HIGHWAY RESEARCH BOARD

Special Report 11-D

Parking and Its Relationships to Business

SUMMARY REPORT OF PROJECT

National Academy of Sciences–
National Research Council

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2101 Constitution Avenue — Washington 25, D. C.

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1956
Washington, D. C.

Study of Parking and Its Relationships to Business

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PREFACE

In the fall of 1951 the Highway Research Board accepted a grant from the automotive and petroleum industries, through the Automotive Safety Foundation, to undertake the direction and administration of a research project aimed at determining the relationship of parking to business. There had been few fundamental facts to evaluate the impact of automobile parking on the economic health of cities and comprehensive research was urgently needed to relate inadequate parking to the use of the automobile in urban areas, and to determine the corollary effects on downtown traffic congestion, retail trade, property values, and taxes.

In order to obtain practical guidance and assistance in the formulation of general objectives, the Board established an Advisory Committee composed of representatives from the fields of business, industry, government, and transportation. This Committee has provided valuable counsel throughout the project. The U. S. Bureau of Public Roads cooperated by assigning a member of its staff as project engineer to facilitate the program and correlate the several research activities.

The Advisory Committee sponsored pertinent research studies at the Universities of California, Kentucky, Michigan, Washington, and Ohio State. Detailed reports of these several studies, which constitute the major work of this project, have been published by the Highway Research Board in its *Special Report 11* series, *Parking As A Factor In Business*. In addition to SR 11, this series also includes Special Reports 11-A, 11-B, 11-C, and this, the final volume, 11-D.

Herein the results of the individual reports are summarized and the more important findings are synthesized. This summary report has been reviewed and approved by the Advisory Committee on the study and its publication marks the concluding phase of the project.

By no means should this suggest that the problem has been solved completely. Although the research has demonstrated many fundamental precepts and focused the subject in a better perspective, the impact of parking on business still cannot be determined by a simple mathematical analysis. Much additional case research is needed in order to provide body to the basic framework developed, which will enable more predictable measures of the effect of parking on business.

D. GRANT MICKLE, *Chairman*,
Committee on Study of
Parking and Its Relationships
to Business

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Parking and Its Relationships To Business: Summary Report of Project

J. T. STEGMAIER, *Project Engineer, Highway Research Board; Highway Transport Research Engineer, U. S. Bureau of Public Roads*

● AT the outset, it was conceived that the project would take the form of numerous research studies carried out on a fellowship basis by university graduate students operating on various phases suitable as thesis or dissertation subjects. However, the college administrators felt that such studies could be handled more adequately by faculty members. As it was essentially a problem in economic research, the actual investigations were delegated to selected schools of business administration and in most cases to their bureaus of business research.

The basic complexity of the problem and lack of tested techniques suggested an exploratory program to investigate in several areas the existence and availability of pertinent data and to establish methods for collecting and analyzing them. Thus, the agreements consummated for the first year's studies granted considerable latitude to the research agencies and resulted in a variety of information assembled by diverse methods.

At the conclusion of these studies the universities involved were invited to suggest additional research which might supply factual answers to the questions presented. Study prospectuses from each university were reviewed by the committee. Certain unpredicted findings of the consumer attitude study in Columbus, Ohio, were instrumental in the ultimate decision to verify these conclusions in other more-automobile-oriented cities with greater commercial development in the suburbs. The second year of actual research produced the expanded study of shopper attitudes in which the factors associated with the shopping habits of individuals and groups were established to be similar in Houston and Seattle to those found in Columbus.

Meanwhile, investigations closely related to the general subject were being conducted by staff members of the Automotive Safety Foundation and the Bureau of Public Roads. The timeliness of these studies was recognized by their publication under the sponsorship of the Board's Advisory Committee for this project.

At this point the committee recognized that the bulk of the data accumulated to date was largely qualitative and inferential. They determined to remedy this by a direct study of the volume and character of retail sales in a city or store before and after the installation of additional parking facilities. To accomplish this on a citywide basis, either would have required a simple historical analysis or would have extended the project beyond a reasonable period of time. To conduct such studies in several large retail establishments would have been beyond budget limitations. Only one such study of a single department store in just one relatively small city could be accommodated in the final year.

The detailed reports on the methodology and findings of these several studies have been published and are available in the Highway Research Board's *Special Report 11: Parking as a Factor in Business,* and in supplemental publications. A recapitulation of these studies is presented in Table 1.

Limitations of time and money have restricted the project largely to study of the effect of inadequate parking on shifts in retail activity and the degree to which availability of ample parking facilities is a major asset to business. Even in this limited area, however, the problem was not found susceptible to the principles of precise mathematical formulae. Nevertheless, many of the additive and subtractive elements have been tested and the general limits of these related factors have been set. This improved perspective is highlighted in the more important findings of the several studies, which are summarized below.

DISTRIBUTION OF FUNDS

The general allocation of research funds among the several individual studies should be a prime point of interest. No direct correlation between

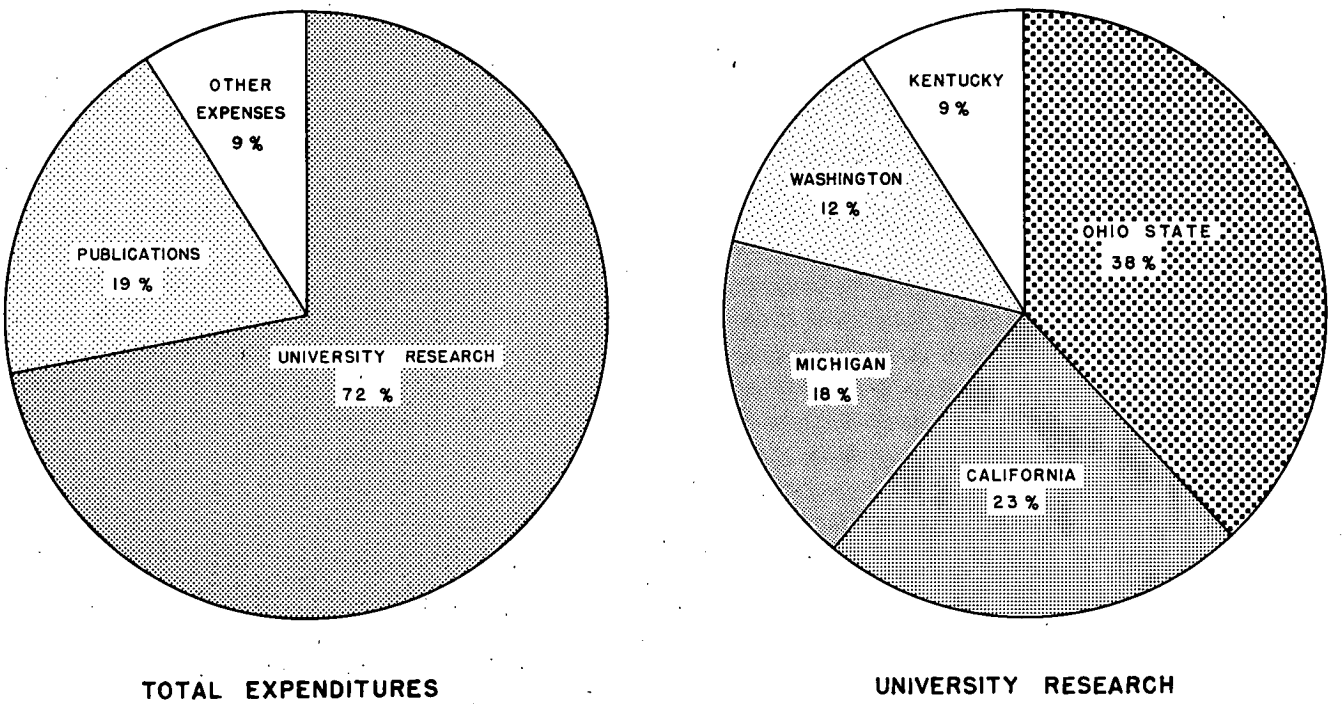

Figure 1. Distribution of funds.

expenditures and reliability of results is intended, but those findings supported by a larger accumulation of substantiating evidence may be accepted with a greater degree of credence.

The Highway Research Board's policy of effective publication and wide distribution of the research reports is noted from the left-hand chart in Figure 1. More intense study in the area of shopper attitudes toward parking and related conditions is indicated in the chart on the right.

