

MIGRATION TO AND WITHIN A SMALL AREA

by

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ABSTRACT

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Migrants, identified by certain personal characteristics, are believed to move into housing areas identified by related social and economic characteristics. At the same time, migrants are also thought to be restricted in their movement beyond certain community areas. Unfortunately, both of these concepts are ill-defined in migration theory and might not apply to housing choice within a predefined small area. However, even though the standard concepts in migration might not relate directly to small areas, both of these concepts can still be used to direct the research into the migrant's behavior and characteristics for small areas.

In this study it becomes clear that a migrant's personal characteristics are not related to his housing choice within a small market area. The study does suggest, however, that the block to which a migrant moves when classified by housing type is strongly associated with the location from which he came. Also, the location from which the migrant came is then, in turn, strongly associated with the migrant's personal characteristics. In other words, a link is made between the origin of a migrant and his small area housing choice and another link is made between the origin of a migrant and his personal characteristics, but a direct link cannot be made between a migrant's small area housing choice and his personal characteristics. Thus, knowing the place from which a migrant moves is vital to the understanding of migration flows into a small predefined urban area.

The proportions of migrants coming from several locations are related to migrant behavior and migrant characteristics for movement to and within a single census tract in Cambridge. The data was obtained from the Cambridge Police Listings for 1960 through 1965. Unfortunately, the hypotheses about differential movement can be checked only for one housing market area because a particular small area was used. Nevertheless, there are significant differences among the rates of migration even on a small scale which can help the planner understand migration flows and help him assist the forced migrants displayed by the proposed Inner Belt.

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Chapter I
INTRODUCTION

Chapter I

INTRODUCTION

Most studies of migration are concerned with the detailed preferences of potential migrants or the detailed history of past migrants. In many of these studies only long distance moves are considered because migration is often explicitly related to job change or job location change. In this study, migration will be examined using selected migration records and both long and short distance moves will be examined. Data about migration to and within a small area will be used. The locations people move from will be related to their housing choice and their own personal characteristics. The small area selected for this study will be considered a prescribed market environment, thus the application of the findings will be limited to a selected urban area.

Information about more than 1,500 movers is examined in depth. The use of selected information about many movers allows the empirical evidence of moves to be explored in the context of migration theory. At the same time, this selected information can improve the planners' understanding of the effects of forced migration. Census measures are used only to provide a background in terms of age, family composition and occupation. In the rest of the study the Cambridge Police Listings for the six year period from 1960 to 1965 are used. The hypotheses about the different rates of movement from location areas are checked for all movers aggregated over the six year period.

The thesis of this study is that the percentage of migrants coming from a location is associated with the housing choices of these migrants and is also

associated with the personal characteristics of those migrants. The housing choices are grouped by sub-categories of block types - racial predominance, demolition threat, a social status measure and an economic saving measure. The personal characteristics of the migrants are grouped by sub-categories within social and economic characteristics - age, male occupation and female occupation. The sample of migrants is limited to those who are moving to Census Tract Five in Cambridge so the examination of housing choices and personal characteristics is already limited by what exists in this area and who would move to this area. In order to establish an association between a housing choice or migrant characteristic and places of origin, each sub-category of choice or characteristic was compared with the distribution of places of origin for all migrants settling in Tract Five.

For this study the place where migrants settle, within the context of the small area, is assumed to relate in some manner to his economic and social characteristics. Most housing market areas are usually defined for movers in regional terms using such criteria as income, occupational grouping, ethnic grouping or educational facilities available. Housing market areas, on a regional scale, are also generally made up of specific small areas linked together by some common identifying factors. If we assume a pre-selected small area within a housing market type, which is relatively homogeneous in regional terms, is it still possible to define differential markets and housing choices within this market area? If so, can the migrants to each of these housing choices be distinguished from each other?

The movement of each person is seen as the result of his individual decision process. It is assumed that differential rates of movement for particular groups of migrants are caused either by their inability to move or by their

lack of desire to move. A dominant cause of their inability to move is usually economic - the lack of necessary funds. The lack of desire to move, on the other hand, frequently arises from a hesitancy to risk new social situations. The distance people readily move, constrained by certain economic and social factors, can be used to define the attachment of people to particular areas.

The associations between where people settle and who they are is not direct, but each of these factors is associated with the places from which the migrants came. The detailed findings of the thesis are as follows:

1. Persons locating in blocks classified as high non-white, proportionately come from locations significantly different from persons settling in blocks classified as low non-white. There is also an association between certain locations of origin for the blocks threatened by the Inner Belt and certain locations of origin and the rest of Tract Five. The first difference simply outlines the link between places where concentrations of non-white migrants would originate, like adjacent neighborhoods, Somerville, Boston, and states in the southern part of the country. The second simply exhibits how the people from the local blocks and Boston know enough to avoid the Inner Belt route while others may not.
2. The migrants who settle in areas classified by a social status measure or economic saving measure are different in terms of their origin from each other. Each housing type seems to draw significantly different proportions of migrants from the categories of origin. At the same time, these housing areas exhibit little significance in attracting people in different proportions when categorized by age, male occupation or female occupation. The association between high status occupations and high rent is the major

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exception to the lack of association between housing type and personal characteristics of migrants.

3. Migrants who are below fifty years old and are moving to Tract Five from some parts of Cambridge, Somerville and the rest of the Boston region and the state of Massachusetts move in the same pattern. However, the younger age groups move much less frequently within the small area studied and more frequently from out of the state or out of the country. As could be expected, older people move the closer distance more frequently or else come from particular locations like Somerville or Boston where a large number of older residents are living.
4. Most of the migrants when classified by occupation move from the origin location groups in the same proportions as the total migrant sample. There are two exceptions to this pattern - the professional-technical migrant and the migrant who is not currently working. Migrants who are professionals come from certain parts of Cambridge and out of state to settle in Tract Five. Migrants who are not currently working in the local labor market seem to either move very short distances, within the study area or the adjacent blocks, or they move from very long distances, from out of state for new employment opportunities or for Cambridge's education facilities.
5. Female occupational groups show entirely different proportions from the location of origin categories than does the total migrant group. Female migrants in general do not significantly differ with respect to their places of origin from male migrants, but at least four significantly different groups of female migrants can be established with regard to the places they come from. The four groups are professional-technical-

clerical-sales, operatives, laborer-service-unemployed and housewives-retired. Even when aggregated in these four groupings the patterns of migration are significantly different from each other.

The quantitative nature of this study attempts to emphasize the aspects of migration which the planner should consider if he is to understand migration flows or if any of his actions force people to move. On a theoretical level, the findings indicate the tendencies of migrants classified by their origin to locate differentially in housing areas and to be identified by certain personal characteristics. The effect of these findings is to establish the fact that areas are linked by migration streams and that migrants define their potential market areas differently. Identifying the linked areas is necessary if migration flows are to be understood. On a practical level, the data developed could easily be used to plot the effect of clearance of the Inner Belt blocks in Tract Five with regard to market pressures by migrants of certain age and occupation characteristics.

Chapter II

HOUSING CHOICE IN MIGRATION THEORY

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HOUSING CHOICE IN MIGRATION THEORY

While many theories of migration are available, most of them do not fit the needs of planners when working with concrete problems in small areas. Nor do many theories relate directly to housing choice. Indeed, most of the theories in migration literature are incomplete and inadequate in presenting a unified rationale for planning action. Even so, a composite of these theories guide the researcher in suggesting alternative possibilities in a detailed study of migration data.

Migration Theory and Planning Problems

Most published hypotheses about migration are simply stated and easy to verify on an aggregated level. Usually the theories explain the numbers of people moving without any mention of their social characteristics.¹ Alternatively these theories explain the frequency of some singular characteristics of most migrants.² Most theories about the areas to which migrants move or the distance that they move consider only long distance moves or movement across significant physical or social boundaries, as in urban-rural migrations.³

¹Walter Isard, Methods of Regional Analysis: an Introduction to Regional Science (Cambridge, The M.I.T. Press, 1960), pp. 51-79.

²E. G. Ravenstein, "The Laws of Migration," Journal of the Royal Statistical Society, volumn 48 (June 1885) and volumn 52 (June 1889).

³James M. Beshers and Eleanor N. Nishiura, "A Theory of Internal Migration Differentials," Social Forces, volumn 39 (1961), pp. 214-218.

In almost all cases the theories of migration are conceptually inadequate for small areas or housing choice because they cannot be applied to the real world except through intuition or over-simplified models.

It is very difficult to define a migration theory that would be adequate for use in small area studies. The practical problems of the planner are seldom related to aggregated data or general theories, although he can receive some direction from theoretical work. The planner's world is physically defined. Frequently his sphere of action is limited, the tools with which he works are detailed, and he directly affects the lives of many people. The extent to which he can define the normal behavior of the people he works with influences how well he can plan for them.

In studies of migration which ignore these practical planning limits, migration is seen as a function of the size of an area and the distance between that area and the migrant's destination.⁴ This type of theory is inadequate for the planner because too many details are ignored. These ignored details influence the size and shape of the areas considered, influence social and economic segregation, and many other factors which, in turn, influence the flow of people. In other studies there is concern for the fact that

⁴The usual mathematical formulation of these laws appears as

$$M_{ij} = \frac{P_j}{d_{ij}} \cdot f(Z_i)$$

where M_{ij} = migration to destination i from source j

$f(Z_i)$ = some function of Z_i where Z_i measures the attraction of destination i (often expressed as the attractive force of cities, relative to their size.

P_j = population of source j

d_{ij} = distance between source j and destination i

certain socio-economic groups migrate more frequently than others.⁵ Little is said about where they go. Merely the number of people migrating without additional information is inadequate for many planning uses.

Neither of the above methods of describing migration are of use to planners who must estimate the results of migration on the city. It is not enough to say that a particular quantity of people will move in or out of the city over long distances. Nor is it adequate to say that more women than men will move. What is needed are frequency distributions of people by social characteristic who move from one area to another, to and within an urban area. A finer breakdown of areas is necessary and a statement of the relationship between this breakdown and the characteristics of movers is needed. The identification of migration flows by amount and personal characteristics for each physical area or area type is basic to the understanding of change in the city.

Toward a Comprehensive Social Theory of Migration

The need for a comprehensive social theory of migration is easy to establish. Unfortunately the development of such a theory is difficult and would require a lengthy evaluation of many sets of data. This study is used to examine only a part of such a comprehensive theory using a very restricted area with a restricted theoretical view. Only one specific market area type is examined and then only those persons who have already decided to move

⁵The boldest example of these laws, which incidentally holds in this study, is that females are more migratory than males. Laws like this were developed by Ravenstein and further developed by D. O. Price in "Distance and Direction as Vectors of Internal Migration, 1935-1940," Social Forces, volume 27 (October 1948) and "Some Socio-Economic Factors in Internal Migration," Social Forces, volume 29 (April 1951) and D. S. Thomas, Research Memorandum on Migration Differentials, Social Science Research Council, New York, 1938.

there are examined. Still, in order to develop this segment of a small area theory, it is necessary to examine the background of current migration theory.

There are several social theories which can direct a search for useful hypotheses in terms of small area housing choice. Certain aspects of these theories help to define our area of concern in better detail. For instance, Stouffer would have the planner consider migration as a function of intervening opportunities.⁶ This type of hypothesis is impossible to check by empirical data because the definition of acceptable intervening opportunities that would be required is too detailed to be practical. Because Stouffer generally restricts his meaning of intervening opportunities, the net effect of his argument is to state that the mover is constrained by his own social and economic characteristics. Stouffer in this way identifies a market area in which the migrant operates, again restricted by social and economic characteristics. The decision maker, the decision process and market areas are the elements of his theory.

In addition to pointing out the importance of social variables in migration, Stouffer also further identifies some distinctions about long distance and short distance movers.⁷ Stouffer identifies the first as being job related and the second as being housing related. An even more useful concept is that used by Beshers whereby the first half of only the long distance

⁶Samuel Stouffer, "Intervening Opportunities: A Theory Relating Mobility and Distance," American Sociological Review, volume 5 (December 1940), pp. 845-867.

⁷ibid., Stouffer elaborates further on the classification scheme developed by Ravenstein, op. cit.

migration decision is job related.⁸ In his terms the second half of any move decision is that of locating the household in a predefined region or urban area.

Job Related Moves and Long Distance Migration

Since the long distance move is job related in many cases, it can easily be related to a general region or housing zone. However, the emphasis of this study will be on the second half of the long distance move decision relating to housing choice. While it is possible that the long distance housing choice decision has much in common with the short distance move by itself, it is also possible that there are important differentiating factors which could cause different views of housing choice for migrants coming from different locations. In the long distance move, those costs of moving that are dependent on distance are surely magnified. Those costs may make economic factors the prime factors in the long distance mover's housing choice. But it is also possible that the financial reward expected from the move will offset economic considerations. Even so, it is still possible that there are additional economic and social factors influencing long distance movers which in turn influence his housing choice so that his choice becomes similar to that of the short distance migrant.

It should be understood that this study will have to avoid discussing certain factors which supposedly have significance regarding the movement of people. Since we have no data on job availability or unemployment by small areas and since no single employment source can be identified with the area,

⁸James M. Beshers, "Computer Models of U.S. Internal Migration," an unpublished research proposal submitted to the National Science Foundation, 1965.

the direct influence of jobs on migration has been ignored. Many studies have tried to define the relationship of jobs and housing but, even so, the results are not clear for small areas.⁹ Proximity to job or proximity to public transportation offers very little for this type of study.¹⁰ As a consequence of avoiding job related moves, this aspect of the migration decision is relegated to that part of the decision which chooses the type of regional housing market or the small area to which the migrant will move.

In addition to the decision to restrict the study of job influences on moves, some additional decisions should be made clear. The traditional breakdown between rural and urban or urban and suburban migrations does not seem important in detailed migration study. Since the area studied is a small area in an urban environment most moves are from urban area to urban area. Moves from long distances are not classified in terms of rural, suburban or urban origin but only by a general distance category. Thus the moves from a distant metropolitan area or from a rural town are both simply classified as out of state moves. Perhaps this ignores some important information useful in the context of the theory of long distance movers versus short distance movers. But since this study is oriented toward detailed housing variables in an urban area, it does not relate strongly to those few migrants of rural origin.

⁹Lois K. Cohen and G. Edward Schuh, Job Mobility and Migration in a Middle Income Small Town with Comparisons to High and Low Income Communities, Purdue Agricultural Experiment Station, Bulletin 763, 1963. See also, J. D. Carroll, Jr. "Some Aspects of Home-Work Relationships of Industrial Workers," Land Economics, volume 25 (November 1949), p. 418.

¹⁰Sidney Goldstein and Kurt Mayer, "Migration and the Journey to Work," Social Forces, volume 42 (May 1964), pp. 472-481. See also, Leonard P. Adams and Thomas W. Mackesey, Commuting Patterns of Industrial Workers, (1955), pp. 43-64.

Additional factors which theoretically influence migration and housing choice will also not be discussed. Most are very difficult to measure quantitatively, like motivation, ability to move, or personal concept of distance.¹¹ This information can only be gotten through intensive interviews. Even then, developing measurement scales and interpreting the data for small areas would be difficult.¹² Differential costs of moving are also difficult to measure on a small scale even if social variables are not taken into consideration. Other items like educational aspiration or health needs could possibly be used for small area migration but they would require special studies. At any rate most of these factors are intangible and difficult to quantify, therefore they are not used in this small scale study of migrant choice and behavior.

Housing Choice, Related Moves and Short Distance Migration

The selection of a household location in a community sub-market is clearly very significant in the case of the short distance migrant although it may not be as significant for the long distance migrant. Similar factors influence the decision in both cases but they are probably integrated into different processes of decision making. In migration theory there are indications of important variables influencing housing choice but there has been no strong verification that those variables are significant in more than a few limited cases.

¹¹This type of migration is well discussed in the literature of migration since data on long distance and specialized moves is available through the Department of Commerce (Census Bureau) and the Department of Agriculture (Agricultural Experimental Stations).

¹²Isard, op. cit., pp. 62-63.

Assistance in describing the important variables is derived from studying the influences on the individual migrant. Pressure to move might be generated by a change in expected future income, a life cycle change (especially a birth or death in the family), social status aspirations, or a change in the status of current residential assets. It is difficult to separate out important motivating changes because they cannot easily be measured. Social status aspirations and life cycle changes are still the most promising because they correlate with readily available data.¹³

Two studies help explain the influence of these processes on migration. Rossi, in an interview series in Philadelphia, emphasized life cycle changes as an impetus for moving.¹⁴ Children being born, their growing up, and parents' retirement influenced the amount of space needed by the families which in turn generated dissatisfaction with the housing unit. Residents also listed cost and outside appearance as important influences in selecting a house. If these interviews are applicable to choices within a small area, there should be an indication of strong demand for low rent or good condition housing by those who know the local housing market the best - the shortest distance movers. A study by Leslie and Richardson, using interview data from Indiana, found that a significant number of movers were highly

¹³Presumably social status maps over to occupation and life cycle stages map into age categories like 20-39, 40-60 and 60 plus. These new categories do not have to correspond directly. Providing that differences do exist, they should not disappear in data remapped to these approximate categories.

¹⁴Peter H. Rossi, Why Families Move (Glencoe, Illinois: Free Press, 1955). For a study in a Cambridge area, see Samuel J. Cullers, "A Study of Planning Attitudes in Cambridge: Census Tract 15," unpublished M.C.P. thesis (M.I.T.: May, 1952).

skilled with rapidly rising incomes and generally younger than non-movers.¹⁵ This type of study suggests the relation of increasing income to moving for status. Unfortunately, most status increasing moves would probably be moves to other market areas which are not examined in this study, unless the migrant were of low status to begin with. At any rate, this type of status increasing move is not studied independently.

Other studies suggest that migrants follow and settle with persons of similar social and economic backgrounds. In the one study done on this aspect of migration it is clear that the move from the city to suburb strongly suggests that link.¹⁶ This is especially true where areas being moved to are newly developed and builders attempt to define a market for the housing by various marketing techniques. The same is true where realtors participate in the local economic and social structure and try to direct change in a local community. But this also may be an important influence in small area choice which would amplify the distinct patterns of movement by each socio-economic group.

