. Statistics on the number of automobiles parked in 30 lots and garages operated by Metropolitan Parking Corporations showed elasticity of -0.82—much more elastic than patronage-based estimates for garages. The greater price elasticity in lot operations derives from the location of facilities, not the types of facilities.

FINANCIAL EFFECT

Parking space rental is only part of the parking industry. Other services such as car washes and minor repair and maintenance work are offered. The downward trend in parking volumes and a shift to shorter parking created a decline in the demand for these extra services. Numerous parking operations reported reductions in the number of persons they employed following the tax. The union representing parking lot employees claimed that their membership fell by 22 percent because of the tax.

The revenue data for the years before and after the tax indicate that the effect on the industry was severe. A typical parking price elasticity based on these data is about -1.6, which indicates a 13 percent per year loss of gross revenue. Of this, 5 percent represents a loss of the usual growth in annual gross revenues and 8 percent represents a decline in gross revenues over the previous year. Thus a typical operator would make only 92 percent of what was made before the tax was instituted. After the tax was deducted, only 69 percent of the former net income would be left. This is 36 percent lower than what would have been expected without a parking tax.

EFFECT ON TRAFFIC

Transportation agency officials and businessmen in the San Francisco area agree that the parking tax had no noticeable effect on traffic. This is hardly surprising—automobile-based elasticity estimates indicate that a 25 percent parking price increase would reduce by 10 percent the number of vehicles parked at off-street, priced facilities. This represents 2 percent of the vehicular traffic in San Francisco. But, this reduction would be difficult to observe because vehicle-miles of travel on urban streets across the country increased by 74 percent from 1960 to 1970 (3, p. 20). At this rate of growth, the price elasticities demonstrated in San Francisco indicate that a parking tax of 100 percent would offset just 1 year's expansion in vehicle-miles of travel. But, because commuting parkers showed greater elasticity than shoppers, traffic reductions during peak hours would be noticeably larger. Furthermore, most paid parking is in the CBD, so that most of the traffic reduction from the tax would be in the congested downtown areas.

Statistics on annual traffic across the Golden Gate Bridge, which carries 1 out of every 6 vehicles entering San Francisco (4, Table 3.1), are shown in Figure 1 (5). They indicate a rise in bridge traffic in 1968 followed by a decline in 1969. The following 3 years show a similar decline in growth. Changes in the parking tax did not appear to create any noticeable changes in annual bridge traffic. The slower growth in traffic during the tax began almost 2 years before the tax. The timing of the slow-down and the lack of change when the tax was imposed and later reduced suggest that the parking tax was not the cause of the slump in traffic growth. Construction on the Bay Area Rapid Transit (BART) system caused some traffic disturbances during this period, and substantial improvements were made in transit services to the Golden Gate Bridge corridor. The decline in growth of annual bridge traffic which began in 1968 may have resulted from these factors rather than the parking tax.

A reduction in peak-hour traffic was noted on the Golden Gate Bridge after the first month of the tax, according to the general manager's report (6, p. 4):

October traffic figures showed an increase of only 1.6 percent over the same period the previous year. We also note that the average number of vehicles during the 3-hour morning commute period was 16,194 cars. Had the same increase occurred that had prevailed from 1958-1968, this average number would have been expected to be 17,337.

