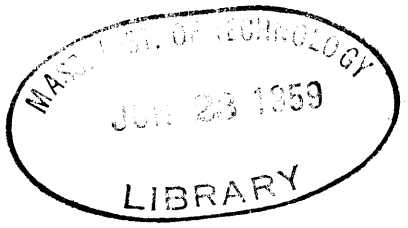

A STUDY OF BUSINESS DISLOCATION CAUSED BY THE BOSTON CENTRAL ARTERY

by

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B.A., Antioch College
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SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER IN CITY PLANNING

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MASSACHUSETTS INSTITUTE OF TECHNOLOGY

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ABSTRACT

A STUDY OF BUSINESS DISLOCATION CAUSED
BY THE BOSTON CENTRAL ARTERY

by James H. Saalberg

Submitted to the Department of City and
Regional Planning on April 1, 1959, in
partial fulfillment of the requirements
for the degree of Master in City Planning

This thesis is an empirical study of some of the effects generated when construction of a major central city highway forces the dislocation of a large number of business establishments whose premises have been taken for the building of the roadway. The study was undertaken in the belief that the questions concerning the dislocation and relocation of existing urban development will become increasingly important and pressing as our larger cities seek to resolve their traffic problems by carving out major expressway systems in their heavily built-up central areas.

As an approach to the subject of dislocation effects, the author has undertaken a case study of the particular effects generated by construction of the Boston Central Artery through the eastern fringe of the city's downtown business district. Four particular questions have been posed:

1. Is the dislocation caused of sufficient magnitude to require consideration?

2. Is there a significant loss sustained in terms of business establishments and employment to the area and to the city so that dislocation can be said to have definite detrimental effects, whatever the other benefits of the construction of the highway may be?

3. Is the pattern of spatial redistribution associated with the forced dislocation positively or negatively related to the future development of the urban community?

4. Are there ways by which the entire process of relocation might be revamped so that the losses generated can be diminished, the benefits augmented, and the entire process of urban renewal and planning facilitated?

In order to answer the above questions, the author studied the relocation movements and business experience in terms of employment growth or decline of the almost 600 establishments which lay in the path of this road and for which data was available. The study period begins in January 1950, when the route of the Artery was formally announced, and ends in 1957, two years after the completion of demolition.

The major conclusions arrived at in the course of this study are as follows:

1. The displacement was of such magnitude and character as to indicate that the questions and problems related to relocation demand careful study and analysis and a degree of planning not normally evident in projects of this type.

2. Despite the adverse picture found in certain subcategories of business activity, notably retailing, the over-all loss of establishments and employment engendered by the forced dislocation does not appear to be significantly greater than what might have been expected to occur under normal circumstances. This appears to be true whether one looks at the losses incurred by virtue of firms going out of business, the losses attributable to firms moving outside the metropolitan area or the city, or the growth experience of the firms which survived the relocation process.

3. The pattern of spatial redistribution generated by the Artery dislocation appears to have been positively related to the more efficient functioning of both the businesses involved and the urban community in general.

4. The Artery experience suggests that the losses generated in the course of the relocation process might be diminished and the benefits augmented if certain policies were adopted. Chief among these would be public financial aid to defray heavy relocation costs and a planned program, related to general urban renewal, of aiding dislocated businesses to select new sites in the area best suited to their particular operations and to the best functioning of the urban economy.

Thesis Supervisor: John T. Howard
Title: Head, Department of City and Regional Planning

LETTER OF TRANSMITTAL

Massachusetts Institute of Technology
Cambridge, Massachusetts

April 1, 1959

Professor John T. Howard, Head
Department of City and Regional Planning
Massachusetts Institute of Technology
Cambridge, Massachusetts

Dear Professor Howard:

In partial fulfillment of the requirements for the degree of Master in City Planning, I submit this thesis entitled "A Study of Business Dislocation Caused by the Boston Central Artery."

Sincerely,

James H. Saalberg

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LIST OF TABLES AND MAPS

ACKNOWLEDGEMENTS

First, I wish to thank the Greater Boston Economic Study Committee for giving me the opportunity while in their employ to carry through the work necessary to develop this thesis. I wish especially to thank Gregory Wolfe, the Committee's Director of Research and my employer, for making available to me much of the basic data which underlies this work and for stimulating my thinking and encouraging me in so many ways.

I am grateful for the assistance of my co-worker, Mrs. Phyllis Sweet of the GBESC staff, for helping me with much of the detail work which inevitably attends this type of study. I also wish to acknowledge my debt to my fellow planner on the GBESC staff, John Culp, for serving as an untiring sounding board and a most generous and helpful critic. In addition, my thanks for the cooperation of all my fellow workers on the GBESC staff.

I want to thank the Massachusetts Division of Employment Security for making available to me data without which this study could not have been done and Miss Mary Wilcox, Chief Supervisor of Research and Statistics for DES, for all her assistance and cooperation. In addition, my thanks go to numerous people at the Boston City Planning Board, the Massachusetts Department of Public Works, and the Massachusetts Department of Labor and Industries for providing necessary information.

A special word of thanks must go to Richard Green for his invaluable assistance in developing map presentations and to Miss Dulcie Jones for many hours at the typewriter.

To my thesis advisor and mentor, John T. Howard, must go my deep appreciation for many probing comments, the right amount of needed guidance, and for a well-timed bit of humor in some of my darkest hours.

Last but never least, my thanks and much more go to my wife, Ellen, without whose patience, counsel, editorial assistance and black coffee this work could never have been brought to completion.

CHAPTER I

INTRODUCTION

The construction of new highways produces a number of effects. The simplest and most obvious of these is the effect on vehicular travel. Time-distance between points is shortened. The capacity to move vehicles from place to place is increased. Assuming the traffic generated de novo by these combined benefits does not exceed the newly created capacity, old roads are relieved of their excessive burdens, the safety of travel is increased and the entire process of moving people and goods from place to place is made more efficient and economical.

This is the immediate and surface effect. More profound, and in the long run, far more important, is the secondary effect of highway construction, namely, the effect on land and on the pattern of development fashioned on the land. The key term here is accessibility, for new highways mean new patterns of accessibility. Considered in broad scope, increased accessibility may or may not mean growth for a given area. Thus, it is a moot question yet whether areas, such as Boston, which have declined relative to the rest of the country, will be benefited by more efficient connections with other areas, or whether these new channels will merely facilitate further decline. Improved over-all accessibility may generate net growth

for the region or the country, but this might well be correlated with increased concentration. The rich would get richer, while the poor were preserved more cheaply.

While the broad implications of increased accessibility remain unclear - and as yet little studied - the narrower effects have received much attention. A major part of the case for new highway construction has rested on the argument that new highways stimulate new development on the lands immediately adjacent to them. Dozens of studies have been carried through during the past decade to demonstrate that where new highways have been built and accessibility increased, new business and new homes have followed. Prominent among these studies are the Gulf Freeway Studies, the Dallas Central Expressway study, the Study of Massachusetts Route 128, and the California Highway Department's studies.[1] In general, these

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[1] See: (a) Norris and Elder, Consulting Engineers, A 15-Year Study of Land Values and Land Use Along the Gulf Freeway in the City of Houston, Texas, Highway Planning Survey, Texas Highway Department, Houston, Texas, 1956. (b) Norris Engineering Company, A Study of Land Values and Land Use Along the Gulf Freeway in the City of Houston, Texas, Highway Planning Survey, Texas Highway Department, Houston, Texas, 1951. (c) W.D. Adkins, Effect of the Dallas Central Expressway on Land Values and Land Use, Texas Transportation Institute, Bulletin 6, College Station, Texas, September 1957. (d) A.J. Bone and Martin Wohl, Economic Impact Study of Massachusetts Route 128 - Industrial Development Survey (Preliminary Report), Cambridge, Mass., January 1958. (e) Studies of the California State Highway Department appear in recent volumes of California Highways and Public Works. (f) For an excellent summary and bibliography of past studies, see William L. Garrison and Marion E. Marts, Influence of Highway Improvements on Urban Land - A Graphic Summary, Highway Economic Studies, University of Washington, 1958.

studies confirm what the eyes can see; along new highways new growth, often of gigantic proportions, takes place, generally at a pace far faster than that in other parts of the area considered. Lately, the question has been raised whether or not much of this growth is of the illusionary kind considered above; if in fact it is a growth carried through at the expense of draining less accessible areas. Some evidence has been gathered which indicates that a drain does occur and that the new development is not necessarily all "growth."[2] This same study concludes, however, that the vacant spots left in old areas are filled in with new activities and that the overall effect is, therefore, beneficial.[3] With this in mind, it remains clear, nevertheless, that new highways, by virtue of improving accessibility, do stimulate significant development on the land immediately adjacent to them.

There is a third impact of highway construction which has to date received virtually no attention. This is the impact resulting from the fact that highways necessarily take up space on the land and in doing so must displace what was previously there. The reasons this effect has been so little studied are not hard to find. In the first place, most of

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[2]Brigitte Orent, The Re-Use of Vacated Commercial Sites in Downtown Boston, unpublished Master's thesis, Massachusetts Institute of Technology, June 1958.

[3]Since this study did not investigate the third and fourth-round effects of this moving-up process, however, the question of net effect for the area remains unresolved.

the major highways built thus far in this era of massive road construction have been constructed either in rural or in suburban areas. For the most part, these roads have been laid down through open or sparsely settled areas. Where any economic use has been displaced at all, it was generally either agricultural or residential. Indeed, it appears that where structures of any kind lay in the path of these roads, the simple expedient was adopted of moving them out of the way. The displacement, in effect, has been minimal.

Even in the relatively few cases where highways have been built into the heart of cities, the tendency to choose routes along previously existing railway rights-of-way or through open land has limited the effect of displacement. This was clearly true in the case of the two most studied in-town highways, the Gulf Freeway in Houston, Texas, and the Dallas Central Expressway in Dallas, Texas. Since by virtue of circumstances and choice there has been a tendency for roads to be built on rights-of-way where little displacement could occur, it is not surprising that this impact has received so little attention.

It seems likely, however, that there is a second reason for the lack of study of this question. Although this has never been made explicit, the impression is inescapable that most highway impact studies have been undertaken either to prove the benefits generated by highway construction or,

alternatively, to dispel the idea that highways have significant harmful effects. Thus these studies have focused on three propositions:

1. Highways cause a net dollar saving to the community in terms of increased gasoline mileage and decreased travelling time.[4]

2. Highways increase the wealth of a community by generating increased land values and new business activity in the surrounding area.[5]

3. Where highways bypass previously existing centers of business, they do not significantly depress the business activity carried on even by the most highway-oriented enterprises, i.e., gasoline service stations, eating places and lodging houses.[6]

There can be little doubt that, wittingly or unwittingly, these studies have tended to prove a case. Since they involve high public expenditures, highways necessarily become prominent political issues. It is not surprising, therefore, that the studies carried on to date have been undertaken or sponsored by those most concerned with fostering these same projects - particularly, the state highway departments - and have tended to focus on the benefits to be derived from such expenditures.

With this in mind, it is not hard to see why the subject

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[4]Lloyd Aldrich, The Economy of Freeways, City of Los Angeles, Los Angeles, California, June, 1953, p. 3f.

[5]Norris & Elder, A 15-Year Study, op.cit., p. 15.

[6]Garrison and Marts, Influence of Highway Improvements, op. cit., p. 25.

of displacement has not been studied. Displacement connotes destruction of property and forced removal of private indivíduals and business. Even if the over-all net effects should prove beneficial to the community, it is apparent that dealing with forced dislocation is a politically unpleasant reality. As has been found to be the case so often in urban renewal, the hostile reactions of those to be displaced creates a politically unfavorable atmosphere which may jeopardize the proposed project completely. For those interested in the successful completion of these projects, it must appear that to raise the issue of displacement voluntarily is to beg for trouble. On the other hand, those who oppose the projects either lack the resources and information to carry through a thorough study or have no real desire to do so. After all, the emotional display of a few partial facts is often sufficient to carry the day.

As our highway program begins to move into high gear, however, it seems increasingly clear that the questions revolving around the impact of displacement can no longer be avoided. One of the major goals of the current road-building effort is to relieve the mounting inadequacies of metropolitan traffic systems and to resolve a condition of growing congestion which threatens to choke off the life of our central cities. Under present technological conditions and habits of travel, this means the construction of major highway facilities directly

to, through, and around the heart of the central city itself. A recent study reports that approximately twenty of our largest cities are planning complete inner-loop systems, while numerous others will require partial loops or, at least, the extension of major radials into or through the downtown area.[7] Unlike their country and suburban counterparts, in-town highways inevitably have more disruptive effects. Few cities have convenient stretches of open land in and around their central areas through which highways can be built. The number of railway rights-of-way is likewise limited. Thus, for the most part, the central city's new road network will have to be carved out of what is already there, the congestion of land use which typifies the central area. Inevitably, this will mean the generation of effects of a type and magnitude not faced in the construction of rural and suburban highways.

The peculiar problems created by the construction of in-town highways, seem unique only if one considers these roads solely as roads. In truth, however, these problems are no different from those involved in all other programs of major reconstruction within the central city area. Essentially, the building of a new highway in the core area is an urban renewal project. Things that were there are torn down, and

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[7]Edgar M. Horwood and Ronald R. Boyce, The Nature of Urban Freeway Systems, Highway Economic Studies, University of Washington, 1958, p. 3.

something new is built in their place. That what is built in this case is a highway rather than apartment, office or industrial buildings is really of only secondary consequence. Each of these naturally has its own special impact, but in general they all involve similar questions relating to the economic and social cost to the community and the refashioning of the city's spatial structure.

It is in this light that the study of in-town highways gains particular significance. Clearly the questions that have been posed concerning new highways generally, also have relevance when applied to the in-town expressway. The benefit to users in terms of saved time and decreased gasoline costs is probably even greater proportionately when the massive congestion of the in-lying area is relieved. The fact that new highways stimulate development in surrounding areas is probably as true when related to the central city. Potentially this probability has great significance, for it offers hope of significant new growth which may help resolve the stifling fiscal problems, sapping the energies and halting the progress of so many metropolitan centers. But it is because in-town highways, like all other public renewal projects, exact or appear to exact special costs and because they patently do force significant relocation on the land that they deserve particular attention.

It is with this in mind and from this point of view that the present study of Boston's Central Artery has been undertaken. Actually, this study deals with the Central Artery not so much as a road but as a major public reconstruction project. Within this context, questions concerning traffic generation and the efficiency of vehicular movement have been completely ignored. In addition, questions concerning the generation of new land values and new economic activity have been largely overlooked. These latter questions certainly have relevance to any consideration of the effect highways have in reshaping the form and function of the city. They deserve more study, but within this context the basic questions have been raised, the basic hypotheses have been formulated, and the basic methods for study have been developed. The particular question that will be dealt with in this paper concerns the as yet little-studied effects generated by the displacement these huge renewal projects cause.

