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Problems with Parking Requirements in Zoning Ordinances

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LAND-USE zoning is frequently used in an attempt to improve resource allocation in markets other than the land market itself. The variety of effects sought by zoning is suggested by some of the goals listed in the Standard State Zoning Enabling Act (on which many state acts are based): to promote health, safety, morals, or the general welfare; to lessen congestion in the streets; and to facilitate the adequate provision of transportation, water, sewerage, schools, parks, and other public requirements.[1]

Examples of indirect zoning approaches to resolution of problems are common. Within the Broadway theatre district of New York City, a density bonus is given to developers who include a theatre in a new building. Density controls, such as floor-area ratios, minimum lot sizes, and limits on the number of dwelling units per parcel, are used in an attempt to reduce traffic congestion in many cities. Requirements for a minimum number of parking spaces in new buildings are intended to improve the traffic circulation pattern by getting automobiles off the street once they have arrived at their destination.

There is a distinct possibility of doing more harm than good by using zoning to resolve a problem that is only indirectly related

1. Donald G. Hagman, *Urban Planning and Land Development Control Laws* (St. Paul, Minn.: West Publishing Co., 1971), pp. 80-81.

to the land market. This is because the land-use zoning approach to the resolution of problems that arise in other markets has the following flaws:

1. There is often a tenuous casual chain between the explicit zoning intervention in the real estate market and the ultimate consequence hoped for in the market where the real problem is perceived.
2. A zoning "solution" gives the impression that something has been done about the perceived problem, regardless of whether the links between the zoning intervention and the perceived problem are working as supposed.
3. The zoning approach disguises the true cost of the intervention because the expense of complying does not appear in the public budget.
4. If the problem being addressed is not fundamentally a land market problem, intervention by zoning may create inefficiencies in land use (and perhaps in other related markets) where none existed before.

Despite these defects there are understandable reasons why planners urge land-use zoning as a technique to deal with problems in other markets. First, there may be an unwillingness or inability to intervene directly in the relevant malfunctioning market. For instance, if traffic congestion is the problem, limits on building density may be a less effective solution than some form of road pricing, but in the absence of road pricing, density limitations are at least a method of giving partial relief in some neighborhoods.

Second, a zoning solution usually gives the appearance of resolving the problem without expenditure of public money. And third, planners may simply believe that land-use zoning is the best, or at least a very effective, solution to the problem at hand. But an examination of the particular case of parking requirements suggests how badly a strategy of intervention by zoning can miscarry when the real problem lies outside the land market.

PARKING REQUIREMENTS IN ZONING ORDINANCES

Zoning ordinances requiring the provision of off-street parking

for new buildings have existed since the 1920s. The usual intent is that the problem of traffic congestion in activity centers can be alleviated by accommodating in off-street facilities the peak number of automobiles that are drawn to a site. This attitude is best exemplified in a 1970 study by Witheford and Kanaan,[2] who assert: "The zoning ordinance provision that confers the greatest benefit in preserving street capacity is probably that requiring new activities to provide parking off-street."

Determinants of Space Requirements

The parking component of zoning ordinances usually states the number of required spaces per seat in a theatre, per dwelling unit, or per square foot of office space. Some cities also have sliding scales for commercial development, with one requirement for the first several thousand square feet of space and a lesser one for subsequent increments of space, or one requirement for the ground floor and a lesser one for the upper floors. Minimum dimensions of the required parking spaces are also usually specified.

A common theme unifying all of these requirements is the "rule of thumb" air about them and the apparent lack of consideration given to the cost of providing the spaces or the price that will be charged for using them. The assumptions appear to be that trip generation rates and parking demand reflect a "need" to travel by automobile and that the demand for parking spaces is not a function of price.

Variations in Spaces Required

The number of parking spaces required by municipal codes varies greatly among cities. The wide variation within southern California is suggested by the figures in Table I, which shows the number of parking spaces required for a hypothetical 10,000-square-foot (930 square meters) general office building of three floors in various cities.

Because the average space required per parked car ranges from approximately 330 square feet (30.69 square meters) for surface lots to 500 square feet (46.5 square meters) for multilevel struc-

2. David K. Witheford and George E. Kanaan, *Zoning, Parking, and Traffic* (Saugatuck, Conn.: Eno Foundation for Transportation, 1972), p. 21.