THE PROBLEM

There is one major finding that pervades throughout the data which have resulted from these varied and searching studies. It is this: the evidence now is more convincing than ever that, although parking in many instances is definitely a factor in business, sweeping generalizations regarding such a complex subject are highly impracticable. Every metropolitan area, every central city, each downtown—indeed each retail establishment—is affected to some degree by parking conditions. Each and every situation represents a different problem, however, and innumerable interdependent circumstances must be considered in any reliable appraisal of the quantitative value of parking. In other words, each individual case must stand on its own merits. Therefore to discern objectively the relationship between automobile terminal facilities and retail trade, the question of parking must be viewed in its proper perspective.

A discussion of parking benefits in terms of retail advantage connotes an undertone of competition. On the one hand, there is the instance of store versus store, and on the other, one shopping area competing with another. Further, the latter case comprises three distinct possibilities: one downtown against another downtown, the central business district in competition with suburban shopping centers, and thirdly one suburban center versus another.

Regarding the situation between suburban centers, it is a fairly well accepted fact that parking is indispensable. Parking may be an important aspect, also, in the case of suburban centers versus downtown, as well as in the competition between central business districts. Similarly, for all types of shopping centers the availability of parking space may weigh heavily in any store by store comparison.

Assuming that adequate parking facilities are provided at suburban shopping centers, probably

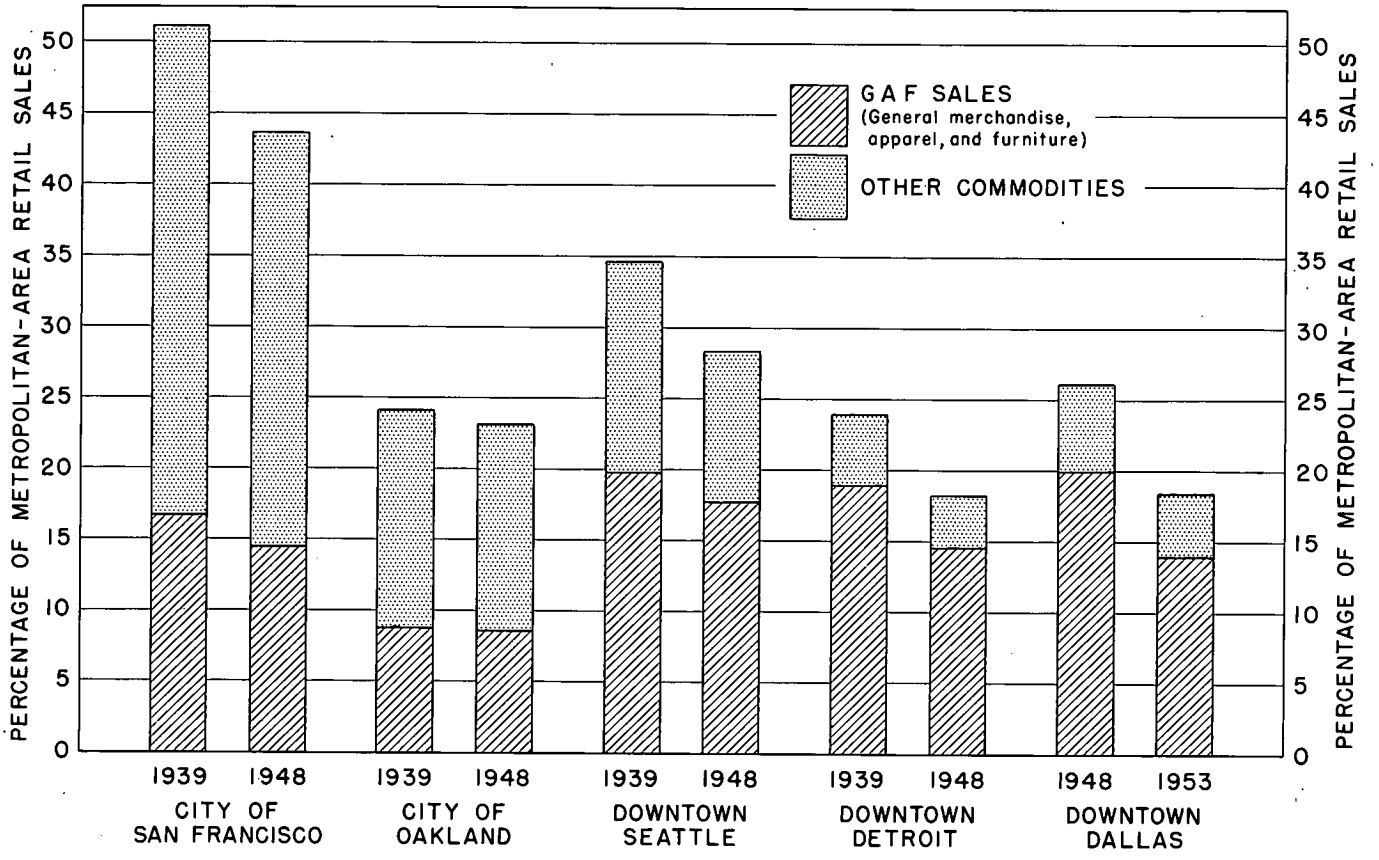

Figure 2. Trends in retail sales within metropolitan areas.

the most frequent and important comparative analysis concerns downtown in relation to these outlying centers. This situation was studied extensively with regard to trends in the geographic and functional distribution of businesses as related to the relative availability of transportation and parking facilities.

RETAIL TRENDS

The trend of locational distribution of retail trade was explored in several metropolitan areas. It was found that all of the central cities, and particularly their downtown districts, experienced declining proportions of the total metropolitan-area sales between 1939 and 1948. In Detroit, for example, the central business district's share of the area's retail trade dropped from 24 percent to 18 percent. (SR 11, pp. 95-100). Sales in Seattle's downtown section declined from 35 percent of the metropolitan-area total to 28 percent. (SR 11, pp. 60-63). Meanwhile, San Francisco's share of the Bay Area's retail sales decreased from 51 percent to 44 percent, and Oakland's slipped from 24 percent to 23 percent. (SR 11, pp. 213-216). The central area of Dallas, which accounted for 26 percent of its metropolitan-area sales in 1948, reaped only 18 percent in 1954.[1] (See Figure 2).

Nevertheless these central districts have expanded their absolute volume of trade. Between 1939 and 1948 their retail-sales increases ranged from 145 percent to 202 percent, representing gains even in terms of a constant dollar. Consequently, not only did the downtown areas continue to account for a substantial portion of the dollar-sales increases in their respective areas, but they also gained in the physical volume of goods sold through retail outlets.

In conjunction with the ever-increasing suburban population this would appear to establish the fact that central retail districts are not decentralizing according to that concept which defines

[1] *Special Census of Business: 1953; Dallas Standard Metropolitan Area.* Bureau of Census, U. S. Department of Commerce, Washington, D. C. 1954.

decentralization as occurring only when movement in the physical location of retail sales exceeds the shifts in relevant market factors, notably population and purchasing power. The peripheral retail growth has not taken place at the expense of the central area. It is somewhat proportional to the population increase and spatial expansion of the metropolitan areas. (SR 11, Part 5). This "suburbanization" is a process of normal growth, since downtown has historically accounted for a declining share of retail business as urban areas have matured.

FUNCTIONAL SHIFTS DOWNTOWN

As it increases in age, however, the central business district does not lie dormant. Although the total commercial front footage may grow but little, the land functions are continually changing.[2] (See Figure 3). More intensive uses replace less intensive uses. Manufacturing and wholesaling-with-stocks, which require considerable floor space, give way to business services and wholesaling-without-stocks. In the retail field convenience-goods outlets, which react more favorably to a convenient location closer to their customers, are yielding to shopping-goods stores. This change in the downtown structure actually accounts for a net gain in productivity for the central area by capitalizing on its most important advantage—the availability of an assortment of services and activities in a compact unit.

These shifts were demonstrated between the Business Census years of 1939 and 1948 in the urban areas studied. For example, while downtown Detroit stores were declining in total number by but 17 percent, gasoline service stations and automotive establishments decreased 37 percent and 71 percent, respectively. The relative dispersion of furniture-furnishings-and-appliance stores was indicated by their mere 2 percent increase downtown, in contrast to a 75 percent gain in the balance of the city and a rise of 163 percent in neighboring communities. Likewise, the number of lumber-and-hardware stores dropped 22 percent in the central area but expanded 12 percent in the remainder of the city and 59 percent in adjacent areas. (SR 11, pp. 95-100).

