

# Transportation and the Spatial Distribution of Economic Activity

GEORGE W. BLEILE and LEON N. MOSES, respectively, Research Economist and Director of Research, Transportation Center, Northwestern University, Evanston, Illinois

● THE MATERIAL in this paper is drawn from a larger study that the authors are conducting. This larger study (being carried out under the auspices of the Transportation Center with financial assistance from Resources for the Future and the Ford Foundation) deals with certain long-run changes that are taking place in the distribution of economic activity in the United States. The long-run tendencies on which the authors have focused are those that have come to be described by the terms "suburbanization" and "regionalization". As applied to economic activity, the former term is usually interpreted to mean a movement out of the central city—particularly the core and the area adjoining it—to suburban areas within a given metropolis. On the other hand, the term regionalization usually refers to the diffusion of economic activity, especially manufacturing, among broad regions of the country. The main theme of the aforementioned larger study is that suburbanization and regionalization are closely related, competing tendencies. Both of them represent basic responses to changes that have been taking place in the mobility of factors of production; the techniques of production, transportation, and communication; the structure of transport rates, etc. The present paper deals with certain aspects of suburbanization.

As already indicated, this term is usually taken to mean a movement of population and economic activity out of the central city to the suburbs. This paper shows that, at least for Chicago, an approach based on this simple dichotomy does not permit a proper appreciation of the major changes that are taking place. Almost every previous study has employed this simple dichotomy because adequate data on the intra-metropolitan area distribution of economic activity were not generally available. As a result, it is not generally known what activities are declining in different zones of a metropolitan area, what activities are expanding, and at what rates these changes are taking place. However, it must be emphasized that the problems associated with metropolitan analysis have not been solely of a data variety. Research workers have not had a theoretical framework that could help them to understand the nature of the economic forces operating within metropolitan areas. Lack of such a framework has also led to the expenditure of great amounts of money and time on the collection of masses of data with only limited usefulness. As a result, much of the discussion concerning suburbanization and the changing functions of the central city is largely speculative in nature. With very little effort one can find "up-to-the-minute" reports, some claiming that "our central cities are coming back" and others claiming that central cities—particularly their compact central business districts—are relics of 19th century technology which will continue to decline, some of them in relative importance and others of them in absolute importance as well. Such contradictory claims can only be settled by a full-scale study of intra-metropolitan growth patterns for many activities. The present paper concentrates on the intra-metropolitan area distribution of manufacturing. This subject is clearly relevant, but the authors recognize that the picture presented is incomplete. (The changing distribution of service industries and the nature of their linkage with manufacturing firms are currently being studied by the authors.)

Changes in the geographic distribution of manufacturing plants within a metropolitan area reflect a composite of different types of investment decisions by many firms. Thus, some firms decide to go out of business, whereas other firms decide to expand their facilities for production and distribution. In the latter case, they must also

decide whether to expand at their existing site, to become a multi-plant establishment by setting up an additional facility at a new site within the metropolitan area, or to establish a new plant in a new location and abandon the old facility. Finally, new firms may decide to enter the area, and old firms may decide to leave. So far as the metropolitan area being studied is concerned, the latter decision amounts to a going out of business. The present study does not explain why firms decide to invest or disinvest. This decision is treated as a datum, major effort being devoted to explaining and documenting the locational aspects of these decisions.

By way of summary it may be said that the dispersal of manufacturing activity from the inner zones of the central city was clearly a dominant tendency in plant location during the past decade. Movement to the suburbs did indeed take place, but there was also a very marked tendency for growth to take place at the fringe of the city. To a considerable extent the tendency that most writers describe as suburbanization is actually a movement from the inner portions of the city to the periphery of the city. In other words, when firms decide to relocate from an existing site, they often select another site that is still within the political boundary of the city. There are a number of reasons for this decision. Some of the reasons have to do with certain frictions that act to moderate the distances firms move. They are explained later in the paper. The authors believe that the marked growth that has taken place at the fringe of the city is also related to transportation: firms prefer to remain within that zone of the city known as the commercial zone because there are transport cost advantages in doing so.

Earlier it was indicated that one type of investment decision involves relocation: a firm decides to shift its plant from one place within the metropolitan area to another. Data on plant relocations clearly reveal the over-all pattern of locational change that characterized Chicago's experience in the period 1950-1960.

