

# USE OF CENSUS DATA IN URBAN TRANSIT PLANNING

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The decline of transit service in urban areas of the United States has been well documented (1). Recently there has been renewed interest in strengthening transit service in urban areas (2). The success of such efforts to improve service and increase transit use depends on the degree to which transit service can satisfy urban travel demands. A unique opportunity exists to utilize data from the 1970 census to assist in the determination of travel demand and in the development of improvement programs for transit service in urban areas.

## USE OF DEMOGRAPHIC DATA

The 1970 Census of Population provides valuable information on the distribution within the urban area of groups that must depend on transit service: the young, the old, and the poor. Although poverty may become a less significant obstacle to automobile ownership in the future, the number of elderly people will continue to grow, as will the mobility requirements of those too young to drive. For example, while the population of the city of New Haven, Connecticut, declined from 152,048 in 1960 to 141,752 in 1967 (the year of a special census-use study), the population sector consisting of the 5-to-17 and the over-65 age groups increased from 45,900 to 46,200. These groups represent over 30 percent of the city's population.

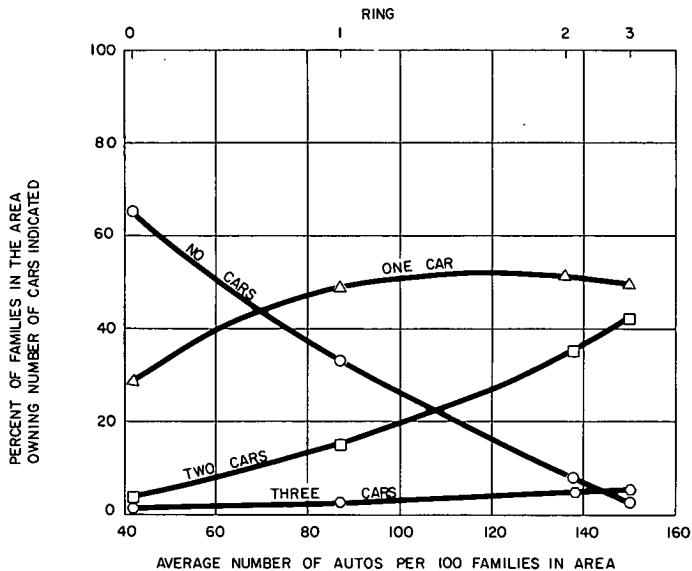


Figure 1. Relationship between number of families owning 0, 1, 2, and 3 automobiles and average automobile ownership in Wilmington, Delaware.

By locating the young and old population by tract and comparing the transit service provided (in terms of bus- or seat-miles of service or trips per day per person), areas where improved transit service is needed can be determined. Areas with low-income characteristics can also be identified from census data. A distribution of the number of households by family income can be obtained and compared to transit service.

The proportion of families that do not own an automobile can also be determined from average automobile-ownership data as shown in Figure 1. Census data can pinpoint areas of low automobile ownership where there is high reliance on and need for quality transit service. As shown in Figure 2, transit use per family declines sharply (in Wilmington, Delaware, from 45 percent of all trips to 5 percent) with the purchase of the first automobile. Yet, more transit trips are made on a system-wide basis by families that own automobiles than by those who do not. (Only one-third of all transit trips are made by those persons in households without an automobile in Wilmington.) Still, the majority of all trips made by members of families who do not own an automobile are made without using transit (55 percent in Wilmington); they are made largely as passengers in some other family's automobile. Improvements to transit service can reduce the need for such dependence and reduce automobile use for this serve-passenger purpose