A review of such figures for Seattle is equally convincing. During this same 1939-1948 period, while the downtown area was losing one-third of its automotive and furniture-furnishings-and-appliance stores, the balance of Seattle showed respective gains of 46 percent and 77 percent. Also, though the balance of the city showed losses of only 30 percent of its food stores and 6 percent of its drug and proprietory stores, the central business district bore respective losses of 45 percent and 30 percent. (SR 11, pp. 60-63).

A similar dispersal of retail establishments has been experienced since 1929 in the San Francisco-Oakland metropolitan area. In addition the number of wholesale, manufacturing and certain service-trades establishments underwent a relative submergence in San Francisco. (SR 11, pp. 228-239).

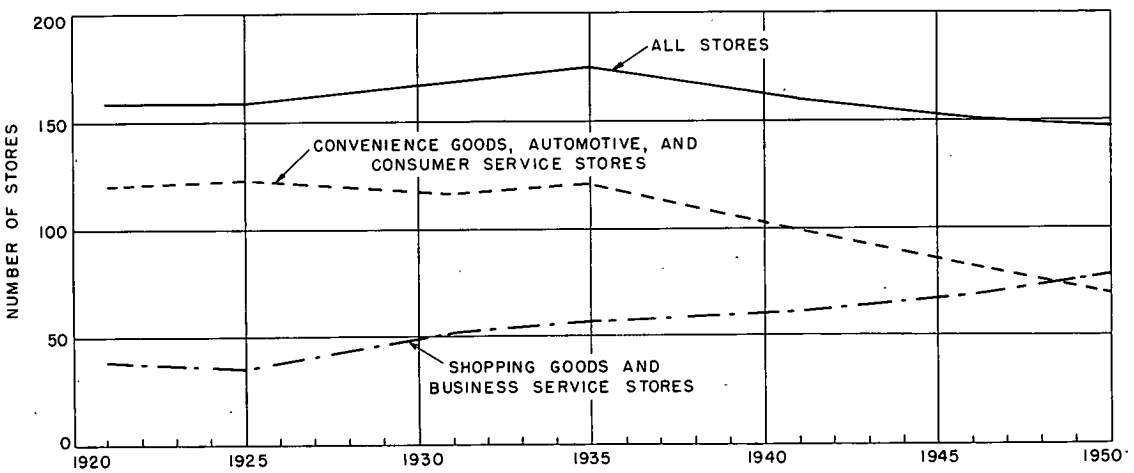

Figure 3. Retail land function changes in Madison.

[2] Ratcliff, Richard U., *The Madison Central Business Area.* University of Wisconsin, Madison, Wisconsin 1953.

Some of these functional changes are also reflected in the steadier position of general merchandise (including department stores), apparel and furniture-furnishings-and-appliance sales in the core areas. The combination of these three retail categories is frequently referred to as the GAF group. A comparison of GAF sales, similar to that already noted for total retail trade, showed a decline in downtown Detroit from 19 percent of the area's total business in 1939 to 15 percent in 1948. (SR 11, pp. 95-100). GAF sales in Seattle's downtown section slipped from 20 percent of the metropolitan total to 18 percent. (SR 11, pp. 60-63). In San Francisco this group fell from 17 percent to 15 percent, while Oakland remained unchanged at 9 percent of the entire Bay Area sales. More recently downtown Dallas recorded an even greater drop in GAF sales, from 20 percent in 1948 to 14 percent in 1954. (See Figure 2).

SUBURBAN BRANCH STORES

Among the GAF stores, the general merchandise category has displayed the most stable sales pattern, despite the postwar trend for large department stores to establish suburban branches. This stability reflects the expansive motive underlying the decision of retailers to operate satellite stores. Rather than any foreboding of decentralization of central business activity, the larger merchants have recognized that suburban markets have grown to a size where additional profit opportunities warrant the establishment of suburban outlets. This was not an effort to counteract the effects of parking inadequacies downtown.

In a 1952 survey of the country's 75 largest cities, questionnaires were returned from 36 department stores which were operating satellite branches. (SR 11, pp. 105-110). The management executives of these stores were asked not only to rank their reasons for establishing a branch store, but also to weigh these reasons according to their proportion of the total decision. The top three reasons, bearing a combined weight of nearly seventy percent of the total cause for reaching

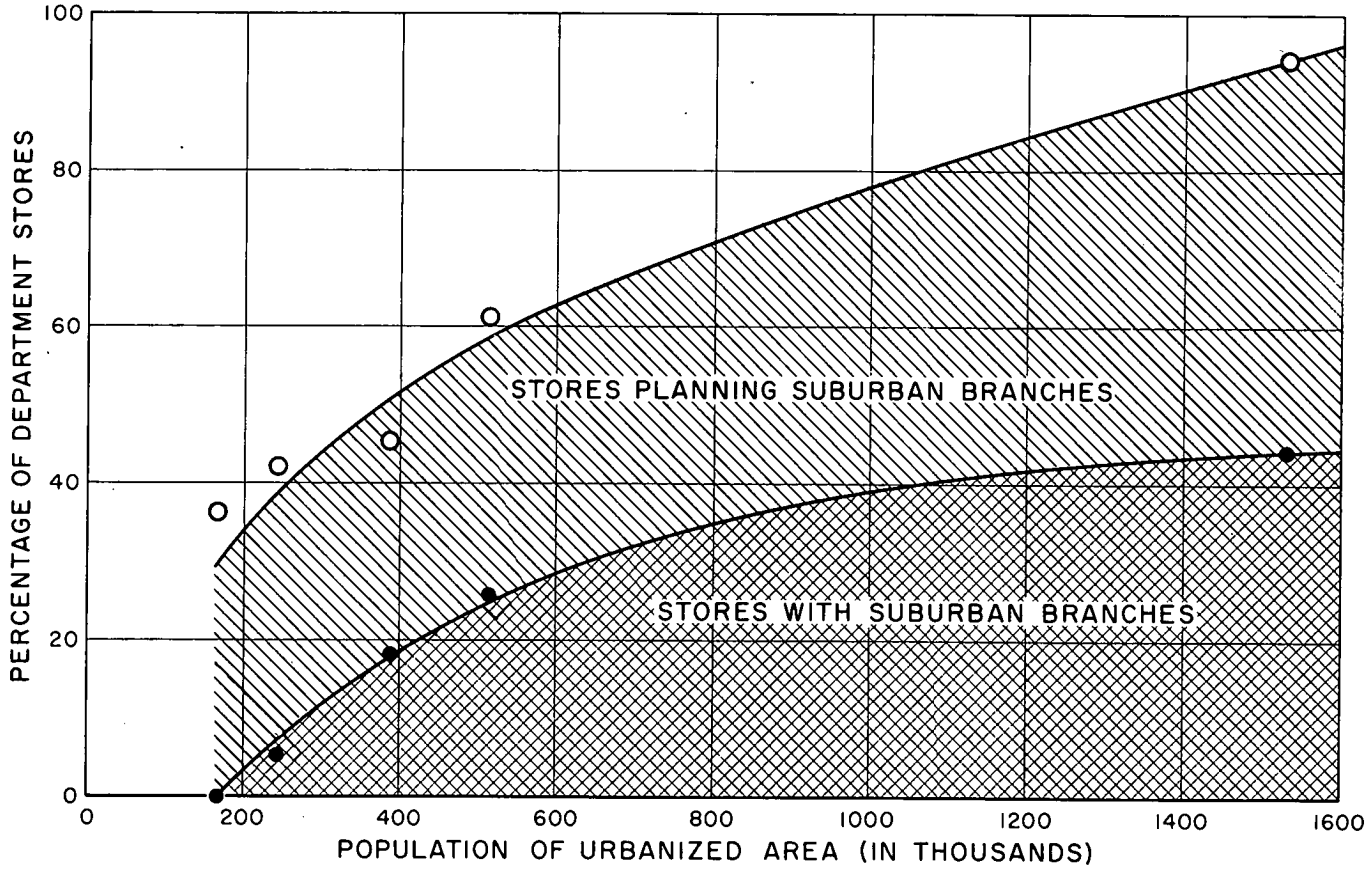

Figure 4. Percentage of department stores with, and planning, suburban branches, by size of urbanized area—1952.