That this problem is one of significant proportions can be illustrated with a few pertinent facts. A recent study indicated that among eight urban areas studied, the average miles of freeway planned for construction is 11 per 100,000 population.[8] Even assuming these roads used no more land than the normal suburban highway, or between 20 and 30 acres

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[8] Ibid., p. 30.

per mile,[9] this would mean an average consumption of 200 to 300 acres of land for each 100,000 people in the area. For the Boston urbanized area this would mean a use of between 4,000 and 6,000 acres of land.[10] More dramatic, however, will be the consumption of land in the heart of the city. Key to all in-town highway systems will be the inner-loops. Because of the greater frequency of entrance and exit ramps on these roads, it is estimated that they will consume up to 40 acres of land per mile exclusive of major interchanges.[11] On this basis, the average land consumption for these inner loops alone will be well over 200 acres each, with something approaching an equivalent amount of land required above this for the construction of interchanges with the major radials feeding into the loop.[12] The average central area enclosed by one of these inner-loops approximates two square miles.[13] On this basis the average inner loop with its major interchanges will take up a land area equivalent to over one-quarter of the central core it has been built to serve. Except where circumstances favor the city with a convenient stretch of open land

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[9]Edgar M. Horwood and Ronald R. Boyce, Measurement of Central Business District Change and Urban Highway Impact, Highway Economic Studies, University of Washington, 1959, p. 5.

[10]Based on Boston 1950 Urbanized Area Population of 2.2 million, United States Census of Population: 1950 - General Characteristics - Massachusetts, U.S. Dept. of Commerce, Bureau of the Census, Washington, D.C., 1952, pp. 21-35.

[11]Horwood and Boyce, Urban Freeway Systems, op.cit., p. 31.

[12]Ibid., p. 31.

[13]Ibid., p. 30.

or railroad right-of-way, the construction of this one key facility will mean the displacement of several hundred acres of existing housing, and commercial or industrial development. Indeed, at the pace renewal in the strict sense is progressing at this time, it does not seem unreasonable to suggest that this in-town highway construction may constitute the major public force reshaping the city during the next decade.

CHAPTER II

FOCUS OF THE STUDY

This study focuses specifically on the impact construction of the Central Artery had on the Boston area in terms of the dislocation of business activity. The broad area of residential dislocation is not treated here primarily because the Central Artery in fact displaced relatively few residential units. Even had residential dislocation of a significant magnitude taken place, there would be good reason to separate a study of this impact from one concerning the effect on business activity. The factors involved in residential relocations are quite different from those involved in business relocation. To cite only the most obvious differences, household units, if forced to move, must move somewhere, while business units have the additional "choice" of ceasing to exist. Furthermore, the choice available to individuals in choosing new places to live is, in most instances, far greater than that open to businessmen in relocating their establishments. Perhaps most important, decisions within the business sphere are made primarily on the basis of economic cost and probable effect on future business volume, while decisions on residential movement contain a large element of personal taste and desire.

The approach of this study will be to deal first with

four general topics. The first concerns the magnitude of the dislocation caused by construction of the Central Artery (Chapter V). The second focuses on the pattern of business failure - voluntary and involuntary - related to the road's construction (Chapter VI). The third and fourth center on the establishments which survived the Artery dislocation. The former concerns the growth experience of the firms affected (Chapter VII). The latter deals with the pattern of spatial movement generated as a result of the forced relocation (Chapter VIII). All of these questions will be answered in terms of establishments and employment. These two measures of business activity are used here, not necessarily because they are the best, but because they are the only ones readily available. Ideally, they should be supplemented by measures of space, business volume and property value, particularly where questions of growth experience are concerned. In terms of the time and resources allotted to this study, however, this material was impossible to obtain.

Following the general discussion, we shall deal with the question of the immediate impact on the city in terms of loss or gain of business activity (Chapter IX). The final chapter will summarize and discuss the conclusions. It will also deal with some of the implications which may be drawn from these conclusions in terms of changing patterns of urban activity

and of the need for public policies to facilitate these changes.

This study aims at answering four general questions. First, we will ask whether the relocation is of such magnitude and character as to require study and consideration. Second, we will inquire whether or not the losses sustained in the relocation process are sufficiently great so that one may conclude that they constitute a definite detrimental effect, whatever the other benefits of the particular project may be. Third, we will ask if the pattern of spatial redistribution associated with the forced dislocation is positively or negatively related to the proper functioning of the urban community. Finally, we will turn to the question of how the entire process of relocation might be revamped so that the losses it generates might be diminished, the benefits augmented, and the entire process of urban renewal and planning facilitated.

In answering these questions, this study will arrive at the following major conclusions:

1. The displacement was of such magnitude and character as to indicate that the questions and problems related to relocation demand careful study and analysis and a degree of planning not normally evident. The additional point will be made that the need for more attention being given to this process is all the more urgent, when one realizes that in

most cities the process of urban renewal will cause major relocation to occur many times over.

2. The losses of establishments and employment engendered by the forced dislocation do not appear to be significantly greater than what might have been expected to occur under normal circumstances. This appears to be true whether one looks at the losses incurred by virtue of firms going out of business, the losses attributable to firms moving outside the metropolitan area or the city, or the growth experience of the firms which survived the relocation process. This is a general result and not necessarily true of all sub-categories of economic activity. Abnormal losses do appear to have occurred in retailing and in one segment of the food industry. The city itself also suffered a significant loss of metal products wholesalers and manufacturers. Each of these, however, represents a special case, which will be discussed in the body of this work.

3. The pattern of spatial redistribution generated by the Artery dislocation appears to have been positively related to the more efficient functioning of both the businesses involved and the urban community in general. Thus, major handlers of goods - manufacturers and wholesalers - showed a tendency to move outside of the congested core area. This was particularly true of firms with major or special space demands

and in activities which appear no longer to have overriding reasons for remaining in the core. Generally, those activities which did remain in the core appear to be those which can more easily adapt central space to their needs and which have major reasons to be in the core because of their peculiar markets or because of special communications requirements. In general, this pattern of movement appears to have been validated by the figures on employment growth and decline. Those manufacturers and wholesalers who moved away from the core did better than those who remained in the center. Only where real ties to the center remained strong did business experience seem to validate decisions to remain in the center.

From the city's point of view, it appears possible to conclude that the pattern generated was beneficial from several standpoints. First, while it is true that a large number of firms did move outside the core, it is equally true that the dominant tendency was to remain in the city, and generally in the central area. This indicates that the central area still has significant vitality. Second, it appears that the businesses which did move outside the core, far from being damaged, were benefited by the relocation; these businesses tended either to post gains compensating in part for some of the real loss suffered during the relocation process or to show trends

somewhat better than the general run of establishments in the city. This indicates that the relocation process, if properly handled, may brighten the prospects for the retention and even revitalization of some manufacturing and wholesaling activities in the central area. Finally, it must be pointed out that these results appear to have been accomplished while at the same time the core area was being relieved of major sources of traffic congestion. Even if the results of the relocation from a business point of view were only neutral, the diminution of the traffic problem would stand as a major gain from the city's point of view.

4. Finally it will be concluded that the losses generated by the Artery relocation might have been diminished and the benefits augmented if certain policies had been adopted. Concerning the first, we will conclude that some assistance should have been made available in the form of public financial aid to defray the heavy costs of relocation. Such aid is currently available under urban renewal legislation. It is argued that this aid should be adopted as part of the program of highway construction, particularly since the construction of in-town highways will involve an increasingly large amount of relocation.

Concerning the augmentation of benefits, it is concluded that if the process of relocation were tied in with the over-

all program of urban renewal, the positive results of the spatial redistribution could be significantly increased. The knowledge gained from past relocation programs should be made available to firms currently facing the problem. Beyond this, a positive program of persuading firms to choose more suitable new locations seems to be a logical step to take. The most effective means would be to offer firms which do move according to the desired pattern bonus aid payments. Finally, it will be argued that relocation should be tied in with other renewal projects. Such coordinated programming would benefit both the firms involved and the urban community in general. It would at once provide businesses with better locations from which to carry on their activities, while at the same time fostering the fulfillment of a more efficient, productive and satisfying pattern of land use for the city.

CHAPTER III

METHOD

The following steps were involved in developing the data for this study. First, it was necessary to determine what firms were affected by the construction of the Central Artery. Second, it was necessary to determine (a) whether these firms ceased to exist or survived the dislocation and (b) if they survived, where they moved to. Third, since employment was to be used as the primary measure of business experience, it was necessary to gather employment statistics for these firms as of the time they were located at the Artery and at some point in time following their move from the Artery. While each of these steps seems straightforward, all of them involved complications, the resolving of which set limitations on the validity of the entire effort.

One immediate limitation was set by the source of the data. A major part of the material for the study was gathered from the Massachusetts State Division of Employment Security (DES). This includes all employment figures, activity classification data,[1] and material concerning the history of the establishments. The latter was important since

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[1]Establishments were classified according to the U.S. Department of Labor Standard Industrial Classification Code assigned to them by DES.

it was necessary to take into account the probability that a number of businesses would have changed name, ownership, or become involved in mergers during the period under study. This material would have been unclear, had a normal city directory been used. Since DES data form such a basic part of the study, the firms studied had to be limited to those covered by the State Unemployment Insurance Act.

The effect of this was to exclude the following major classifications: small firms, essentially single proprietorships not required to report to DES; railway employees, covered under a separate act; and government employment, also covered under separate legislation. A review of the establishments in the area indicated that there was very little in the way of either railroad or government employment affected; therefore, this forced exclusion does not significantly affect the results of the study. However, it does appear that upwards of 300 establishments listed as having been in the Central Artery area were not covered by DES.[2] Most of these undoubtedly were small. Therefore, the effect, in terms of employment, was slight. However, since many of the conclusions are given in part or in whole in terms of establishments, the exclusion of some 300 out of a possible total of 1,000

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[2]These are firms which appear in Polk's directory, but for which no records could be found at DES.

does constitute a significant limitation.[3] The results must be read with this in mind.

The problem of determining which establishments were affected by the construction of the Central Artery was essentially one of reconstructing history. Some material was available from the Boston City Planning Board on the firms located at Artery sites at the time of condemnation. This material, however, covered only the first part of the Artery. In addition, conversations with people affected by the Artery made it evident that a number of firms, anticipating eviction, had moved as much as several years prior to the time of condemnation. For these reasons, it was decided to establish cut-off dates and to include those firms at Artery sites at these times. The two dates chosen were January 1, 1950, for

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[3]Employment is somewhat further understated because of the fact that owners of unincorporated firms are not covered under the unemployment insurance act. Therefore, they are not included in the employment figures reported by DES, even though they are working members of their firms. In corporations, all employees, including officers and directors, are covered. The effect of the exclusion of owners of unincorporated businesses is undoubtedly slight - probably amounting to an underestimation of no more than 200 or 300 in total employment. Even if this number were added to the employment not included because of the exclusion of non-covered firms (probably between 300 and 500), the total underestimation is probably no more than 700-800, or about ten per cent of the total employment developed from DES data. This difference is not insignificant, but it does not appear to invalidate any of the conclusions drawn in this study.

the section of the Artery running from North Station to Fort Hill Square and January 1, 1954, for the section of the Artery running from Fort Hill Square to Harvard Street. These dates coincided roughly with the dates on which the official routes for these separate sections of the Artery were made public.[4] However, the general route of the Artery had been known since 1948. The choice of the 1950 and 1954 dates thus introduces another source of error. Undoubtedly some firms which did move in anticipation of Artery construction have been excluded from the study. On the other hand, it is known that some of the firms included in the study moved for reasons other than forced dislocation.[5] The assumption is made that these two effects tend to cancel each other out.

The list of establishments studied was developed by drawing from Polk's 1950 City Directory all those establishments found to be at addresses taken for the Central Artery. Adjust-

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[4]Material on dates was provided by Mass. Dept. of Public Works.

[5]These firms were included originally because of the arbitrary way in which the initial list had to be drawn. Where it became known early enough in the study that firms had moved for reasons other than forced eviction, these firms were removed from the study. However, past a certain point in time, retabulation became unfeasible. Thus, it is known that at least three firms are included which should not have been. In total, on the basis of a subsequent questionnaire, however, it is not believed that the number mistakenly included is high - probably no more than five per cent of the total. As the text states, this number is probably balanced by an equivalent number which should have been included but were not.

ments were made by checking with Polk's 1954 City Directory to take into account firms which moved into and out of second half Artery locations between 1950 and 1954.

The date chosen for developing before and after comparisons was the year 1957. Establishments that were listed by DES as having been suspended (i.e., no longer under coverage) and which were listed neither in Polk's 1957 City Directory nor in the 1957 Boston City Telephohe Directory were assumed to have gone out of business. These firms are counted as "deaths." Again, this is an approximation since there are no records available. The location of those firms which did survive was determined by using the 1957 Boston Telephone Directory and, in a few cases, DES records.

Employment statistics were taken in toto from DES records. For firms in the first half of the Artery, employment as of September, 1950, was used, while for firms in the second half of the Artery, September, 1954, employment figures were used.[6] This procedure was used because of the desire to estimate as accurately as possible the employment actually displaced by construction of the Artery. A later check revealed that, had the 1950 figures been used throughout, the total difference would have been less than one per cent. The

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[6]The month of September was used on advice from DES that it is the most normal employment month of the year.

differences within the detailed categories would have been somewhat larger, but with one exception where the use of 1950 figures would have boosted the sub-total used in the study by nine per cent, use of 1950 data would have changed the totals used in this study by no more than several percentage points in either direction. Where comparisons are made using only the Artery data, the effects of these differences can be considered of little significance. The question does arise, however, whether the comparisons made between Artery trends and city trends are valid, since the city figures are based on changes occurring between 1950 and 1957. A study of the data indicates that in no case would the conclusions reported be significantly different if 1950 Artery figures had been used. The author feels now that it would have been simpler and more direct to use a single date for establishing the base employment figures, and he suggests that in future studies of this type such a procedure be adopted.

In general, the statistics developed and the mapping procedures used are quite straightforward and require little elaboration. One note seems necessary concerning the use of the median to describe the average size of firms. As might be expected, the distribution of the firms was positively skewed in favor of the small firms. The use of a simple arithmetic mean would therefore have given an unclear picture

of the size distribution of firms since it would have given excessive weight to the few large firms. Where such a distribution exists, the median is the most valid expression of the average.