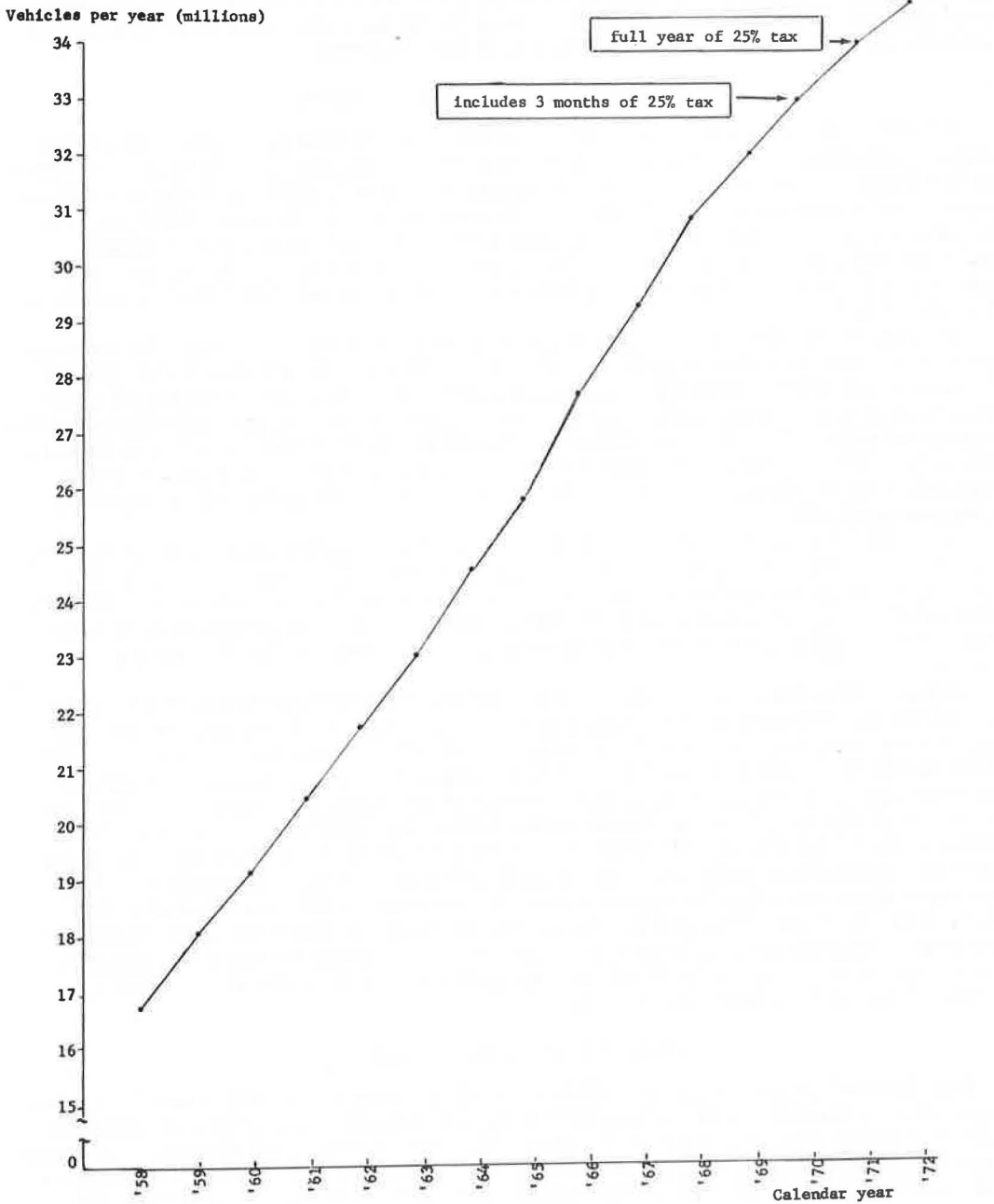
It is difficult to be sure what has accounted for this reduction in the rate of growth for all traffic for the month of October and also for the morning commute hours, but we believe the main reasons to be:

1. The increase in parking rates in San Francisco.
2. The general slow-down in business activities.
3. The increased numbers now riding the Sausalito and Tiburon Ferries, particularly during the commute hours.

Peak-period traffic across the Golden Gate Bridge has remained roughly constant since the parking tax went into effect. If this were due solely to the parking tax, it would indicate that the effect of the tax on traffic volumes during commute hours was much greater than at other times of day. However, there were 2 significant changes in transit service during this period that throw doubt on the importance of the parking tax in halting peak-period bridge traffic growth. The first drop in peak traffic corresponds to the institution of the tax and to the establishment of the Sausalito and Tiburon ferry service. The second drop corresponds to a reduction in the parking tax as well as the takeover of bridge bus operations by Golden Gate Bus Transit. The bus takeover added 1,500 passengers per day during commute hours, accounting for much of the drop in peak-period vehicles per day that occurred between 1971 and 1972 (7, p. 4).