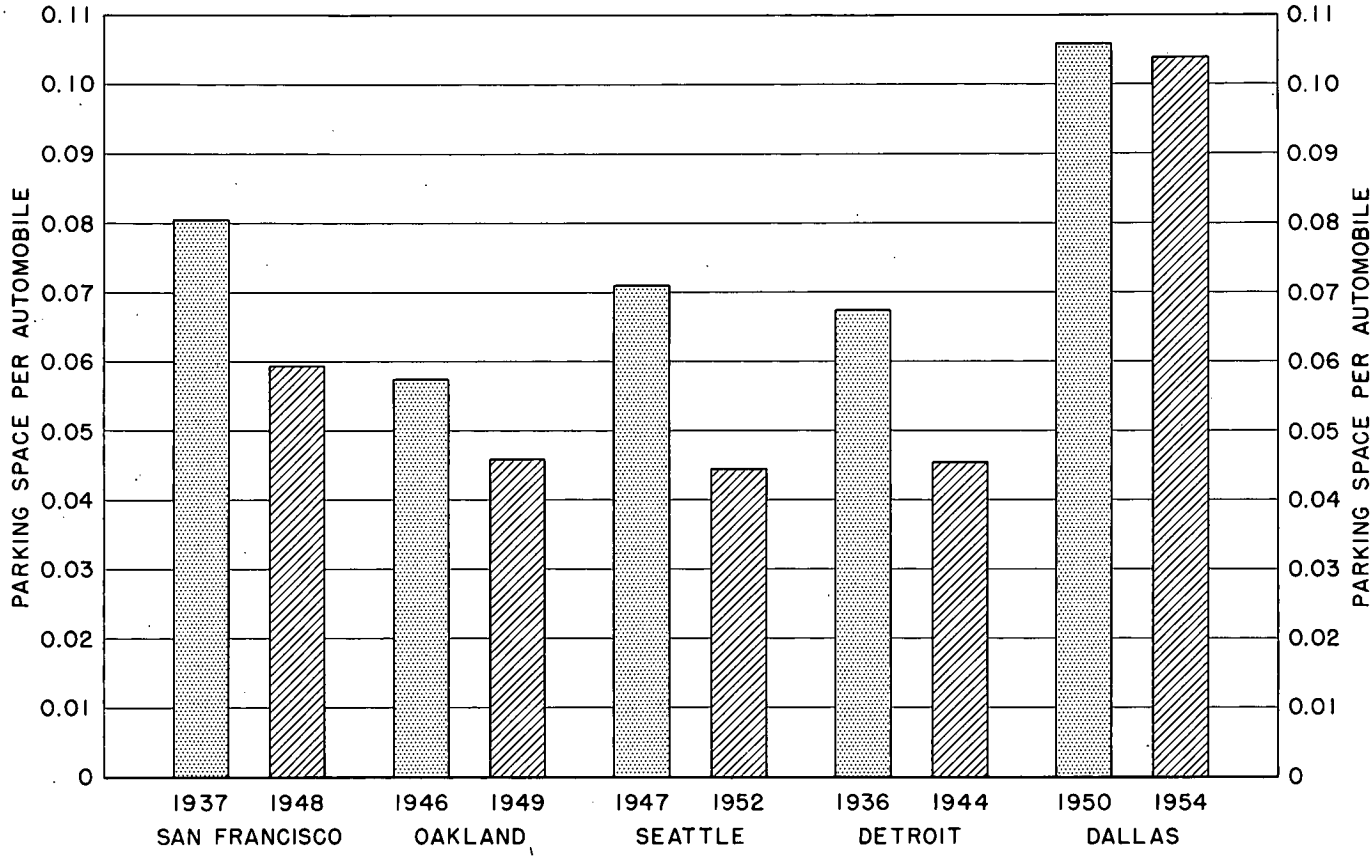

Figure 5. Trends in ratio of downtown parking spaces to automobiles registered in the county.

the ultimate decision, were related to population growth and expansion of business to reach new customers. Whether due to the fact that, for economic reasons, less transit service is provided in the suburbs than in more densely populated areas, or because of the excessive cost of adding to the main store downtown, they felt that the untapped markets could best be reached through branch stores. Insufficient parking space at the downtown store ranked only as their fourth reason, accounting for but ten percent of the weighted decision. The reason: "to regain former customers who had moved to suburban areas," was a poor fifth.

This survey definitely tagged suburban branches as a big city operation. It also confirmed prior indications that the suburbanization of retail trade was proportional to population increases. When ranked by size of city in decreasing order of population, over 90 percent of the existing branches fell into the first two quintiles. However, the accelerated rate of branch store planning by the department stores in the lower quintiles suggested a spread of this movement among stores in smaller cities down to a population of about 150,000. (See Figure 4).

By far the primary consideration, then, for the establishment of branch department stores is the potential suburban market, not so much to regain lost customers nor because of downtown parking conditions. When an urban area expands to a certain size, enterprising merchants have reached out to meet them. Rather than curtailing downtown shopping, increased automobile registration and usage primarily has enabled suburban business to swell.

PARKING TRENDS

To what extent have parking problems contributed to this suburban expansion and downtown's slower rate of business growth? A dearth of parking facilities in the central business district has been reported in all sections of the country. Surveys in downtown Detroit indicated an

TABLE 1

RECAPITULATION OF RESEARCH STUDIES ON PARKING AND ITS RELATIONSHIPS TO BUSINESS

HRB Publication	*Title*	*Author*	*Subject*
Special Report 11, Part 1	Attitudes Toward Parking and Related Conditions in Columbus	C. T. Jonassen, Ohio State University	Effect of parking and other factors in motivating consumers' choice between downtown and suburban centers.
Special Report 11, Part 2	Economic Relationships of Parking to Business in Seattle Metropolitan Area	Louis C. Wagner, University of Washington	Association of business trends with parking, traffic, and transit conditions downtown and in suburban centers.
Special Report 11, Part 3	Relationships Between Downtown Automobile Parking Conditions and Retail Business Decentralization	William J. Watkins, University of Michigan	Effect of parking on retail business trends and on the establishment of department store suburban branches.
Special Report 11, Part 4	Central City Property Values in San Francisco and Oakland	Paul F. Wendt, University of California	Trends in downtown real estate values and sales' prices, and gross and net incomes from central city properties.
Special Report 11, Part 5	Trends in Economic Activity and Transportation in San Francisco-Bay Area	David A. Revzan, University of California	Evolving transportation technologies related to population and business trends, property values, and urban decentralization.
Special Report 11-A	Shopper Attitudes	C. T. Jonassen, Ohio State University	Effect of parking and other factors on consumers' shopping location in Columbus, Houston, and Seattle.
Special Report 11-B	Shopping Habits and Travel Patterns	Alan M. Voorhees, Automotive Safety Foundation; Gordon B. Sharpe, and J. T. Stegmaier, U.S. Bureau of Public Roads	Purchase habits of shoppers and the frequency, mode, and temporal and spatial distribution of their shopping trips.
Special Report 11-C	Comparative Parking and Buying Habits of A Department Store's Customers	Laurence C. Pendley, University of Kentucky	The effect of a new parking facility on the parking and buying habits of customers at a Lexington, Kentucky, department store.
Special Report 11-D	Parking and Its Relationships to Business Summary Report of Project	J. T. Stegmaier, U.S. Bureau of Public Roads	Summary report of all the above studies constituting the project on the relation of parking to business.

aggregate of about 31,000 off-street parking spaces in 1936. This figure dropped to 24,000 in 1944 with an estimated shortage of 2,900 spaces. Due to the steady increase in population together with sharply rising registrations of motor vehicles, by 1948 the shortage was approximately 6,900 and in 1952 about 9,000. (SR 11, pp. 100-101). Another way of expressing this lack of automobile parking space is by relating the available parking spaces to the number of automobiles registered in the county. In downtown Detroit for instance, this ratio dropped one-third during the years from 1936 to 1944. (See Figure 5).