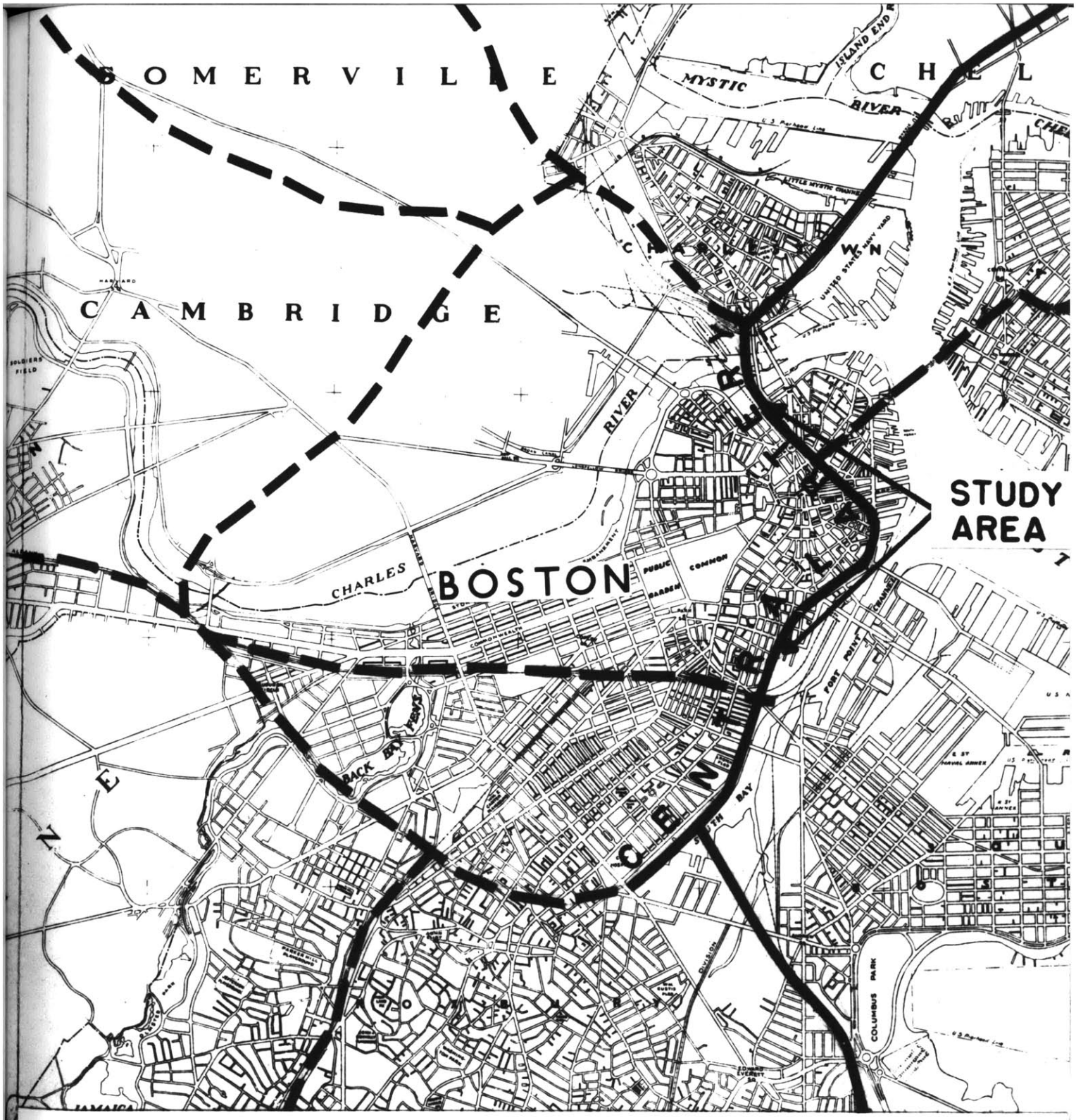
CHAPTER IV

BACKGROUND ON THE ARTERY

The Boston Central Artery is an express highway approximately four miles in length extending from Charlestown in the north, to a connection with the Southeast Expressway just south of the peninsula containing the core of the city (see Map 1). The highway is intended to act as a distributor of traffic to Boston's downtown area, to connect the Northeast and Southeast Expressway radials presently under construction, and eventually to form part of the Inner Belt loop which will surround the central section of the city and function as the master link in the central city's highway system. The first half of the road is on an elevated structure, the next half mile is tunnelled, and the last mile and a half is again elevated. Total cost of the road, which has taken more than eight years to build (construction is not yet completed), has been approximately 110 million dollars or between 30 and 35 million dollars per mile.* This short stretch of highway thus ranks as the most expensive piece of road yet constructed in the United States.

The particular section of the Central Artery which is the subject of this study, is the one and one-half mile strip running from North Station just past the crossing of the Charles River through the eastern fringe of the downtown, to

*Figure reported by Mass. Department of Public Works.



N

SCALE IN FEET

— existing

– – proposed

MAP I

BOSTON INNER HIGHWAY SYSTEM

the point where the highway comes above ground from its tunnel at Harvard Street. This section of the highway was built essentially in two parts. The first half of the route, running to Fort Hill Square over an elevated structure, was announced in 1950. The period from the start of condemnation to the final completion of demolition ran from November, 1950 through June, 1954. The road was finally opened for use in November, 1955. The route for the second half of the Artery was not settled finally until March, 1954. Condemnation for the second half of the Artery was begun in June, 1954, and demolition was completed in May, 1956. As yet this second half, including essentially the tunnelled portion of the Artery, is not complete, and only the portion to Essex Street just past South Station is open.

These are the bare facts concerning the Central Artery. They do not make inspiring reading, and reported so long after the fact, they seem rather lifeless. Yet, the truth is that the creation of the Central Artery was not a simple affair. The years prior to actual construction effort were filled with constant controversy between those who saw the Artery as the fulfillment of an absolute necessity and those who viewed it virtually as a destructive weapon pointed at the heart of the city.[1] The proponents argued that the Artery was vitally

[1]Background material on the Artery was gathered from articles appearing in the Christian Science Monitor between the years 1948 and 1956.

needed to relieve the growing traffic congestion of the downtown and to open up the declining commercial center of the city once more to easy access from the metropolitan hinterland. They also argued that the construction of the route would revivify the seedy eastern extremity of the downtown area and lead to significant and badly needed new building in the core of Boston.

Opponents focused on the destructive effects that inevitably would attend the construction of the road. They pointed to the fact that hundreds of businesses would be displaced and argued that many of these, unable to stand the cost of moving or to find suitable new locations within Boston, would be lost to the city. They argued that major districts of the city's business community would be split or significantly eaten into, notably the food, apparel, leather and printing areas. They pointed to the 100 families which would be displaced by the road. And, inevitably they stressed the fact that some 28 million dollars in assessed valuations would be removed from the city's already shrinking tax rolls. The arguments were heated, to say the least, and gave a foretaste of what may be expected as nationwide programs of in-town highway building accelerate in coming years. The remainder of this paper is aimed at shedding some light on one particular aspect of this controversy, namely the effects generated

when a highway like the Central Artery dislocates hundreds of businesses and thousands of workers in a central city area.

CHAPTER V

MAGNITUDE OF DISPLACEMENT

The area through which the Central Artery was built forms for the most part a district of wholesaling and light manufacturing on the eastern fringe of Boston's downtown.[1] It is not surprising, therefore, that the bulk of the establishments and employment displaced were engaged in these two activities. In particular, four clearly defined districts were penetrated by the Artery. The food market district, running from Dock Square east to the harbor, was sliced in two, as was the printing district, immediately to the south. Below the printing district, the Artery cut through a mixed border area between the apparel and leather districts.

In total, and within the definitions established by this study, the Artery displaced some 573 establishments employing 7,160 persons. This is probably a minimum estimate.[2] As

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[1]The definition of the downtown used throughout this study is with minor differences the same as that used by the Greater Boston Economic Study Committee, and coincides generally with the definition used by the Boston City Planning Board.

[2]Taking into account the limitations of the DES data, the actual number of establishments displaced by the Central Artery was probably closer to 900; the actual working force displaced was probably about 8,000 (see Chapter III, pp. 21-22 and Footnote 3). This difference does not, however, invalidate the Artery-city comparisons to be made below, since the city data has also been developed from DES material and therefore has the same limitations.

TABLE ONE

DESCRIPTION OF ESTABLISHMENTS AT CENTRAL ARTERY

Activity	Establishments No.	Establishments %	Employment No.	Employment %	Median Size
Total	573	100	7160	100	5.8
Manufacturing	157	27	3401	48	9.1
Meat (ND)*	7	1	556	8	60.0
Other Food (ND)	12	2	581	8	9.9
Apparel (ND)	29	5	717	10	15.0
Printing (ND)	36	6	701	10	9.9
Other Non-Durable	30	5	275	4	5.6
Metal Products (D)*	25	4	358	5	7.9
Other Durable	18	3	213	3	7.5
Wholesaling	242	42	2445	34	4.9
Meat	29	5	631	9	12.3
Other Food	56	10	501	7	4.8
Apparel	24	4	274	4	4.0
Metal Products	65	11	524	7	4.6
Leather	38	7	247	3	3.8
Other	30	5	268	4	7.3
Retail	99	17	676	9	4.6
Services	47	8	371	5	4.2
Trucking & Trans.	12	2	136	2	6.7
Construction	16	3	131	2	5.8

*ND - Non durable; D - Durable

SIZE BREAKDOWN

Class	Establishments No.	Establishments %	Employment No.	Employment %
0-4	264	46	578	8
5-9	136	24	884	12
10-19	91	16	1249	18
20-49	54	9	1625	23
50-99	20	4	1308	18
100/	8	1	1516	21

General Note: Per cent sub-totals may not balance because of rounding.

Table One shows, manufacturing and wholesaling accounted for 69 per cent of the establishments and 82 per cent of the employment displaced. The remainder was composed of ancillary retail and service activities. The largest portion of establishments and employment was engaged in the four activities described above. Taken together, food, printing, apparel and leather manufacturing and wholesaling accounted for 40 per cent of all establishments and almost 60 per cent of all employment.[3] The only other large component was metal wholesaling and manufacturing, which accounted for 15 per cent of the establishments and 12 per cent of the employment. Food manufacturing and wholesaling loomed particularly large, making up 18 per cent of the establishments and almost one-third of all employment.

The bulk of the establishments displaced were small. The median size was 5.8 employees, and 86 per cent of the establishments had fewer than 20 employees. Only eight employed 100 or more. Manufacturing firms tended to be larger than

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[3] Note on Terminology: To avoid complexities of language, the following short terms will be used throughout this study to refer to the detailed categories.

1. Other food, referring to manufacturers or wholesalers of food products other than meat.
2. Apparel, referring to the combined categories of apparel and textile wholesalers and manufacturers.
3. Printing, referring to the combined category of printing and publishing.
4. Leather, referring to the combined categories of leather and shoe wholesaling and manufacturing.

average, and therefore, while the number of establishments engaged in manufacturing was fewer than in wholesaling, manufacturing loomed largest when measured by employment (48 per cent of the total). Meat manufacturers were particularly large (median size, 60); thus, the seven establishments in this category (one per cent of the total) accounted for eight per cent of all employment. Meat wholesalers, apparel manufacturers, and miscellaneous wholesalers (primarily chemical, paper and furniture) were also notably above the average size for the group as a whole and for their particular sub-groups.

When the Artery figures are compared with the totals for Boston and the downtown, it becomes apparent that the displacement did affect a significant, and in several cases a very significant, segment of establishments and employment in the city. As Table Two shows, the Artery displaced approximately two per cent of all the establishments and employment in the city. Compared to the downtown, it displaced five per cent of the establishments and four per cent of the employment. The meat manufacturers, while few in number, amounted to one-fifth of all those in the city and employed almost one-quarter of all those engaged in this industry. The relative magnitude of the displacement was also notable in other food manufacturing (particularly in terms of establishments), printing and metal products wholesaling and manufacturing. In

TABLE TWO

COMPARISON OF CENTRAL ARTERY ESTABLISHMENTS WITH BOSTON CITY AND DOWNTOWN

Activity	Establishments		Employment	
	% of DT	% of City	% of DT	% of City
Total	5	2	4	2
Manufacturing	11	5	10	3
Meat (ND)	35	20	42	23
Other Food (ND)	20	5	31	4
Apparel (ND)	5	3	5	3
Printing (ND)[1]	10	7	14	8
Other Non Durable[2]	15	5	4	2
Metal Products (D)	17	5	13	2
Other Durable	17	5	21	2
Wholesaling	7	5	9	5
Food[3]	20	11	26	11
Metal Products[3]	14	8	9	5
All other[4]	5	4	6	3
Retail	5	1	2	1
Services	1	1	1	*
Trucking	10	2	5	1
Construction	5	1	1	1

* Less than one-half of one per cent

1. Excluding publishing
2. Including publishing
3. Excluding brokers, agents, and manufacturers' sales branches
4. Includes all others, plus brokers, agents, and manufacturers' sales branches.

summary, the data reveals that this short one and one-half mile of Central Artery construction did displace a significant proportion of the city's business activity. A particularly large segment of the production and distribution activity of the city was dislocated, and in several specific activities what must be regarded as major relocation was forced.

CHAPTER VI

SURVIVAL

The first effect we shall deal with in attempting to arrive at some over-all conclusions on the positive or negative result of the Artery dislocation concerns the number of establishments which went out of business between the time they were forced to relocate from the Central Artery and the cut-off date of the study, mid-1957. Stated simply, this is the question of survival.

Recognizing the limitations of the data,[1] Table Three, nevertheless, seems to indicate certain tenable conclusions. First, it appears that the great bulk of the establishments did survive relocation from their Central Artery places of business. Over-all, almost four-fifths of the 573 Artery establishments were still in existence in 1957. Survival rates were generally higher than average in the manufacturing and wholesaling components which formed the bulk of the activity displaced from the Artery area. Only in the other food manufacturing and wholesaling categories were the survival rates below the general average. The possible significance

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[1] It should be pointed out here again that only those firms which, in 1957, had ceased to be covered by DES and could not be located either in Polk's Directory or in the Boston area telephone book were classed as having ceased to exist. Since no data are gathered either by the city or the state on firms which come into and go out of existence, no check as to the accuracy of this method is possible.

TABLE THREE

SURVIVAL RATES

Activity	Establishments			Employment		
	CA*	S.	%	CA	S	%
Total	573	455	79	7160	6369	89
Manufacturing	157	135	86	3401	3163	93
Meat (ND)	7	6	86	556	476	86
Other Food (ND)	12	7	58	581	560	96
Apparel (ND)	29	25	86	717	619	86
Printing (ND)	36	35	97	701	700	99
Other Non-durable	30	25	83	275	248	90
Metal Products	25	22	88	358	352	98
Other Durable	18	15	83	213	208	98
Wholesaling	242	205	85	2445	2229	91
Meat	29	24	83	631	587	93
Other Food	56	42	75	501	426	85
Apparel	24	23	96	274	256	93
Metal Products	65	55	85	524	481	92
Leather	38	35	92	247	238	96
Other	30	26	87	268	241	90
Retail	99	55	56	676	422	62
Services	47	41	87	371	349	94
Trucking, Trans.	12	9	75	136	132	97
Construction	16	10	63	131	74	56

*CA - All Central Artery

S. - Number Surviving

% - Per cent of CA that survived.

of this fact will be dealt with below when more evidence has been adduced. The notable disappearance of retail establishments will be discussed shortly below.

It is apparent that, in general, survival rates were higher among the larger firms than among the smaller ones, and that the larger a firm was, the greater was its chance of surviving. Thus, over-all, while the surviving firms accounted for only 79 per cent of all those located at the Artery, they included some 89 per cent of the employment. A comparison of the median size of all firms at their Artery locations with the median size of surviving firms at their Artery locations gives the same picture. The over-all median was 5.8 employees; the median of those which survived was 6.6. As an examination of Table Four will show, the picture was generally true for most categories; the surviving establishments in each category were generally larger than the total Artery average for that category. When establishments are separated by size class as in Table Five, this picture is once again confirmed: the larger the firm, the greater its chances of survival.