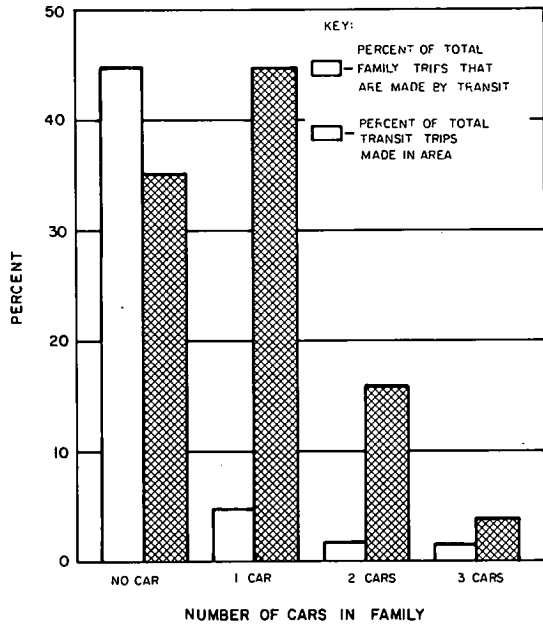


Figure 2. Relationship between transit trip-making and automobile ownership in Wilmington, Delaware.

### NATURE AND USE OF JOURNEY-TO-WORK DATA

The 1970 census also collected data from a 15 percent sample of households on employment and mode of travel to work. These data will be coded to block and tabulated at the tract (and in some cases block) level. Special tabulations of these data can be made available at the traffic zone level through a standardized data summarization program developed jointly by the Bureau of the Census and the Federal Highway Administration.

Although work travel in urban areas represents only 20 to 30 percent of all daily travel, it forms a considerably higher proportion of weekday peak-hour travel (60 to 80 percent). In addition, it represents an even greater proportion of travel by transit modes. Data given in Table 1 show that for work travel the utilization of transit is nearly double that of automobile; well over half of all transit trips are made for work purposes.

Another advantage of using 1970 census data for transit planning purposes is related to the fact that transit-use levels have tended to stabilize or decline slowly during

TABLE 1  
DAILY PERSON TRIPS FROM HOME BY PURPOSE AND MODE OF TRAVEL IN PHILADELPHIA IN 1960

Purpose	Mode				Total
	Automobile		Transit		
	Num-ber	Per-cent	Num-ber	Per-cent	
Home to work	724	68.3	336	31.7	1,060
Home to other than work	1,774	87.0	266	13.0	2,040
Total	2,498	80.6	602	19.4	3,100

Note: Number of trips in thousands.

the past few years. Thus, 1970 data, which will become available in 1971 or 1972, will still be current for the purposes intended.

#### USE OF TRANSIT RELATED TO SERVICE LEVELS

Census data can be used to determine the percentage of all work trips made by transit and the number of transit users per 100 workers. These measures can be related to measures of transit service. A study in Wilmington, Delaware, related transit use to the level of transit service provided as determined from an index that combined cost, travel time (versus automobile time), service coverage, and frequency. As shown in Figure 3, those areas that received good transit service had twice the ridership, according to estimates based on parameters of automobile ownership and family size, while areas with poor service had only one-fifth the expected use (3). An analysis of transit service levels related to use as determined from census data on mode of travel for the journey-to-work in urban areas can determine where transit service should be increased to attain higher levels of utilization.

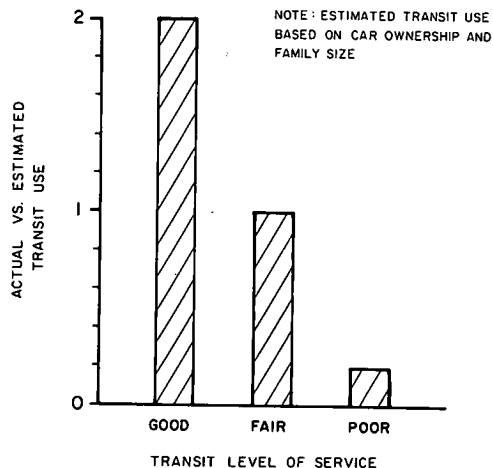


Figure 3. Actual versus estimated use of transit in Wilmington, Delaware.