Between 1947 and 1952 Seattle lost a net of 13 percent of the parking spaces in its central area. A shortage of 2,400 spaces already existed in 1947. Moreover, 2,000 of the lost spaces were in the business core where the shortage was most critical, and mainly at the curb where a higher rate of turnover normally accounted for more efficient usage. These losses really deprived parkers of over 11,000 daily parkings. During the five-year interval the ratio of spaces to registered automobiles fell 37 percent. (SR 11, pp. 69-80).

The parking situation in San Francisco differed little. Its 1,400 downtown curb spaces of 1937 had dwindled to 300 by 1948. Meanwhile this decrease was not offset by additional lot and garage spaces, although the Union Square garage was largely responsible for a slight over-all increase in total off-street spaces. Again, the great loss of spaces at the curb stressed the impact of a 25 percent decrease in the ratio of total spaces to vehicles.

A better balance of supply and demand was noted in Oakland between 1946 and 1949, when relatively no storage change was reported. But even though there were actually more spaces than in San Francisco, the space-auto ratio declined by one-fifth. (SR 11, pp. 254-275).

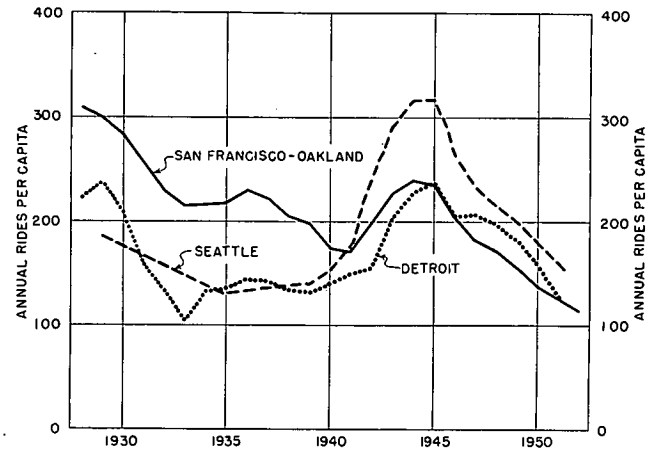

Figure 6. Trend of annual mass transit rides per capita.

TRANSIT TRENDS

Although parking facilities have become less adequate downtown, mass transit has not been used sufficiently to fill the gap. The streetcar and bus riding "habit" flared up during the gas rationing years of World War II, but since 1945 the familiar cycle of fewer rides, rising operating costs, declining revenue, and increased fares has been prevalent. Transit rides per capita have fallen to and even below their depression lows in San Francisco-Oakland, Seattle, and Detroit. (See Figure 6). (SR 11, pp. 85, 103, and 275-281). Moreover, in view of the spatial pattern of transit routes, the city hubs have suffered the greatest losses, particularly of trips for off-peak purposes such as shopping. Throughout the nation the volume of transit riders has decreased about 50 percent from its abnormal wartime peak, dropping off to a point slightly below its prewar level.

PROPERTY VALUES

Downtown property values have displayed a pattern of stabilization and gains since the slump of the depression years. By 1950 values in San Francisco had recovered to the peaks of the late 1920's. Across the bay in Oakland, where speculation ran higher during the 1920's, the rally of real estate values was not as consistent, but income from improved properties more than recovered. (SR 11, Part 4).

However, assessments downtown lagged substantially behind market prices. For example, between 1929 and 1952 assessed values dropped 27 percent in the central business district of Seattle and 6 percent in its retail core. Meanwhile, the total city assessments rose 35 percent. Since 1939 respective gains of 14, 22, and 65 percent were registered in the CBD, the retail core, and the city proper. The central business district assessed valuations as a proportion of the city total declined from 29 percent in 1929 down to 25 percent in 1939 and then tumbled to 16 percent by 1952. (SR 11, pp. 64-66).

OTHER FACTORS

There has been some tendency to link downtown's slower rate of growth in retail sales and assessed valuations with its increasing shortage of parking facilities. This stand appears to be well taken on the basis of concurrent declines in San Francisco, Seattle, and Detroit. But in Dallas, where the ratio of spaces to automobiles remained nearly constant, downtown sales failed to increase while the total metropolitan-area business gained over 40 percent. And downtown Oakland managed to maintain its sales position while the space-auto ratio declined.

Obviously, there are many other relevant factors. Most important has been the broadening base of urban economic activities and of the population. The major part of this growth has occurred in the peripheral areas, where suburban retail outlets have satisfied much of the consumer demand. Downtown could not expect to retain its former proportion of such an expanded market. At the same time this over-all expansion partially accounts for the maintenance of property values and retail sales downtown, through the added supply of daily central-city workers. This "captive" market may be responsible for as much as 35 percent of the retail trade in the central areas of larger cities. In smaller cities, however, this factor is less important. For example, in Lexington, Kentucky, a city of 50,000 population, fewer than 15 percent of a department store's sales were made by persons who came downtown primarily to work. (SR 11-B, pp. 5-6).

Of course, traffic congestion is another potent force toward making downtown inaccessible. It is invariably found where parking facilities are inadequate. Also, the fact that mass transit service is less in the suburbs, generally crowded conditions, and adjacent blighted areas, are hindrances to downtown shopping. There is need for store modernization and such amenities as air condition-

ing, improved lighting and landscaping. Lack of effective merchandising techniques and sales promotion, such as night openings, contribute further to downtown's inability to maintain the pace. Not the least of its disadvantages is the effect of walking distance from place of parking to final destination and the cost of the parking space itself. Though all parking facilities may not be filled to practical capacity, vacancies occur only where demand is subdued either by the excessive distance to ultimate points of destination or by unattractive parking fees.

SHOPPING TRAVEL PATTERNS

Other research has pointed to the relatively moderate effect of parking in the competition between central business districts and suburban centers. Objective studies of data obtained from the home-interview type of metropolitan area traffic survey showed that shopping trips conform to a fairly standard pattern. (SR 11-B). The total number of shopping trips originating in any area was related directly to the number of automobiles owned by residents of that area. Families made an average of one trip each week to shop for major "shopping-goods," such as items of apparel and articles for the home. Areas displaying a higher ratio of registered automobiles to dwelling units generated additional vehicular trips due to more frequent shopping (in cars) for groceries, drugs, hardware, and other every-day "convenience goods." In residential areas where less cars were owned per dwelling unit, fewer automobile trips were generated to the neighborhood stores and a smaller ratio of parking space was required.

These studies (in Albuquerque, Boston, Houston, and Washington, D. C.) also indicated a decline in the number of shopping trips downtown by families living beyond about two miles from the city center. The shopping-trip pattern of these cities having a population of over 150,000 was well dispersed, the central business district being predominantly a shopping-goods center. In Appleton, Wisconsin, a city of 40,000, shoppers were dependent upon downtown for most convenience goods as well as for shopping goods.

Downtown shoppers who rely upon public transportation are significant since they make no demands upon parking facilities. Transit plays a relatively minor role in serving suburban shopping areas, but in large cities its importance downtown is magnified by the high-density residential areas on the fringe of the central business district. In cities of one-quarter million population about half of the shoppers reached the central business area on mass transit vehicles—a larger proportion in the larger cities, less in the smaller ones. However, the auto shopper is likely to spend one and one-half to two times as much downtown as the shopper who travels to town via mass transit.

Detailed analyses of selected suburban shopping centers in Washington showed that approximately 80 percent of the shopping trips to each center were made by persons living within ten-minutes driving time. The shopping travel patterns were in substantial agreement with the principle of retail gravitation advanced by Professor Reilly and later adapted by others.[3] In assigning shopping trips to competitive shopping centers the most reliable estimates followed this adaptation—the drawing power of a shopping area on a group of shoppers is related directly to its size in terms of goods selection and inversely to the square of its travel-time distance from the shoppers' place of residence. Therefore, rather than parking, the major factors influencing shopping location appear to be proximity of the shopping facilities to the customers from the standpoint of time and the range of goods selection available there.

SHOPPER ATTITUDES

Investigations of shoppers' attitudes toward downtown as opposed to suburban shopping centers have corroborated these findings. (SR 11-A). The following attitudes largely shaped shoppers' habits in Houston, Seattle, and Columbus, Ohio (See Figure 7):

Downtown advantages: (1) Selection of goods is larger. (2) Several errands can be run on one trip. (3) Prices are cheaper.