Housing Market Areas Described by Distance and Socio-Economic Characteristics

The development of migration theory for small areas involves outlining the probable influences on the migrants' decision process. The first problem is to identify the housing market that the migrant will participate in. While the social and economic definitions of the market are quite important,

¹⁵Gerald R. Leslie and Arthur H. Richardson, "Life-Cycle, Career Pattern, and Decision to Move," American Sociological Review, volume 26 (December 1961) pp. 894-902.

¹⁶Edgar C. Rust, "Intra-Metropolitan Migration: Six Boston Area Municipalities," unpublished M.C.P. thesis (M.I.T.: June, 1963).

there are some geographical parameters that must also be defined. Obviously the widest definition of a market area would be in terms of the homogeneity of housing types and social classes which contribute to define a vague concept of "neighborhood." There is a great danger that if the market area is defined as being too large many of the different elements in the market area may be obscured. In a beginning study more is to be gained by defining markets in smaller terms and then extending the findings to areas of similar market type if larger areas are needed. Because the area boundary is defined early in the study by Census definitions and the area size is restricted by the amount of data that has to be processed, the concepts of housing market choice are already restricted.

If we take the case of a family or household that is attracted to the market area under study, we can assume some things about the decision process within the family. The implications of certain household characteristics on housing location outline the study variables. Obviously age and occupation are important variables because they reflect economic realities and aspirations. Social mobility and social status are obviously influential factors in the move decision and these are frequently expressed in neighborhood terms like housing condition and racial occupancy. Economic factors are also important to migrants and these can be reflected by rents and availability of units.

Some Hypotheses about Migration into and within a Small Area

As a result of examining the standard approaches to migration theory, it is possible to suggest some concepts applicable to the small area under study. All of the hypotheses are modified by the limits of the market area being studied. Thus, the hypotheses apply only to Tract Five or, at best,

areas similar to Tract Five in the Boston urban region. In addition, each of the hypothesis is concerned with the origin of the move as a major variable. This is done in an attempt to define areas linked with the local housing submarkets. The detailed hypotheses which are derived from the general discussion of migration theory are as follows:

Sub-Market Housing Choice Factors:

Migrants settling in areas with a high percentage of non-white occupancy would generally come from areas of large non-white population. Most migrants should avoid the Inner Belt threatened blocks unless they were transients who did not care to remain for a long time. Migrants who would settle in the higher status housing are from higher status occupations. Alternatively, the migrants settling in the low rent housing would probably be persons from the study area who had information enough to select bargains.

Life Cycle Factors:

Younger persons move more frequently than older persons because they are increasing their family size and frequently need additional space. In addition, younger people are more able to move, so they can and do move longer distances than older people.

Status Factors:

People with high status occupations are more mobile so they can move longer distances. People with lower status occupations, either through inability or unwillingness to move, will generally be frozen to their present locations.

Family Composition Factors:

Families with other relatives living with them would more likely develop more social contacts and would therefore be less likely to move other than the very short distances. Single people would not be constrained by social contacts as much and could therefore move greater distances.

While all of the above ideas seem plausible, they are not all supported by the data of the study. Some of the impressions gained from theory do not hold when discussing housing choices in a small area or the locations from which certain types of migrants come. In order to determine the validity of some of these ideas the detailed data is examined for particular categories of migrants and where they came from. Aggregated data is not used, but rather contingency tables and frequency polygons are used to indicate which classes of migrants came from what locations.

Chapter III

MIGRATION ESTIMATION USING DETAILED DATA ANALYSIS

Chapter III

MIGRATION ESTIMATION USING DETAILED DATA ANALYSIS

In order to design a study in which some hypotheses about small area migration can be tested, compromises must be made to accommodate available data. Aggregated census data can be used to indicate the market context of the study¹ and perhaps give some information about aggregated changes occurring in the area, but it cannot be used to check hypotheses.² Aggregated data can help define trends and allow checks on some of the net effects of migration but it cannot be used directly. Although interview data is usually disaggregated, the problems of using interviews for a detailed study of a small area are significant.³ Fortunately disaggregated information about moves, listing a few social characteristics, can be obtained and

¹See APPENDIX A for general background information about Tract Five.

²Census data can be used by comparing population distributions by sex and age over time. By examining population profiles and adjusting for cohorts, the net effect of population change can be estimated. However, it is impossible to say who came into the area and who moved out with even a slight degree of certainty. In addition, these changes are available only for ten year periods and information cannot be gathered about other aspects of change relating to age.

It is difficult to compare incomes and occupations in the same manner because these measures change for residents over the ten year period. Standard adjustments cannot be made for these changes. Income adjustment would almost assuredly hide important changes that occur in the local population.

³Interview data is not easy to collect or to process for any kind of study, but there are additional problems in using interview data for a small area migration study. Most moves are probably not planned and the reasons for moving can seldom be articulated in an easy recordable format. People seldom foresee what would make them move in the future and often cloud the reasons that made them move in the past. An interview is especially inappropriate where the means-end discrepancies of life are the largest, in low income urban areas where reality is ugly and people often construct their own new realities.

this information offers the best data for a detailed study of small area migration.⁴

Unfortunately using the detailed data provided by the Cambridge Police Listing also presents problems. The disadvantages of the data must be accepted and the study designed around them. First, the limitations of the police data in recording characteristics of migrants must be recognized. Then, additional problems with the data can be examined by checking the data against other sources. Finally, the study must be designed around the information that is available and known to be valid. Other sources of information can be integrated into the study once the important variables are defined. It is only then that statistical techniques can be used for analysis and some comments can be made about the persons who move into the area being studied.

Data Source - Description

The Cambridge Police Listing provides information about movers on a yearly basis. The information includes a few social characteristics of the movers and some information about where they came from. Although the information is difficult to work with and is inexact in many cases, by using some standard data processing and statistical techniques, the validity of most of the data can be checked. The advantages of the Police Listing data are that it is explicit and gives information about a large number of movers in a small area. It has been collected in a relatively uniform manner for at least a decade and provides information at the level of individual house addresses.

⁴Two standard sources of data for a study of population movement characteristics are the United States Census Bureau's 1/1000 sample from the 1960 census or the Boston Regional Planning Project's three percent sample of the Boston Region. Neither survey would offer enough respondents for a detailed small area study, but they certainly could be used if migration between slightly larger areas was to be studied.

Once the area for study was chosen, the Police Listing information had to be gathered for that area. Information in the police list can be aggregated to any size or shape area since the data is recorded by house address. Although the information is published by Ward and Precinct, only voting results are aggregated to that level. Street name and house numbers had to be recorded for each block in the study area and the data was then transcribed by both the block number and the detailed address. Sections of the Police Listing are not available in summary form so that re-listing had to be done for all movers since 1960 and all residents in 1960.

A detailed description of the Police Listing data follows. Individuals are listed by police officers for each house address. They are listed when registering to vote, when registering as an alien, after being interviewed in person at home or after returning a pre-addressed card to the police station. Each individual lists his own occupation (which sometimes defies logical re-classification) and his date of birth. Individuals are listed by first and last names. The Police Listing is compiled each year in January or February by the local police and its purpose is to establish certification of residence. The information is recorded for the residence as of January 1 of the current year, so a person, if he is a migrant, is asked about his residence on the previous January 1. The police have orders to list everyone. The officers go to every house and list any residents 20 years or older (persons 20 years of age become eligible to vote in that next year).

Certification of residence is one requirement for voting eligibility. But even if residence is established, voting eligibility is dependent on living in Massachusetts for one year and Cambridge for six months, as well as

No.	V Registered Voter Residence Last Year Name	Occupation	Year of Birth
COLUMBIA STREET CONTINUED			
V 171	BELKNER, ERNEST P	DRIVER	1925
V 171	BELKNER, PEARL	AT HOME	1928
171	RUSSELL, JUDITH 46 KINNAIRD ST	FACTORY	1944
171	RUSSELL, MILORED 46 KINNAIRD ST	NURSE	1920
173	MCCUSKER, ALICE	HOUSEWIFE	1942
173	MCCUSKER, EDWARD	COOK	1936
174	LEVINE, ARTHUR W MATTAPAN	AT HOME	1938
V 174	LEVINE, LOUIS	STORE KEEP	1896
V 174	LEVINE, PAULINE	HOUSEWIFE	1903
174	SHALLOW, ETHEL	HOUSEWIFE	1916
V 174	SHALLOW, JOSEPH M	LABORER	1913
V 174	SPECTOR, BEATRICE	HOUSEWIFE	1923
174	SPECTOR, IDA M	AT HOME	1884
V 174	SPECTOR, SAMUEL E	OPERATOR	1917
175	PARKER, IRA F	FAC WORK	1934
175	PARKER, JEAN M	AT HOME	1936
V 177	LIVERNOIS, MARY	HOUSEWIFE	1928
V 178	KOULETSIS, EFFIE	STOREKEEPER	1926
V 178	KOULETSIS, LPAMINONDAS	HOUSEWIFE	1926
179	BELL, HENRY D	LABORER	1895
179	BELL, LILLIAN	AT HOME	1895
V 179	BELL, LLOYD H	STUDENT	1935
179	CHESTER, ARTHUR S	P O CLERK	1902
180	LYNCH, JOHN F	LABORER	1934
180	LYNCH, LILLIAN	HOUSEWIFE	1932
V 180	SIMONE, AGNELINA	AT HOME	1894
183	CALLINAN, JAMES	DRIVER	1925
183	CALLINAN, PHYLLIS	HOUSEWIFE	1928
V 183	GEORGILAS, ANNA	HOUSEWIFE	1925
V 183	GEORGILAS, GEORGE	LABORER	1921
183	GREEN, MARY ANN BOSTON	FACTORY	IRIS 1944
V 183	MAIDONIS, GEORGIA	HOUSEWIFE	1923
V 183	MAIDONIS, JOHN G	CLERK	1920
DICKINSON STREET (NOT IN TRACT FIVE)			
V 4	MCELMON, HELEN F	HOUSEWIFE	1928
V 4	MCELMON, RALPH A	MECHANIC	1928
V 5	OHOLLERAN, ANNE	HOUSEWIFE	1914
V 5	OHOLLERAN, JAMES F	STOCK CLK	1913
6	BRODERICK, JOHN C	FIREMAN	1912
V 6	BRODERICK, MARJORIE A	HOUSEWIFE	1916
V 6	MAGUIRE, ANNA B	HOUSEWIFE	1909
V 6	MAGUIRE, FRANCIS E	GOVT EMPLO	1908
V 6	MAGUIRE, MARGUERITE M	FILE CLERK	1942
39	CAPONE, PATRICIA 7 KING PLACE	AT HOME	1921
V 41	WALSH, LAURA L	OFFICE	1926
ELM STREET			
V 14	DOOLEY, CORA R	HOUSEWIFE	1888
14	DOOLEY, MARY	RETIRED	1896
V 14	IANNICIELLO, ANTHONY P	LAWYER	1913
V 16	CARLO, CATHERINE	CLERK	1892
V 16	CARLO, CECILIAN	CLERK	1928
16	MASSAN, CARLO	BAKER	1895
16	MALIK, LARRY 1 WORCESTER ST	ROOFER	1940
16	MALIK, RETA 1 WORCESTER ST	AT HOME	1939
20	COILEY, ELEANOR	HOUSEWIFE	1929
20	COILEY, JOHN	SAND BLAST	1925
20	THIVIERGE, ARTHUR	CARPENTER	CANA 1919
20	THIVIERGE, HELEN	HOUSEWIFE	FREN 1941
20	THIVIERGE, IRENE	HOUSEWIFE	1931
V 22	BENOIT, JOHN J	CLERK	1919
V 22	BENOIT, MARGARET T	HOUSEWIFE	1923
22	JONES, HELEN 138 PINE	M W	1928
22	JONES, JOSEPH 138 PINE	LABOR	1919
22	LUSCAP, DAPHINE L 201 HARVARD	FACTORY	PANA 1923
22	SEWELL, SHIRLEY B 201 HARVARD	FACTORY	PANA 1936
22	THOMPSON, VERONICA E 201 HARVARD	FACTORY	PANA 1934
28	TRAOD, BEATRICE BROOKLINE	M W	1933
28	TRAOD, EUGENE BROOKLINE		
V 28	WRIGHT, CATHERINE	HOUSEWIFE	1919
V 28	WRIGHT, CHARLES R	MECHANIC	1920
V 32	BERMAN, HARVEY	STUDENT	1938
V 32	BERMAN, PHILIP D	PACKER	1902

Figure 1:

Sample column from
the 1965 city of
Cambridge Police
Listing⁵ (Ward 2,
Precinct 3)

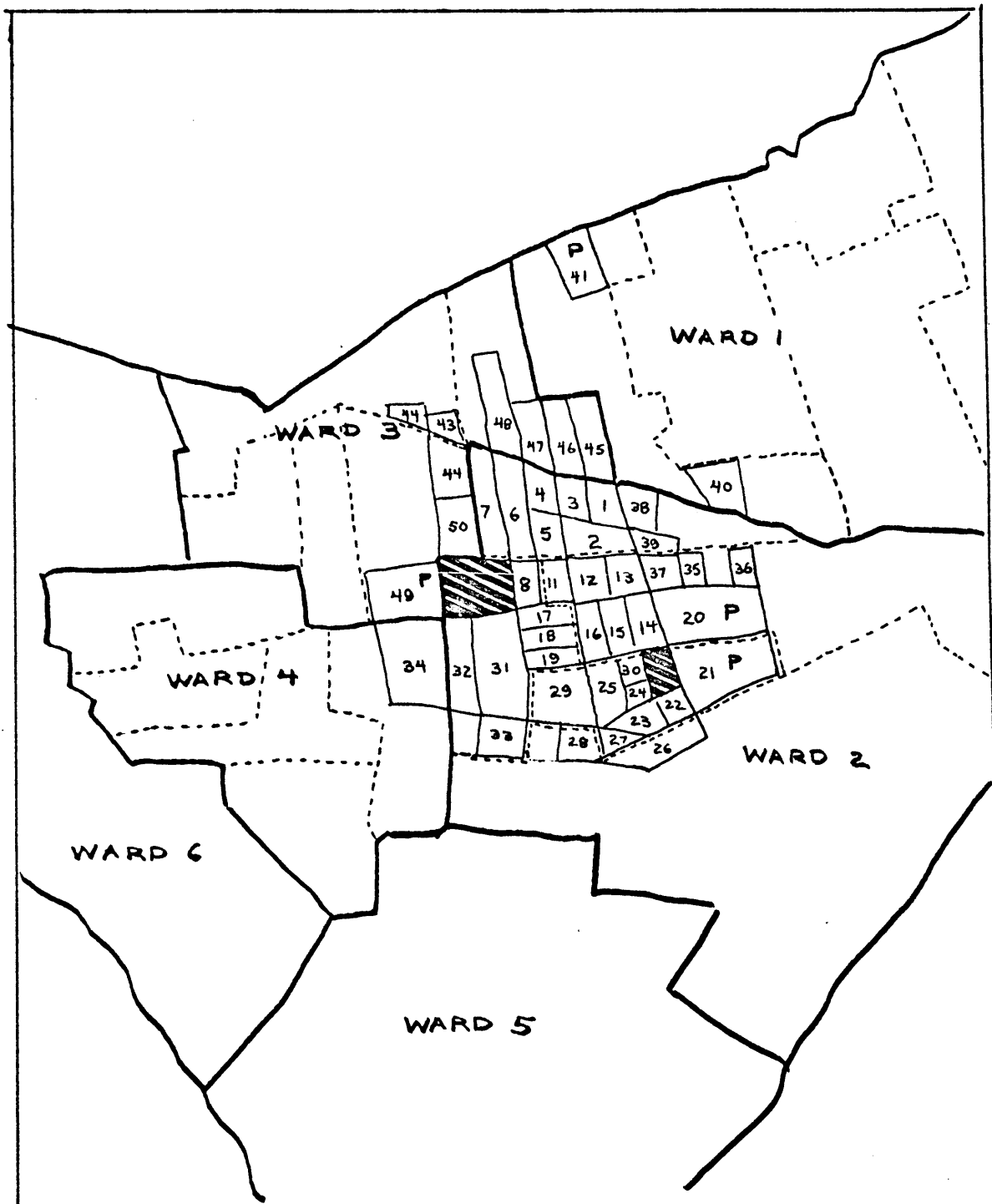


Figure 2: City of Cambridge wards and precincts⁶ with study area outlined.

- Ward boundaries
 - Precinct boundaries
 - ▨ Non-residential areas
 - P Public housing projects
- Census Tract Five blocks—block numbers 1-19; Special blocks—block numbers 20-50.

⁶Cambridge Planning Board, City of Cambridge, Wards and Precincts (Cambridge, City of Cambridge, 1960), Map.

being a citizen. New residents may register to vote if they come from another part of Massachusetts at any time during the year. However, they will not appear in the current year Police Listing unless they register before early February. Students in dormitories are not listed, but students in apartments are listed if they claim self-support and have a local car registration.

While many attempts are made at listing individuals, the source of information is not always consistent. Police officers will occasionally depend on neighbors for information about people who are not at home and have been listed in previous years. Since the listing is generally taken by the same police officer each year, some familiarity with the area is assumed. If neighbors are not available or do not give the necessary information a card is left at the house for the resident to complete. One call back is given if the cards are not returned and a legal notice must be sent before a name is dropped from the Police Listing.⁷

In many cases there are delays and difficulties, but still the Police Listing yields valuable information about movers, their social characteristics and place of last year's residence. The place of last year's residence is listed by address and street if in Cambridge, town if in the state of Massachusetts, state or country otherwise. All moves for migrants who move more frequently than once a year are not recorded, only the one move around January 1 of the previous year is recorded. Also, if movers are intent on not being listed (in order to evade bill collectors), this can easily be done in the present system. Thus, all of the rapid turnover for local addresses is probably not recorded although some multiple moves are recorded.