The net influence of plant relocations within the Chicago metropolitan area has been to move economic activity from inner portions of the central city to the edge of the city and beyond. Thus, if the net gains and net losses of manufacturing plants due to relocations are computed, it is found that the greatest percentage gains took place in an area that is 10 to 15 mi from the core of the city. The greatest, and almost matching, losses occurred in a zone that is within 5 mi of the core. This pattern holds for the aggregate of all manufacturing activity and—with relatively small deviations—it also applies to all of the two-digit manufacturing industries. Thus, so far as the effects of relocation on the spatial distribution of manufacturing establishments are concerned, marked differences do not appear between industries.

To a certain extent this finding confirms the fears of those who talk about a flight of industry from the central city. However, this speculation must be interpreted with care. First, the major movement is not from the city to the suburbs, but from one part of the central city—the inner zones—to another part, namely, the fringe. Second, the pattern of expansions at old locations must be taken into account. Third, the pattern of new locations must be studied. Finally, the way in which the force of relocation actually works must be made clear.

One way of formulating the "flight" hypothesis is to say that firms in the inner portions of the city operate under more unfavorable conditions than do firms in any other portion of the city. As a result, a higher proportion of them decide to relocate, and their decision takes them to the edge of the city or beyond. This version of the flight hypothesis can be formulated in a way that permits it to be tested. Thus, from actual data a figure  $k_1$  is derived, which is the percentage of all firms that decided to carry out relocations in some given period of time. All firms in existence during this period are grouped according to their distance from CBD. The number of firms in each distance group is then multiplied by  $k_1$ . This multiplication provides an estimate of the number of firms in each distance group that would be expected to carry out relocations on the assumption that distance from the CBD has no effect. If distance actually does have a significant effect, the actual number of firms in the inner portions of the city that decide to relocate should be greater than the expected number, whereas the opposite would be true in the outer portions. In fact, distance from the CBD has no significant influence on the proportion of firms in each distance group that decide to

carry out relocations. It is true that absolutely more firms in the inner portions of the city relocate, but this is because there are more firms located there: distance from the core of the city has no significant influence on the proportion of firms in various distance groups that make investment decisions which involve relocation. (This result is based on a regression of the ratio of the number of plants that originated to the total number of plants by postal zone or the distance of the center of the postal zone from the CBD. The data were less than ideal because the total number of plants referred to 1960, whereas the number of origins referred to the 10-yr period. Use of postal zones also served to restrict the number of observations in the regression.) Firms all over the metropolitan area adjust to changed conditions by carrying out locational readjustments. On the other hand, once a decision to relocate is made, this decision most often involves a new site which is farther from the CBD than was the origin. There are interesting policy implications in this finding, but the discussion of these implications must wait until the review of the pattern of relocations has been completed and the locational patterns of the other types of investment decisions have been analyzed.

If the origin and destinations of all firms that relocated were plotted on a map, the over-all impression would be one of general disorder. However, this impression would be misleading because there are forces that appear to moderate and channel the locational readjustments that firms carry out. In general, and perhaps too simply, two sets of forces impinge on a firm that is considering a change in location. There are the motives for moving to a new location such as lower-priced land, better transportation, etc. On the other hand, there are considerations that tend to keep firms from moving too far from their old locations: an established labor supply, ties with other firms that provide material or service inputs; reluctance on the part of management to shift residence. These factors or linkages exert a friction on distance moved. Thus, we found that the mean and median distance moved by relocating plants were both about five miles, and the distribution was very skewed toward the shorter distances. The modal distance moved was somewhat less than one mile.

Comparison between the destinations of relocating plants and the site selected by new firms provides further evidence concerning the hypothesis that there are frictions that act to moderate the distance moved by relocating plants. After all, a major difference between the two types of firms is that those which are new to the area have fewer or no established ties for local inputs of various kinds. It was found that relocating plants consistently had destinations that were closer to the CBD than did new plants, after corrections were made for size. This finding bears on a related issue, the separate influences of the CBD and the original site on distance moved. However, the relative strengths of these two types of frictions have not been determined.