This result is not unexpected. Quite obviously, smaller firms with less capital available to them could less afford to stand the costs of relocation. They, therefore, went out of business in greater numbers. This tendency was aggravated by the fact that the Central Artery area had been characterized

TABLE FOUR

SIZE COMPARISON OF ALL CA FIRMS AND SURVIVING FIRMS

Activity	Median Size (No. of Employees) All CA Firms	Surviving Firms (1950)
Total	5.8	6.6
Manufacturing	9.1	9.9
Meat (ND)	60.0	49.0
Other Food (ND)	9.9	27.5
Apparel (ND)	15.0	15.8
Printing (ND)	9.9	10.5
Other Non-Durable	5.6	6.1
Metal Products (D)	7.9	9.2
Other Durable	7.5	8.8
Wholesaling	4.9	5.2
Meat	12.3	12.5
Other Food	4.8	4.9
Apparel	4.0	3.8
Metal Products	4.6	4.9
Leather	3.8	4.0
Other	7.3	7.2
Retail	4.6	4.8
Services	4.2	4.3
Trucking, Trans.	6.7	9.2
Construction	5.8	7.5

TABLE FIVE

SURVIVAL BY SIZE CLASS

Size Class	Establishments			Employment		
	CA	S	%	CA	S	%
0-4	264	193	73	518	432	75
5-9	136	111	82	884	726	82
10-19	91	76	84	1249	1050	84
20-49	54	49	91	1625	1487	92
50-99	20	18	90	1308	1158	89
100/	8	8	100	1516	1516	100

by low rents. Once the Artery removed some millions of square feet of floor space while at the same time forcing hundreds of business firms to seek new locations within a short period of time, rents in the area went up significantly.[2] Faced with the cost of moving in the first instance, the economically more vulnerable small establishments were equally less able to stand the increased rent costs. That smaller firms show a

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[2]Figures developed by the Boston City Planning Board show that the first half of the Artery alone caused the destruction of 2.74 million square feet of floor space. The figure for the second half of the Artery is not known, but it may be assumed to have been roughly similar to the first half total. All told, probably some five million or more square feet of usable floor space were demolished in the course of Artery construction. A 1953 space inventory prepared by the Boston Planning Board indicated that only two and one-quarter million square feet of vacant second class floor space, the type predominant in the Artery area, existed in the entire downtown. True, this study occurred after much of the demolition for the first half of the Artery had taken place. But it occurred before the demolition for the second half had begun. Thus, it appears that the second half of the Artery alone probably removed an amount of floor space roughly equivalent to the total amount of similar vacant space in existence in the downtown at the time. An unknown portion of this vacant space was itself in the Artery area, and therefore was removed by further demolition. With these facts in mind, it is not difficult to see why rents went up.

As early as December 1951, the Christian Science Monitor reported the then Commissioner of the Massachusetts Department of Public Works, William F. Callahan, as stating that "most businesses, industries, and homeowners in demolished areas have so far found places to go, but many have had to pay very high rates for space...." This referred to the effect of the early stages of dislocation. Conversations with a number of individuals forced out by later stages of construction indicate that this boosting of space costs continued to take place.

lower rate of survival than larger ones, was to be expected in any case. National figures indicate that smaller firms generally disappear at a faster rate than larger ones.[3] However, the fact that in this case the demise was associated with a forced relocation leads to certain questions of public policy which will be discussed in the concluding section of this paper.

The particularly sharp loss of retail establishments, measured either by employment or by establishments, deserves special note. Only 56 per cent of the retail establishments survived, while the general average was 79 per cent. In part this picture can be related to the excessive demise of small firms. Retail establishments generally were smaller than average. Their median size was 4.6 employees, compared with the over-all average of 5.8. Yet, this is obviously not a sufficient explanation. The median size of retail establishments was little different from that found in wholesaling generally or in the service area, yet the survival rate for the retailing was far lower. The conclusion is inescapable that retail activity was particularly hard-hit by Central Artery dislocation.

The reasons for this are not hard to deduce. Most of the retail activity in the area consisted of eating and

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[3]This material is drawn from the Survey of Current Business. Detailed citations may be found in Appendix I.

drinking establishments, food shops, and a miscellany of small clothing and general merchandise establishments. The bulk of these apparently were dependent on the business generated by the employees and businesses located in the Artery area. When these were reduced sharply by the relocation, the potential for retail trade was also reduced. In all probability, this loss of opportunity for retail business was counter-balanced in part by the expansion of retail business in areas to which displaced Artery firms moved. However, except in the Newmarket district to which the meat dealers moved in mass and possibly in South Boston, the relocated Artery firms did not constitute a significant proportion of the firms already in the areas to which they moved. Thus, it may be presumed that the retail business they generated could be taken up easily by expansion of retail establishments already operating in these destination areas. The conclusion seems inescapable that the Artery dislocation did cause a real loss of business opportunity for the Artery retail establishments. It seems probable that it was this fact, coupled with the difficulties facing small firms in meeting relocation costs in any case, which accounts for the severe loss which occurred among the Artery retail group.

There can be no doubt that a number of the firms which were located at the Central Artery were no longer in business

as of 1957. The question remains to be asked whether there is any significance to this fact: did the firms go out of business because they were forced to relocate; did they go out of business in numbers greater than might have been expected under normal conditions and assuming the Artery had not forced their removal? Ideally, the answer to the first of these questions should be based on a knowledge of what motive was behind the discontinuance of the establishments involved. Unfortunately, this information is for all practical purposes impossible to get. The firms are no longer there, and no public records are kept which would shed light on the matter.

Material on the second question is almost as difficult to arrive at, primarily because of the difficulty of developing figures on what might have been expected to occur under normal conditions; that is, the number of Artery firms that might have been expected to survive had relocation not taken place. The only relatively complete data which seems to be available is that covering annual rates of discontinuance of business firms for the nation as a whole. These rates are developed by the U.S. Department of Commerce on the basis of firms covered under the Old-Age and Survivors Insurance program (Social Security) and are reported periodically in the Survey of Current Business published by this government agency. Despite the fact that the social security data used in the

development of the national average is based on broader coverage of firms, including specifically the smaller firms not covered under the unemployment insurance program, the use of these national figures appears to be valid, particularly since a size adjustment must be made in any case. Thus, by applying the national rates, with necessary adjustments, to the group of Artery firms, it is possible to develop a picture of the number of firms which might have been expected to survive under "normal" conditions. These "normal" figures may then be compared with the actual number surviving to give an indication whether an abnormal loss was associated with the Artery dislocation.

The full details of the development of the normal survival figures are reported in Appendix I, and only brief comments on this process will be made here. The general process hinges on the development of normal annual discontinuance rates which can be applied to a group of firms with the particular characteristics of the Artery group. Once these rates have been developed, they can be applied by a simple process of year-by-year subtraction of the annual expected number of discontinued firms from the Artery group. The end result is the number of firms which might have been expected to survive after a seven and one-half year period had elapsed under average national conditions.

Key to this process is the adjustment of annual discontinuance rates to take into account the particular characteristics of the Artery group. Briefly, three adjustments have to be made, one taking into account the peculiar size distribution of the Central Artery establishments, one taking into account their age structure, and one taking into account the different survival rates for separate types of business activity. National reports show clearly that discontinuance rates are lower (and survival therefore higher) among larger and older firms. They also show that survival tends to be above average for wholesalers, lower than average for manufacturers and just about average for retailers. The adjustment for size is particularly notable, since it compensates for the fact that use of DES data eliminates from consideration some 300 smaller firms, thus skewing upward the size distribution of the Artery group in comparison with the overall national picture. The adjustment for age takes into account the fact that Artery firms seemed to be generally of above-average age. The adjustments for the differential rates apparent among the manufacturing, wholesaling and retailing groups makes it possible to develop comparisons for these major sub-categories.[4]

It must be pointed out that these adjustments represent

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[4] Ibid.

only educated guesses. The results reported in Table Six must therefore be read only as approximations. To make the case as valid as possible, the "normal survival" figures have been computed under the most severe assumptions; that is, national discontinuance rates have been adjusted as low as seemed reasonable. This has the effect of pushing up the number of firms which might have been expected to survive under average conditions. Thus, while the national rate of discontinuance averaged eight per cent per year, the figure developed on the basis of the above-mentioned adjustments for application to the Artery firms is four per cent. To make the case even more severe a second set of "normal survival" figures has been developed cutting the discontinuance rates applied to the Artery firms in half, or from four to two per cent per year for the over-all group.[5] In effect, the net result of this

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[5]The complete table of discontinuance rates, national and Artery, is as follows:

	National rate*	Artery Rates "Normal"	Artery Rates ½ "Normal"
Total	8%	4%	2%
Manufacturing	9%	3.5%	1.7%
Wholesaling	6%	3%	1.5%
Retailing	8%	4%	2%

* National rates are seven-year averages.

process is to make it "easier" for the Artery group to show a below-normal survival picture. The results of this process are reported in Table Six, which includes the actual number of firms surviving, the number that might have been expected to survive at the estimated "normal" rate of discontinuances and the number which might have been expected to survive if this "normal" rate were over-estimated by as much as 50 per cent.

TABLE SIX

COMPARISON OF ACTUAL AND "EXPECTED" SURVIVAL
(in terms of number of establishments)

Activity	Actual	Expected at "normal" rates	Expected at ½ "normal" rates
Total	455	422	493
Manufacturing	135	114	134
Wholesaling	205	182	212
Retail	55	70	84

Table Six seems to indicate that only in the retail component was the survival significantly lower from what might have been expected under normal circumstances. This fact adds weight to the discussion of retail experience above. Even if the most severe comparison is made, the picture is not significantly different. In the grand total, for instance, the difference between the maximum expected survival and the actual

survival is 38. The total number of Artery firms which failed to survive was 118; therefore, under the extreme assumptions only one-third of the Artery discontinuances can be attributed to other than normal circumstances. Carried further, it may be argued that even in the extreme case, the number of firm deaths above normal expectations represents less than 7 per cent of the total establishments dislocated. Assuming they accounted for one-third of the employment in the non-surviving group, the employment loss assignable to this group (approximately 263) is only four per cent of the total Artery employment. The author feels that this effect should not be considered inordinate.

To conclude, then, it does not appear that, except in the area of retail activity, the number of firms which went out of business to 1957 exceeded greatly - if at all - the number which would have gone out of business in any case. This does not mean that the greatest part of the 118 did not cease to exist because of the forced relocation. In fact, they all may have done so for this reason; but this we shall never know. The conclusion correctly stated is that, even though all 118 non-surviving establishments may have gone out of business because of the Artery dislocation, it is probable that even if there had been no Artery built a similar or not significantly smaller number would have ceased to exist for other reasons.

CHAPTER VII

GROWTH

Turning now to the establishments which did survive the Central Artery dislocation, we shall deal first with the general growth experience of this group. The treatment here must necessarily be brief, since there is no simple comparison that can be made to determine the real significance of this factor. No data is available on a city, metropolitan or state basis which can be used to develop a comparative picture. The only figures that could be presented on these broader bases are net figures, taking into account not only growth and decline in firms which continued to exist through the given period, but also losses and gains incurred as a result of firms coming into and going out of existence and of firms moving into and out of the given area. Obviously, for the Artery firms which survived only the first two effects - gains and losses in existing firms - are applicable; therefore, it seems invalid to make any general comparison between the growth figures to be presented here for the Artery group and any other statistics available. Some attempt at comparison will be made when the over-all effect on the city itself is considered separately in Chapter IX. In anticipation, the results of this comparison will be summarized briefly at the end of this Chapter.

As Table Seven shows, the Artery establishments which

TABLE SEVEN

GROWTH OF EMPLOYMENT IN SURVIVING FIRMS

Activity	Employment At CA	1957	Per Cent Change
Total	6369	7193	+13
Manufacturing	3163	3605	+14
Meat (ND)	476	1034	+117
Other Food (ND)	560	304	-46
Apparel (ND)	619	728	+18
Printing (ND)	700	756	+8
Other ND	248	233	-6
Metal Products (D)	352	366	+4
Other Durable	208	184	-12
Wholesaling	2229	2701	+21
Meat	587	1022	+74
Other Food	426	423	-1
Apparel	256	208	-19
Metal Products	481	542	+13
Leather	238	257	+8
Other	241	249	+3
Retail	422	327	-23
Services	349	389	+11
Trucking & Trans.	132	105	-20
Construction	74	66	-11

survived grew 13 per cent in employment during the period 1950-1957. Obviously, however, the pattern of growth and decline was quite different among the various sub-categories of economic activity. Here it should be noted that, in general, the figures and differences involved are small and therefore must be read with care. A number of tendencies do, however, appear to be significant.

Most dramatic is the growth which took place in meat manufacturing and wholesaling. The surviving establishments in these categories increased their employment 117 per cent and 74 per cent respectively. Indeed, growth in these two categories accounts for the greatest bulk of the over-all increase. The immediate conclusion possible is that mere dislocation need not necessarily damage business activity. This point will be elaborated and carried further in succeeding chapters. Other groups also showed apparently significant growth, including apparel manufacturing, printing, metal products, wholesaling, and general service activities.

Contrasted with these growth trends, significant employment decreases took place in other food manufacturing, apparel wholesaling, and retailing. The decline in food manufacturing contrasts sharply with the increase in the meat categories and provides part of the basis for a conclusion concerning the differential effects of spatial movement to be dealt with later.

The decline in retail employment, added to the heavy loss already noted by virtue of firms going out of business, adds weight to the conclusion already reached that the retail establishments were particularly hard hit by the dislocation. No explanation is readily available for the differential experience of apparel wholesalers and manufacturers.

One interesting comparison possible is that between the surviving establishments and those which did not survive as shown in Table Eight. On an over-all basis, it appears that the employment gain within the surviving establishments somewhat more than compensated for the loss sustained as a result of business deaths. Since data on movement indicates that only two establishments moved outside the metropolitan area (as defined by the Greater Boston Economic Study Committee), it is possible to conclude that no general loss was suffered by the Boston region as a result of the Central Artery dislocation.

Again, however, the picture within the detailed subcategories is diverse. In general, it appears that the employment experience of establishments in most categories either compensated for, or did not add significantly to the loss due to business deaths. Thus, in meat manufacturing and wholesaling the dramatic growth among the surviving firms makes the loss of employment incurred by virtue of establishment deaths appear relatively insignificant. Much the same picture

TABLE EIGHT

COMPARISON OF EMPLOYMENT LOSSES THROUGH BUSINESS DEATHS WITH EMPLOYMENT EXPERIENCE IN SURVIVING ESTABLISHMENTS

Activity	Employment Lost Through "deaths"	Net Employment Change In Surviving Establish.
Total	791	∠824
Manufacturing	238	∠442
Meat (ND)	80	∠558
Other Food (ND)	21	∠256
Apparel (ND)	98	∠109
Printing (ND)	1	∠56
Other ND	27	-15
Metal Products (D)	6	∠14
Other Durable	5	-24
Wholesaling	216	∠472
Meat	44	∠435
Other Food	75	-3
Apparel	18	-48
Metal Products	43	∠61
Leather	9	∠19
Other	27	-8
Retail	254	-95
Services	22	∠40
Trucking & Trans.	4	-27
Construction	57	-8

appears to be true for printing and to a lesser extent for apparel manufacturing, metal products manufacturing and wholesaling, leather wholesaling, and general services. Only in other food manufacturing, other durable manufacturing, apparel wholesaling and trucking were more jobs lost by virtue of declines in surviving firms than were lost as result of business deaths. In retailing, the additional loss sustained by virtue of declines in surviving establishments was far less than that caused by business deaths, but was nevertheless significant. The conclusion here is that, in general, the employment shifts among the surviving establishments either compensated for the losses sustained when establishments went out of business or did not add significantly to these losses. The bulk of the damage caused by Artery relocation, therefore, appears to have been related to firms going out of business. As we have already seen, this latter effect does not appear to have exceeded significantly what might have been expected to occur even had no forced relocation taken place.