⁷ Information about the Police Listing was obtained from Captain James F. Reagan of the Cambridge Police Department in an interview.

Problems in the Data

There are three main difficulties in using the Police Listings for a study of migration in a small area. The first two come from the nature of the Police Listings themselves - their scope is limited and their validity can be questioned. The third disadvantage is a result of the fact that all analyses must be designed around the information available. The census block data from 1960 must be integrated into the analysis to allow references to the physical characteristics of the area. The selection of primary variables is an important task and must be justified in terms of convenience and the implied hypotheses.

The Scope of the Data

The first problem, that of the scope of the Police Listing items, can easily be explained. The lists do not yield any indication of race for American citizens. An indication of non-whites is possible through the listings of West Indian citizenship but these cases are rare. Second, the Police Listing gives no information about the number of persons in a family under twenty years old. Finally, there is no indication of income of the persons who are listed as residents or movers.

These three factors remain important failings in using the Police Listing because they all directly influence migration patterns. If a person is non-white, his opportunities for residential location are limited directly by location in many cases and indirectly by rent and condition in many others. The number of children clearly influences the size of a housing unit needed as well as the amount of money left from income to pay for housing. Fortunately, some of these factors can be approximated indirectly in the study. Race can be implied for some migrants by their settling in blocks having

very high percentages of non-white. The presence of children can sometimes be estimated by age and marital status. Occupations can indicate rough approximations of income. Unfortunately none of these approximations are fully adequate for our study as shall be seen later.

The Validity of the Data

The second objection to using the Police Listing for this study is easier to argue against. Many persons question the accuracy and un-biased nature of the Police Listing. For any particular area, the accuracy of the list depends on the diligence and determination of the police officer recording the information. In the case of the current study area, biases and inaccuracies can be identified by comparing the 1960 Police Listing with the 1960 Census Tract data. Three assumptions are necessary for this to be accepted as a useful comparison; first, that there are few significant differences occurring between January and March of 1960 - the respective dates of the surveys; second, that the Police Listing data does not significantly deteriorate following 1960 so that an evaluation for 1960 is valid until 1965; and third, that the accuracy for movers is the same as the accuracy for the residents in 1960. The first is a logical assumption and the second and third can be independently evaluated.

A cross check of the Police Listing with the 1960 Census shows that the age distributions are very similar.⁸ When there are more persons in one category there are usually less in the adjacent age category which implies that people are not consistent about reporting their age, especially when

⁸United States Bureau of the Census, U.S. Censuses of Population and Housing: 1960, PHC(1)-18, Census Tracts. Table P-2. (Washington, U. S. Government Printing Office, 1961), p. 97.

	MALE			FEMALE		
	Census 1960	<u>Police Listing</u> 1960	Difference (Census- Police List)	Census 1960	<u>Police Listing</u> 1960	Difference (Census- Police List)
20-24	87	62	25	122	80	42
25-29	113	98	15	83	77	6
30-34	108	121	-13	98	106	- 8
35-39	97	90	7	98	103	- 5
40-44	88	93	- 5	98	127	-29
45-49	83	91	- 8	126	113	13
50-54	72	74	- 2	102	101	1
55-59	72	80	- 8	88	93	- 5
60-64	68	91	-23	94	104	-10
65-69	65	46	19	81	59	22
70-74	50	50	--	67	64	3
75-79	31	27	4	26	36	-10
80 Plus	<u>14</u>	<u>13</u>	<u>1</u>	<u>32</u>	<u>30</u>	<u>2</u>
Total	948	936	12	1115	1093	22

Figure 3A: Age comparison between census data (1960) and Police Listing data (1960)

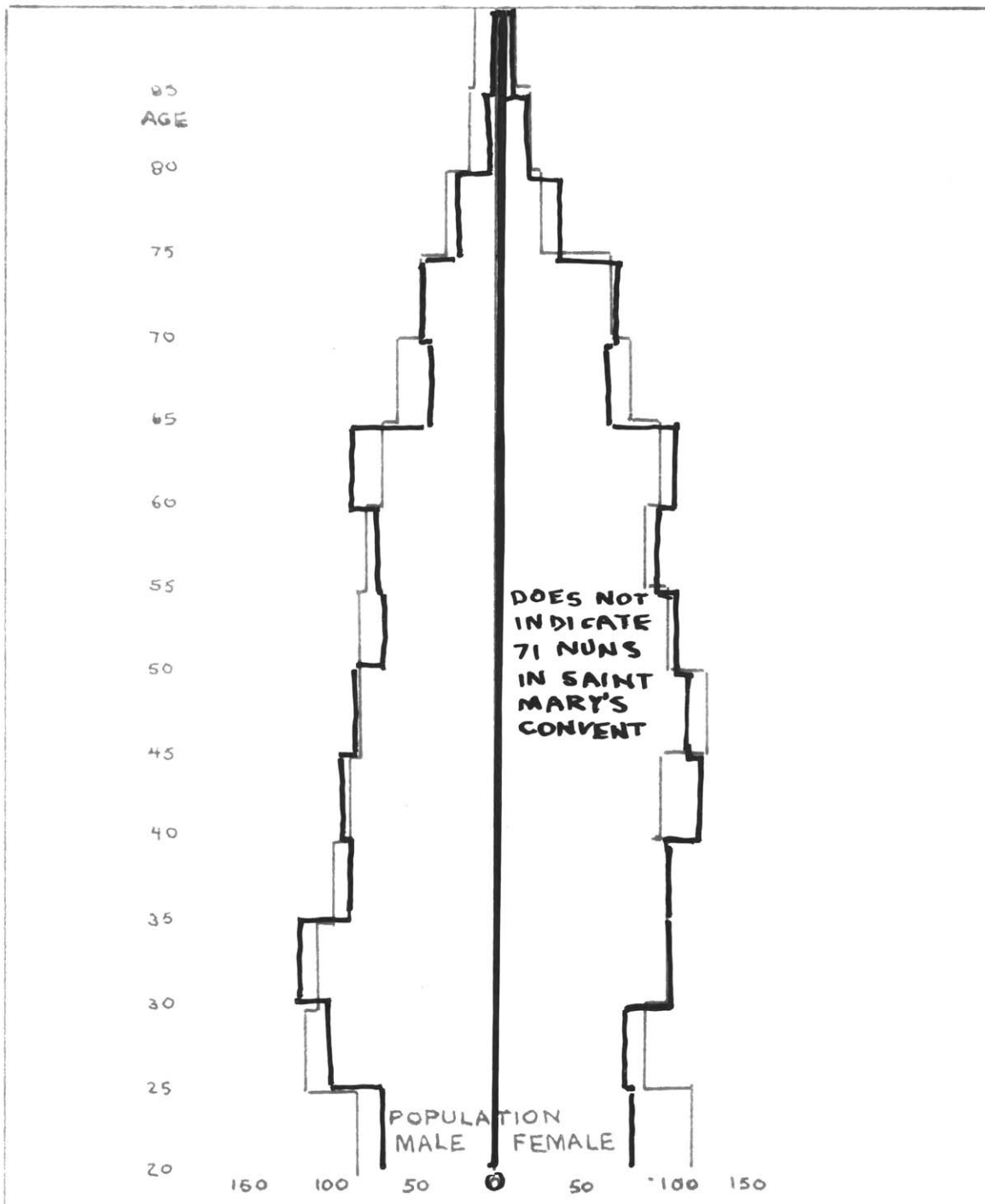


FIGURE 3B: AGE PROFILE FROM THE 1960 POLICE LISTING

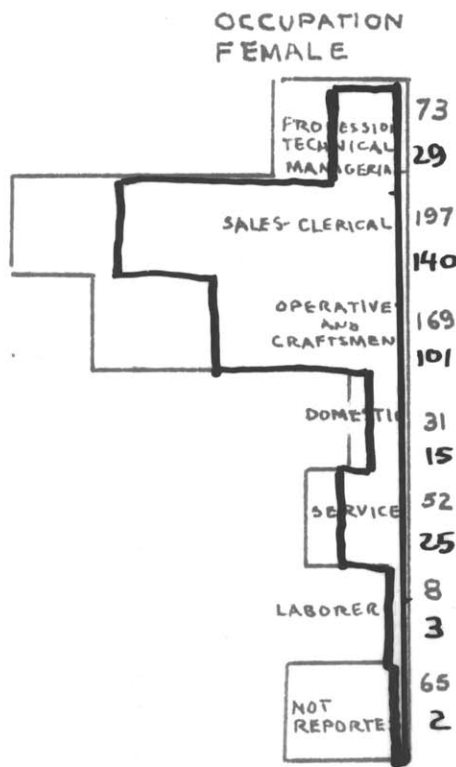
FIGURE 3C: AGE PROFILE FROM THE 1960 CENSUS

20

nearing 60 years of age. Since Saint Mary's Convent was ignored in the Police Listing total and there are many nuns living in the convent, much of the difference in female categories could be due to this exclusion. Even so, there still is a discrepancy among young persons below 30. This discrepancy totals 88 persons excluding a correction for the convent. These persons are either students (this being the only evidence of students in the area, however) or young persons who have not been recorded as residents and who are not that eager to vote or to make an effort to be listed. The census data does not indicate excess proportions in either "not reporting" or "not in the labor force" (25% and 20% respectively) so they probably are not students. In any event, the younger ages seem to be understated by about 10% and regardless of the origin of the difference, since both students and young married workers are frequent movers, the migration figures for these ages are probably also understated.

In comparing occupational categories, differences are not as clear because an interpretation of the reported occupation had to be made when transferring the information from the Police Listing to punched cards. A listing such as "service" could mean "army", or "T.V. serviceman" or "service station attendant". The recoding was biased by personal interpretation but hopefully this bias was consistent. For males, either coding bias or respondent bias enlarged the professional-technical category.⁹ The bias of the coding and individuals not wanting to be listed as unemployed or unreported probably enlarged the laborer category. The laborer category seems to take up most of the discrepancy between the not reported categories, leaving little room for students to be in that category. The female occupation chart comparison

⁹ Ibid., Table P-2, p. 97.



MALE

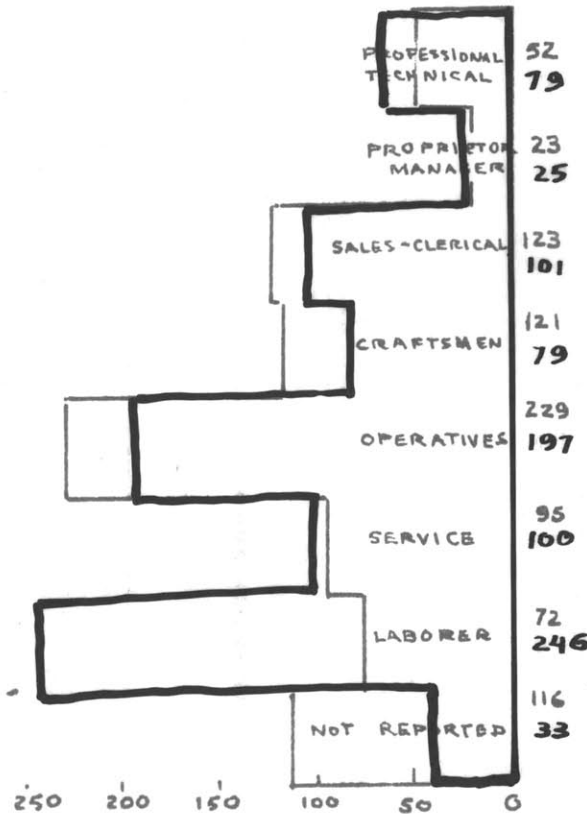


FIGURE 4A:
OCCUPATION
PROFILE FROM THE
1960 POLICE
LISTING

FIGURE 4B:
OCCUPATION
PROFILE FROM THE
1960 CENSUS

possibly indicates that most females prefer to be listed as housewives because all categories are understated.¹⁰ A correction could be made to the professional-technical category to include the teachers in Saint Mary's convent, but the other discrepancies are not easily corrected.

Matching the information about family composition presents some difficulties.¹¹ Most of the difficulties arise from the assumptions that were made in recording the data. The sex of the respondent was determined by his first name. Grouping into households was done by the coincidence of last names and similar addresses. Marriage was assumed if males and females of within 10 years of age were living at the same address. If a person was listed as being more than either ten years older or ten years younger, he was considered a relative living with a family. These assumptions confuse brother and sister with man and wife if both are within ten years of age of each other. But more important, no record can be established for relatives in a wife's family living in the same household, because their last names are different from the husband's last name. Aside from this obvious and serious fault, the family composition figures do not seem disproportionately exaggerated.

¹⁰ ibid.

¹¹ ibid., Table P-1, p.35.

<u>Police Listing</u> Categories:		
Married	Without Others	556
	With Others	96
Single	Male Alone	163
	Male With Others	121
	Female Alone	293
	Female With Others	148

CENSUS CATEGORIES	CENSUS	POLICE LISTING
Population in Household	2970	---
Head of Household	986	1108
Wife of Head	583	652
Other (Relative or Non-Relative)	564	<u>269*</u> Does not include wife's relatives.
Children under 18	837	---
Head of Household	986	1108
Husband of Primary Family	769	652
Primary Individuals	214	<u>456*</u> Includes wife's family as individuals.

Figure 5: Family composition, comparison between census data (1960) and Police Listing data (1960)

In most cases the data from the Census of 1960 seems to correspond to the data from the Police Listing of 1960. Evidently the differences in timing of the surveys made little difference in the data. However, the changes that might occur during the study years of 1960 and 1965 must still be evaluated. Changes during this period are rarely documented so that the best evaluation possible is one on the basis of change between 1950 and 1960. Still, the assumption that the area remained without radical change is necessary. However, this last assumption can be made more safely than the assumption that no significant change occurred at all.

Few physical changes occurred between 1950 and 1965. No major structures were added in this period, but some houses were torn down to provide space for industrial parking lots.¹² More than ninety percent of the buildings in

¹²An estimate of changes in the number of structures in the area can be gotten from the Sanborn Atlas upon checking the updated area maps.

the area were built before 1940, so that rapid change is unlikely. The census of 1960, which should probably show an increase in units because of the change in the housing unit definition, shows a decline over the 1950 figure of 46 units - less than five percent of the total.¹³

The whole tract has remained in the same general market position with respect to the City of Cambridge. Tract Five has had poorer housing, lower rents, lower owner-occupancy and higher non-white population than the rest of Cambridge in both 1950 and 1960.¹⁴ The vacancy rates in the tract are steady over the decade, but the tract has a higher vacancy rate than the rest of Cambridge. Home ownership has increased at about the same rate as the rest of the Boston area, but rents have generally shown an above-average increase. The rent rise is not disturbing because rents were so low in 1950 and 1960 that some adjustment could be expected.

The social changes in Tract Five between 1950 and 1960 are not significant except when the decrease in white families is measured against the

¹³The definition of the housing unit was changed so that persons living in one room with access to a public hall or the outside, or having a private kitchen would be included as living in separate units. Further discussion of the effect of the redefinition appears in Frank S. Kristof, "The Increased Utility of the 1960 Housing Census for Planning," Journal of the American Institute of Planners, volumn 29 (February 1963), pp.41-42.

¹⁴In 1950 Cambridge had 84% of its dwelling units in sound condition while Tract Five had 69%. In 1960 the same percentages were 79% and 60%. The median rent in 1950 for Cambridge was \$49.41 and for Tract Five it was \$25.72. In 1960 the median gross rents were \$79.00 and \$71.00. The percentage of non-white occupied dwelling units in Cambridge for 1950 were 4.7% and for Tract Five were 13.3%. In 1960 these percentages were changed to 5.9% and 17.1%. Owner occupancy increased in Cambridge by .6% in the decade between 1950 and 1960 while it increased 1.7% in Tract Five, but still the percentages of houses owner occupied in 1960 were lower for Tract Five than for the rest of Cambridge.

stability of non-white families. An analysis of age information indicates that the usual pattern of young families moving out is followed, so it could be assumed that young white families are causing the loss of population. There is a general upgrading of occupations and incomes as can be expected in most areas during this decade. There has evidently been a decrease in the numbers of managers and foremen who live in the area, but this is to be expected since there were so many little shops in the area in the 1940's. Between 1950 and 1960 Tract Five lost 25% of its population, but there is a suggestion that this trend might have been reversed since 1960 because Cambridge has grown slightly since 1960, according to the 1965 state census.

There are no ethnic patterns of change in the decade between 1950 and 1960, so we can presume there have been no continued changes in ethnic balance since 1960. The residents of Tract Five had a lower mean for years of education in 1950 than Boston, but it rose significantly between 1950 and 1960. Probably more people in the area are looking toward technical jobs in the future, but still the area has remained dominantly a working class area housing unskilled and semi-skilled workers with incomes between \$4000. and \$8000. a year. In the past there has been a great deal of homogeneity in occupation and income, and there seems no reason why this fact would have changed between 1960 and 1965.

Having assessed the validity of the Police Listing for 1960 and examined the potential for change in Tract Five, a final data check must be done. This check establishes the validity of the Police Listing data for movers, not for permanent residents. Unfortunately a direct check cannot be made because the information from the census pertains to the years prior to 1960.

Moreover, the census data relates to the present residents of the area and not all previous movers. As a result of these two factors, two comparisons are made to check the data. First, there is an approximate check on the number of movers per year. And second, there is a check on the proportions of movers from different locations or areas as defined by the census.

Two items in the 1960 census are used to check the data for movers. The place of residence in 1955 is generally called the migration item.¹⁵ The year of moving to the present housing unit is called the residential mobility item.¹⁶ The migration question helps describe the distance migrants moved in gross terms - from within the SMSA, from the central city or from within the country. The proportions moving from these areas is checked against the Police Listing data after an adjustment for age is made. The results appear in Figure 6. For the second, item adjustments have to be made to convert families to households. The flow of migrants must also be assumed to be continuous. The estimates from the Police Listing for movers per year is shown in Figure 7 - approximately 145 households move each year.