The intensity of manufacturing activity in the outer rings of the city increased as a result of expansions at existing locations as well as by relocations. However, such expansions were much more evenly spread over the entire area than were the relocation destinations. The pattern does reveal a primary peak in a zone that is 11 to 13 mi from the core, but the dominant impression is one of a broad plateau. Once more it must be recalled that there are many more firms in the inner portions of the city than in the outer portions. Therefore, if the absolute number of expansions carried out at existing sites resembles a broad plateau, this must mean that a smaller proportion of firms in the inner portions of the city carry out expansions at their existing locations. In other words, whereas the percentage of firms that relocate does not bear any relation to distance from the CBD, the percentage of firms that carry out expansions at existing locations does exhibit such a relationship. Moreover, the relationship is negative; that is, the closer to the CBD, the smaller the proportion of firms that carry out expansions at existing sites.

Plants established in Chicago by firms that are new to the area tend to locate in two general areas. The greatest concentration of new firms is in a zone that extends 4 mi around the core area. A second, somewhat lesser, peak occurs in an area that is 11 to 16 mi away from the core. Once again, the separate industry experiences do not appear to differ significantly from that for the aggregate of all manufacturing. However, the size of new plants does make a difference. The locational tendencies of new small plants is systematically different from that for new large plants.

Findings on the latter issue tend to bear out the "seed-bed" hypothesis. This hypothesis states that the inner portion of the city tends to act as the spawning ground of new small enterprise. The logic of the hypothesis is best presented as a number of propositions.

1. New small firms lack the capital to construct their own facilities and must depend on lease space. Such space is most readily available in the inner portions of the city, particularly in that zone which has been called the grey area. Thus, it is the distribution of relocations (origins and destinations) that permits the core area to fulfill this function.

2. The farther a firm is from the CBD, the more is the likelihood that it will have to integrate vertically and provide itself with many auxiliary services. Small firms are more limited in their ability to carry out such vertical integration and are therefore likely to establish themselves where they can draw on the agglomerated service facilities.

3. It is alleged that small firms are more likely to obtain loans on reasonable terms in the core area because banking is more competitive there.

4. A small firm on the outskirts of the city is less likely to be able to draw on the large pool of unskilled, low-wage labor that is found in the inner portions of the city.

It has been found that the seed-bed hypothesis does have substance. Almost 25 percent of all small firms established themselves within 2 mi of the CBD in the period under consideration. The percentage of new large firms that selected this area was only 3.6. Fifty-four percent of new small plants located in a zone extending 4 mi around the CBD, whereas only 14 percent of large plants settled in this area. Lease of existing facilities rather than construction of new buildings did characterize the behavior of small firms. Whatever their distance from the CBD, the proportion of small plants that relied on leased facilities was always greater than the proportion of large plants that engaged in lease arrangements. Thus, within the 4-mi zone around the core of the city—that area so often referred to as the grey zone—85 percent of new small plants depended on lease facilities.

There are obvious implications in the foregoing discussion for urban renewal. The grey area is often regarded as that portion of the central city most in need of rehabilitation. It is also the area through which it is often recommended that inner circumferential routes be constructed. Such rehabilitation and road construction are prescribed as two of the cures for the ills of central cities. This analysis suggests that the attraction the central city has for new small firms will be reduced unless new facilities are constructed to replace present "run-down" buildings. Put bluntly, the area that appears to be so badly in need of cleaning-up is precisely the area that permits the central city to perform and benefit from the function of encouraging the growth of small enterprise. New buildings could also allow it to perform this function—possibly more effectively—but the issue of cost must be faced. Unless a subsidy is involved, such buildings would probably involve higher rents.

The amount of industrial construction that is taking place in the outer portions of the central city and in the adjoining suburbs raises questions concerning the future of the central city as a spawning ground for new enterprise. Over time, more facilities are likely to become available on a lease basis in peripheral and suburban area. This suggests that the locational pull the inner portion of the city now exerts on new small enterprise may be reduced in the future. Other locational elements such as the existence of a large pool of low-wage labor and the massed service industries will have to carry a larger part of weight if the central city is to attract as much new, small-scale industry in the future as it has in the past. Therefore, it becomes very important to determine what is happening to the distribution of banking, legal and other such business service industries within the metropolitan area. It is also important to determine whether the low-wage labor force is becoming more dispersed. These are issues which the authors are currently investigating.