TABLE I—PARKING SPACES REQUIRED IN A 10,000-SQUARE-FOOT OFFICE BUILDING OF THREE FLOORS IN CALIFORNIA CITIES

City	*Requirement*	*Spaces*
Placentia	8 spaces per 1,000 square feet (1 space per 125 square feet)	80
Duarte, Glendora, Los Alamitos, Upland	1 space per 150 square feet	67
Buena Park	6 spaces per 1,000 square feet	60
San Jacinto	1 space per 300 square feet *plus* 1 space per each 2 employees	53
Walnut	Minimum of 6 spaces *plus* 1 space per each 175 square feet above 1,000	51
Arcadia, Bellflower, Hawaiian Gardens, Inglewood, La Verne, Monrovia, Ontario, Paramount, Pico Rivera, Pomona, San Dimas, Signal Hill, Yorba Linda	1 space per 200 square feet	50
Costa Mesa	6 spaces per 1st 1,000 square feet 4 spaces per 1,000; 1,000-11,000 3 spaces per 1,000; above 11,000	42
Anaheim, Artesia, Bell, Cerritos, Camarillo, Chino, Corona, Cudahy, El Monte, Elsinore, Fullerton, Hemet, La Habra, La Mirada, Loma Linda, Lomita, Maywood, Montclair, Monterey Park, Newport Beach, Norco, Norwalk, Port Hueneme, Rosemead, San Bernardino, San Gabriel, Santa Barbara, Santa Paula, Simi Valley, South Pasadena, Thousand Oaks	1 space per 250 square feet	40
Garden Grove	4 spaces *plus* 1 space per 300 square feet	37
Rolling Hills Estates	3.5 spaces per 1,000 square feet	35
Fountain Valley	1 square foot of parking for 1 square foot of building	31
Westminster	1 space per 200 square feet of first floor *plus* 1 space per 500 above	31
Riverside, Rialto	1 space per 250 square feet, first floor 1 space per 500 square feet, above	26
Burbank, Downey, Industry, Los Angeles (except CBD), Santa Monica	1 space per 500 square feet	20
CBD of Los Angeles, Long Beach, Vernon	1 space per 1,000 square feet	10

Source: Special survey by Rex B. Link and Associates, Los Angeles, California, April 1975 (unpublished). Some requirements may have changed since that date.

tures, Table I shows that most cities require at least 1 square foot (0.093 square meter) of parking space for every square foot of building area, and some require much more. Further, it is not uncommon for planning departments, as part of their negotiations with developers, to require *more* than the number of parking spaces required by the zoning codes.[3]

Minimum versus Maximum Space Requirements

This detailed regulation of the supply of parking for new buildings implies that planners know how to tailor the parking supply to differing local circumstances. But the difficulty inherent in taking these decisions out of the private market is illustrated by the fact that some planners recommend zoning regulations to force the supply of parking *above* the quantity that would be provided by the private market, while others recommend an upper limit on the number of parking spaces to reduce the quantity *below* what would be provided by the private market—both with the goal of reducing traffic congestion.[4] For instance, in certain districts of downtown San Francisco, California, parking space may not exceed 7 percent of the gross floor area of a new building.

There is some logic to both policies, of course. More off-street parking can help get automobiles off the streets once they are at their destination. On the other hand, less off-street parking may reduce the number of automobiles coming to activity centers. In the first case only traffic and parking in the immediate vicinity of a new building are considered, while in the second case the perspective includes congestion on routes leading to activity centers.

RATIONALES FOR PARKING REQUIREMENTS

The primary justification for requiring provision of off-street parking in new buildings is that the new buildings will "attract" more vehicles to the site, and these vehicles must be gotten off the street or they will impede traffic circulation. Without an increase

3. Some ordinances go into great detail regarding the types of activities for which parking must be provided. A recent survey (Witheford and Kanaan, *Zoning, Parking, and Traffic*) of 216 cities disclosed that 48 specified the amount of parking required for dance halls, 30 had special requirements for skating rinks, and 12 specified the parking required for billiard and pool rooms (two of which required two parking spaces per pool table).