The Research Design

It has been established that the Police Listing data can be used to define the origin of the moves and the personal characteristics of the migrants. However, additional data will have to be incorporated into the research design in order to obtain significant information about housing choice. The additional data used will be the housing data from the 1960

¹⁵U. S. Bureau of the Census, op. cit., Table P-1, p. 35.

¹⁶U. S. Bureau of the Census, op. cit., Census Tracts, Table H-2, p. 219.

Figure 6: Comparison of places of origin for migrants in census data (1955 through 1960) and Police Listing data (1960 through 1965)

Item	Census	Census Percent	<u>Police Listing</u>	<u>Police Listing</u> Percent
Moves (different house) in 1966)	1098		1567	
Moved from:				
Other part of SMSA	791	72%	1124	72%
Central City	74	7%	156	10%
Outside of SMSA	163	15%	242	15%
Abroad	37	3%	45	3%
Not Reported	33	3%	--	--

Figure 7a: Comparison of number of units moved in each year in census data (1950 through 1960) and Police Listing data (1960 through 1965)

	Census	Estimated Census*	<u>Police Listing</u>
Units Reporting	986		
1960 (Census reports	262	35	In six year period: Families 652 Individuals 228 (correction for wife's family included) Total 880 Per Year 146
1959 cumulative until		125	
1958 March 1, 1960)		100	
1957 (Census reports	217	72	
1956 cumulative until		60	
1955 January 1, 1958)		48	
1954		35	
		Per Year 145	

*see Figure 7b for approximation method.

1958-March 1960 = 262
 1960 = 35
 1959 = 125
 1958 = 100
 260

Most recent full year = 125 moves
 Adjusted for two months = 145 moves
 (1960)

1954-1957 = 217
 1957 = 72
 1965 = 60
 1955 = 48
 1954 = 35
 215

Assumptions:

1. Assume flow of movers is continuous.
2. Assume number of units that remain is a continuous fraction of those who remained last year, decreasing to an asymptote of permanence.

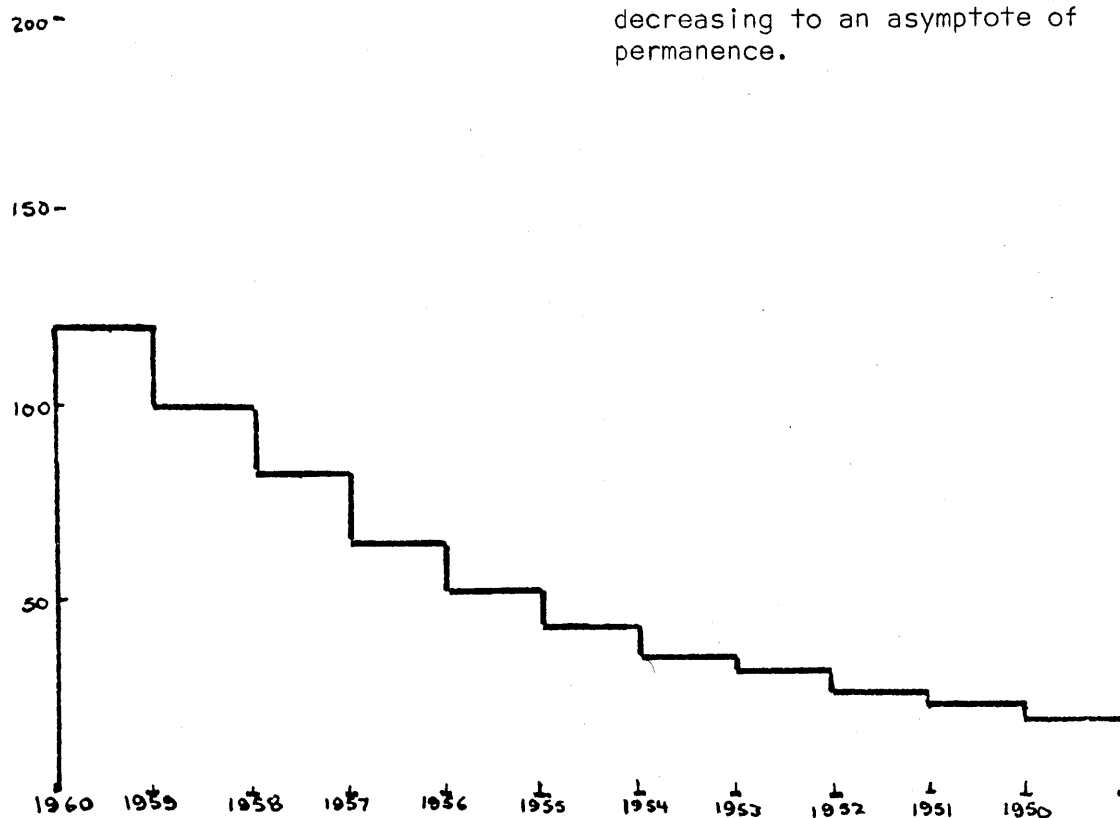


Figure 7B: An estimate of the number of household units who stay in Tract Five referenced by year.

Census housing data by city block for Cambridge¹⁷ as well as information about the probable Inner Belt route.

Within the broad structure of the information that is available for this study,¹⁸ a conceptual framework for the examination of the data should be established. The area chosen, Tract Five, is small, but it is a type of area that is not rare elsewhere in the Boston region. In fact, the area is surrounded by similar blocks to the north in Somerville and to the south in Cambridgeport. However, Tract Five is small enough for a detailed comparative study of housing choice, because while it is part of a larger market area there is a great deal of variation within the tract.

The origin of the migration move seems to be the most significant variable and the best possible variable around which the study could be structured. The origin categories allow interpretations of movement according to both a concept of areas linked by migration flows and a concept of approximate distance. The housing choice variables were selected as the

¹⁷U. S. Bureau of the Census, U. S. Census of Housing: 1960. HC(3)-183 City Blocks, Cambridge, Mass. Table 2 (Washington: U. S. Government Printing Office, 1961), p. 2.

¹⁸There is a large amount of information that could be used for this study and which is important in migrant decisions but which has been excluded for arbitrary reasons. The most significant is the year of the move. Statistically, movement patterns differ significantly from year to year for almost all characteristics studied, but since there is no yearly chronicle of influences for this area, this would make an interpretation of the differences impossible. Information about personal life history could not be used because the time series studied was not long enough. Judgments were not made about what kinds of local amenities would attract particular migrants to live near them or what local disamenities would influence certain migrants to seek housing distant from them. This could certainly be done, but the undertaking would not be trivial by any means.

most important variables. Areas, by block, were defined mainly in census terms.¹⁹ The last variable to be defined was the personal characteristics of the migrants, which were also defined in census terms.

Origin of Move Categories:

Originally an attempt was made to define streams of migrants by a purely distance criteria. This frequency distribution resulted in high amounts of migration in some distant categories. The delineation of areas where migrants came from, only in terms of distance, was difficult because political boundaries are not clearly defined in terms of distance. Still, distance can be approximated roughly, but when it is, some of the important migration streams are lost by aggregating over similar distance and not over areas of similar characteristics. For this reason, areas were grouped into locations of origin which sometimes follow a distance pattern but which are more significant as independent locations.

In defining the location from which people move, the categories used must be clearly different from each other. In other words, the categories should be significant in terms of migration theory. Obviously very short distance moves are distinct because of the migrant's knowledge and familiarity

¹⁹Blocks 8, 10, 21 and 22 were combined for all classification systems because they are so similar in housing characteristics like condition, rental, owner occupancy and non-white occupancy. In addition, these blocks represent smaller areas and fewer housing units when taken alone than is usual for the rest of the blocks. This is the only major difference in size or shape among the blocks in the tract, so that after this correction is made it can be assumed that the influences of the size and shape of the blocks on migration is not significant.

Occasionally for the special blocks surrounding the tract blocks were combined or split up (as in the case of the public housing area). This re-ordering of blocks has no influence on the findings of the study.

with the area. Long distance moves are also probably unique because of the migrant's need of a new job or change in social environment. The middle distance moves are generally municipally defined by city boundaries, like moves from Cambridge, Somerville or the downtown Boston area. The areas picked hopefully define different migrant streams because of the different needs and different orientations of the migrants from these areas.

The third criteria used to determine the origin measure describes a relatively smooth declining curve. While an approximation of a gravity model curve was not attempted nor desired especially, the frequency of moves was desired to diminish continually in an ordered sequence so that comparisons with other distributions would be easy to show and differences between frequency distributions would be immediately recognized. The frequency distribution should not be interpreted strictly in terms of distance or distance modified by the size of the source of migrants. This interpretation is faulty and should be avoided. The distinction between distance defined linked areas and socio-economic defined linked areas is not as important to this study as is the behavior and characteristic differentials for migrants when defined by these areas.

The groups of local and very short distance movers are easy to define. These movers come from within the seventeen blocks in Tract Five or from the additional thirty blocks surrounding Tract Five. These areas are shown as the inner area and special blocks in Figure 8. The inner blocks were originally defined by the definition of Tract Five, but the special blocks were added because of the intensive movement from these areas to Tract Five. In almost all of these cases it can be assumed that housing variables are important influences in the migrant's choice of location.

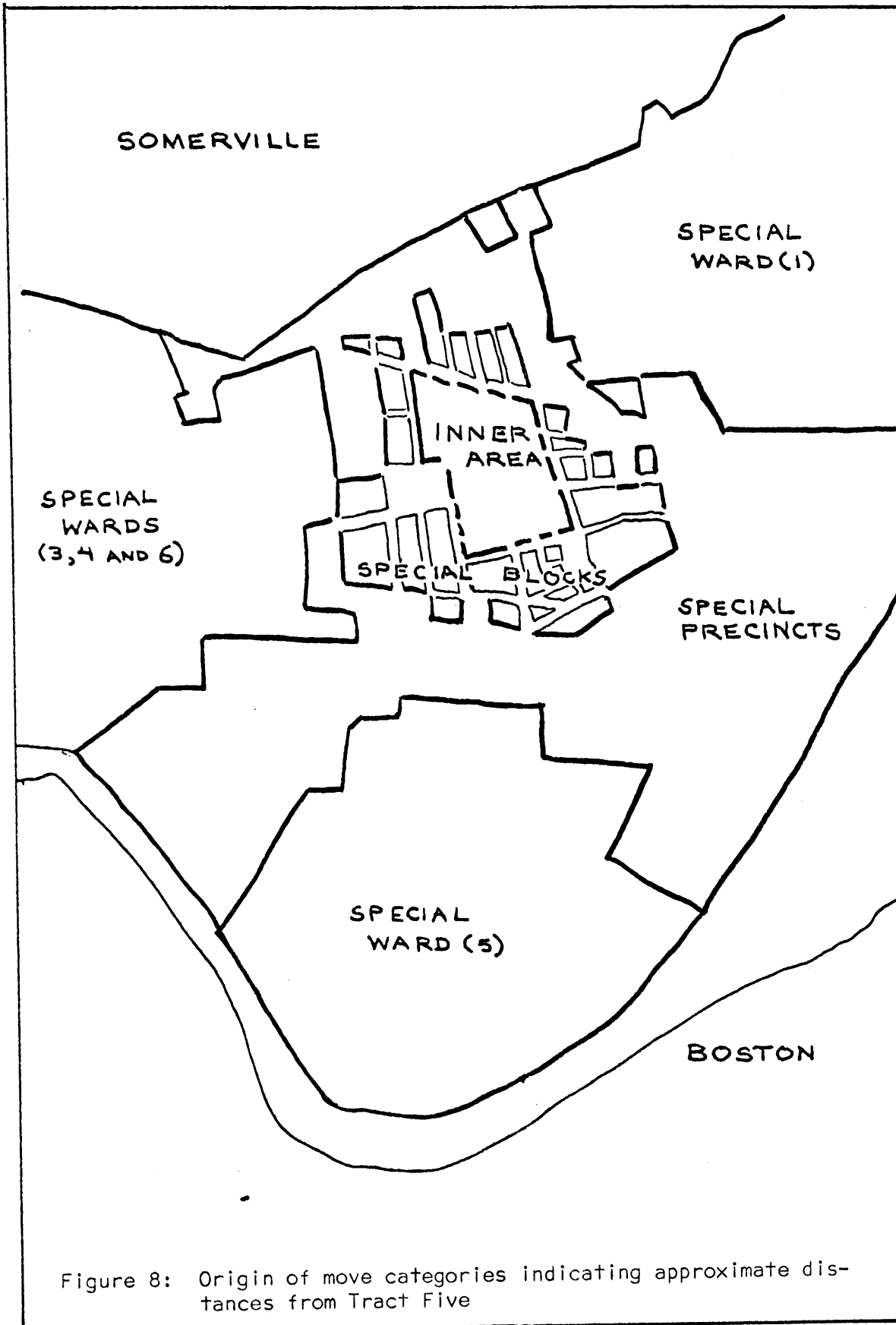


Figure 8: Origin of move categories indicating approximate distances from Tract Five

Towns	Moves	Wards	Moves	Precincts	Moves	Block	Moves		
Cambridge	1021	1	103	1	19				
				2	5				
				3	8				
				4	23				
				5	48				
				2	481	1	68	Special Blocks	19
								Other	29
								Tract Five	50
								Special Blocks	18
								Tract Five	142
						2	153	Special Blocks	11
						3	160	Tract Five	112
								Special Blocks	44
								Other	4
						4	58	Special Blocks	56
								Other	2
						5	42	Special Blocks	7
								Other	35
				3	122	1	51	Special Blocks	36
						2	24	Special Blocks	5
								Other	19
						3	34	Special Blocks	17
						Other	17		
				4	11				
				5	2				
		4	98	1	34				
						2	17		
						3	40	Special Blocks	10
						Other	30		
		5	48						
		6	60						
		7	11						
		8	5						
		9	15						
		10 & 11	14						
		Not recorded	65						
Somerville	113								
Boston	112								
Everett-Winthrop	32								
Allston-Brighton	26								
Roxbury-Dorchester	23								
Watertown-Arlington	17								
Medford	15								
Charlestown	11								
Remainder of State	47								
Out of State	115								
Out of Country	45								

Figure 9: Number of moves for six year period listed by disaggregated origin locations (see Figure 2 for Ward, Precinct and Block Locations).

The third and fourth categories of moves are those from the Precincts which surround Tract Five and those from the rest of the Wards in Cambridge excluding Wards 7, 8, 9, 10 and 11. The Precinct boundary shown in Figure 8 is irregular and obviously could not conform to any specific measure of distance. The Wards excluded from the fourth measure are those further west than Harvard Square. Both of these groups of migrants seem to come from areas similar to Tract Five and they do not move any great distances. Exact information concerning the socio-economic characteristics of Wards and Precincts is not available so a detailed comparison of the areas with Tract Five is not possible.

The next two categories do not correspond to distance categories as much as they do to political boundaries. The fifth category of origins includes the rest of Cambridge and Somerville. These areas are similar in general to Tract Five, so that they would represent somewhat similar housing markets on a regional scale. The sixth category is that of urban Boston including Charlestown, Roxbury, Brighton, Allston, Jamaica Plain and other nearby towns. These towns were grouped together after studying the migrant characteristics from all towns, because they seemed to represent similar types of migrants. In both of these categories it is possible that the moves were generated by job change. Because the areas are still within commuting distance of most industrial and business areas a job change is not necessarily assumed.

The last three grouped categories of moves were moves from the rest of Massachusetts, out of state moves and out of country moves. Most of these moves are clearly long distance moves and probably involve a job change or a search for a new-job. A simple distance measure is not adequate because there are some out of state locations closer to Tract Five than western

Massachusetts is. In many cases, the out of state and the out of country moves should have been combined because there are so few out of country moves. Even though this is a strong reason for aggregating, these moves were kept separate because they are of such a distinctly different nature.

In most of the graphs shown in the next chapter the origins of migrants' moves are used in the nine categories listed above. But in order to determine whether there are significant differences between the short area moves (consisting of the inner blocks and the special blocks) or the long distance moves (out of state and out of country) and the other moves, occasionally either the short or long distance moves will be combined and eliminated from the analysis together. In most cases there seems to be no significant difference in migrant behavior dependent on long or short moves by themselves, so that the nine category system is most often used.

Physical Characteristics of the Area:

The physical descriptors of the housing areas are derived from the census block statistics. The year 1960 was taken as a base year for classification and it is assumed that the blocks remained stable in the measured characteristics for the six year study period. This assumption of stability in housing condition or rent (relative to the rest of the tract) is useful in this study but probably should not be used for longer periods of time. The 1960 data was used to describe housing choice and in almost all cases census block boundaries define the housing areas. Block data was used to obtain the smallest information unit possible for housing choice - there are no smaller data units available. The usefulness of the block in determining influences on housing choice can be questioned, but certainly rear neighbors do have

an influence on housing locations although perhaps not as much as the neighbors across the street.

Housing areas by block are distinguished from each other by a racial occupancy measure, an Inner Belt threat measure, a statistically derived social status measure and a statistically derived economic saving measure. The data used is listed in Figure 10. The first two measures were used to determine whether migrants from different locations were affected by high non-white occupancy or the threat of the Inner Belt. The last two measures were used to determine if migrants from certain locations tended to select different kinds of housing according to the criteria defined by the status and economic scales. The first two classification systems are straightforward but the last two are more complicated.