#### USE OF CENSUS DATA IN TRANSIT ROUTING STUDIES AND FOR CORRIDOR IMPROVEMENTS

Census data on population and employment by tract or block could aid greatly in routing transit service. Maps of existing routes and service frequency can be overlaid on population and employment patterns to see if existing routes should be modified or supplemented. These data should be particularly valuable in routing feeder service to existing or proposed rapid transit stations.

The home-to-work data by mode of travel should also prove most valuable in determining those corridors of commuting movement that are most susceptible to improvement through the provision of express bus service. Possible urban corridor project locations and possible locations for fringe parking facilities can be identified. Total travel as well as existing transit demand in these corridors can be determined.

#### USE IN ANALYSIS OF WORKER-PARKING REQUIREMENTS AS RELATED TO THE USE OF TRANSIT

An important potential use of census data on journey-to-work travel is in its application to worker-parking requirements. These data include automobile driver and passenger information so that automobile occupancy to work destinations can be determined. In addition, total employment by small area will be available. Together with transit use information, these data can form the basis for evaluating the supply of parking spaces for workers within the downtown area. As shown in Figure 4, a basic relationship exists among these variables.

By comparing automobile use and parking supply expressed in terms of employees per space, the need for improved parking can be pinpointed. This relationship can also be used to achieve a balance between transit and automobile use as related to parking policy. Although improvements to transit, especially in smaller urban areas, will not generally result in a reduction in highway facility requirements in any single corridor, the accumulative effect of such transit improvement can have a marked beneficial effect on downtown parking requirements and on CBD circulation.

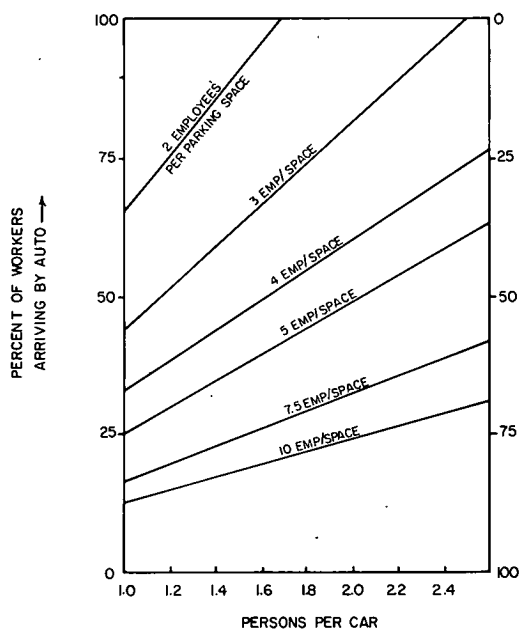


Figure 4. Basic relationship among automobile use, automobile occupancy, and parking requirements for work travel (based on assumption that 8 of 10 employees arrive by automobile or transit and all spaces are used).

### SUMMARY

1970 census data will prove a rich data source for transportation planning purposes. The journey-to-work data (coded to small geographic units within the urban area for the first time) are especially applicable to the analysis and improvement of urban transit services. Data from the 1970 population census can also identify areas where transit service is needed to serve the young, the old, and others who have no alternative means of transportation. By relating levels of transit use to measures of transit service, areas where improved service has high potential can be determined. Routing studies can also be undertaken by using census data. Finally, worker parking needs can be determined and related to the supply of parking now available. It would be a wasted opportunity if planners in every urban area did not seize this rich data source and attempt to improve their urban transit systems in a logical, systematic way based on an analysis of the information becoming available.

### REFERENCES

1. 1970 Transit Fact Book. American Transit Assn., Washington, D. C.
2. Fugate, D. Changing Highway Concepts. Traffic Quarterly, April 1970.
3. Wickstrom, G. V. Simulation and Forecasting of Transit Travel in New Castle County. New Castle County Program, Tech. Rept. 12-015-33308, 1966.