Downtown disadvantages: (1) Parking is difficult. (2) Area is too crowded. (3) Traffic is congested.

Suburban center advantages: (1) Home is closer. (2) Parking is easier. (3) Store hours are more convenient.

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[3] See Converse, Paul D., and Mitchell, R. V., "Movement of Retail Trade Within a Metropolitan Area," *Journal of Marketing*, July 1937; and Rouse, James W., "Estimating Productivity for Planned Regional Shopping Centers," *Urban Land*, November 1953.

Suburban center disadvantages: (1) Selection is limited. (2) Fewer kinds of business are represented. (3) Prices are too high.

In the opinion of the majority of those interviewed in the three cities, the central business district had decided advantages; a better chance of meeting needs and getting the best products for the least money, despite some loss of time and convenience due to traffic and parking conditions. However, although difficulty of parking was downtown's main drawback, it apparently did not handicap business too much. In other words, when all the factors were taken into consideration, the downtown advantages seemed to minimize the disadvantages and parking did not greatly affect the shoppers' trip destination. For instance, 90 percent of the respondents in Columbus found parking difficult downtown, 71 percent were concerned about the parking cost, and traffic congestion hampered 81 percent. Yet less than 10 percent allowed these impediments to deter them from shopping downtown by automobile.

"In the first place," the report states, "a large proportion of people do not use their cars for shopping downtown. To these must be added many who have reserved or private parking facilities. Moreover, the buying of shopping goods is infrequent. . . . In other words, the parking difficulty, *as far as shopping downtown is concerned,* affects a large proportion of people not at all and the majority infrequently. Thirdly, the advantages of the central business district as against the suburban centers are of such a nature that the majority are willing to pay the inconvenience cost to get what they feel is available only downtown. Since parking seems, however, to be the number one disadvantage of downtown,

DOWNTOWN	SUBURBAN CENTER
ADVANTAGES:	ADVANTAGES:
1. Greater selection.	1. Closer to home.
2. Several errands in one trip.	2. Easy parking.
3. Cheaper prices.	3. More convenient hours.
DISADVANTAGES:	DISADVANTAGES:
1. Difficult parking.	1. Limited selection.
2. Too crowded.	2. Fewer types of business.
3. Congested traffic.	3. High prices.

Figure 7. Consensus of shopper attitudes in Houston, Seattle, and Columbus.

efforts to improve that situation will increase the stability of the area. Parking, however, should be kept in its proper perspective. Other measures, such as the improvement of mass transportation, should not be neglected." (SR 11-A, p. 38).

There was ample evidence that families with children were more inclined to favor suburban shopping centers. Similarly, skilled workers showed greater orientation toward suburban shopping than the other occupational groups, and those in the middle income group preferred to shop in the suburbs more than others. On the other hand, the higher socio-economic groups tended to be more strongly attracted toward downtown. Also, women appeared to be more oriented to downtown than men, those with an urban background more than those who were raised in rural areas, the 50-64 age category more than the younger groups, and the better educated more than those with less education.

Greater concern with the over-all problem of parking and traffic congestion was expressed by the middle income group, those with rural backgrounds, the younger age groups, and by families with children. Generally, women had less difficulty finding a place to park than men, but men were more satisfied with the cost of parking and with the traffic situation.

The interaction of these influencing factors was significant. For example, distance from the central business district was important in determining the degree of attraction to the downtown area, but its influence may be affected by the economic status of the shopper. Downtown usually had a stronger attraction for shoppers living nearby than for those living farther away. Within reasonable distances, however, the higher economic groups were more likely to be satisfied with downtown than those in the lower income brackets.

Another perplexing point concerned the general increased satisfaction with downtown as parking improved. In spite of this trend, the Houston shoppers were more strongly oriented toward suburban centers than those shopping in Columbus or Seattle, even though they had less difficulty finding a place to park downtown. But they used their automobiles more.

Finally, an overriding desire to shop where the selection of goods is greatest lured relatively more of the higher-income groups downtown, notwithstanding the fact that they were the ones more

averse to parking inconveniences there.

SHOPPER PARKING

To complete the parking perspective it is necessary to appraise the importance of shopper-parkers in the over-all terminal problem within the central business district. Naturally, as cities increase in size, the relative importance of parking at the curb drops sharply with regard to the shopper who drives her car downtown. Parking lots, which supply space for only one-fifth of the shopper-parkers in smaller cities, increase in importance in the larger ones and provide over 40 percent of this space in the average city with a million-and-a-half people. Over this same population range, garages rise from relative insignificance to account for a one-sixth share. In the very large cities off-street parking spaces, lots and garages combined, replace the curb as the dominant haven for shoppers who must park their cars.

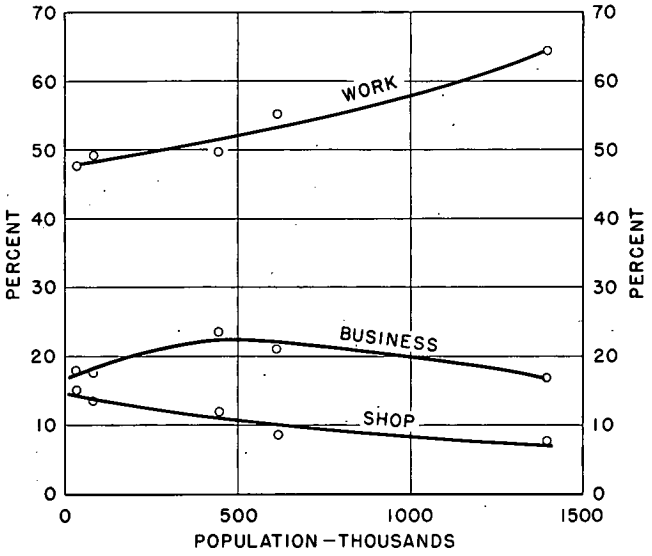

Figure 8. Proportion of space-hours used by downtown parkers.

More interesting, perhaps, is the relative use of parking facilities according to the purpose of trips to the central business district. On the basis of total parkings occurring downtown, in the smaller cities work trips are only half as important as trips for either a shopping or business purpose. On the other hand, in larger cities parkings by those on work trips surpass those for other purposes. But the significance of these differences is multiplied when the effect of length of parking time is considered. Workers generally park twice as long as the others, averaging from three to six hours, against about one to two hours for shopping and business trips. Therefore the proportion of total parking space-hours used by workers increases from less than 50 percent in cities under 100,000 population to more than 60 percent in the over-one-million group. While business trips account for about 20 percent of the total space-hours throughout the range of city size, the shoppers' share decreases from 15 percent to less than 10 percent as population rises. (See Figure 8).

The ratio of shopper parkers to total parkers declines with increasing city size so that at about one-quarter million population a plateau is reached in the absolute number of automobile trips downtown to shop and in the space-hours used by these vehicles while parked. (SR 11-B). At this plateau the average daily trips numbered about 6,000; space-hours totaled about 9,000. The accumulated vehicles used by shoppers during the peak parking period reached a maximum of less than 2,000 automobiles. Under existing conditions, therefore, the auto shopper is playing a relatively minor role in the downtown parking picture. However, the shoppers who travel downtown in automobiles display purchase habits which emphasize their importance in the shopping picture.

PURCHASE HABITS

Whatever effect the availability of parking facilities might have on a business is dependent also upon the proximity of the facility with respect to the affected establishments. The distance shoppers will walk after parking their cars varies in cities of different sizes. The average walking distance to the major shopping destination is around 200 feet in small cities but exceeds 800 feet in cities with over a half-million population. Further, purchase habits vary as walking distance increases. In one case for instance, about half the shoppers who parked at a small customer lot in Lexington, Kentucky, actually purchased something during their trip. The number of shoppers as well as the number who made purchases (purchasers) declined in stores located at a greater distance from the lot. However, the average amount of purchase by each shopper who bought something was fairly constant regardless of distance. Therefore the sales pattern for total pur-

chases also decreased as distance from the lot increased. Figure 9 shows that the maximum sales occurred in stores within a few hundred feet of the lot and there was a sharp decline beyond about 1,000 feet. (SR 11-C).