Additional material which will be presented when the effects on the city of Boston are studied as a special case will support the conclusion that Artery dislocation did not, with the exceptions noted, generate employment shifts significantly worse than what might have been expected to occur normally. In fact, it will become clear that in a number of cases the

experience of the Artery establishments was better than that which occurred in the city generally.

CHAPTER VIII

SPATIAL MOVEMENT

Some 455 establishments or 79 per cent of the total included in this study did move and survive through 1957. This section will be concerned with the patterns of spatial redistribution found to have occurred as a result of the movements of these establishments. The first section will deal with a description of the patterns of movement. The second will relate the picture of growth or decline in business to this pattern of spatial movement. The final section will consider the conclusions that may be drawn from this over-all picture.

The spatial analysis is based on movement within, or to, three delineated areas as shown in Map 2. Area 1 is the downtown of Boston as defined generally by the Greater Boston Economic Study Committee. Area 2 includes the predominantly wholesaling and light manufacturing districts which are contiguous to the downtown or central core of the city. Area 3 includes the outlying areas of the city proper and the hinterland beyond. It should be noted that one of the key characteristics imputed to Area 2, referred to as the frame[1] of the downtown, is close and immediate connection with the downtown area. It is on this basis that the close-in areas of East Boston, Charlestown and Cambridge, separated as they are from

[1]Frame concept drawn from Horwood and Boyce, Measurements of Central Business District Change, op.cit., p. 12f.

RELOCATION SITES OF CENTRAL ARTERY FIRMS

FITCHBURG ▲ WINCHESTER ■ MEDFORD ● STONEHAM ■ WAKEFIELD ■ ROWLEY ●

EVERETT ▲ ■

REVERE ●

ERVILLE ▲

CHELSEA ■

WINTHROP ■

WALTHAM ●

CAMBRIDGE ■

WATERTOWN ▲ ▲

NEWTON ▲ ■

BROOKLINE

BOSTON

QUINCY BAY

AREA 1

▲	2 firms
▲	4 "
▲	22 "
▲	20 "
▲	15 "
▲	9 "
▲	9 "
●	5 "
●	33 "
●	19 "
●	26 "
●	31 "
●	16 "
■	48 "
■	32 "
■	5 "
■	3 "

AREA 2

AREA 3

NEEDHAM ● ● ●

DEDHAM ●

NORWOOD ● ●

NEW BEDFORD ●

BROCKTON △

QUINCY △

ACTIVITY KEY

MANUFACTURING	WHOLESALING	OTHER
MEAT	MEAT	RETAILING
OTHER FOOD	OTHER FOOD	SERVICES
APPAREL	APPAREL	TRUCKING
PRINTING	METAL PRODUCTS	CONSTRUCTION
OTHER NON-DURABLE	LEATHER	
METAL PRODUCTS	OTHER	
OTHER DURABLE		

N

Boston proper by the Charles River and the harbor, are placed in Area 3, the hinterland, rather than being included in Area 2, the frame. This also accounts for the peculiar, asymetrical shape of Boston's frame area. The basic data describing the pattern and magnitude of movements by the Central Artery establishments are summarized in Map 2 and Tables Nine, Ten and Eleven.

It appears obvious that a major portion of the surviving Artery establishments, approximately two-thirds, remained in the downtown area. Ninety-per cent of those staying in the downtown remained clustered in a tight band running one-quarter of a mile along either side of the former Artery sites. The next greatest concentration, approximately one-fifth of the establishments which moved, was in the frame. Only 15 per cent of the establishments moved outside these two central areas into the rest of the city and the hinterland beyond.

When the dimension of employment is added, however, the picture shifts significantly. While two-thirds of the establishments remained in the downtown, they accounted for less than one-half of the total employment (47 per cent). The obvious conclusion is that the larger establishments tended to move out, while the smaller ones remained close in. The differences in the median sizes of firms remaining in the downtown and those moving out confirms this conclusion immediately. For

TABLE NINE

PATTERN OF SPATIAL MOVEMENT: ESTABLISHMENTS

Activity	Total Moving	Area 1 No.	Area 1 %	Area 2 No.	Area 2 %	Area 3 No.	Area 3 %
Total	455	299	66	85	19	71	15
Manufacturing	135	81	60	32	24	22	16
Meat (ND)	6	2	33	2	33	2	33
Other Food (ND)	7	4	57	1	14	2	29
Apparel (ND)	25	22	88	2	8	1	4
Printing (ND)	35	20	57	13	37	2	6
Other ND	25	15	60	4	16	6	24
Metal Products (D)	22	9	41	7	32	6	27
Other Durable	15	9	60	3	20	3	20
Wholesaling	205	130	63	39	19	36	18
Meat	24	5	21	15	62	4	17
Other Food	42	33	79	3	7	6	14
Apparel	23	19	82	2	9	2	9
Metal Products	55	26	47	13	24	16	29
Leather	35	31	88	2	6	2	6
Other	26	16	62	4	15	6	23
Retail	55	48	87	2	4	5	9
Services	41	32	78	5	12	4	10
Trucking & Trans.	9	5	56	2	22	2	22
Construction	10	3	30	5	50	2	20

TABLE TEN

PATTERN OF SPATIAL MOVEMENT: EMPLOYMENT

Activity	Total Moving	Area 1 No.	Area 1 %	Area 2 No.	Area 2 %	Area 3 No.	Area 3 %
Total	6369	2979	47	2029	32	1361	21
Manufacturing	3163	1261	40	1224	39	678	21
Meat (ND)	476	100	21	329	69	47	10
Other Food (ND)	560	146	26	368	66*	46	8
Apparel (ND)	619	536	87	44	7	39	6
Printing (ND)	700	156	22	280	40	264	38*
Other ND	248	110	44	90	36	48	20
Metal Products (D)	352	79	22	74	21	199	57
Other Durable	208	134	64	39	19	35	17
Wholesaling	2229	930	42	676	30	623	28
Meat	587	47	8	444	76	96	16
Other Food	426	334	78	41	10	51	12
Apparel	256	181	71	60	23	15	6
Metal Products	481	116	24	81	17	284	59
Leather	238	149	63	13	5	76	32*
Other	241	103	43	37	15	101	42
Retail	422	397	94	4	1	21	5
Services	349	282	81	55	16	12	3
Trucking & Trans.	132	85	64*	31	24	16	12
Construction	74	24	32	39	53	11	15

NOTE: * Includes one very large firm.

TABLE ELEVEN

PATTERN OF SPATIAL MOVEMENT: MEDIAN SIZE OF FIRM*

Activity	Total Moving	Area 1	Area 2	Area 3
Total	6.6	5.2	9.3	9.3
Manufacturing	9.9	8.6	15.7	16.7
Meat (ND)	49.0	---	---	---
Other Food (ND)	27.5	---	---	---
Apparel (ND)	15.8	15.0	---	---
Printing (ND)	10.5	7.1	16.0	---
Other ND	6.1	5.5	---	7.5
Metal Products (D)	9.2	6.3	7.5	19.9
Other Durable	8.8	8.1	---	---
Wholesaling	5.2	4.2	8.0	10.9
Meat	12.5	7.5	12.5	---
Other Food	4.9	5.3	---	4.9
Apparel	3.8	3.7	---	---
Metal Products	4.9	3.4	4.6	11.7
Leather	4.0	3.7	---	---
Other	7.2	6.0	---	9.9
Retail	4.8	4.9	---	4.2
Services	4.3	4.2	7.5	---
Trucking & Trans.	9.2	8.5	---	---
Construction	7.5	7.5	7.5	---

NOTE: * No medians computed where less than five firms in category.

the downtown, the median size was 5.2 employees; for Areas 2 and 3 the figure was 9.3. Once again, however, it appears that the greater proportion of those moving outside the downtown settled in the frame, and even in terms of employment, only one-fifth of the total relocated moved outside the two central areas. Clearly, there was a tendency for the larger firms to move out of the downtown as a result of the forced relocation, but there was an equally strong tendency for all firms to remain clustered in the central areas.

Looked at in detail, it becomes obvious that this general experience did not hold true for all the different groups which made up the total of Artery establishments. Turning first to the manufacturing component, it appears that in general there was a somewhat greater than average tendency for these establishments to move outside the downtown. Only 60 per cent of manufacturing establishments and only 40 per cent of the employment in this general category remained in the downtown, while the comparative over-all figures were 66 per cent and 47 per cent. Moreover, it appears here that the larger the firm, the farther away from the downtown it tended to move. Thus, the median size of establishments moving to Areas 1, 2 and 3 respectively were 8.6, 15.7 and 16.7 employees. Considering the specific manufacturing categories, there are several notable variations from the general trend. Apparel manufacturers

remained almost entirely within the downtown. Metal products manufacturers showed the greatest tendency to move out and constituted the only manufacturing group to move significantly beyond the frame. Within printing the dominant move measured by employment was to the frame, indicating an exodus particularly of larger firms.

The pattern in wholesaling is generally similar to that found in manufacturing, although there appears to be a somewhat greater tendency for establishments and employment in this category either to remain in the downtown or to move beyond the frame. The tendency for larger establishments to move farther away from the downtown is even more evident within this group; the median size of establishments moving to Area 3 (10.9) is significantly larger than the median of those moving to Area 2 (8.0). Once again, however, the patterns found among the several sub-categories are quite different. In meat wholesaling the dominant move quite clearly was to the frame. Contrasted sharply with this was the tendency for other food wholesalers to remain clustered in the downtown. This difference is all the more striking when it is realized that both sets of firms had been located in the same downtown market district. Like their manufacturing counter-parts, apparel wholesalers remained generally in the downtown, as did wholesalers engaged in distributing leather products. The pattern of sharp outward

movement found among metal products wholesalers parallels closely the picture found in the manufacturing counter-part of this category.

As might be expected, the ancillary retail and services activities show a dominant tendency to remain clustered in the downtown. Because of the smallness of the numbers involved, it is difficult to make any conclusive statement concerning trucking and construction, although the latter does show some tendency toward movement out of the downtown and into the frame area.

Summing up to this point then, it appears that there was a significant tendency among the predominant makers and handlers of goods, the manufacturers and wholesalers, to move out of the downtown area in which they had been originally located. For the most part, this movement was to the manufacturing and wholesaling frame contiguous to the downtown. The movement out was especially notable in activities which either have special building requirements, as in printing, or which consist of the handling of heavy bulk products, as in meat packing and in metal products wholesaling and manufacturing. The exceptions to the general tendency, however, are as notable as the cases in which it was followed. The three which clearly fall under this heading are dealers in other food products, apparel manufacturers and wholesalers, and leather handlers. These will

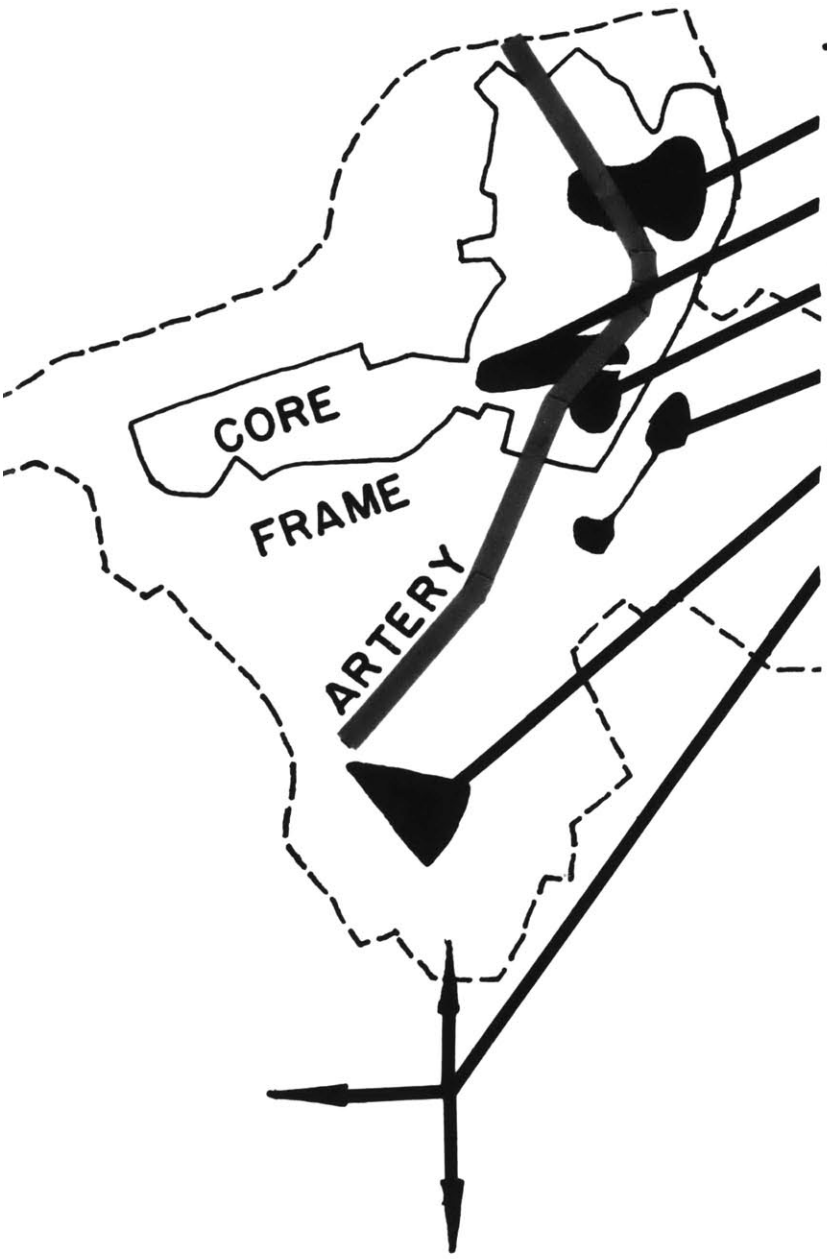
be dealt with shortly. The ancillary retail and service activities which survived the dislocation showed a very understandable tendency to remain in the area where traditionally their business had been.