In all cases blocks are grouped together into categories. In the first two cases there are only two categories, either high non-white or low non-white and either threatened by the Inner Belt or not threatened by the Inner Belt. The measure for high non-white occupancy was above 17.1% which is the tract mean. As can be seen in the data of Figure 10, if non-whites are more than a low percentage of occupancy, the percentage is usually well above the mean. Even so, there are few blocks with very high non-white occupancy and none with over 56%. Figure 11 indicates how those blocks with high non-white occupancy cluster together. The blocks to be effected by the proposed Inner Belt are in a straight line and shown in Figure 12. The Inner Belt route was first proposed almost twenty years ago, and the proposed route is still being questioned. But since alternatives to the indicated blocks were not proposed until quite recently the impact of the highway plan should have been constant over the last six years. For the housing status and economic

Figure 10: Area Information from 1960 census (housing characteristics)²⁰

Census Block	Total Population	Total Units	Sound Units	Percent Sound	Owner-Occupied Units	Percent Owner-Occupied	Non-White Occupied	Percent White Occupied	Average Contract Rent	Social Status Measure	Economic Saving Measure	Inner Belt Threat	Racial Occupancy
1 -1	177	57	33	67.8	16	28.1	6	89.5	44	HH	LH		
2 -2	284	98	88	89.8	12	12.3	2	98.0	42	HH	LL		
3 -3	103	46	18	39.1	16	34.8	18	60.9	37	LL	LH		N
4 -4	154	55	25	45.5	6	10.8	3	94.9	38	HL	LL	I	
5 -5	81	32	28	87.5	12	37.5	--	100.0	51	HH	HH	I	
6 -6	303	93	39	41.9	18	19.4	2	98.0	48	HL	HL		
7 -7	259	88	56	63.6	27	30.7	7	92.0	53	HH	HH		
8 *	161	59	54	92.5	2	3.4	--	100.0	59	HH	HL		
11 -11	142	44	28	63.6	7	15.9	5	88.6	45	HH	LL	I	
12 -12	98	37	36	97.3	3	8.1	2	94.6	51	HH	HL		
13 -13	106	36	16	44.4	5	13.8	20	44.5	49	LL	HL		N
14 -14	162	62	20	32.3	14	22.6	24	61.3	39	LL	LH		N
15 -15	221	69	47	68.1	14	20.3	15	78.3	42	LH	LH		N
16 -16	198	59	13	22.0	10	16.9	16	72.9	54	LL	HL		N
17 -17	175	67	58	86.6	15	22.4	12	82.1	48	LH	LH	I	N
18 -18	171	41	16	39.0	13	31.7	19	50.7	41	LL	LH	I	N
19 -19	246	84	42	50.0	16	19.0	25	70.2	50	LL	HL	I	N
Tract 5	3041	1027	617	60.1	206	20.1	176	17.1	47				

*(8, 10, 21, 22)

²⁰United States Bureau of Census, U. S. Census of Housing, City Blocks, Cambridge. (Washington, U. S. Government Printing Office, 1961), p. 2.



Figure 11: Blocks with a high percentage of housing units occupied by non-whites.

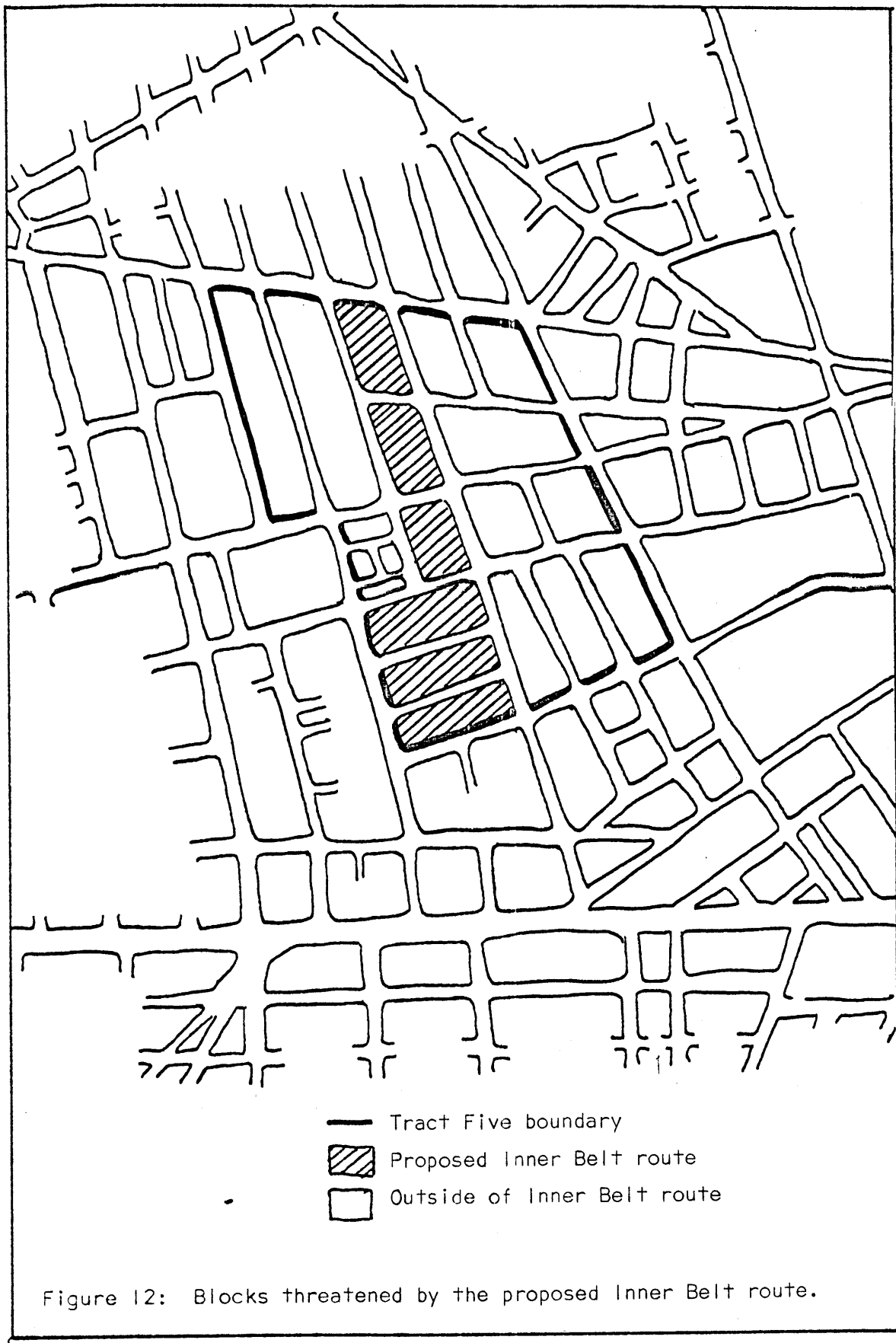


Figure 12: Blocks threatened by the proposed Inner Belt route.

saving measures blocks were also grouped into a classification dependent on selected means in Tract Five. The means relate to percentage of sound units, contract rent, percentage of units occupied by non-whites and percentage of units occupied by the owner. With a partition around the mean there are two categories for each item - high and low. However, if the information items are combined there are many more categories generated. For a combination of three aspects of housing, eight categories of housing are generated. For four items, there are sixteen categories generated. Thus for the two way partition there are 2^n categories for n information items. Since there are only twenty blocks to categorize using a housing classification system it would be foolish to try to expand the types of categories. With 16 categories there are no blocks which fit into at least five categories so a smaller series is needed.

It is helpful to imagine housing choice as representing a choice related to either increasing social status or increasing economic saving. Under these concepts, two measures are set up. Blocks are then ranked in the order of a migrant's preference for a particular type of block. For instance, the most desirable blocks from a status viewpoint are assumed to be those with high white occupancy and a high percentage of buildings in sound condition. The housing status measure continues in four stages to the least desirable from a status viewpoint - high non-white and poorly cared for buildings. It is assumed that non-white occupancy is important for social status reasons to both white and non-white migrants. The importance of race for these purposes is less clear than the importance of good condition, but still it is probably significant to many migrants. Figure 13 shows the location of

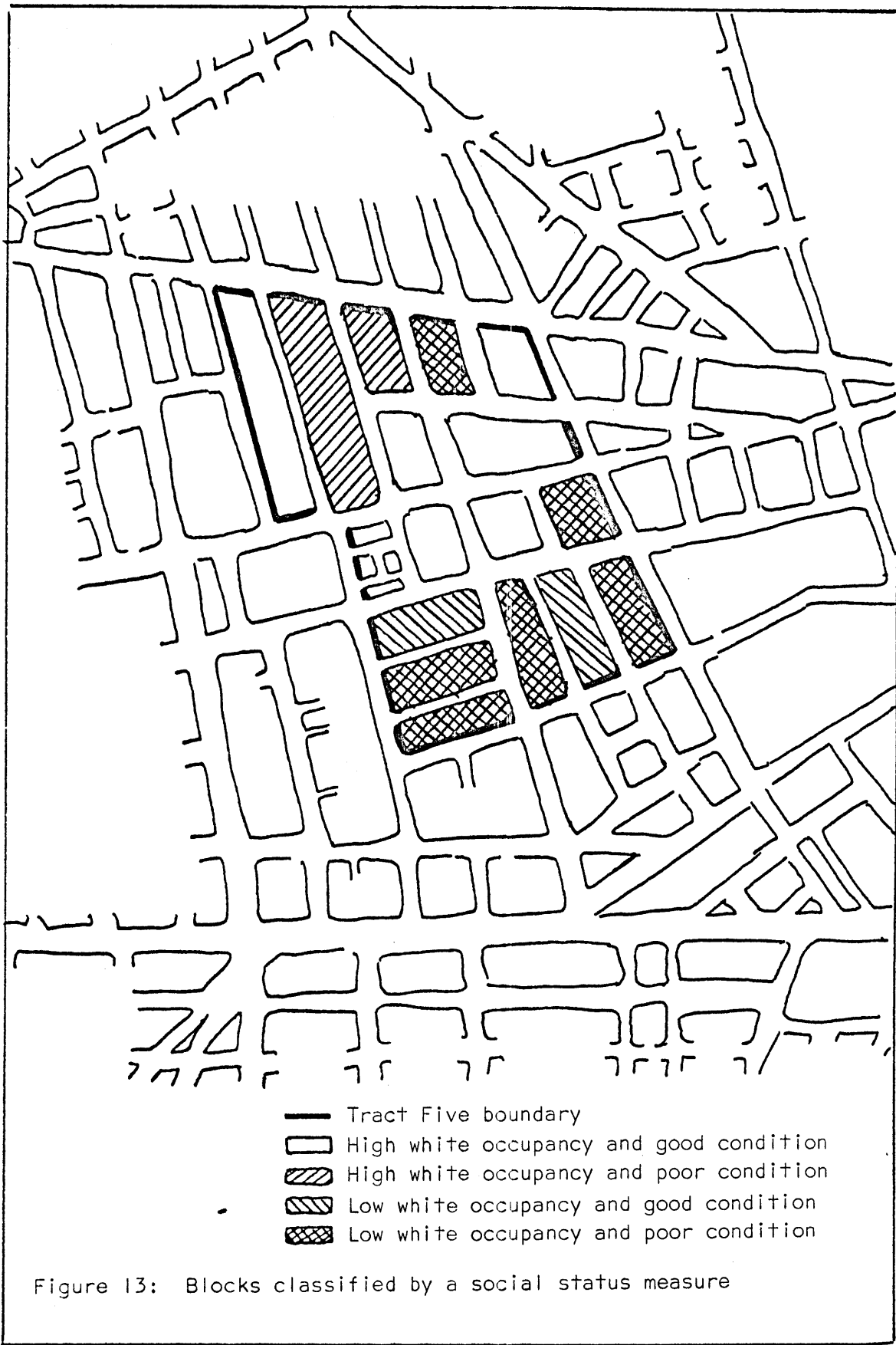


Figure 13: Blocks classified by a social status measure

blocks classified according to 60 percent of the housing in sound condition and 17 percent non-white occupied.

A similar measure is constructed for the economic motivation of migrants with low rent and low owner occupancy rated as the best choice. These blocks are shown in Figure 14. The rent level used for partitioning is \$47 per month and the owner occupancy level used is 20 percent. Rent measures are presumably a good indicator of economic saving, but in these statistics contract rent is used which is not always useful when classifying large groups of units. An argument in favor of using contract rent could be based on the fact that the tenants with low contract rent have the option of controlling the costs of heat and utilities when necessary. Owner occupancy is included so that a measure of the number of rentable units is available, to indicate the supply characteristics of the housing market.

There is always the possibility that a classification scheme which relies on partitioning around mean percentages destroys a large amount of useful information. Unfortunately, a better system for classifying the housing alternatives is not available because there is so little data on the housing stock. The fact that the economic classification scheme does have significance when cross-tabulated with resident occupation indicates that at least the economic measure is valuable for gauging differences in housing choice.

The validity of the partitioning scheme is also, to some extent, dependent on the number of choices offered in each category. In this study, however, the focus is on the different choices of migrants dependent on their own characteristics. In this case, each migrant is assumed to have an equal chance of selecting a particular housing unit in any housing area. Differences could arise dependent on the amount of information available,

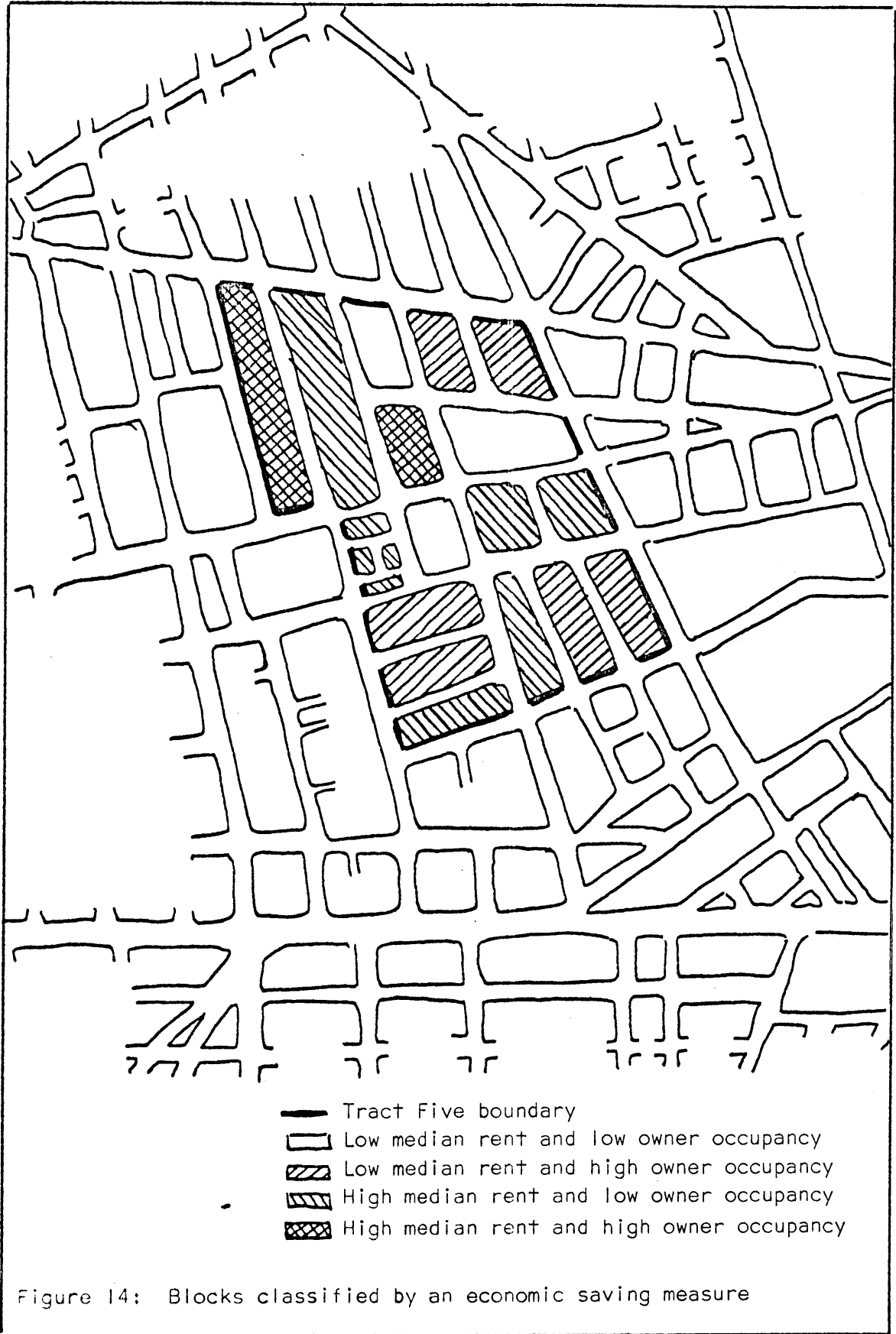


Figure 14: Blocks classified by an economic saving measure

but the study is designed to test for this type of influence. Another argument would insist that the migrant is constrained by the supply of units only to the extent that he is not willing to bid up the price of a unit, thus implying that the most affluent or most knowledgeable will get the best units. This argument presumes a limited market area for the migrant with non-substitutable alternatives. If a regional market is considered, many alternatives are assumed to be available when studying just a small part of the market.

Personal Characteristics of the Migrants:

The personal characteristics of the migrants are used in the same way as the physical area characteristics, they are cross-tabulated against the location from which the migrants moved. All of the personal variables are straightforward and census groupings are always used. Some of the census categories are collapsed or combined in order to get a more useful set of classifications for this area, but this procedure does not alter the data. The characteristics used for the study are: age categories by ten years, male occupation categories and female occupation categories. The other personal variables either present an insurmountable difficulty in interpretation or are not important in differentiating movement patterns.

Earlier in this chapter the problems concerning the family composition categories were explained. As a result of the differences, the categories are not useful. In addition, when the family composition data is cross-tabulated against the other data, the results are not significant. A grouping of age according to life cycle was also excluded from the study because it added no information that the usual age categories did not

convey. Moreover, many of the differences in movement seem to be diluted by the aggregation into three age categories instead of six categories. Differences between the movement patterns of migrants simply by sex are non-existent in all of the data, so that category was dropped also.

Statistical Method

In order to process the information selected from the Police Listing, the use of a high speed computer was necessary. All information had to be coded on cards so that the data could then be used with the statistical analysis programs which are available. The output from this analysis appears as contingency tables printed in the next chapter. These tables are cross-tabulations of the origin of the migrant's move against other variables, to show that where the migrant came from varies with his behavior and his personal characteristics.