4. This controversy illustrates the perhaps mythical motto of one Soviet planner: "What is not prohibited should be made compulsory."

in the supply of off-street spaces, it is argued, additional cars will cruise the streets in search of scarce vacancies on or off the street.

Reduction in "Cruising"

Even the provision of more off-street parking spaces will not necessarily eliminate cruising for parking if the price of on-street parking is kept so low that it is always almost fully occupied. If the price of on-street parking is cheaper than off-street, there is always an incentive to cruise for street parking so long as the value of expected cruising time is less than the differential between the on-street and off-street parking prices. It is generally on-street parking that is underpriced, either because no price is charged, or because the meter price is set too low.[5] Owners of off-street parking facilities will presumably not set prices so low that customers are frequently turned away.

The provision of more off-street parking would reduce its price and would thus tend to reduce cruising to the extent that it reduces the gap between the price of spaces that are almost always filled and the price of spaces where there are vacancies. The alternative policy of increasing the price of on-street parking to a market-clearing price would seem preferable both for achieving efficiency and for raising municipal revenue.

Reduction in Parking Spillover

A second justification for off-street parking requirements, especially in locations outside the central business district (CBD), is that commercial activities may cause "parking spillover" into residential neighborhoods. It is certainly understandable that residents of an area "threatened" by nearby development would press for mandatory inclusion of sufficient off-street parking spaces to accommodate all the cars likely to be attracted.

The new and spreading practice of issuing residents special permits (without which parking is limited to 1 or 2 hours or subject to metering) may, however, be a more effective way to alleviate parking spillover. Without some sort of parking preference for

5. One important reason why street parking may be underpriced is because "overtime" or illegal parkers are not always ticketed.

residents, one may expect continued support for parking requirements in all new buildings adjacent to residential areas.

Encouraging Downtown Growth

A third prominent argument in favor of parking requirements is that additional parking is necessary to encourage trade and employment in downtown areas. If new construction is not required to provide parking for all additional traffic attracted to the site, the price of parking for those in adjacent buildings may be driven up by the increase in demand for parking space. This external cost is a "pecuniary" one in that is simply leads to price changes—but this price rise is sufficient reason for those already located downtown to want parking requirements for new construction.

The argument that construction of new commercial space without accompanying parking will lead to more congestion, higher parking prices for everyone, and a resulting decline in the number of people coming downtown is akin to saying that "nobody goes downtown anymore because it's so crowded." But if people have a demand for parking downtown, the private market will tend to supply it, just as the private market supplies additional restaurants, coffee shops, stationery stores, and so on—all of which will be in greater demand if new construction draws more activity to the site. The chief effect of minimum parking requirements is that parking spaces will be priced below the cost of providing them. If the price of parking is at or above the cost of providing it, there is no obvious reason why developers would not provide it on their own, even in the absence of the requirement.

An additional weakness of the argument that parking requirements are necessary to encourage people to come (that is, to drive) downtown is that most parking requirements apply citywide, so that the result would be more cars being parked (and driven) everywhere, not just downtown. In fact, many cities have a "downtown exception," so that fewer parking spaces are required per square foot of building space in the CBD area than in other parts of the city. For instance, in Los Angeles the requirement in the CBD is one parking space per 1,000 square feet (93 square meters) of building area, while it is one space per 500 square feet (46.5 square meters) elsewhere. Thus, the effect of the parking re-

quirement may be to make CBD locations relatively less rather than more accessible by automobile compared to other parts of the city.

In any case it is a mistake to identify the health of a downtown area with the number of vehicles that can be driven or parked there. If the effect of an increased number of parking spaces on the demand for all modes of transportation (including public transit and carpooling) to downtown areas is considered, the net result is not necessarily beneficial.

Meeting Residential Parking Needs

The fourth argument for off-street parking relates to requirements in purely residential areas (such as two garage spaces per dwelling unit). So long as street parking is unpriced in residential neighborhoods, each owner has an incentive to rely on the street for parking, rather than incur the cost of providing his own off-street space(s), with the result that residents and visitors have to hunt for a vacant parking space.

In the interest of keeping available some vacant street spaces at all times, or perhaps because residents generally prefer to see their streets relatively free of parked cars, some off-street parking might be required of each dwelling unit in residential areas. Current zoning regulations may err, however, on the side of requiring too much off-street parking per dwelling unit. The focus of this article is, however, on parking requirements for nonresidential uses.