It is impossible to isolate the effect of the parking tax from the effect of transit service improvements, but their combined effects have a distinct pattern: Overall bridge traffic continued to grow and peak-period traffic growth stopped. Because transit services in the Golden Gate Bridge corridor are commuter operations, their effect on peak-period traffic would be greater than on other traffic. Whether the parking tax exerted an equally strong influence on peak-hour travel remains unanswered.

Figure 1. Trend in Golden Gate Bridge traffic, 1958 to 1972.



The impression that the tax had no noticeable effect on traffic volumes appears to be accurate. Overall daily vehicular traffic on the Golden Gate Bridge continued to grow, bringing with it increases in fuel consumption and pollution. Peak-period congestion held constant, but mostly because new transit services absorbed the growth in peak-hour automobile use. The 25 percent parking tax appears to have slowed, but not reversed, the growth trend in automobile use in San Francisco.

EFFECT ON DOWNTOWN BUSINESS

A number of downtown retail establishments and professional offices in San Francisco complained that the parking tax was harmful to business (8). However, in letters to the Board of Supervisors asking that the tax be reduced, officers of downtown stores argued their point indirectly by referring to lower patronage in neighboring garages, by pointing to differences in suburban versus city sales statistics, and by simply claiming that the tax was harmful. Store managers were reluctant to quote actual dollar sales volumes before and after the tax. In some cases they admitted that these had increased.

Because of inflation, the number of sales transactions may be a better indicator of retail activity than dollar volume. Only 1 store reported statistics on the number of transactions and the average amount of each sale. That store experienced a 9.5 percent drop in transactions and an 11.6 percent increase in the average sale following the imposition of the tax (between January 1 to October 30, 1970 and January 1 to October 30, 1971). The net growth of about 2 percent that it experienced is probably more than offset by inflation, but it is doubtful that this experience is typical of downtown business generally.

Sales statistics show that total retail sales, excluding automotive expenditures, for only the city, declined in 1969, the year before the tax. They stabilized at the 1969 level and are at that level now. The San Francisco metropolitan area as a whole also showed a drop in retail sales in 1969, but returned to a normal growth pattern after that. City retail sales showed no improvement in 1972 even though the tax was reduced in June 1972.

Department store sales are a good indicator for determining whether the parking tax influenced downtown sales. Unlike food and drug stores, department stores are apt to draw customers who pay for parking. Logically, this segment of overall retail sales would be expected to be sensitive to a parking tax. Again statistics show the city and county of San Francisco had a substantial decrease in growth during the first 9 months of the tax (9), while the remainder of the metropolitan area enjoyed steady growth. By mid-1971, the downward effect seems to have been overcome, and sales were at a record high in the city during the Christmas season. Paradoxically, department store sales fell from their usual pattern when the tax was lowered to 10 percent in July 1972. This pattern suggests that downtown San Francisco has indeed been having trouble keeping pace with department store sales growth in the suburbs, but the timing of the sales declines does not indicate that the parking tax is a major cause for the lack of downtown success.

SUMMARY AND CONCLUSIONS

For almost 2 years beginning in October 1970, the city and county of San Francisco imposed a 25 percent tax on parking within its jurisdiction. This step was taken primarily to raise revenue for San Francisco. This tax was the most stringent, areawide economic control ever placed on automobile usage, and the experience gained may contain lessons for other areas that are considering similar policies to conserve fuel, reduce congestion, or improve air quality.

The San Francisco experience highlights 2 themes that are central to contemporary transportation problems. One is the extreme popularity of automobile transportation—the love affair between the American and the automobile. The other is the growing disillusionment with the side effects of the highway explosion—concern about air pollution, energy conservation, land use, congestion, and urban aesthetics. The 2 themes are partly in conflict because controlling the side effects of automobile use implies controlling the use itself.

If public attachment to the automobile is strong, then it is unlikely that transportation controls such as parking taxes would diminish undesirable side effects, but they would generate substantial revenues. On the other hand, if the attachment to the auto is weak, imposing a parking tax would discourage traffic and reduce the unwanted effects of automobile use. At first glance, then, a parking tax would appear to yield either tax revenues or desirable relief from the unpleasant automobile side effects, and possibly both. The surprising moral of the San Francisco experience is that a narrowly conceived parking tax will do neither. Overall, San Francisco's 25 percent parking tax served to reduce traffic levels by the equivalent of about 3 months of normal growth, and the revenues paid to the government were more than offset by parking operator losses.