The statistical program that was used is called DATATEXT. It was developed in the Department of Social Relations at Harvard University for general data analysis. Alphanumeric coding can be used as input. The first section of the program will select, code and recode variables into numeric values according to a set of control cards. Variables can be combined into single variables or split into two or more new variables. The same logical rules used for forming variables can be used for editing the data. DATATEXT will print frequency distributions for each variable and, at the same time, print standard statistics for these distributions. Cross tabulations are printed to indicate the distribution of migrants over two variables on each page. Additional dimensions can be ordered by either forming new variables or having the tables extend over many pages.

The analytical technique used in this study is quite simple. Cross tabulations will be printed to indicate how many migrants choose each housing area type or can be classified by each personal characteristic dependent on where they move from. Thus, the migrants between twenty years old and thirty years old might move mostly very long distances, from out of state or out of the country, while very few migrants in this same category might be moving within the tract. The pattern should be obvious from looking at the data, but a problem remains in determining the significance of the data. A comparison of the proportions of migrants moving from each origin can be done by a graphical analysis, but the degree of association between one set of migrant's behavior or characteristics and his coming from a certain location must be determined statistically.

A difficulty faced by this analysis is to identify the significance of patterns whereby persons of given characteristics move unlike other migrants. A statistical test must be used which takes into consideration the number of persons in a cell and the number of persons in each category. In order to formulate this test, there must be an assumption as to what the data would look like if there were no singular tendencies for particular migrants to move from certain origins. To do this, independence between a migrant's characteristic and his origin is assumed. Assuming independence means that since there is no relation between the distance a migrant travels and his personal characteristic, a percentage of the total sample characteristic is simply the percentage of persons in that category multiplied by the percentage of persons in the second category. If the relationship is not significant, then the pattern of independence will obviously result in most cases - with exceptions for random fluctuations in the data. Obviously

as the number of categories increases the influence of random fluctuations, or noise, changes. This latter fact must be accounted for in the statistical measure also.

If the data indicates that independence is not a valid assumption, then this is reflected in the statistic also. In this case, when the row proportion is multiplied by the column proportion to get a percentage expected in the cell, there is a difference between what is in the cell and the expected percentage under the independence assumption. A measure of this difference is the Chisquare statistic. The assumption of independence, which could be any other assumed function, is called the null hypothesis. Just as the Chisquare statistic indicates the difference between an expected and an occurred quantity, the Chisquare distribution indicates the probability of the null hypothesis being wrong.

In calculating the Chisquare statistic, first the percentage of the total distribution is tabulated for each cell. This quantity can be called O_{ij} . If there are 1500 people in the sample and 150 of them are in the cell of the first row and the first column, then O_{11} would be set at .1. Then an expected value for that cell would be calculated by dividing the row total by the total distribution or $\frac{\sum O_{1j}}{\sum \sum O_{ij}}$ and multiplying that by the column total divided by the total distribution or $\frac{\sum O_{i1}}{\sum \sum O_{ij}}$. This procedure yields an E_{ij} under the assumption of independence. Thus, if there were 300 persons in row one and 500 persons in column one for the above distribution of 1500 migrants, the expected value under the assumption of independence or E_{11} would be set at .066.

The computation of the Chisquare over all of the cells allows a comment to be made about the total distribution. The formula for the Chisquare

statistic is $\chi^2 = \sum \frac{(O_{ij} - E_{ij})^2}{E_{ij}}$ and the significance of this statistic is dependent on the number of categories in the distribution. The number of categories in the distribution used when testing the null hypothesis is called degrees of freedom. Thus the test of the null hypothesis, that of independence, is done by checking the significance of the Chisquare statistic for the given degrees of freedom, which yields the probability that independence does not exist given the data as presented.

The procedure that will be followed for each cross-tabulation is easily described. First the origin categories will be cross-tabulated against the housing choice categories in the data and a Chisquare statistic will be provided. If the Chisquare is significantly large - indicating that the assumption of independence is unlikely in more than 95% of the cases - then that distribution will be examined further. A search for single significant characteristics in the table will then be made. In some cases, particular groups will account for much of the variation from independence and these groups will be identified. In other cases, single groups causing the pattern cannot be identified and the analysis will have to end with the conclusion that each group causes a large portion of the variation from independence.

Chapter IV

DETAILED MIGRATION FLOWS INTO AND WITHIN TRACT FIVE

Chapter IV

DETAILED MIGRATION FLOWS INTO AND WITHIN TRACT FIVE

Given the data from the Police Listings for six years, many different studies could be attempted. Unfortunately, only a small percentage of those begun are useful when completed. Many of the tables that were generated using the migrant information are not shown in this chapter because their significance is doubtful. Only those tables which relate to hypotheses dependent on the origin of the migrant's move will be examined. In only a few cases can clear reasons for a migrant's behavior be seen, in most of the other cases there are significant differences in the pattern of movement but these differences are not ascribable to obvious causes.

In order to examine the distribution of migrants who are attracted to this area, the characteristics of all the migrants will be discussed one category at a time. This will be done simply, with frequency distributions showing the percentage of migrants in each category. These frequencies will be compared with the proportions in the population of 1960 so that proportions in the migrant streams can be related to the current population. It is interesting to note the personal characteristics of the migrants and their general movement to particular areas because these are the distributions for which differential movement is judged.

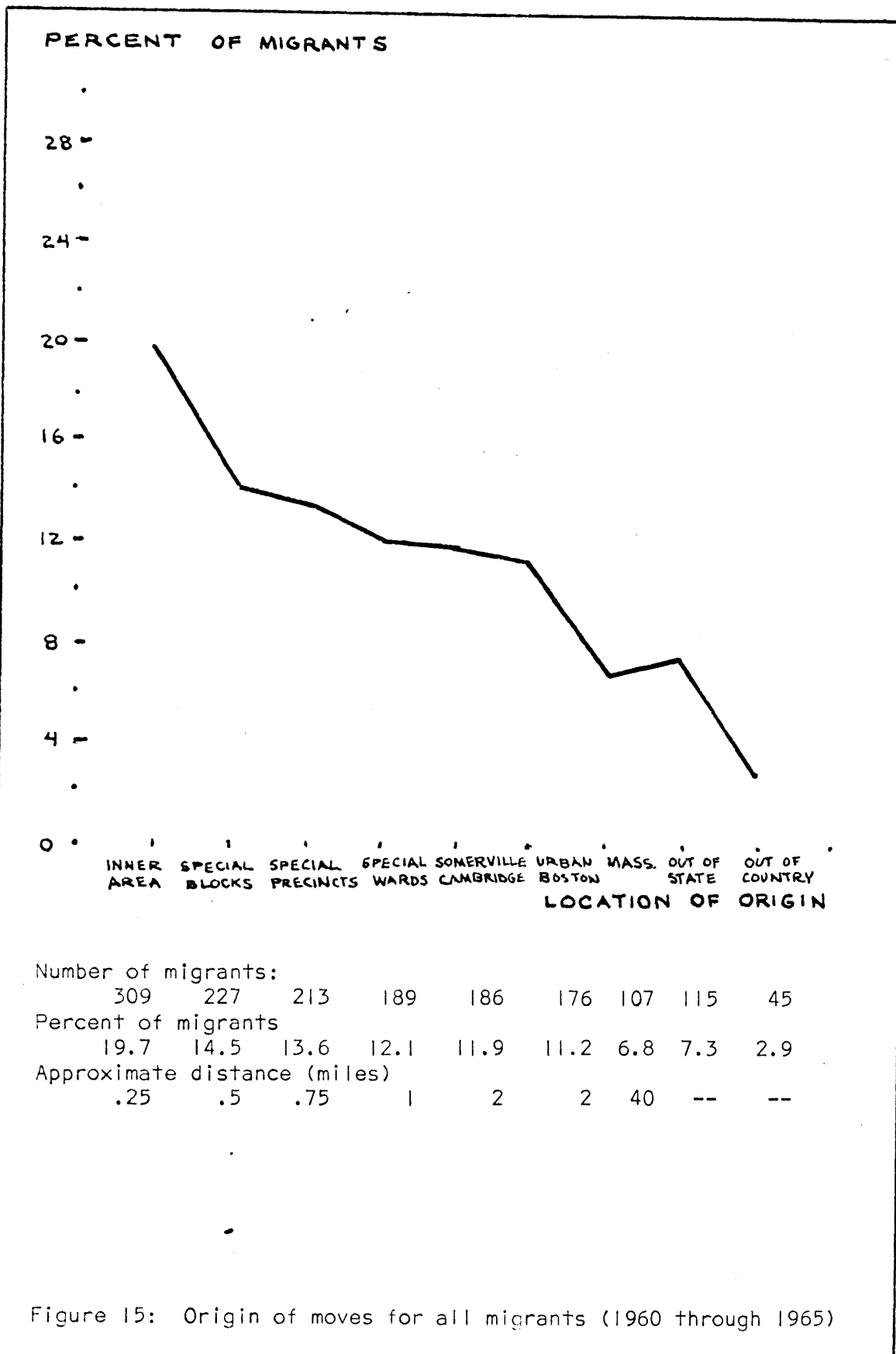
The second section of this study tests the origin categories against the selection of housing areas. This aspect of the study yields interesting facts which stress the importance of knowing the origin of migrants' moves.

The clearest cases of differential settlement are for race and the Inner Belt blocks. The importance of housing choices based on the schemes explained in the last chapter are less clear. It is important to note that while the origins of the move relate to the housing choice, the personal variables of age and occupation do not relate directly to the physical variables except in one case. The usefulness of this finding for the development of theory and planning practice can be demonstrated in the next chapter.

While the personal characteristics of the migrants do not relate directly to the housing choices that are made, these characteristics do relate to the place from which the migrant came. Age categories are significant in defining some different ways in which migrants move, especially for older migrants or migrants moving either very short or very long distances. For male migrants, classified by occupation categories, the different patterns of movement are caused by two groups only - professional-technical workers and non-workers. For female migrants, classified by occupation, each category exhibits a distinct pattern of movement.

General Characteristics of the Migrants

In this section, the distribution of origins for all migrants are indicated first. Then information relating to the frequency of choice of housing areas is illustrated. The number of migrants moving into blocks with high non-white occupancy and blocks threatened by the Inner Belt route are compared with the proportions of people living in these areas in 1960. The same is then done for the number of migrants moving to housing classified by the social status measure and the economic saving measure. Finally the distributions of the age and occupation of migrants is compared with the 1960 distribution.



The origins of migrants' moves show an interesting distribution. Although fifteen percent of the movers come from out of state, a large number of the remaining movers traveled only a short distance to come to Tract Five. More than twenty percent of the movers came from within the seventeen block study area while another fifteen percent came from the thirty selected blocks near the area. The remaining movers are evenly distributed as coming from the rest of Cambridge and the rest of the Boston region, but they have been categorized in a continuous distribution. Most of the migration studied occurs over short distances - eighty percent within two miles, twenty-five percent within one-half mile and twenty percent within a quarter of a mile.

The frequency polygon for all migrants, aggregated for six years, appears to be similar to a gravity model distribution. This is quite reasonable for most random data over distances and it would be easy to adjust the categories so that the data would almost assuredly conform to some standard curve. Adjustments would have to be made for the sudden drop from very short moves to longer ones. The population in the urban center of Boston would have to be considered as inflating the potential migrant figure from that area. Lastly, the distribution from the states would have to be broken down even further to obtain a smooth curve. It is this general distribution for the origin of moves for all migrants that the distributions for selected migrant categories will be compared against.

When a check of the percentages of residents for non-white blocks in 1960 and movers to non-white blocks is done, the significance of the differences between the residents for 1960 and migrants is obvious. There were 857 movers to high white blocks which constitutes 54.7% of the migrants. Residents in 1960 in these blocks were 54.5% of the total population. Thus the

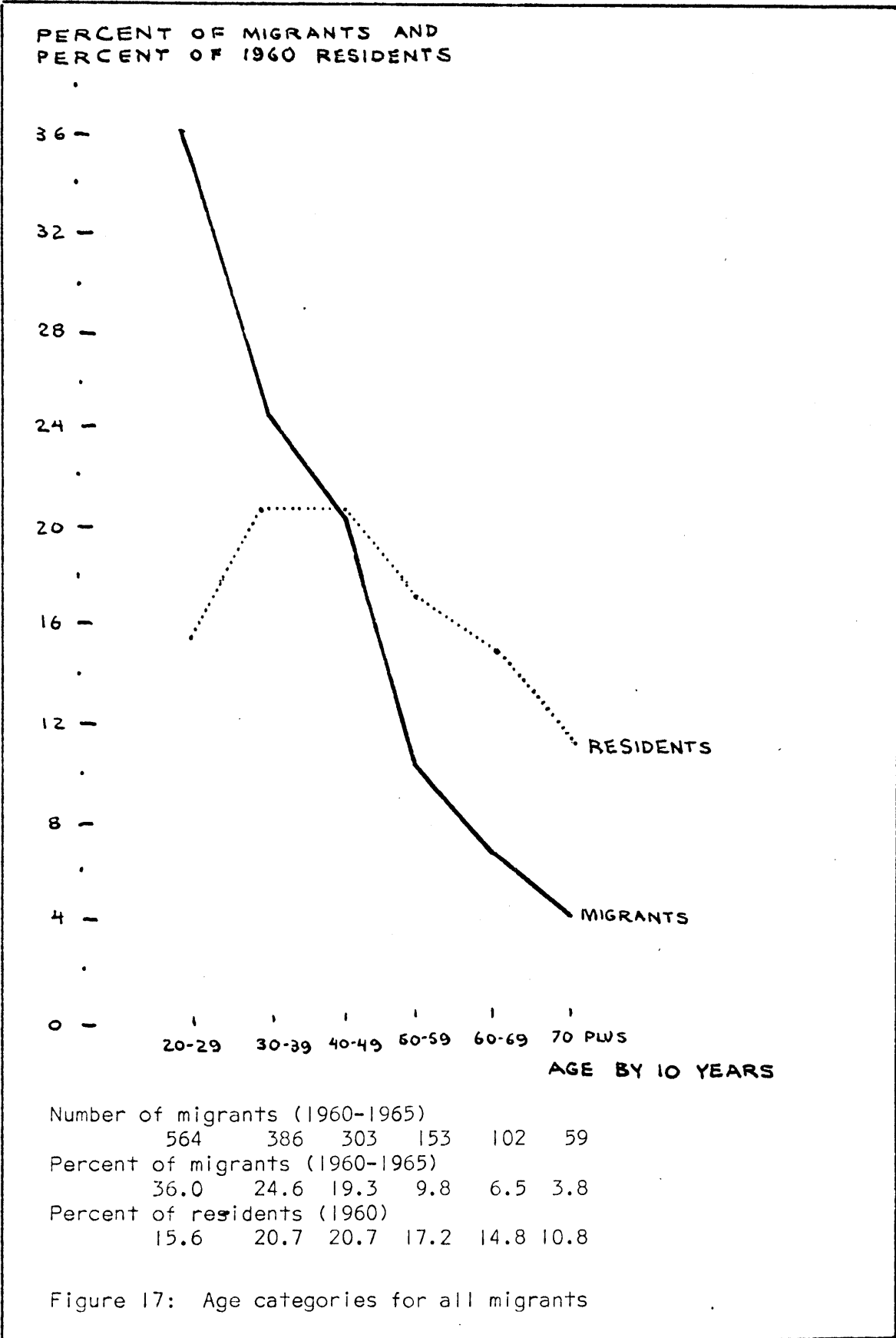
710 persons moving to low-white blocks were not moving to areas where housing turnover was greater or where change was any more dramatic than for the rest of the area. For the Inner Belt route the percentages are not quite as close and a little higher turnover is indicated for the Inner Belt area with 32.0% of the migrants moving to an area where 29.4% of the population over 20 was housed in 1960.

The next two distributions do not indicate additional differentials between migrants and what exists in the area. Figure 16 shows the distribution of migrants in each category of housing type. Note that there are few differences between the percentages of persons living in housing areas classified by either status or economic grouping in 1960 and the percentages of migrants moving to those areas. Evidently different housing types do not reflect different turnover rates. A possible exception to this fact are the low rent-low owner occupied blocks which represent three percent more persons as migrants than as 1960 residents. The significance of this is limited by the fact that the difference is only three percent, and that these housing areas represent some rapid turnover areas and that is why the rents are low. At any rate, none of the housing categories seem to show large differences between the proportion of movers and the proportion of residents in 1960.

<u>SOCIAL STATUS MEASURE</u>			
High White Good Condition	High White Poor Condition	Low White Good Condition	Lo ^w White Poor Condition
Migrants			
622	235	211	499
Percent of 1960-1965 Migrants			
39.7	15.0	13.5	31.8
Percent of 1960 Residents			
40.3	14.2	12.6	32.6
<u>ECONOMIC SAVING MEASURE</u>			
Low Rent Low Owner Occupancy	Low Rent High Owner Occupancy	High Rent Low Owner Occupancy	High Rent High Owner Occupancy
Migrants			
314	492	575	186
Percent of 1960-1965 Migrants			
20.0	31.4	36.7	11.9
Percent of 1960 Residents			
16.8	33.9	37.5	11.9

FIGURE 16: Housing choice for all migrants, by social status measure and economic saving measure.

The ten year age categories for migrants shows a rapidly decreasing frequency. Thirty-six percent of the migrants are from twenty to thirty years old. The percentage in each age group drops regularly until migrants over seventy are only four percent of the total migrant group. The very young age group from twenty to twenty-five might be understated, but generally even a five year grouping yields an even frequency. It is interesting to note that there are more than twice as many migrants in the twenty to thirty year old category as there are permanent residents in the area. However, this proportion reverses until there are more than twice as many residents as movers in the over seventy category. Obviously there are many factors



which cause younger people to be more mobile and these same factors cause younger and older people to move different distances.