CONSEQUENCES OF PARKING REQUIREMENTS

As Table I illustrates, zoning requirements typically specify the minimum number of parking spaces that must be provided in conjunction with new development. Such requirements are likely to have two different effects on the parking supply.

First, the total supply of parking spaces will be increased, and this will depress the price of parking and lead to increased automobile travel. Second, the spatial distribution of parking will be determined mainly by the location of new construction rather than by demand and cost considerations.

Spatial Distribution of Parking Supply

In a downtown area where zoning codes do not specify minimum parking requirements, submarkets for parking are likely to develop in response to spatial differences in demand and supply functions for parking spaces. That is, parking services will be sold at differing prices in differing geographic locations within the downtown area. Demand for parking at each location will depend largely on the density of employment and shopping in the immediate area, the price and service levels of public transit, and travelers' incomes. The supply schedule for parking in that location will be determined by land rents in the immediate area, together with costs of the capital and operating inputs that are combined with land to supply parking services.[6] Interactions between different supply and demand in different parts of the CBD produce substantial price variation across space. Parking prices thus act both to allocate the quantity of land and capital devoted to parking in different parts of the downtown and to ration the number of automobile trips destined there.

Spatial Distribution Without Minimum Requirements. This situation is depicted in Figure 1. The quantity of parking services, measured in space-hours per time period, appears on the horizontal axis while the price per space-hour is measured on the vertical axis. In an area of intense development (and thus high land rents), the supply schedule for parking services (in the absence of minimum requirements) may look something like S_1.

A corresponding high level of travel demand to such an area implies a derived demand for parking there such as shown by D_1, with the result that parking is priced at P_1. In a less intensely developed part of the downtown area, lower land rents result in a parking supply schedule such as S_2, while lower travel demand implies a parking demand schedule D_2 that is below D_1. Parking

6. Land and capital inputs are substitutable over a wide range in the production function for parking services. Roth (*Paying for Parking*, Hobart Paper No. 33, London: Institute of Economic Affairs, 1965, p. 59) estimated that the capital cost (excluding land cost) per parking space is roughly 10 times higher in a six-story parking structure, and 24 times higher in an underground facility, than in an open surface lot.

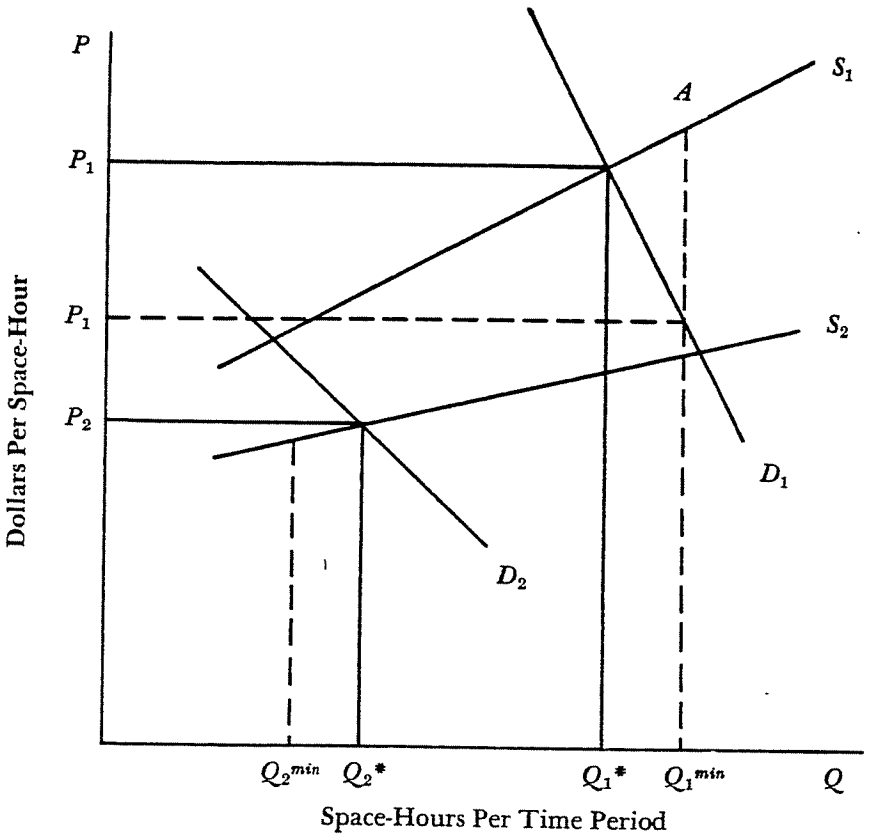

Figure 1. Effects of zoning on parking price and quantity

services are thus sold in this area at a price P_2 that may be considerably less than P_1.