Other purchase habits of shoppers who parked at the Lexington lot are of interest. On the average weekday men accounted for about half the drivers and only one-fifth of the passengers using the lot. On Saturday, nearly two-thirds of the drivers were men but only three percent of the passengers. It would appear that husbands frequently serve as family chauffeurs on their "day off." This was primarily a shopper's lot. Three-fourths of the drivers shopped, regardless of day of week. On weekdays only about half of the passengers went shopping while the others transacted business. Nearly three-fourths of the Saturday passengers shopped.

Most significant was the relative proportion of shoppers who made purchases and how much they spent. On the average only one out of every two shoppers actually bought something. On weekdays the average purchaser's expenditure amounted to about $11. For all shoppers the mean purchase was slightly less than $6. The average over-all purchases made by all the occupants of each shopper car totaled $20. On Saturday the number of shoppers and purchasers and the amount of their sales were somewhat greater than on weekdays and the shopping patterns were more erratic.

EFFECT OF NEW FACILITIES

Reports have come from several cities regarding the favorable effects of a progressive parking program. But many of these cities are satellites of a large metropolitan area and in others the expansion of suburban centers has been curtailed by the unanimous decision of local merchants to preserve downtown. Rather than a city-versus-city comparison, in this project investigations were made of the relative advantages of parking facilities in the competition among downtown department stores within a city. Only one city was

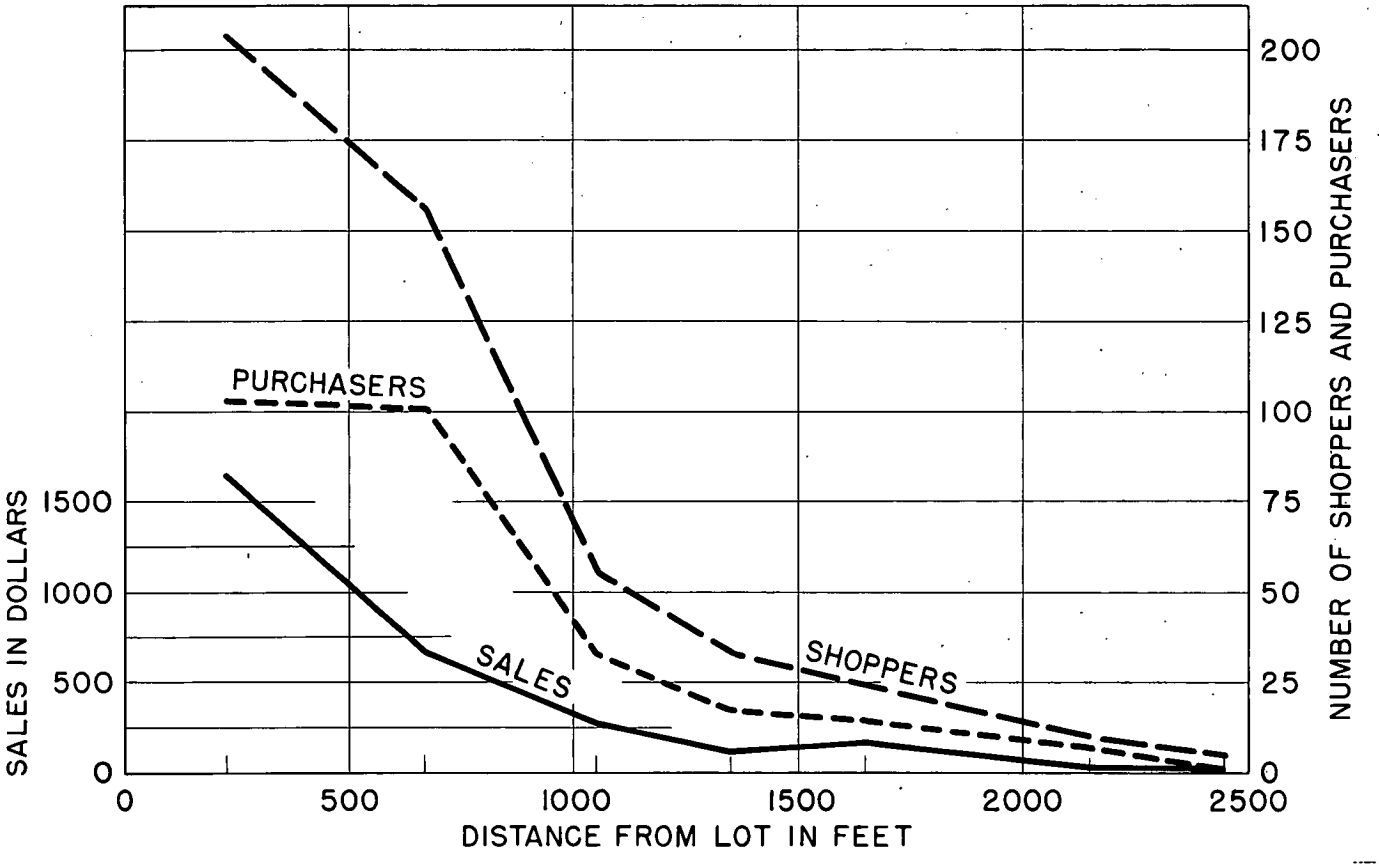

Figure 9. Average weekday shoppers, purchasers and sales, by distance from a parking lot in Lexington, Kentucky.

studied and consequently care must be used in drawing conclusions from the findings.

Shopper habits were observed at a Lexington, Kentucky, department store in 1954, before it opened a new customer parking facility, and in 1955 after this parking lot had been in operation for about a year. At the time of the 1954 study the store validated parking up to two hours at a nearby parking garage. The new lot was opened on a strictly commercial basis with normal parking fees and shortly after opening the garage validating practice was discontinued. During this interval small increases were found in: (1) the proportion of men shopping at the store, (2) the percentage of shoppers who were already in town primarily to work or for some purpose other than shopping, and (3) the relative number of customers who shopped in the morning. On 1954 weekdays 28 percent traveled to the store in a city bus; in 1955 only 19 percent. After construction of the lot there were relatively more automobile shoppers but an even greater increase in the percentage of walkers. About 85 percent spent less than 30 minutes in the store—the walkers less, the automobile shoppers more.

Slightly over half the shoppers made a purchase and generally the more time a shopper spent in the store the more money he (or she) spent. The percentage of purchasers among the shoppers who came directly from home was significantly higher than the proportion of worker-shoppers who bought something. In both years the taxicab passengers were more likely to make a purchase than those traveling by other means; auto shoppers were more likely to buy something than bus passengers. But in 1955 all except the taxi shoppers were less likely to make a purchase than their 1954 counterpart. As far as store sales were concerned, relatively fewer were accounted for by both automobile and bus customers after opening the new lot, though the walkers' share almost doubled. There was no significant change in the percentage of shoppers and purchasers traveling by automobile, who lived at varying distances from the store. Both before and after the lot was opened, the proportion of auto-driver shoppers increased as the distance of their residence from the store increased. Similarly, more customers continued to come from farther away on Saturday than on weekdays, and the greater the distance, the more likelihood that they made a purchase.

In both 1954 and 1955 the spatial pattern of shopping trips per unit of population remained virtually unchanged throughout the range of distance from the store. Trips were more frequent on Saturday than weekdays, but in 1955 on all days of the week the trips were fewer and the percentage of purchasers was smaller than previously. The pattern of sales per unit of population as distance from the store increased also remained very similar. However, the 1955 sales were lower and the average purchase was smaller.

At the time of the earlier study 45 percent of the auto drivers who shopped at the store parked their cars at the curb, 20 percent in parking lots, another 20 percent in the customer garage, and 15 percent in other garages. The 1955 study found 40 percent parked at the curb, 14 percent at the new lot, 25 percent at other lots, only 6 percent in the customer garage, and less than 15 percent in other garages.

This distribution is important since the purchase habits of shoppers vary depending upon their mode of travel and place of parking. The average taxi passenger did the most spending, the walkers least, and auto drivers half again as much as bus passengers. Less was spent in 1955 than in 1954 by all driver-shoppers, regardless of where they parked, but those parking at the former customer garage continued to spend more than the other auto drivers. The new lot, however, moved into second place in the ranking of the types of parking facilities according to the average purchase.

There was no apparent change in the distribution of purchases in each major department of the store in so far as the purchasers' mode of travel was concerned. At the time of each study about half of the weekday purchases in most departments were by auto drivers, but on Saturday drivers made over 80 percent of the major-appliance and furniture sales. Also, men's clothing and major-appliance purchases were disproportionately high on Saturdays, while the purchase of yard goods and small wares predominated on weekdays.