It is difficult to determine the significance of certain occupational groups and their ability to migrate simply from the distribution of 1960 residents and the migrant distribution. Percentage distributions do indicate the relative amount of turnover in each category. There are more professionals, craftsmen, service workers, workers not currently working and retired in the migrant streams than there are in the permanent residents category. There are many fewer laborers migrating than are in the permanent resident group, thus if a steady percentage of each category were to remain in the area, there would be a significant decline in the laborer group in the area over the six year period. Still, because of the large percentage of working class people in the migrant force a radical change in composition of the area is improbable. In addition, these figures may simply represent the immobility of laborers in areas like Tract Five. For the female occupation categories there are many more operatives and professionals in the migrant group and many fewer housewives. In general the migrant group has many more working women in each category than the 1960 area residents. This could mean either that women are willing to work to get new or different housing or simply that there are many more workers in the younger and more mobile groups which make up a large part of the migrant force.

Migrants Classified by Origin of Move and Housing Area Choice (Non-White Occupancy, Inner Belt Threat, Social Status Classification or Economic Saving Classification)

Certain physical characteristics of housing areas seem to attract migrants from certain locations more than other locations. Racial factors obviously influence migrants from certain sectors of the city because non-

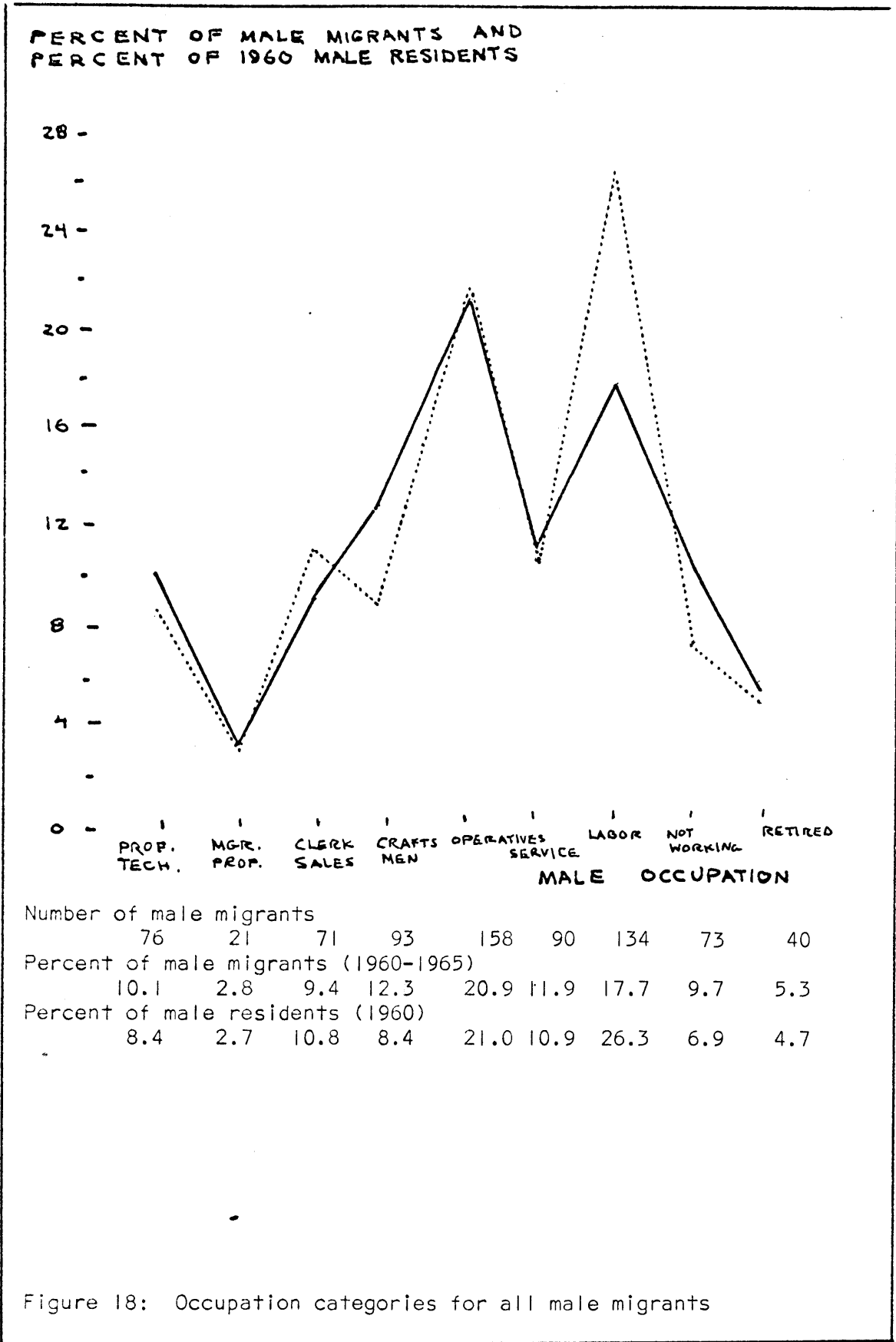


Figure 18: Occupation categories for all male migrants

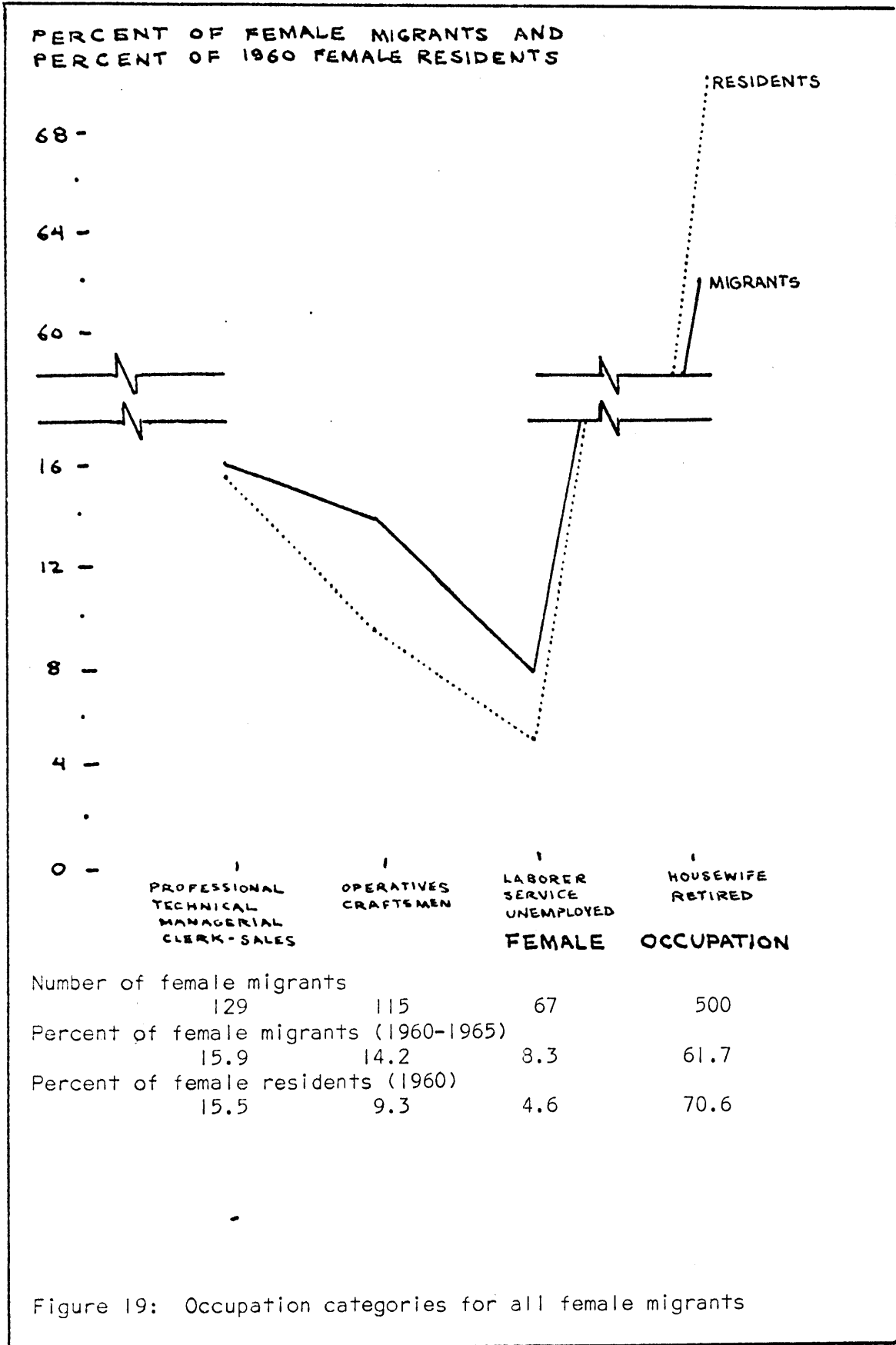


Figure 19: Occupation categories for all female migrants

whites operate in a limited housing market. The Inner Belt threat seems more meaningful to migrants who were probably concerned with the effects of the route in their previous locations.

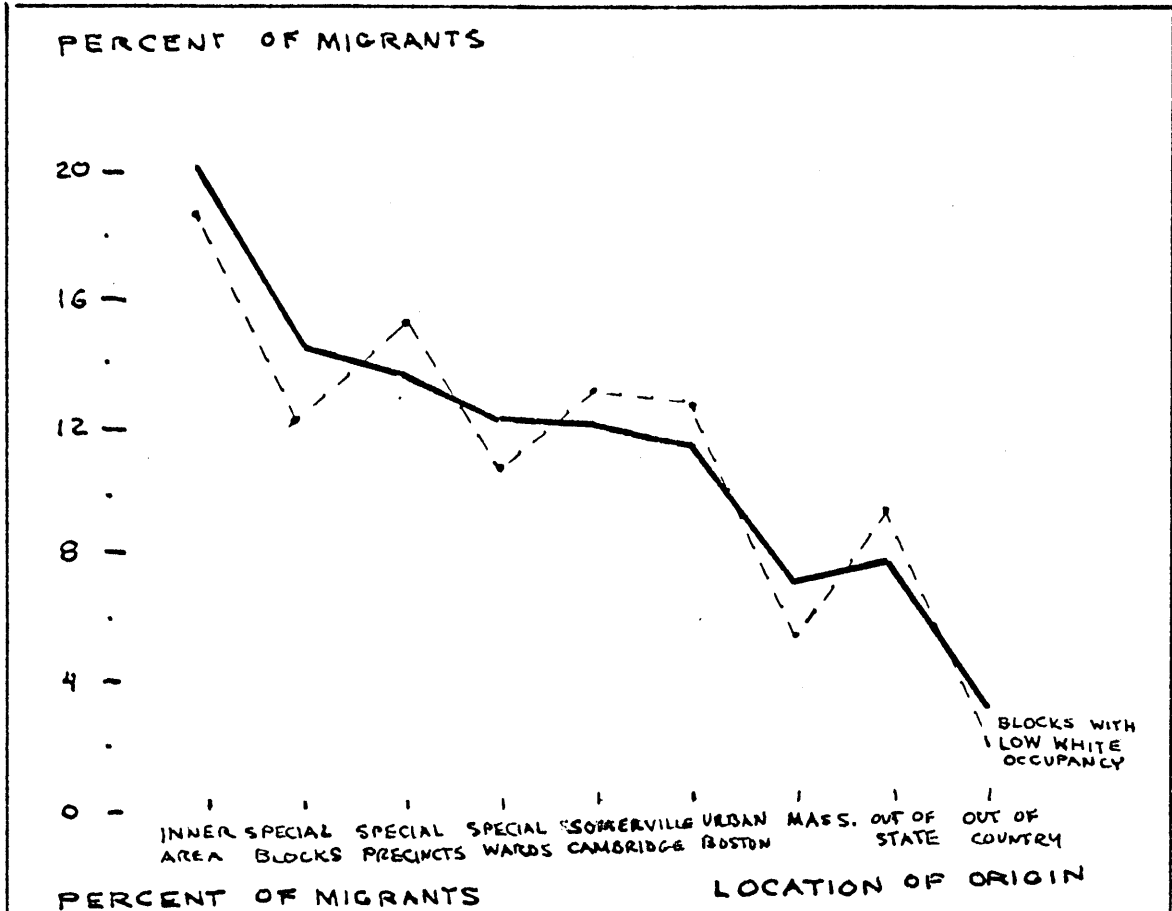
Tract Five is not a housing area that would be chosen by status conscious migrants. For areas of high white occupancy the selection of sound housing is limited mainly to the short distance migrants. For those moving into non-white neighborhoods the choices for sound housing are not as closely related to short distance moves. On the other hand, Tract Five definitely attracts people because housing is cheaper there than in many other places in the Boston area. However, those seeking the lowest priced houses are generally migrants from nearby. While some of the reasons for migrants' choice of certain types of housing can be hypothesized, many of the variations in movement from the different places of origin are still difficult to interpret. Even so, it is clear that differential housing choices are related to the migrant's origin.

When the distributions of migrants settling in highly white occupied areas and settling in highly non-white occupied areas are compared with the distributions of migrants regardless of their choice, interesting differences develop. The statistical analysis used indicates that the association between where migrants settle and where they came from will occur 99.95 percent of the time, given the Tract Five data. The non-white blocks have a small percentage of Tract Five residents moving to them, but this is offset by migrants moving from other non-white areas - nearby precincts, urban Boston and out of state. These statistics would argue for an association between certain outside areas and Tract Five. In addition, these percentages indicate that the assumption of a racially defined market is supportable.

Further support for a racially defined market is found in the significant difference between female migrants classified by occupation and how they settle in high white or high non-white blocks. It is clear from the data that women who settle in the non-white areas tend to work more, further implying that these movers are probably non-white. This impression is further strengthened by the fact that female migrants in the non-white blocks work less frequently in clerical and sales jobs than migrants settling in the high white areas. At the same time, however, the market for housing in these areas is not further defined by either male occupation or age grouping. The distributions for these characteristics against the housing choice are not much more than could be expected from chance variation.

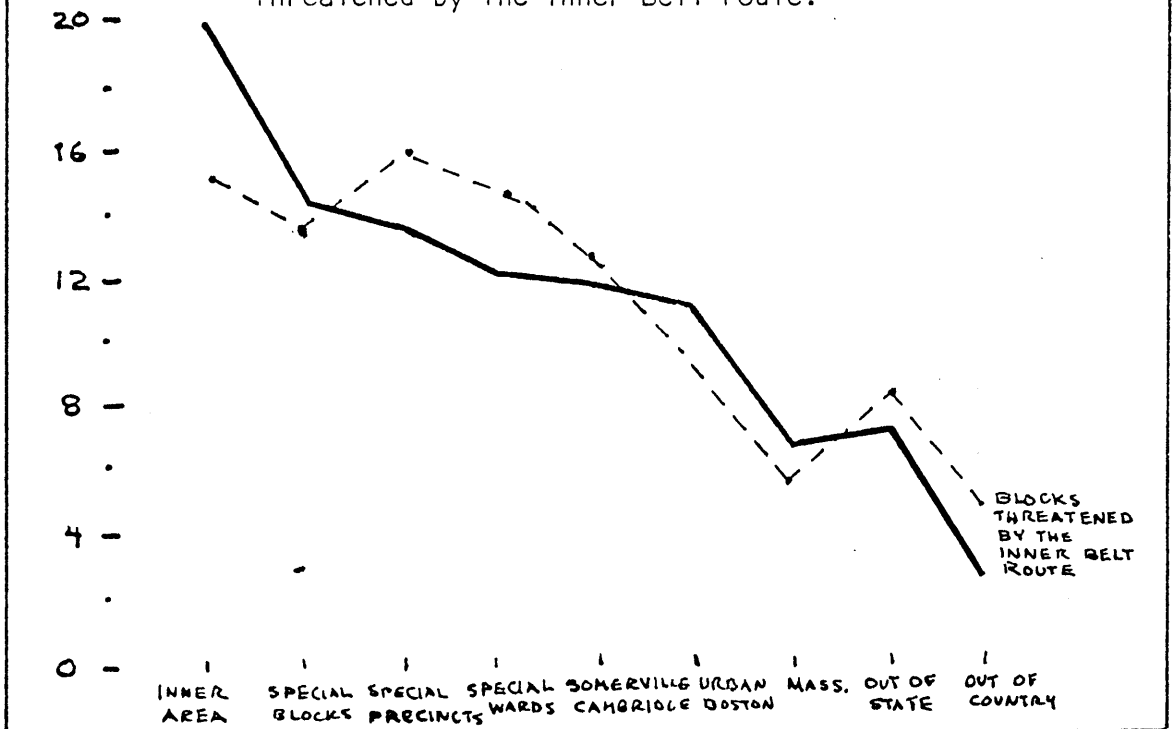
Settlement in the areas threatened by the Inner Belt construction also seems to vary significantly with migrants from different locations. The Inner Belt threatened areas seem to be ignored to a greater degree by both the very short distance migrants, migrants from Boston and migrants from the rest of the state than by the other groups of migrants. The variation from the assumption of independent choice is significant above the 99.95 percent level for this set of data also. It is interesting to note, however, that there are no other aspects of age, male occupation or female occupation which distinguish those migrants settling in the Inner Belt threatened blocks from those settling in the rest of the area. The data indicates that certain occupations might be associated with non-Inner Belt threatened areas but this statement could be made with only an 80 percent surity.