Focusing on the manufacturing and wholesaling patterns of movement, it is possible to unravel the diverse patterns one step further. Clearly, there tended to be three separate types of movement (Map 3). The first represented a clustering around previously existing and traditional centers of the activity within the downtown. The apparel, leather and other food establishments quite obviously followed this pattern. The second pattern of movement was typified by the mass relocation of the given activity to a new location within the frame. The clearest examples of this occurred among the meat dealers and the larger printers. Finally, there was a third pattern of general dispersal with particularly heavy movement into the frame and hinterland area and out of the downtown. The movement of the metal products wholesalers and manufacturers exemplifies this pattern.

We must now ask whether the experience of the relocated establishments was related to their differential movement patterns. The measure we shall use to determine this is employment growth or decline. It must be pointed out, however, that in many of the detailed breakdowns, the numbers are so small

MAP 3

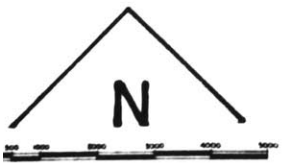
PATTERNS OF CONCENTRATION AND DISPERSION



ACTIVITY	"A"	"B"
OTHER FOOD	34	49
APPAREL	27	48
LEATHER	28	35
PRINTING	10	35
MEAT	17	30
METAL PRODUCTS	0	77

COLUMN "A" - No. of firms in concentration

COLUMN "B" - Total firms relocating



that individual conclusions are highly tentative. To avoid this somewhat, Areas 2 and 3 will be considered as a unit, and comparison will be made only between experience within the core and experience outside of it (Table Twelve).

In general, it appears that firms which moved outside the core tended either to grow more, or to decline less than those which remained in the core. Over-all, employment among the firms which remained in the core showed no net change while employment among the firms which moved outside the core increased 24 per cent. In manufacturing, while there was a 10 per cent increase in core employment, outside the core, the growth was 17 per cent. In wholesaling, the outside growth was 40 per cent while in the core employment decreased four per cent. Since in the remaining activities, employment remained so centered in the core or was so small to begin with, no comparisons can be made.

Looking at the manufacturing and wholesaling categories in detail, it appears that where a significant number of cases is available, the general pattern holds true. In most cases one of three things happened: employment in the outer area increased more than in the core area, as in printing; employment in the outer area increased, while it decreased in the core, as in meat wholesaling; or, employment in the outer area decreased less than in the core, as in other food manufacturing.

TABLE TWELVE

PATTERN OF SPATIAL MOVEMENT: EMPLOYMENT EXPERIENCE BY AREA

Activity	Area 1 CA	Area 1 1957	Area 1 ±	Area 1 ±%	Areas 2 & 3 combined CA	Areas 2 & 3 combined 1957	Areas 2 & 3 combined ±	Areas 2 & 3 combined ±%
Total	2979	2976	- 3	*	3390	4217	+827	+ 24
Manufacturing	1261	1386	+125	+ 10	1902	2219	+317	+ 17
Meat	100	237	+137	+137	376	797	+421	+112
Other Food	146	75	- 71	- 49	414	229	-185	- 45**
Apparel	536	622	+ 86	+ 16	83	106	+ 23	+ 28
Printing	156	164	+ 8	+ 5	544	592	+ 48	+ 9
Other ND	110	94	- 16	- 15	138	139	+ 1	+ 1
Metal Products	79	58	- 21	- 27	273	308	+ 35	+ 13
Other Durable	134	136	+ 2	+ 1	74	48	- 26	- 35
Wholesale	930	889	- 41	- 4	1299	1812	+513	+ 40
Meat	47	43	- 4	- 9	540	978	+438	+ 81
Other Food	334	319	- 15	- 4	92	104	+ 12	+ 13
Apparel	181	156	- 25	- 14	75	52	- 23	- 31
Metal Products	116	116	0	0	365	427	+ 62	+ 17
Leather	149	165	+ 16	+ 11	89	92	+ 3	+ 3
Other	103	90	- 13	- 13	138	159	+ 21	+ 15
Retail	397	299	- 98	- 25	25	28	+ 3	+ 12
Services	282	314	+ 32	+ 11	67	75	+ 8	+ 12
Trucking, Trans.	85	72	- 13	- 15	47	33	- 14	- 30
Construction	24	16	- 8	- 33	50	50	0	0

* Less than 0.5 per cent

** Decline exaggerated by large loss in one firm.

There were several exceptions to this pattern, that is, cases in which experience outside the core was not as good as that within the core. These occur in apparel wholesaling, leather wholesaling, and other durable goods manufacturing. If these several cases can be held aside for a minute, it appears possible to say that those firms which moved outward tended to do better than those which remained within the core and that, therefore, the outward pattern of movement generated by the Central Artery dislocation was a good one. Indeed, it may be asked whether the experience of the firms which remained in the core might not have been better, had they chosen to move outward.

If we attempt to understand why the differential movement patterns occurred, it will become clear why in most cases, outward movement was beneficial and why, in a few exceptional cases, the tendency to remain in the core was not detrimental. The patterns of movement which were generated resulted from two sets of factors: one, the developing characteristics of the downtown area and, two, the characteristics of the establishments themselves.

Three characteristics of the downtown must be noted. First, the downtown is characterized by increasing congestion of movement. Second, it is characterized by a decreasing amount of usable loft space, and third, it is characterized by increasing

rents, generated by the preceding factor and rising taxes. It should be noted again that the Central Artery itself by removing upwards of five million square feet of usable floor space contributed to these latter developments.[2]

It appears clear that the Artery firms were generally of the types which would be most affected by these developing trends in the downtown. The firms which moved out had one or several of the following characteristics:

1. They were larger than average users of space;
2. They had specialized space needs, particularly a requirement for buildings with heavy floor loads;
3. The markets they served tended to be at least metropolitan;
4. As producers and distributors of goods, they were particularly dependent on easy access to and from their base locations;
5. Ranking as small businesses generally, they were particularly sensitive to the cost of space.

These, then, were precisely the firms which would be most adversely affected by the trends in the downtown noted above.

In light of this discussion, how can the exceptions to the beneficial effects of outward movement be explained? The simple conclusion appears to be that in three of the cases noted - apparel and leather wholesaling and other durable goods manufacturing - the benefits of being in-town were not outweighed by

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[2]See Chapter VI, Footnote 2, page 41.

the potential benefits of moving out of the core. In the case of apparel, for example, we have an industry which is highly dependent on being accessible to out-of-town buyers. We also have an industry with highly flexible space requirements. The first of these characteristics appears to make it necessary for firms to be close to the area where buyers congregate, namely the downtown. The second makes it easier for the firms to find or to adapt space for their needs. Much the same is true for the leather wholesalers, found in Boston, and of furniture firms, which dominate the category "other durable manufacturing."

The experience in other food wholesaling stands as the exception which proves the rule. In this case we have an activity which remained clustered downtown, but suffered significant decline. This experience stands in particularly sharp contrast to that of the meat dealers. Undoubtedly the food dealers remained in the downtown because they felt it would be unwise or too expensive to move away from the traditional market district. Thus, there was no organized movement within this group, as there was among the meat packers, to seek a new location. The results of this study indicate that this was an unwise decision, and that, in fact, the food merchants, as major goods handlers, might have done better to relocate outside the core of the city.

Reviewing briefly the patterns of spatial redistribution, we have found that the dislocation caused by the Central Artery

tended to force a movement outward from the core that was both logical and beneficial to the firms involved. Looking at the characteristics of the firms which moved outside of the core and the evolving characteristics of the downtown, it appears obvious, that with several logical exceptions, the activities carried on by these establishments could be better performed in less congested and more accessible locations. The experience of the firms tends to validate this conclusion. The fact that the bulk of the firms which moved out of the core remained clustered in an area contiguous to the downtown indicates that a location within the general central area is still desired by the small manufacturers and wholesalers which dominated the group under study. The key factors which must be maintained within this peripheral area to keep it attractive are adequate space, at a reasonable price, and adequate accessibility, both to the downtown and the metropolitan hinterland.

CHAPTER IX

IMPACT ON THE CITY

We turn now to a consideration of what effect the dislocation has had on the city of Boston itself. This question has particular relevance in light of the fact that Boston, like many central cities, has been suffering a decline in business activity over the past decade. This decline, with its contingent loss of revenue to the city, has placed Boston in a deteriorating fiscal position and has led to a growing feeling of pessimism concerning the future of the central area. The question we raise here is to what extent the dislocation caused by the Central Artery has contributed to this general decline.

At first glance it appears that the loss sustained as a result of the Artery experience constituted a disproportionately large part of the general decline suffered by the city between 1950 and 1957. All told, within this period, the city suffered a net loss of an estimated 12,000 "covered" jobs and 2,500 "covered" business firms.[1] Within the Artery group, the loss suffered by the city as a result of establishments going out of business or moving out of the city was 153 business units. The net loss in employment, taking into account business deaths,

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[1]These estimates are based on data developed by the Greater Boston Economic Study Committee from material supplied by the Massachusetts Division of Employment Security.

out-migration and the additional factor of growth and decline among the firms which remained in business within the city was 668 employees.[2] Thus, it appears that the loss attributable to the Artery firms accounts for approximately 6 per cent of the city decline in firms and 5 per cent of the decline in employment. Since the Artery firms made up only 2 per cent of the city's business population in 1950, it appears that the share of the city decline attributable to them is disproportionately high.

It must be remembered, however, that the city figures are net figures and include the effect of new firms coming into existence during the time period under study. Obviously, this effect cannot be present in the Artery group. Unfortunately, no figures are available either on the number of firms going out of, or coming into existence in the city. Nor, is it known how much of the decline in city business activity was due to net out-migration of business firms. All these figures would need to be known, if a true comparison were to be made. On a national and state basis, it is known that the number of firms coming into existence somewhat over-balances the number of firms

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[2]Once again, it must be noted that these figures do not include the experience of an estimated 300 establishments known to have been in the Artery area, but not covered by DES. Since, however, city data come from the same source and have the same limitations, direct comparison between city and Artery figures are valid.

discontinuing business.[3] Therefore, it may be assumed that the gross loss suffered by Boston as a result of business deaths and out-migration is significantly larger than the net figures indicate. The 153 firms lost as a result of Artery dislocation would thus constitute a much smaller proportion of this more comparable gross city decline.[4]

One possible line of reasoning does lead to the conclusion that the Artery dislocation did not cause a significant loss to the city, at least in terms of jobs. We have seen that the business deaths associated with the Artery group were probably not significantly different from what might have been expected under normal circumstances. If it may be presumed that business births in the city followed the general trend, at least to the extent of matching business deaths, then it may be assumed that the Artery deaths were compensated for by the creation of new firms. The "real" loss, then, caused by the Artery relocation would be accounted for by out-migration. Since this

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[3]U.S. Department of Commerce, Survey of Current Business, 38:24, No. 8, August 1958; 36:8, No. 6, June 1956; and 34:11, No. 1, January 1954.

[4]If it may be assumed that Boston's rate of business discontinuances was roughly similar to the state average, or about 15 per cent below the national rate, then the city would have lost approximately seven per cent of its existing firms each year. The total business deaths during the period from the beginning of 1950 through mid-1957 would have been roughly 13,000. The Artery loss due to business deaths, 118, would thus have accounted for less than one per cent of the total number of business deaths during this period.

loss was more than compensated for by the growth of employment among firms which remained in the city - 680 jobs gained versus 557 lost by out-migration - it might be argued that the Artery dislocation did not add to, and in fact led to some compensation for, the general decline suffered by the city. This is tenuous reasoning, however, since it assumes that the entire loss of 2,500 firms and 12,000 jobs suffered by the city between 1950 and 1957 was due to net out-migration. It is hard to believe that this was the case, since it would have meant a loss by net out-migration of over 300 firms per year.

It seems most valid to say that the Artery dislocation did result in a net loss of jobs and establishments to the city. Clearly, insofar as the forced move did drive firms out of business or lead them to leave the city, the dislocation added to the city's decline. It is known that in a number of cases this was the specific cause involved. Counter-balancing this force is a significant amount of statistical evidence that the effect thus generated by the Artery dislocation was not much greater than what might have been expected to happen normally. Therefore, it appears that, while the Artery dislocation was a specific cause for loss of establishments and jobs to the city, other factors would have caused a similar result to occur even if the Artery had not been built.

Looked at in detail, it appears obvious that the bulk of

the loss caused by the Artery occurred by virtue of establishments going out of business. Tables Thirteen and Fourteen summarize this data. Of the 153 firms lost, 118 or 78 per cent were business deaths. Only 35 firms moved outside the city. As might be expected from the preceding discussions, the firms which went out of business were smaller than the average. Therefore, while they accounted for more than three-quarters of the loss of firms, they included only 59 per cent of the employees lost (791 of 1348).

The largest part of the loss by death of establishments was attributable to the demise of retail establishments. These deaths accounted for 37 per cent of the loss of firms and 32 per cent of the loss in employment. Significantly, the next largest loss was suffered in other food wholesaling and manufacturing. Together these accounted for 16 per cent of the establishment loss due to business deaths and 12 per cent of the employment deaths. This appears to add weight to the conclusion reached in the previous chapter that the other food component was adversely affected by poor relocation decisions.

Out-migration accounted for major loss only in metal products manufacturing and wholesaling. Of the 35 firms which moved outside the city, 11 or nearly one-third were in these categories. Moreover, of the 557 employees lost by out-migration, fully 57 per cent were in these two groups. The

TABLE THIRTEEN

IMPACT ON CITY: ESTABLISHMENTS

Activity	Total CA Establishments		Loss by Business Deaths		Loss by Out-Migration		Loss: Total	
	No.	%	No.	%	No.	%	No.	%
Total	573	100	118	100	35	100	153	100
Manufacturing	157	27	22	19	10	29	32	21
Meat (ND)	7	1	1	1	1	3	2	1
Other Food (ND)	12	2	5	4	0	0	5	3
Apparel (ND)	29	5	4	3	1	3	5	3
Printing (ND)	36	6	1	1	1	3	2	1
Other ND	30	5	5	4	3	9	8	5
Metal Products (ND)	25	4	3	3	3	9	6	4
Other Durable	18	3	3	3	1	3	4	3
Wholesaling	242	42	37	31	17	49	54	35
Meat	29	5	5	4	1	3	6	4
Other Food	56	10	14	12	3	9	17	11
Apparel	24	4	1	1	2	6	3	2
Metal Products	65	11	10	8	8	23	18	12
Leather	38	7	3	3	1	3	4	3
Other	30	5	4	3	2	6	6	4
Retail	99	17	44	37	3	9	47	31
Services	47	8	6	5	4	11	10	7
Trucking & Trans.	12	2	3	3	1	3	4	3
Construction	16	3	6	5	0	0	6	4

TABLE FOURTEEN

IMPACT ON CITY: EMPLOYMENT

Activity	Total CA Employment		Loss by Business Deaths		Loss by Out-Migration		Loss: Total		Net In-City Change[1]	Net CA Effect[2]
	No.	%	No.	%	No.	%	No.	%		
Total	7160	100	791	100	557	100	1348	100	+680	-668
Manufacturing	3401	48	238	30	301	54	539	40	+323	-216
Meat (ND)	556	8	80	10	40	7	120	9	+507	+387
Other Food (ND)	581	8	21	3	0	0	21	2	-256	-277
Apparel (ND)	717	10	98	12	39	7	137	10	+103	- 34
Printing (ND)	701	10	1	*	34	6	35	3	+ 35	0
Other ND	275	4	27	3	29	5	56	4	- 21	- 77
Metal Products (D)	358	5	6	1	156	28	162	12	- 22	-184
Other Durable	213	3	5	1	3	1	8	1	- 23	- 31
Wholesaling	2445	34	216	27	225	40	441	33	+446	+ 5
Meat	631	9	44	6	2	*	46	3	+432	+386
Other Food	501	7	75	9	30	5	105	8	- 9	-114
Apparel	274	4	18	2	15	3	33	2	- 33	- 66
Metal Products	524	7	43	5	162	29	205	15	+ 35	-170
Leather	247	3	9	1	1	*	10	1	+ 16	+ 6
Other	268	4	27	3	15	3	42	3	+ 5	- 37
Retail	676	9	254	32	16	3	270	20	- 92	-362
Services	371	5	22	3	12	2	34	3	+ 38	+ 4
Trucking & Trans.	136	2	4	1	3	1	7	1	- 27	- 34
Construction	131	2	57	7	0	0	57	3	- 8	- 65

* Less than one-half of one per cent.