Spatial Distribution with Minimum Requirements. By specifying the parking required per unit of floor space, as Table I illustrates, zoning requires a minimum quantity of parking capacity for any particular density of new development. In Figure 1, this minimum quantity of parking in the more intensely developed section of downtown areas (subscript 1) might, for example be Q_1^{min}. In this case the supply schedule becomes the "kinked" curve $Q_1^{min} AS_1$, with the result that more parking than the market would offer is supplied, its price being reduced from P_1 to P_1'.

In the less intensely developed area (subscript 2), however, the

minimum parking requirement associated with the level of development might be Q_2^{min}. The parking submarket in this section of the downtown area would thus be unaffected in this example. Zoning-mandated minimum parking requirements may thus affect the development of parking submarkets and the resource allocation purpose they serve in three ways.

1. If minimum requirements change over time, areas of comparable density of development may have very different supplies of and prices for parking if they were developed at different dates (Witheford and Kanaan [7] report that, among 45 cities, the average parking requirement for manufacturing plants rose from 1 space per 3.6 employees in 1951 to 1 space per 2.3 employees in 1969). Returning to Figure 1, a single submarket characterized by the curves D_1 and S_1 might have a minimum parking requirement below Q_1^* if it has many older buildings, while a newly developed area of the same density might face a minimum such as that shown by Q_1^{min}. In the older area, parking would be priced at P_1 while it would be sold at P_1' in the newer area.

2. If the parking zoning requirements are uniform throughout a jurisdiction while demand and supply vary by location, the requirements may force an increase in the supply of spaces in some areas while leaving others unaffected. Thus not only will there be an increase in the total number of parking spaces provided, but also they may be located in the wrong places.

3. If parking requirements vary greatly among jurisdictions within a metropolitan region in ways unrelated to demand and the cost of supply (Table I displays an eightfold variation among rather similar cities in southern California), they may also cause inefficient shifts in the geographic distribution of parking spaces and travel within a region.

Since parking requirements are likely to have all three of these effects, the allocation of land and capital to parking (as well as the related volume of automobile traffic) in each submarket may be

7. D. Witheford and G. Kanaan, *Zoning, Parking, and Traffic*, p. 73.

quite unresponsive to the cost of supplying parking there. Instead, they depend on arbitrarily set standards that ignore both travelers' valuation of parking and the cost of supplying it.

Increased Total Supply of Parking

If parking specifications imposed by zoning do require more parking to be provided in some parts of town than would otherwise be supplied, the total supply of parking will be above its market-determined equilibrium level. Tentative evidence that zoning codes may already require the provision of inefficiently large amounts of parking space can be inferred from the fact that new parking garages are rarely built as independent commercial ventures today. This suggests that additional parking structures cannot offer competitive rents for land, given the zoning-mandated oversupply of parking.[8] Further, local excesses of parking supply in certain areas will lead to lower parking prices there, as illustrated in Figure 1. The areawide average of parking prices will thus be reduced.

Impacts on Parking Use. One would expect two reactions to a parking price decrease induced by a zoning-mandated expansion of supply. First, the number of trips using parking in the zoned area would be expected to increase. In addition, the average duration of trips using parking should lengthen as the price falls.

Both of these represent increases in the quantity of parking space-hours consumed during some specified time period. Whether zoning achieves one of its intended objectives—alleviating traffic congestion in and en route to downtown—depends in part on how the required additional parking supply is used.

Data measuring the composition of an increase in the quantity of parking services in response to a price change are not readily available, but some idea about this response can be inferred from related information. Let

R = gross revenue from parking operations per time period;
P = average parking price per hour;

8. In addition, zoning focuses on the number of spaces required, prohibiting the relevant commodity—namely parking space-hours at a given time of day—from being supplied by more efficient management of existing spaces, and sharing of facilities by daytime and nighttime activities.