In general then, after operating the parking lot for almost a year, the basic shopping habits and travel patterns of the store's customers were not altered significantly. However, the total sales declined. Not only was the store unable to improve its sales position relative to other department stores in the city, but it actually slipped while the

others gained. To explain this paradox requires a closer look at the conditions surrounding the development of the parking lot. It was small, with a capacity of less than 100 cars, located in the middle of the block, and across the main street from the store. There was no visible connection between the two, either in name or advertising. Most important though, the lot was from the start a fee facility with standard shopper parking rates, operated as a separate commercial business. And then shortly after opening the lot, the store decided to terminate its two-hour free customer parking arrangement with a 140-car capacity parking garage within 300-feet walking distance from the rear entrance. These were the only parking changes within 2 or 3 blocks of the store during the period between the two surveys. Indications are that the net effect of lost free parking and added fee parking was lost business. Parking can be a help, but there must be an over-all improvement in the cost and convenience to the shopper.

At the other extreme were the results recorded by the largest department store in Salt Lake City. Six months after completion of its 510-space "Parking Terrace" garage, the store's monthly sales exceeded the previous year's by 10 percent more than the margin reported by the Federal Reserve Board for all department stores in the city. Knowing the proportion of total store customers who parked at the Terrace and assuming an average expenditure double that of the other shoppers (SR 11-A, pp. 4-5; SR 11-C), it was estimated that one-third of the purchases by the garage users represented generated business. With a turnover of three cars per day, each responsible for $5 worth of purchases, this generated business would approximate $1,500 per parking space during the year. It is noteworthy that this store is the largest in the city and that it aggressively promotes the Parking Terrace, which also bears its name. This garage represents customer parking of excellent design, being physically connected with the store building at each level. Most important was the limited free parking available through validation of parking tickets when shoppers made a purchase.

The results of interviews to determine the reaction of shoppers to improved parking facilities are consistently favorable. One such interview study was directed at shoppers who parked at a new garage owned by Hartford's largest department store, located less than a block away. When asked whether they would have come downtown rather than elsewhere if the garage was not available, 20 percent said "no". In the absence of the facility a few others felt that they would not have traveled by automobile, but they still would have shopped downtown in order to take advantage of the better selection of goods there. Also, the availability of the garage was of somewhat greater importance to men than to women and on Saturday than on weekdays, suggesting that it was a greater advantage to shoppers whose needs were decided in advance rather than to those merely on a routine shopping trip.

These examples suggest the possible limits of the effect of customer parking facilities on department store business. Within these bounds there are many different possibilities. In the competition among individual stores within a commercial center the larger ones have an essential competitive advantage due to the greater selection. But other factors being reasonably similar, parking can only bolster trade in relation to the design, location, operation, rate schedule, and promotion of the facility under consideration.

CONCLUSION

A marked change in shopping habits has accompanied the spectacular growth of automobile use. The shift from public transit to private cars has had a substantial effect upon retail activities downtown. As the ever-growing urban population became more mobile and migrated outward, travel time and distance to the central business district seemed objectionable for many of their shopping trips. It is far simpler to shop at new outlying commercial centers closer to the residential neighborhoods. The parent city's share of the metropolitan market, therefore, is ebbing and the flow is toward the younger suburban centers.

But the downtown picture is not an altogether somber scene. Although the central business district's relative proportion of the total metropolitan-area business has declined, its volume of trade has simply increased at a slower rate than the outlying sections. Rather than decentralization this might be termed peripheral urbanization.

Certain land functions have shifted downtown but there always will be some uses of land that require a central location. Most offices are there;

it is the government and financial center; it has central distributing agencies, most of the hotels, restaurants, and large theaters, which cannot be duplicated elsewhere. The retail core is still the only true regional shopping center, being most easily accessible to the largest group of people. Despite the suburbanization trend, real estate values and income from properties there have risen. The fact that workers comprise a sizable portion of the shoppers downtown probably accounts for much of the continued strength of department store and fashion apparel sales. Moreover, new office buildings are increasing this supply of captive shoppers. In readjusting to a more mature role, downtown has successfully maintained its fame as the star attraction.

It has been inferred that the historical shortage of parking facilities has been primarily responsible for the surge in suburban sales. But the expanded population base, which has prompted department stores to establish suburban branches, is perhaps the most important single factor. Consequently, it appears that the changing pattern of shopping due to the increased mobility of the auto shopper has been more influential in recent retail trends than parking and traffic conditions.

The importance of parking varies a great deal. A categorical generalization of the quantitative effect of parking on business is not readily possible because of the many other relevant factors. Besides, there are innumerable situations, and parking must be viewed in the proper perspective in order to determine its real effect. The most important factors influencing shoppers' travel habits are: (1) the total travel time from their home to the shopping district—the main advantage of suburban centers, and (2) the selection of goods available there—the number-one attraction downtown. These favorable attitudes far outweigh the disadvantages at either location.

Together these factors of travel time and selection can be used to measure the general market area of any commercial district. In a suburban center with limited public transit facilities, parking should be provided for practically all of the shopping trips generated within its market area. The number of parking spaces, of course, will depend upon such conditions as the daily, weekly, and seasonal pattern of shopping trips; the anticipated walking trips; the nature of goods available; and the length of time parked. In the downtown area the relative use of mass transit is an important consideration, but provision must be made for parking the cars of the remaining automobile shoppers living within the market area.

If a shopping center fails to provide the required parking facilities, shoppers must spend added time seeking a parking space and thereby increase the over-all travel time from home to store. This tends to decrease the radius of the market area. Conversely, those centers which opportunely satisfy the parking demands of these "misplaced" customers, can extend the natural limits of their market. Apparently this explains what has happened to a portion of the downtown market. When many shoppers switched from transit to car at a time when many types of shopping goods became available at spacious suburban centers, the parking difficulty reduced downtown's effective shopping radius. Correction of the parking deficiency should enable the downtown merchant to recoup much of his lost business. But this is the only case where added parking will generate business directly, and then only to the extent of the actual trade area. In other words, downtown can only lure or lure back those shoppers who will have a shorter over-all trip or those to whom a greater selection of goods overshadows any added time it might take them to accomplish their shopping mission.

However, an adequate parking program may provide the stimulus for further investment in an existing commercial area, which will provide additional selection opportunities. Indirectly, then, parking might be responsible for increasing the drawing power of a shopping center.

In the competition among individual stores within any type of shopping area, parking can be an important factor in drawing shoppers from one store to another. It seems, however, that the less expensive and the nearer parking facilities are to an establishment, the more advantageous they are, not only in terms of potential shoppers but also on the basis of anticipated retail sales. Also, there is an immeasurable influence exerted upon the above interpretations by different merchandising practices. All of these factors affecting over-all shopping convenience and satisfaction cannot be mentioned here but among the more important are prices, modernized facilities, advertising, charge accounts, night openings, deliveries, and other services. Although the bigger magnets basically will attract more people, those offering

the greatest conveniences have a competitive advantage. Other things being equal, therefore, parking looms as a vital factor. Nevertheless, it cannot create additional purchasing power.

Briefly, then, this project has demonstrated several fundamental precepts regarding parking as a factor in business. The complexity of the data indicated that the effect of parking is not readily adaptable to a mathematical analysis. On the other hand, the subject has been focused in its proper perspective by establishing the qualitative importance of many relevant factors and the critical balance that exists among them. Possibly more important, not only has the way been pointed to additional needed information, but valuable guide posts have been established to orient and steer future researchers. Moreover, a basic framework is provided upon which to develop these related factors or other variables and to which numerical values can be assigned when added case studies furnish further opportunities to measure the effect of parking on business.

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The HIGHWAY RESEARCH BOARD was organized November 11, 1920, as an agency of the Division of Engineering and Industrial Research, one of the eight functional divisions of the NATIONAL RESEARCH COUNCIL. The BOARD is a cooperative organization of the highway technologists of America operating under the auspices of the ACADEMY–COUNCIL and with the support of the several highway departments, the Bureau of Public Roads, and many other organizations interested in the development of highway transportation. The purposes of the BOARD are to encourage research and to provide a national clearinghouse and correlation service for research activities and information on highway administration and technology.