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[1]Net employment change among surviving firms remaining in the city.

[2]Loss: Total ± Net In-city Change.

remainder was scattered, for the most part, among the other manufacturing and wholesaling categories.

Finally, we turn to the details of the net effect generated by the Artery dislocation on the city as shown in Table Fifteen. Here a comparison is made between employment trends in the city generally and changes attributable to Artery relocation, taking into account employment lost through deaths and out-migration as well as the growth or decline among establishments which remained in the city. Once again, it must be pointed out that the city trends are affected by the inclusion of the effect of establishments coming into existence and moving into the city during the period under study. As a result of this, city trends are more positively weighted than the Artery trends. One may presume that if the effects of business births and in-migration were excluded from the city figures, that is, if they were made exactly comparable to the Artery figures, the negative city trends would appear greater and the positive city trends would appear smaller. The comparative figures should be read with this in mind, since generally this adds weight to the conclusions drawn. No adjustment has been made in city figures, however, because of the unavailability of data.

It appears obvious that within all the ancillary categories - retail, services, trucking and construction, the Artery experience was significantly poorer than that found in the city

TABLE FIFTEEN

COMPARATIVE EMPLOYMENT TRENDS (1950-1957)

Activity	Net Artery Change No.	%	Boston City Trend
Total	-668	- 9	- 3
Manufacturing	-216	- 6	-15
Meat (ND)	+387	+70	+ 9
Other Food (ND)	-277	-48	-11
Apparel (ND)	- 34	- 5	-14
Printing[1] (ND)	- 1	0	- 5
Other Non Durable[2]	- 76	-26	-27
Metal Products (D)	-184	-51	-10
Other Durable	- 31	-15	-10
Wholesaling	+ 5	*	- 4
Food[3]	+190	+19	- 6
Metal Products[3]	- 87	-24	-11
Other[4]	- 98	- 9	- 2
Retail	-362	-54	-12
Services	+ 4	+ 1	+17
Trucking	- 16	-21	- 4
Construction	- 65	-50	- 8

* Less than one-half of one per cent.

[1]Excluding publishing

[2]Including publishing

[3]Excluding brokers, agents, and manufacturers' sales branches.

[4]Includes all others, plus all brokers, agents, and manufacturers' sales branches.

generally. The effect is particularly notable, as might be expected, in retailing, where the Artery group showed a 54 per cent decline while the city suffered only a 12 per cent decline. Insofar as it may be assumed that most of these activities drew their sustenance from the businesses and workers located in the immediate Artery area, it is not hard to understand why the excessive decline occurred. With over 150 firms and more than 3,000 workers removed from this district, the market for these activities became significantly smaller.

Looking at the manufacturing and wholesaling components, the opposite picture appears to be true generally. Manufacturing establishments as a group showed a decline less than half as large proportionately as that suffered in the city generally (6 per cent versus 15 per cent). In wholesaling, the city suffered a 4 per cent decline, while the Artery group showed no change over-all.

Treatment of the detailed categories within wholesaling and manufacturing is limited by the difficulty of developing comparable figures for all Artery categories; however, it does appear that with some exception the experience of the individual Artery groups was at least no worse than the experience of the comparable city groups. The Artery groups either showed gains greater than the city's, as in meat manufacturing and wholesaling, showed declines less severe than those experienced in the city,

as in apparel manufacturing, or showed trends little different from the city's, as in other non-durable manufacturing. The two activities to show trends distinctly worse than those found in the city generally were metal products wholesaling and manufacturing and other food wholesaling and manufacturing. Previous analysis indicates that this was true in the former case primarily because of movement out of the city and in the latter case, because of declines in employment among the firms remaining in the city.

For reasons elaborated above, however, it may be argued that in both these cases the relocation caused by the Artery merely accentuated trends already operating within the industry.

Summarizing, then, it appears possible to say that while the city probably did suffer some loss in terms of both establishments and jobs as a direct result of the relocation forced by the Central Artery, the over-all effect was probably not significantly worse, except in the area of retailing, than might have been expected had the Artery not been built. In fact, in several cases it appears that the growth experienced by firms subsequent to relocation compensated for the losses suffered as a result of business deaths or out-migration, so that in the dominant manufacturing and wholesale activities the Artery firms as a group did better than the general run of similar firms in the city.

CHAPTER X

CONCLUSIONS

This study set out to determine the effects generated when a large public works project like the construction of a major highway is carved out of a central city area. The general questions raised for consideration were what happens to the business establishments and the employment forced to relocate because their previous locations are taken for the construction of the new facility, and what can be learned from the experience of these establishments. Three particular questions have been posed:

1. Is the dislocation caused of sufficient magnitude to require consideration?
2. Is there a significant loss sustained in terms of establishments and employment to the area and to the city so that the dislocation can be said to have definite detrimental effects, whatever the other benefits of the particular project may be?
3. Does the pattern of relocation engendered by the forced removal reveal anything about the workings of the urban community and does this pattern appear to be positively or negatively related to the future development of the urban community?

One question which has not yet been dealt with, but which will be treated in the final pages of this concluding chapter, concerns whether the detrimental effects of the relocation might not be mitigated while the beneficial effects are enhanced. This question is naturally important to any complete consideration of the adequacy of public policy; it is of special importance, however, to the establishments immediately concerned in the relocation.

The construction of the Central Artery, a major highway built through the eastern fringe of downtown Boston, has provided the specific occasion for this study. It is believed that this is the first time that the dislocation effects of highway construction have been studied particularly and in detail. As has been pointed out, the implications of this study are relevant not only to the problems surrounding the developing program of highway construction, but also to the general movement to reconstruct our central cities; that is, to urban renewal broadly considered. Wherever reconstruction takes place, it is certain that buildings will be demolished and activities will be forced to relocate. The problems and effects of dislocation will inevitably arise. Looked at in this light, it makes little difference whether the new development is a highway, a business center, or a residential complex. This study, while focusing on the effects generated by a highway project, may therefore stand as an example of a more general case.

It should be noted that this study deals with a particular case and only part of the general problem. The Central Artery caused relatively little residential dislocation and therefore this topic has not been studied. Furthermore, the primary business activities affected were in-town wholesaling and light manufacturing and the services ancillary to these activities; therefore little can be said of possible effects on the major retail and office activities which predominate in the core of the city. Finally, as is obvious, this study represents a consideration of only one particular situation, and the conclusions drawn must await validation by other studies of similar situations.

Recognizing these limitations and the weaknesses of the data discussed in earlier sections of this paper, it, nevertheless, seems possible to draw certain useful answers to the questions stated above. First, it appears obvious that the dislocation caused by this one reconstruction project was of sufficient magnitude to require careful consideration. The Artery carved out an area of approximately 45 acres in the core of Boston. From this area, it is known to have displaced close to 600 business establishments and over 7,000 workers, representing approximately two per cent of the city's entire business community.[1] Clearly movements of such magnitude demand careful

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[1]The total number, including establishments and employment not covered by DES, may be closer to 900 firms and 8,000 jobs (see

study and analysis, for, as this particular investigation indicates, even one such mass relocation may have significant effects on the pattern of activity carried on in the urban community. The need for study, analysis, and careful planning becomes imperative when it is realized that in most major cities mass relocation must occur not once, but many times over as urban renewal projects begin to multiply. In Boston, for instance, significant relocation has already been caused in three instances - the Central Artery, the West End, and the New York Streets projects. Two other projects, the Government Center and the Inner Belt, promise to have effects at least as great as any yet experienced. There can be no doubt that future projects will involve hundreds of businesses and thousands of workers. In the long run, it may very well be that a large and perhaps a major portion of the city's economic activity will be directly involved in such forced relocation.

In answer to the second question, it appears that in general the dislocation caused by construction of the Central

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1(continued) Chapter III, pp. 20-21 and footnote 3). In addition, it is important to note here that this study concerns only the dislocation of firms from sites actually taken for the construction of the Artery. In the course of this study, the author has learned that during the stormy and often uncertain genesis of the Artery, a number of firms moved away from locations which they thought would be taken for the road, but which were not touched in the end. This fact, of course, raises interesting questions concerning the effects generated when uncertainties and delays are involved in carrying through major projects. Conceivably, the anticipatory relocation stimulated by these factors was of significant magnitude. The study of this effect, while beyond the scope of this paper, should receive some attention in future studies.

Artery probably did not cause a loss either to the metropolitan area or to the city significantly greater than what might have been expected to occur under normal circumstances. The rate of survival found among the Artery firms generally does not seem to have been abnormally low, and thus it appears that the Central Artery dislocation did not cause an excessive number of business deaths. Concerning out-migration, virtually no establishments moved beyond the borders of the metropolitan area and, therefore, the loss to this area was nil. The city itself lost only some 35 firms accounting for less than 600 employees by out-migration, and the bulk of this occurred in the outward movement of metal products wholesalers and manufacturers. Furthermore, it seems that such employment loss as did occur was compensated for by growth among establishments which remained in the city. Looking at detailed effects on the city, the conclusion is drawn that, with the particular exceptions noted, the experience in the activity sub-categories, as measured by employment changes, was at least no worse and in a number of cases better than trends found in the city as a whole. This is not to say that the disproportionate losses suffered by the city in retailing, other food and metal products activities were inconsequential. One may explain the latter two in terms of changing locational requirements which would probably have caused a similar result in any case as time went on. In

contrast to this, the loss in retailing does appear to be directly related to the forced removal of so many businesses and workers, and is therefore one loss that might not have occurred had the Artery not been built. When the plusses and minuses are added up, however, it does appear that the overall loss to the city was not so great as to constitute a major detrimental effect related to the construction of the Central Artery.

Turning to the third question, it appears that the pattern of relocation generated by the forced dislocation under study does reveal something about the changes taking place in the city's structure. There appears to be a tendency for major segments of manufacturing and wholesaling to move outside the core area. This occurs particularly in those activities which no longer have major reasons for remaining in the core area or which no longer are able to find adequate space at the right price for carrying on business in this area. Most often these reasons coincide. The lack of space, the high cost of space, and the excessive traffic congestion of the central area act to push these handlers of goods outward, while the expanding nature of their markets and the easier access to market areas available outside the core draws them to new locations in the fringe areas of the city. The movement pattern found among the metal products establishments exemplifies this trend most clearly.

The key factor which appears to separate out those activities which remain in the core from those which move out seems to be the need to maintain close and direct communication with other business elements - either customers, buyers or sources of information - which necessarily find their locus in the core area. This factor appears to be clearly operative in the apparel and leather activities. Both these activities need to be immediately accessible to out-of-town buyers and to be close to the sources of style information. The additional fact that these establishments probably are better able to adapt space to their needs, makes it easier for them to maintain central locations. It would appear at first glance that the printers, too, should fall into this group, for they, too, have need for immediate and rapid connection with their dominant downtown market. However, the space demands of this group tend to be more stringent and therefore they are pushed out by their inability to find adequate quarters at the right price in the core. Not surprisingly, they tend to locate in the fringe area, as close as possible to the core itself.

The differential growth patterns found among the firms included in this study support the contention that the patterns of movement generated were valid ones. Those manufacturing and wholesaling firms which moved away from the congested core, did better than those which remained in the center. Only where real

ties to the center remained strong does it appear that business experience as measured by employment validated the decision to remain in-town. Indeed, in the one segment in which by the reasoning presented above there should have been a strong outward movement and was not, it appears that the business experience was notably bad. This, of course, was in the other food group.

It appears, then, that the construction of the Central Artery forced a significant outward movement of manufacturers and wholesalers. This movement, far from being detrimental, was beneficial to those who followed it. The question may be raised whether in fact the effects of the Artery relocation might not have been more beneficial had more establishments chosen to follow this trend. In generalized terms, the Artery experience leads to the conclusion that with few specific exceptions manufacturers and wholesalers are no longer best located in the central core area. Bluntly, they do better in more outlying areas. Nor is this conclusion without its sanguinary implications for the core area itself. These activities with the volume of truck traffic they generate, constitute one of the major sources of congestion choking the life of the central area. If it can be demonstrated, as appears to be the case, that these activities do better when located outside the core, then it may be hoped that in time the movement out will grow

of its own accord and a major source of central area trouble will be removed to the benefit of all concerned. Going even further, this conclusion may argue for the institution of a planned program of relocation in which firms are helped to find new locations in the outlying areas of the city. It appears that such a program would be justified, even to the extent of providing some assistance to defray moving costs, since in the long run it would benefit the city as well as the business concerns themselves. Logically such relocation could be tied in with redevelopment projects in the outlying areas. Thus, blighted areas could be cleared and repopulated with the manufacturing and wholesaling activities whose relocation from the core area is sought or is being forced. Certainly the idea is worthy of further study.

This is particularly true in light of the fact that, in the Boston area at least, sites cleared under urban renewal programs have tended to go begging. Thus the New York Streets project and the Cambridge Rogers Block project remain vacant. It does not seem illogical to wonder whether these projects might not have been more successful if some positive program had been adopted of guiding firms forced to relocate from the Central Artery area into these redevelopment areas.

Returning now to the central focus of this thesis, we have argued to this point that the losses incurred as a result of

the forced relocation do not appear to have been significantly large or abnormal when looked at in the overall and that the pattern of relocation generated appears to have been beneficial in its results. In toto, then, we have painted a rather happy picture concerning the relocation caused by the construction of the Central Artery. In doing this, however, we have tended to obscure certain obvious facts. These pertain particularly to the losses suffered by Artery establishments because of forced relocation. Whether or not these losses, looked at in broad perspective, were little different from what might have been expected to happen normally, the fact remains that they probably occurred in this case because of forced relocation. This is true both for the firms which went out of business and of the firms which appear to have lost business.