Q = number of parking space hours sold per time period;
q = number of parking space occupancies (the number of trips requiring parking of any duration); and
t = the average duration of parking occupancies.

Then

$$Q = qt \tag{1}$$

and

$$R = PQ = Pqt. \tag{2}$$

What is of interest is the response to a change in price of parking. Differentiating with respect to price yields

$$\frac{dR}{dP} = Pq\frac{dt}{dP} + Pt\frac{dq}{dP} + qt \tag{3}$$

Hence

$$\frac{dR}{dP}\frac{P}{R} = \frac{dt}{dp}\frac{P}{t} + \frac{dq}{dP}\frac{P}{q} + 1,$$

or

$$n_R = n_t + n_q + 1 \tag{4}$$

where n_i is elasticity of variable i with respect to P.

From a review of the responses of travelers and parking operators to a 25-percent municipal parking tax imposed (and later reduced) by the city of San Francisco, Kulash [9] infers values of two of these parameters. Estimates of n_q, the price elasticity of the number of trips downtown, fall in the range of –0.2 to –0.4. Yet operating revenue seems to be more elastic with respect to observed price changes; Kulash's computations imply values of n_R

9. Damian Kulash, *Parking Taxes as Roadway Prices: A Case Study of the San Francisco Experience,* Paper no. 1212-9 (Washington, D.C.: The Urban Institute, 1974).

ranging from –0.4 to –0.6. In conjunction with Equation 4, the indicated range of elasticities of t, the average parking duration, is –1.0 to –1.4.

Thus the apparent greater sensitivity of revenues than of the number of trips to a parking price change is reconciled by a change in the average duration of parking occupancy associated with trips. While the total number of trips shows an inelastic response to price changes, the duration of parking responds elastically to a price change.

This can occur either because the parking duration of all trips changes or because there is substitution between trips requiring short- and long-term parking. The latter would occur, for example, if the number of work trips increased more in response to a parking price reduction than did the number of trips requiring short-term parking, say for shopping or personal business purposes. The experience with the San Francisco municipal parking tax suggests that work-trip demand is indeed more responsive to parking price changes than the number of trips for nonwork purposes is, although both are probably inelastic.[10]

Impact on Choice of Travel Mode. Other evidence suggests, however, that travel behavior may be surprisingly responsive to changes in parking prices. Using a sample of 275 government employees working in the Civic Center area of downtown Los Angeles, California, Groninga and Francis [11] investigated the effect of parking subsidies on mode choice for the trip to work. Of the sample, 135 were employees of the county of Los Angeles, who receive free parking if they choose to drive. The remaining 140 were federal employees. Among these employees, those who drove paid an average of about 70 cents per day to park.

The percentage of employees using different modes of travel to work in each of the two groups is presented in Table II. Significantly higher fractions of the unsubsidized federal employees traveled to work in carpools or by bus, while a higher proportion of the subsidized county employees drove to work.

The results of a survey of some 3,500 commuters working in

10. Ibid.

11. Curtis L. Groninga and William E. Francis, "The Effects of the Subsidization of Employee Parking on Human Behavior," unpublished paper, University of Southern California, May 1969.

TABLE II—PARKING STATUS AND PERCENTAGE OF LOS ANGELES CIVIC CENTER EMPLOYEES USING DIFFERENT TRAVEL MODES

Travel Mode	*Federal Employees (Pay for Parking)*	*County Employees (Free Parking)*
Automobile driver	40	72
Automobile passenger	27	16
Bus rider	33	12

Source: Groninga and Francis, "The Effects of the Subsidization of Employee Parking on Human Behavior," unpublished paper, University of Southern California, May 1969.

Century City, California, a satellite employment center of Los Angeles, also suggest a significant response of travel behavior to parking price variations. There, some employees are offered fully or partly subsidized parking by their employers. Others pay up to $40 per month to park if they drive. Table III shows the percentages of employees having parking subsidies available, and those paying to park, who commute by various modes. While no group displays a high proportion of bus or carpool use, among unsubsidized commuters the fraction of bus and carpool travel is three times that among those having fully subsidized parking available.