Most available information on areawide parking price changes has shown that the level of demand for parking is inelastic—a large price change results in a small reduction in the number of vehicles parked. Examination of vehicle parking counts in San Francisco supports this conclusion. An overall price elasticity of about -0.3 was found to be consistent with observed behavior.

On the other hand, estimating parking price elasticity on the basis of the change in gross revenues suggested that the market was more elastic, where an increase in price was offset by a drop in dollar sales volume. A revenue elasticity of about -1.6 was estimated on the basis of the revenue change.

The incompatibility between these 2 sets of estimates has been explained by a shift in the mix of parking before and after the tax. Statistics on net parking fees and a comparison of garages catering predominantly to shoppers and commuters indicate that after the tax there was a sizable decline in long-term parking relative to short-term parking. Commuters, more than shoppers, shifted to new travel patterns to avoid the increased parking fees. This pattern, together with the fact that parking operations are concentrated near the CBD, suggests that traffic conditions at the most congested times and places may have benefited the most from the imposition of the tax, but there are no traffic data available to support or rebut this.

The tax had little effect on traffic in the city as a whole. At most, the reduction of vehicles in San Francisco was 2 percent. Because the annual growth in urban automobile usage has been nearly 8 percent over the last decade, the contribution of the tax toward solving congestion, air pollution, and fuel conservation problems would be swallowed up by 3 months of normal growth.

If the behavior observed in response to a 25 percent tax can be taken as an indication of what would happen if a 100 percent tax were imposed, then such policies are not effective instruments for alleviating pollution and energy problems. Parking charges would have to be doubled each year just to preserve the status quo.

The effect of the parking tax on the level of downtown retail activity also was minimal. Other than the parking industry, downtown business continued with no noticeable disturbance.

The only sizable effect of the tax was on the parking industry itself, where it dealt a major blow to profits. Gross revenues were estimated to be 36 percent below the level projected under normal growth, and 31 percent under those observed the year before the tax. These losses exceeded the revenues that the city and county governments collected from the tax. Had parking operators in San Francisco been fully compensated from tax receipts for the financial damage due to the tax, the tax would have caused a net loss of revenues for the city and county. This poses a serious question about the fairness of using a parking tax to control unpleasant effects of private automobile use, especially when taxes and surcharges larger than the San Francisco tax are contemplated.

That traffic did not respond to the San Francisco parking tax should not be surprising because each paid off-street parking space in the city is used by about 2 cars a day. The entire commercial parking industry, comprising 50,000 spaces or 100,000 daily occupancies, accounts for 200,000 one-way trips per day. Roughly 1 million vehicle-trips per day are made within San Francisco, so only 1 trip in 5 uses paid off-street parking.

The off-street parking industry is predominantly located within the downtown area. In a metropolitan area the size of San Francisco, less than 5 percent of all auto trips are made to or from the CBD (10, p. 97). Any traffic control directed at the center alone will have only a small effect on areawide traffic, air pollution, and energy use.

If parking controls are to be used to combat problems of traffic congestion, air pollution, and fuel consumption, they need to be applied to a broader base than current paid parking operations. Controls on other forms of parking, notably on-street parking, could help to compensate off-street parking operators by maintaining the existing garage patronage levels while reducing overall automobile usage. However, controls on the high turnover on-street segment of the parking market might lead to a slowdown in downtown business activity.

Perhaps a more promising avenue for reducing automobile-related problems lies in controlling employee parking. In the United States, an average of only 7.3 percent of persons driving to work pay for parking. Seventy-five percent have parking provided by employers and 12 percent park on the street (11, p. 90). Pricing or restricting employee parking could contribute to reducing the undesirable side effects of automobile use, because most work travel occurs when congestion is at its worst and when transit service is frequent and widespread.

Parking controls, to be effective, need to be more broadly based than those in San Francisco. If parking prices are to be effective in altering travel behavior on a large scale, dramatic changes will be necessary in the supply of free parking and in the setting of prices.

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