Conversations with many of the people involved in the relocation confirm the fact that in many instances the mere costs of moving ran into thousands of dollars for a single establishment. Several businessmen reported costs running over $10,000. In addition to these costs, a number mentioned the loss of business experienced during the moving period, and several noted the loss of customers who were unwilling to follow the establishments to their new locations. In a number of cases, there were significant additional costs involved in advertising new locations. Clearly relocation involved major expenses for

the firms involved. It should be remembered that the bulk of these firms were small, and there can be little doubt that the costs of moving placed a particular burden on the limited capital resources of these establishments. Large firms, however, were not immune from the damage caused by the costs of moving. It is known that one large candy manufacturer almost went into bankruptcy when faced with the cost of moving the heavy machinery he used. Finally, it must be pointed out that many of the firms incurred additional expense by virtue of the fact that they were forced to pay higher rents in their new locations. In great part, this circumstance is directly attributable to the nature of the Artery relocation. Because so many establishments were forced to move within such a limited period, the demand for space was pushed unnaturally high. At the same time, the construction of the Artery eliminated several millions of square feet of available space. With space demand high and the supply now more limited, it was inevitable that rents would rise.

The crucial point is that all of these additional costs were created for the Artery firms by a public decision from which there was no recourse. It may be argued that forced eviction is nothing more than another one of the normal possible consequences of doing business which all firms face. After all, had these firms been forced out by private develop-

ment, they each would have faced a similar situation. The author must dissent from this argument. In the first place, because the decision was a public one and because the benefits of the new project, in this case a highway, were expected to accrue to the entire community, it seems that some effort should have been made to limit the damage being caused to private parties.

Beyond this, however, it seems obvious that part of the costs generated, particularly the increased rents, were caused by the sheer magnitude of the project - the fact that so many were forced out in so short a time. It is doubtful that many private projects would have this same effect. Finally, it appears possible to argue that had some help been given in limiting the costs of moving and in easing the transition of relocation, the detrimental effects of the dislocation might have been diminished and the beneficial effects augmented. Certainly a level of good will would have been generated which would have made easier the job of carrying through the project under study and other future projects.

What particular things might have done? First, aid, either in the form of loans or direct cash payments, might have been made available to cover a major part of the moving expenses for at least the smaller firms. This is the group which suffers most and where the greatest loss to the community occurs.

In this connection, it should be noted that there is sound precedent for instituting such a practice. Under the present urban renewal procedures, businesses may receive up to $2,500 to defray their moving costs.[2] Second, some similar system might have been instituted to cushion the effect of higher rents generated when the space market was suddenly glutted with new demand at the very time the available supply was being diminished significantly. It is assumed that a system of subsidy or loan would be more acceptable and easier to administer than a system of rent control. The same result might of course be achieved by some system of tax abatement. However achieved, it is believed that such aid would significantly relieve the damage caused to business establishments by virtue of sudden and unexpected costs. It would also limit the loss caused to the entire community when firms are either forced to contract or go out of business because of their inability to bear these costs. It is important to note that this would be accomplished at a cost which seems small when compared to the total amount expended for the project. In the case of the Artery relocation, had the maximum allowance of $2,500 now available under urban renewal been paid to each of the establishments relocated the total cost would have been

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[2]Housing and Home Finance Agency, Detailed Summary of the Housing Act of 1957, HHFA, Washington, D.C., July 1957, p. 6.

about $1.5 million or somewhat under one and one-half per cent of the total cost of the project. This cost seems nominal enough in light of the results that might be achieved.

Indeed, in light of the apparent fact that in numerous cases the costs of moving ran to substantially more than $5,000 and in some cases to substantially over $10,000, it may be questioned whether the maximum allowance should not be doubled or even tripled with exceptional amounts above even this general maximum being paid where very large firms are involved. Perhaps a graduated scale, based on size and type of firm, would be the most equitable system to adopt. In the case of the Artery, it may be pointed out that even if the maximum were tripled to $7,500 and even if this maximum had been paid to all firms, an unlikely case, the total additional cost would have been little more than four per cent of the cost of the project.

There is some question whether such aid should be made available to firms which own the buildings in which they operate, since these firms do receive compensation in the form of condemnation payments. Three points should be made in this connection. First, the majority of the Artery firms were space-renters, not space-owners, and therefore did not receive even this compensation. Second, those who owned buildings still received no compensation for the direct moving costs

they had to face, and it may be presumed that the monies they received for their old quarters were probably needed merely to pay the cost of new space. Third, it must be pointed out that while the space-owner firms seem at first glance to have been in a better financial position to face the costs of relocation because of the payments due them under the condemnation process, in fact this was not the case in many instances. Conversations with Artery space-owners indicate that the actual condemnation payments were delayed as much as two or three years in many instances. These firms were thus faced with a situation in which a large part of their capital was unusable. Where this occurred, the firm was at least no better off than the space-renter. It seems apparent that some speed-up in the process of settling condemnation claims is necessary. Failing this, some substantial aid, probably in the form of a loan in anticipation of condemnation settlement, should be made available to space-owners. But beyond this, it seems that the general argument still holds true and that space-owners, like space-renters, should receive some aid to cover the direct costs of moving not included in condemnation payments.

The final point we wish to make here is that much of the damage caused by the dislocation might have been avoided and positive assistance been given in helping the establishments

to find and choose new locations. Going further, it may be asked whether a definite plan of relocation might not have increased the benefits which the laissez-faire pattern of relocation appears to have generated. Firms which might have been expected to do better in locations outside the core could have been counselled to choose such locations, and assistance might have been given in the finding of such sites. Indeed, under similar circumstances, it would seem that such a mass forced relocation could be tied-in with renewal efforts. Perhaps bonus moving-cost payments might be offered to firms which relocated according to the pattern desired by the city.

The purpose of the above discussion has not been to develop a detailed program of planned and aided relocation, but rather to suggest the outlines of some practical approaches to the resolution of this very real need. It will remain for future studies to develop more fully what has been presented here only briefly. The primary ideas the author has sought to convey are that means are available and that the adoption of some program is justified by the results which can be achieved. From a minimum point of view, such a program of planned and coordinated relocation would have the effect of diminishing the potential for causing damage to private business. At the same time it would help ease the ill-effects of congestion and chaotic land use so prevalent in the core area. From a more positive point

of view, it seems probable that such a program would in fact improve the prospects for retaining and stimulating business activity in the central area. At the same time the community would be taking definite steps to foster the evolution of a land use arrangement for the entire urban area which would be more suitable to all its needs.

As our programs of reconstruction multiply in the future, the magnitude of forced relocation is bound to grow. This study has indicated that such relocation has not had severe adverse effects in at least the one case reviewed. While the dislocation was of significant magnitude, it did not cause a major loss of establishments and employment above what might have been expected normally. Beyond this, the pattern of space use it seems to have generated appears to make more sense than that which obtained originally. Finally, the assertion has been made that the process of relocation offers an opportunity for communities to foster business movements which would be beneficial not only to the particular establishments involved, but which would also have the effect of bringing into existence a more efficient and productive land use pattern.

APPENDIX I

Computation of "Normal" Survival Rates

In computing "normal" survival rates to provide a base for judging the significance of Central Artery survival rates, national figures from the Survey of Current Business[1] were used. The actual figures used were the various national annual rates of discontinuance of business firms; thus, the final survival figures were arrived at by a process of subtractions of expected number of discontinued firms year by year from the actual number of Artery firms in existence as of 1950. The result of the compounded subtraction produced the "expected normal" figures presented in Table Six.

Before this process could be carried through, the national rates had to be combined and adjusted to take into account three factors:

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[1]a. U.S. Dept. of Commerce, "Growth in Business Concerns," Survey of Current Business, (Washington, D.C., Vol. 38, No. 8, August 1958, p. 24.

b. U.S. Dept. of Commerce, "Concerns in Business and Their Turnover," Survey of Current Business, Washington, D.C., Vol. 36, No. 6, June 1956, p. 8.

c. Betty C. Churchill, "Recent Business Population Movements," Survey of Current Business, U.S. Dept. of Commerce, Washington, D.C., Vol. 34, No. 1, January 1954, pp. 12, 13.

All statistics reported as estimates based primarily on data supplied by the U.S. Dept. of Health, Education and Welfare, Bureau of Old Age and Survivors Insurance.

1) the age of firms

2) the size composition of the Artery group

3) the different types of activities

Discontinuance rates vary along all three of these dimensions, The specific steps were as follows:

1. Rates according to age of firms were used as the base, since this was the only case in which a single figure was reported for all firms. It also represents the most unknown factor. No data was available or gathered on the age of Artery firms, and this imposes the greatest difficulty in arriving at a final conclusion. Furthermore, the only series of discontinuance by age of firms found, did not extend beyond 5.5 years of age. All the results reported must be read with this in mind.

The annual rate of discontinuance found for firms 5.5 years old was 11 per cent.[2] Tentative results of a questionnaire sent to Artery firms indicated indirectly[3] that this group was generally above average in age. With this in mind, the base rate of discontinuance decided upon was 5 per cent or somewhat

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[2]Betty C. Churchill, "Survival Patterns of the Postwar Business Population," Survey of Current Business, U.S. Dept. of Commerce, Washington, D.C., Vol. 32, No. 12, p. 15.

[3]The particular question asked concerned the number of years the firm had been located at its Central Artery address prior to moving. This gives a minimum estimate of age of firm.

less than half of the 5.5 year rate. It must be emphasized that this represents only a guess, since the actual age composition of the Artery firms was not known, nor was it known how fast the national discontinuance rates drop past the 5.5 mark. To further take into account possible error in this guesswork, a second set of rates were developed, using 2.5 per cent as a base discontinuance rate.

2. Annual survival rates by size of firm were developed from data reported in a study of the two-year period 1949-1950.[4] For the two-year period these rates were as follows:

0-3 employees	--	17 per cent
4-7 "	--	10 per cent
8-19 "	--	8.3 per cent
20+ "	--	5.3 per cent

These were converted to an index basis, by dividing each rate of the overall average, 15 per cent. This gave the following series:

0-3 employees	--	113
4-7 "	--	67
8-19 "	--	55
20+ "	--	35

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[4]Betty C. Churchill, "Size Characteristics of the Business Population: 1944-51," Survey of Current Business, U.S. Dept. of Commerce, Washington, D.C., Vol. 32, No. 1, p. 12.

These indexes were then multiplied by the base figures, based on age of firms to give rates on the basis of size class. The results for the 5 per cent base were as follows:

0-3 employees -- 113 (index) x 5 = 6 per cent

4-7 " -- 67 (index) x 5 = 3 per cent

8-19 " -- 55 (index) x 5 = 3 per cent

20+ " -- 35 (index) x 5 = 2 per cent

3. After "normal" rates of size classes were developed, these were applied to the size composition of the Artery firms to develop an overall "normal" discontinuance rate to be used on this group. This involved weighting the size-class rates by the percentage of Artery firms in this class. The process for all firms was as follows:

size class	% of Artery firms	x Discontinuance Rate =	
0-3 --	38%	6%	228
4-7 --	26%	3%	78
8-19 --	22%	3%	66
20+ --	14%	2%	28
			$\frac{400}{100} = 4\%$

Thus the overall adjusted rate was found to be 4 per cent. This rate was then applied to the total of 573 Artery firms on a year-by-year basis over a 7.5-year period to arrive at the "expected" number of surviving firms; that is, 4 per cent of 573

was subtracted from the total for the first year, 4 per cent of the new total, 550, was subtracted from this new figure to give the second year loss, etc. The final total, as reported, was an expected survival of 422 firms.

As a final step, this same process was followed using the "½ rate" figure for annual rate of discontinuance, 2 per cent. As is reported in the text, this 2 per cent is by coincidence roughly one-quarter of its overall national rate (8 per cent).

4. The same process was followed for each of the three sub-categories reported - manufacturing, wholesaling, and retailing. First, each group has its own peculiar size composition. This was taken into account in Step 2. Second, it was found the general discontinuance rates for these classes varied according to activity. This was taken into account by adjusting the size class figures by the per cent above or below the general average each group tended to be normally. The general annual discontinuance rate reported[5] for all groups over a six-year period, 1952-1957, was 8 per cent; for manufacturing, 9 per cent; for wholesaling, 6 per cent; for retailing, 8 per cent. On this basis size class figures were adjusted up 12.5 per cent (1/8) for manufacturing, down 25 per cent (2/8) for wholesaling, and left the same for retailing.

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[5]Based on data cited in Note 1 above.

The computation for wholesaling is given below as an example.

size class	% of CA firms		(General discontinuance rate)	Adjusted discontinuance rate	
0-3	40	x	(6)	4.5	= 180
4-7	26	x	(3)	2	= 52
8-19	24	x	(3)	2	= 48
20 +	10	x	(2)	1.5	= 15
					295
					100 3%

The annual discontinuance rate used was, thus, 3 per cent for wholesaling; the ½ rate was 1.5 per cent. These rates were then applied to the 1950 total of Central Artery firms engaged in wholesaling, as described generally above. The complete table and ½ rates is as follows:

Activity	"normal" rate	½ "normal" rate
Total	4	2
Manufacturing	3.5	1.7
Wholesaling	3	1.5
Retailing	4	2

How accurate these rates are is impossible to say. Some data has come to hand more recently from state sources which provides additional material, but this is not conclusive. The Massachusetts Bureau of Corporations reports that in 1958, ten per cent of the state's corporations were dissolved. Taking into account that 1958 was a recession year, this is in line with national

discontinuance rates. The State Department of Labor and Industries has supplied figures on manufacturing which indicate that the state discontinuance rate in this category varied between 2.5 per cent and 3 per cent during the period 1950-1956, with the seven-year average being 2.8 per cent. Since it is not possible to adjust the figures for age and size of firm, no exact comparison is possible with the rates developed for this study. Compared to the national average, the state figure appears low, however. (9 per cent versus 3 per cent.) This might indicate either that the national figures are all too high or that the state figures are inordinately low. Survey of Current Business figures indicate that the Massachusetts rates of discontinuance are generally somewhat below the national average (approximately 15 per cent), but the difference noted above is quite in excess of this.[6]

If the figures reported by the Department of Labor and Industries are the more accurate measure of reality, then the rates used in this study, based as they are on higher national rates, are probably too high. With this in mind, it is probably safest to use the survival figures computed on the ½ "normal" rate basis for checking the conclusions of this study.

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[6]Betty C. Churchill, "State Estimates of the Business Population: 1944-51," Survey of Current Business, U.S. Dept. of Commerce, Washington, D.C., Vol. 32, No. 1, p. 12.

It should be pointed out that the rate used in manufacturing (1.7 per cent) is still quite a bit below the Labor and Industries figure of 2.8 per cent. It must be pointed out, however, that if the same corrections for age and size used above were applied to this 2.8 per cent state average, the result would probably be significantly lower than 1.7 per cent. The rate could be as much as 50 per cent lower. This would increase the number of firms expected to survive and weaken the conclusion drawn, namely that the survival experience of the Artery firms was not significantly worse than what might have been expected to occur normally. On this basis, for example, some 60 per cent of the Artery loss by deaths would have to be considered loss above "normal" loss - assuming a "normal" discontinuance rate as low as 1 per cent. This would clearly be a significant difference, since even by the lower rate used in the body of this study, only one-third of the loss could be considered abnormal. Unfortunately, there appears to be no sure way to resolve this problem. The author has presented in the study what he believes to be a reasonable case.

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