Impact on Traffic Congestion. Other evidence also suggests that the response in automobile tripmaking to a parking price change might significantly affect travel in a metropolitan area. Data from a 1968 travel survey in Washington, D.C., suggest that a $1 increase in the average parking price of $2 per day would reduce the number of work trips made in singly-occupied automobiles by 15 percent.[12] While this is consistent with a parking price elasticity of private automobile work trip demand of only about –0.4, a 15-percent reduction in automobile traffic could substantially re-

TABLE III—PARKING STATUS AND PERCENTAGE OF CENTURY CITY (CALIFORNIA) EMPLOYEES USING DIFFERENT TRAVEL MODES

Travel Mode	*Parking Cost*		
	Unsubsidized	*Partly Subsidized*	*Fully Subsidized*
Auto Driver	75	85	92
Carpool	12	9	4
Other [a]	13	6	4

[a] Including bus, walk, bicycle.

Source: Tabulated from data provided by Century City, Inc. (1977).

12. Damian Kulash, *Parking Taxes as Roadway Prices: A Survey of Related Experience,* Paper no. 1212-1 (Washington, D.C.: The Urban Institute, 1974).

duce traffic congestion and air pollution in most metropolitan areas.

Additional evidence from the Metropolitan Washington Council of Governments (COG) suggests that a policy of eliminating free parking in the CBD, combined with a $2-per-day parking surcharge, would reduce automobile work trips by 25 to 30 percent.[13] While this seems like a dramatic diversion, automobiles parked at rates subsidized by the federal government account for 40,000 of the 140,000 commuter automobiles entering the downtown Washington, D.C., area daily. Their drivers receive subsidies of up to $50 per month per driver.[14] Removing free parking might by itself be expected to reduce the number of these trips significantly. If combined with a $2-per-day surcharge, it might well produce diversion of the magnitude projected in the COG report.

CONCLUSION

Collectively, this evidence suggests that a parking price change may exert a significant impact on the number of work trips made by automobile. Hence if a zoning-mandated increase in the supply of parking reduces its price, a substantial increase in the number of trips using long-term parking may result. The number of trips requiring short-term parking would also be expected to increase.

Consequently, an attempt to solve even locally-construed congestion problems via minimum parking zoning may backfire. Street circulation problems in the downtown area could be aggravated, and additional congestion on transportation routes serving the downtown area may also result. In addition, air pollution and energy consumption—themselves often the targets of other policies embraced by local governments—may be aggravated if automobile travel increases.

Disincentive to Inner-City Redevelopment

Parking requirements may also cause serious problems in the land market. Where a zoning ordinance requires provision of more

13. Metropolitan Washington Council of Governments, *Parking Management Policies and Auto Control Zones,* Report no. DOT-OS-40045-1 (Washington, D.C.: U.S. Department of Transportation, 1976).

14. Charles F. Bingman, "Federal Subsidies of Employee Parking," memorandum to the Secretary of Transportation from acting administrator, Urban Mass Transportation Administration, 1977.

parking spaces than is justified by the price they command, the excess spaces result in a deficit for the developers of a new building.

This zoning-induced parking deficit is greater for larger buildings and is in effect a tax on the quantity of floor space in the building. Because the zoning requirement applies only to new construction, it would retard redevelopment of older areas. Since the marginal cost of providing more parking spaces at a site increased dramatically for underground or multistory structures, the "tax" per square foot of additional building space increases more than proportionally with building size. This is a clear disincentive to high-density development.

Adverse Effects on Public Transit

Another land market effect of parking requirements may be to alter the spatial pattern of new development. The parking "tax" on new development is particularly onerous where land values and building densities (and thus the cost of providing parking) are high in relation to the price received for parking. This would tend to be the case in areas already well served by mass transit. Thus the parking "tax" would tend to shift new development away from areas best served by mass transit and toward areas where automobile use (and thus the demand for parking) is highest. Such a tendency may counteract other local policies designed to encourage development in areas easily accessible by transit.

There is certainly reason to suspect that parking requirements may have some unintended and undesirable effects in both the transportation and land markets. They illustrate the potentially counterproductive results of intervening in the land market to solve problems originating outside it. Unwisely used, zoning may actually aggravate some of the problems it is intended to alleviate.

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