When housing areas are classified by the social status measure, according to racial occupancy and percentage in sound condition, the



PERCENT OF MIGRANTS

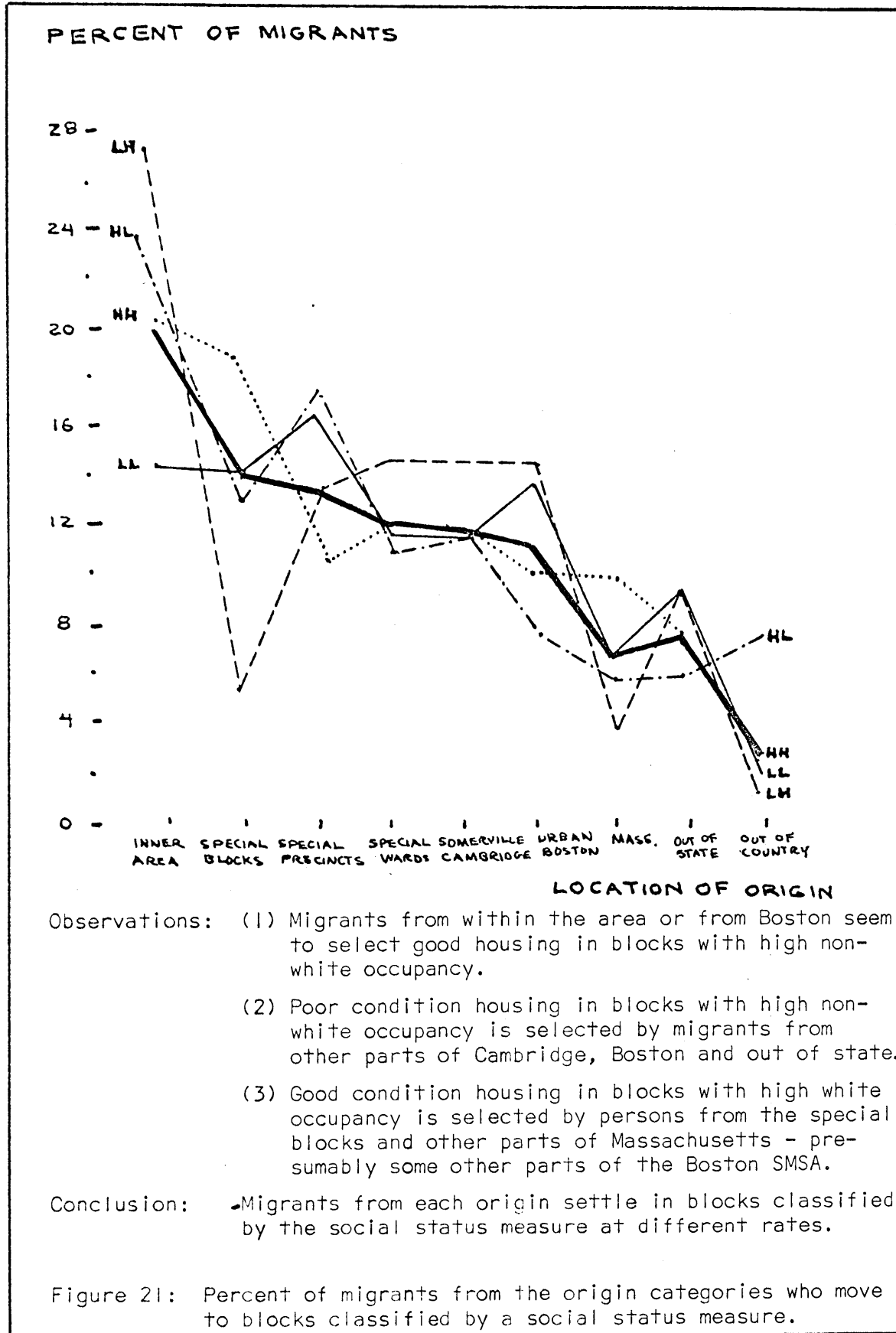
Figure 20: Percent of migrants from the origin categories who move to blocks with high non-white occupancy and blocks threatened by the Inner Belt route.

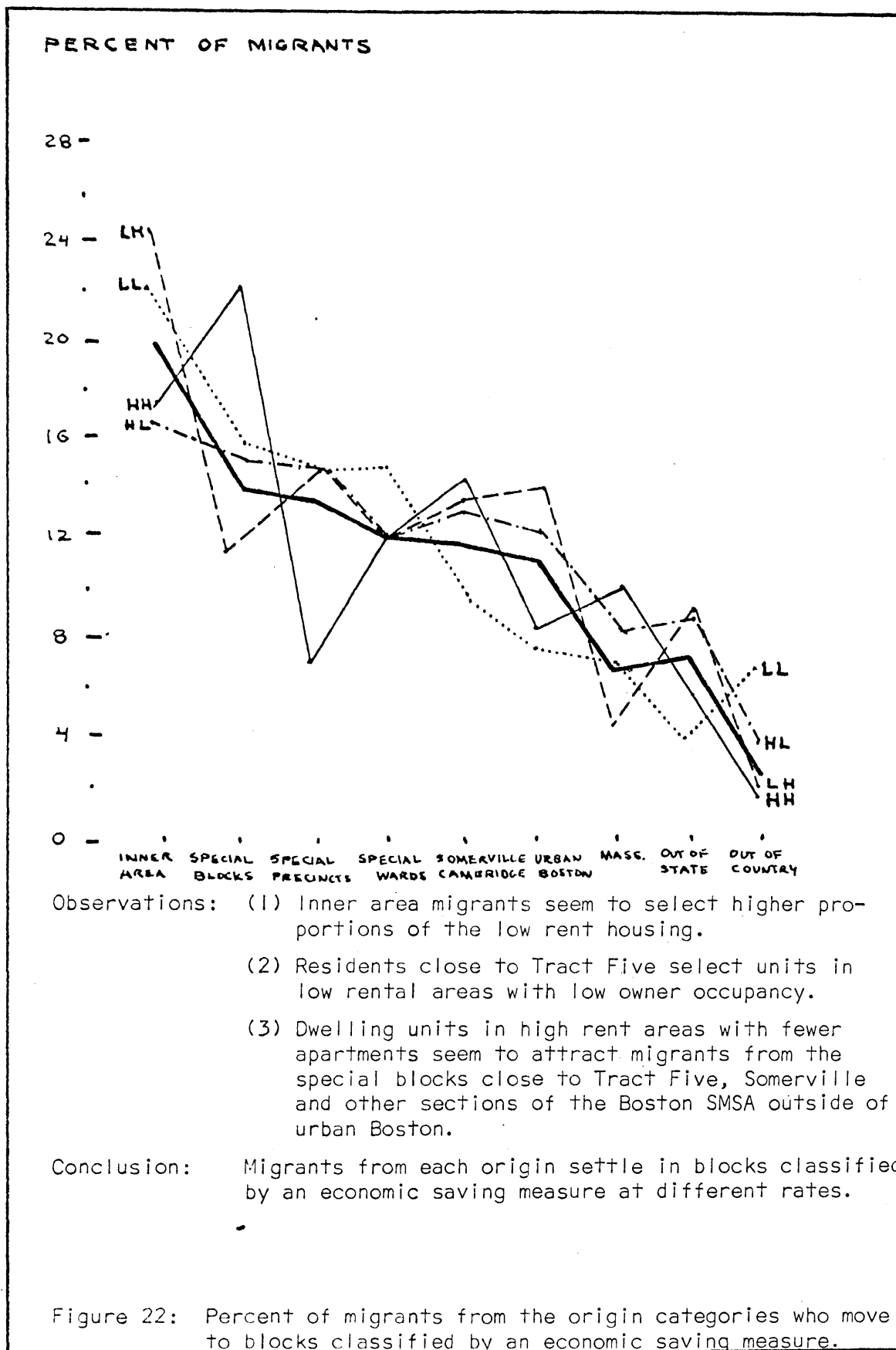


distributions of migrants moving to these areas is significantly different for each group of migrants dependent on where they came from. The distributions are indicated as being significantly different more than 99.95 percent of the time. The difference is not reduced by reconsidering housing areas with any single housing category eliminated from the analysis or with the long and short distance moves eliminated. The association between the areas from which the migrants came and particular types of housing choice, is not restricted to certain types of housing areas or for movers from one or two origin locations, it is significant for almost all migrants moving to any of the housing choices from each of the areas.

This same housing area classification does not seem to have any significant associations with either the migrants from 1960 through 1965 or residents in 1960 when grouped by age, male occupation or female occupation. This fact tends to amplify the importance of the link between areas and housing type. It seems remarkable that even on such a small scale of choice previous location would have a more significant association with housing choice than the personal characteristics of the migrant. This could be due to some inherent one sided fault in the classification scheme. More likely, this association is due to the fact that personal characteristics of the migrant are more clearly associated with particular housing units rather than housing areas, at least in terms of this status measure.

In the case of housing areas classified by the economic saving measure, average contract rent and percentage owner occupied, the findings are similar to housing classified by the social status measure. The association between the places that migrants come from and their housing choice is significant more than 99.95 percent of the time according to this data. No significant





reduction in the Chisquare statistic is achieved by eliminating the short or long distance move, nor is it evident that the elimination of one of the housing areas would significantly reduce this difference. Again, the situation arises where a migrant from a particular origin is more likely to settle in one type of housing area than any other type of housing area.

When the economic saving measure for housing areas is checked against the personal characteristics of the migrants some interesting results arise. For age categories, the data indicates that there is about a fifty percent chance of association for migrants and only about a 2.5 percent chance of association for the residents in 1960. In the case of males classified by occupation an association with housing areas classified by the economic saving measure is significant more than 90 percent of the time. The distribution for female migrants classified by occupation is even higher, above 99 percent. At the same time for 1960 residents an association of only 80 percent of the time is indicated. This data would argue for linking male occupations with areas classified according to an economic measure, indicating a relationship between income and housing choice. In the case of females, however, income characteristics seem less to relate to the type of housing currently occupied than the type of housing a person is moving into.

Migrants Classified by Origin of Move and Personal Characteristics (Age, Male Occupation or Female Occupation)

At least two influences relating to a migrant's personal characteristics help define his pattern of movement. First, it is possible that the location categories have differing proportions of certain categories of migrants living there. For instance, the urban area of Boston obviously would have a greater proportion of middle aged and elderly persons who

might move to Tract Five than the rest of the state. Also, the special wards in Cambridge would probably have a higher proportion of professional or technical workers living there than the rest of the Boston region. The second influence is less direct. It is possible that distance itself is significant for many migrants. For instance, migrants who are elderly are probably less likely to participate in a large area housing market because of a limit of public transportation, a limit in the number of distant social contacts or a fear of change. Evidently both of these influences combine to influence migrants of differing personal characteristics to settle in Tract Five at different rates from each of the origin categories.

When the distributions of migrants by age and origin of move are compared to the total distribution of migrants interesting differences can be seen. The distributions by age categories are significantly different from the overall distribution with a very high degree of certainty, above 99.95 percent of the time. In attempting to find the age grouping which most likely causes the differences, certain age categories were dropped from the analysis and new tests of significance were calculated. By eliminating the 20 to 29 year old group the probability of the distribution approaching independence increases only minutely. After eliminating the 60 and above categories the significance of the difference drops to the 97.5 percent level. Still there is a great deal of variation.

It is impossible to select a single age group that represents the major difference from the overall distribution. While there are certain ages and certain distances which correspond closely to the general distribution there are many exceptions. The bulk of the discrepancies occur in the very short distance and very long distance moves, but still there are

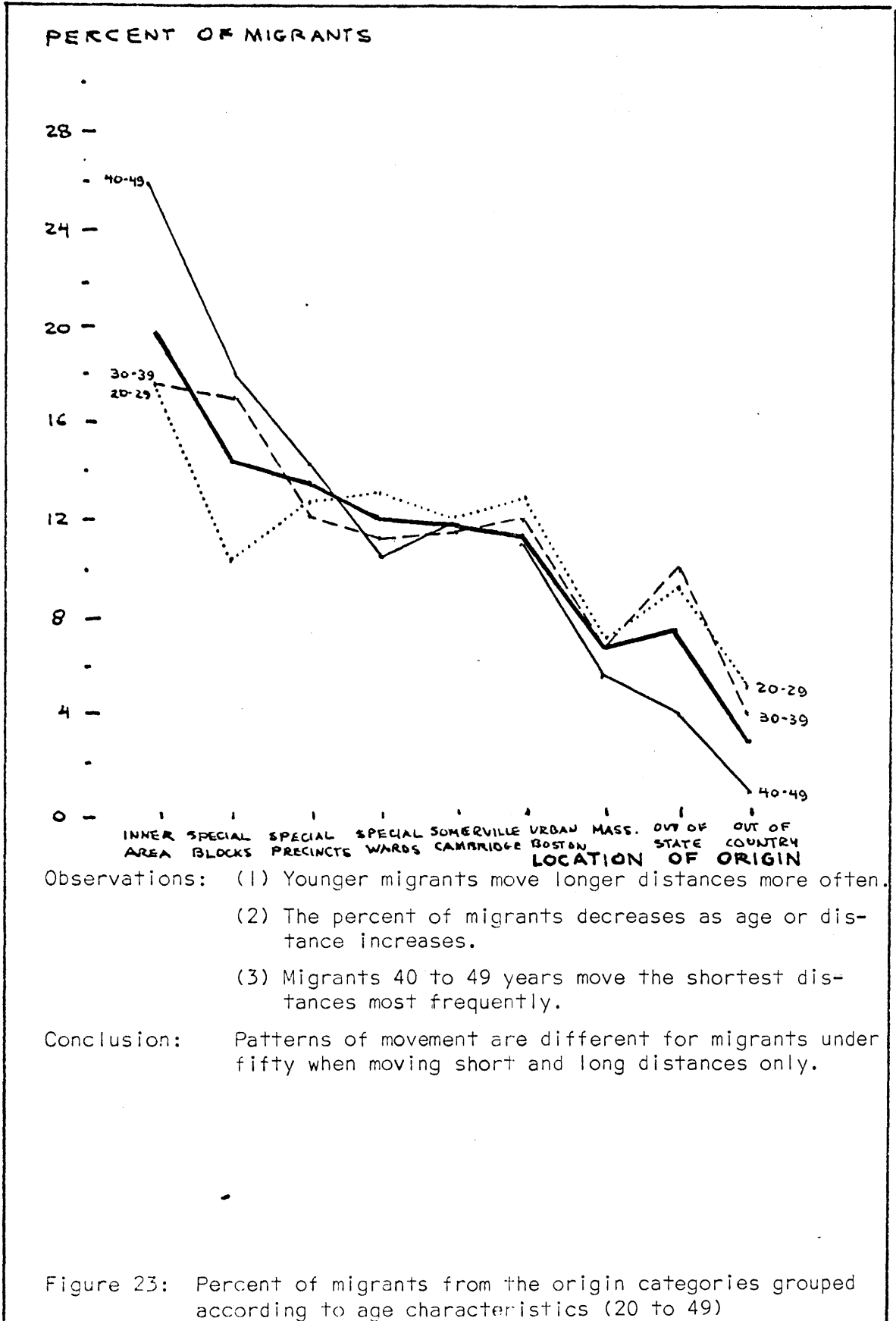
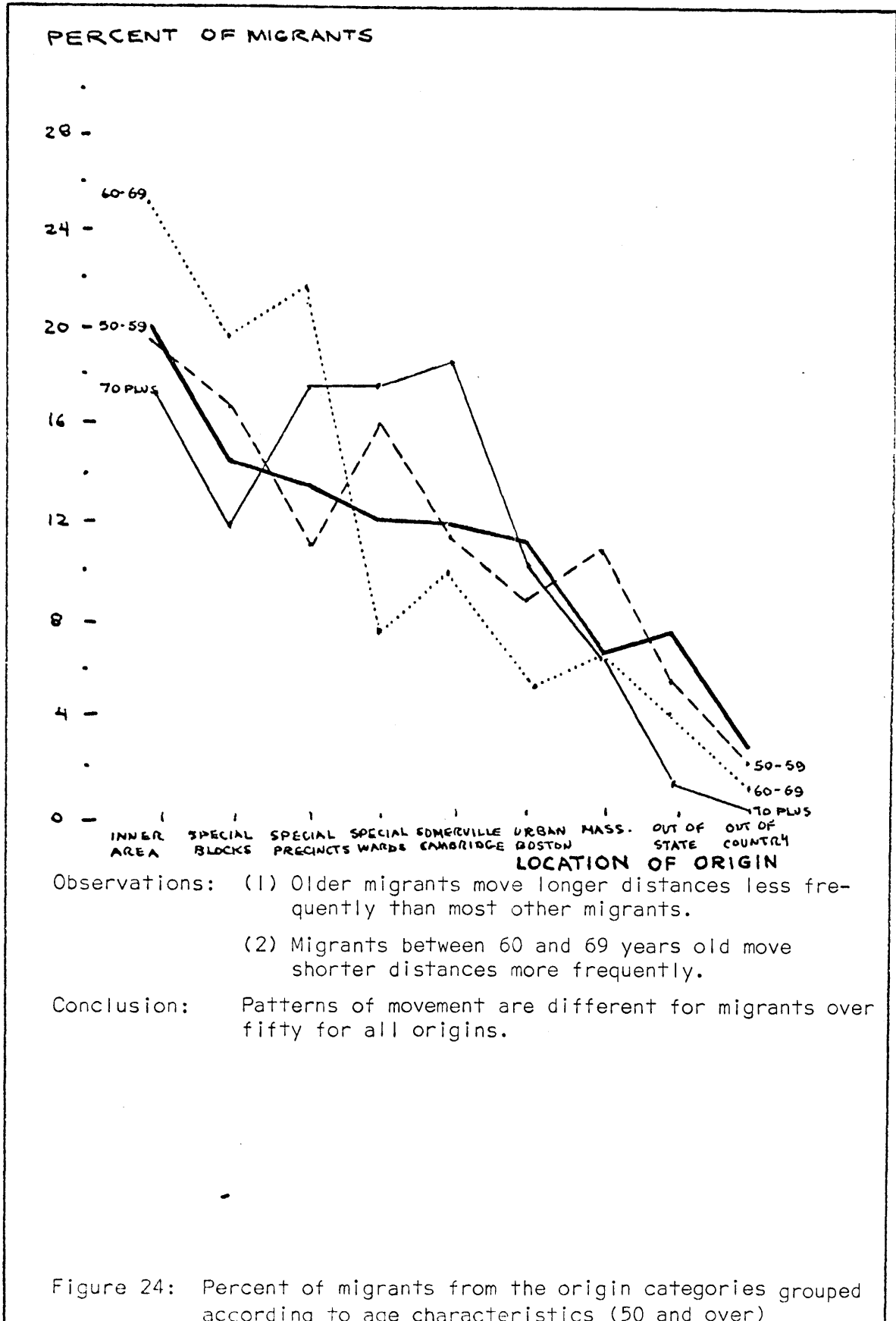


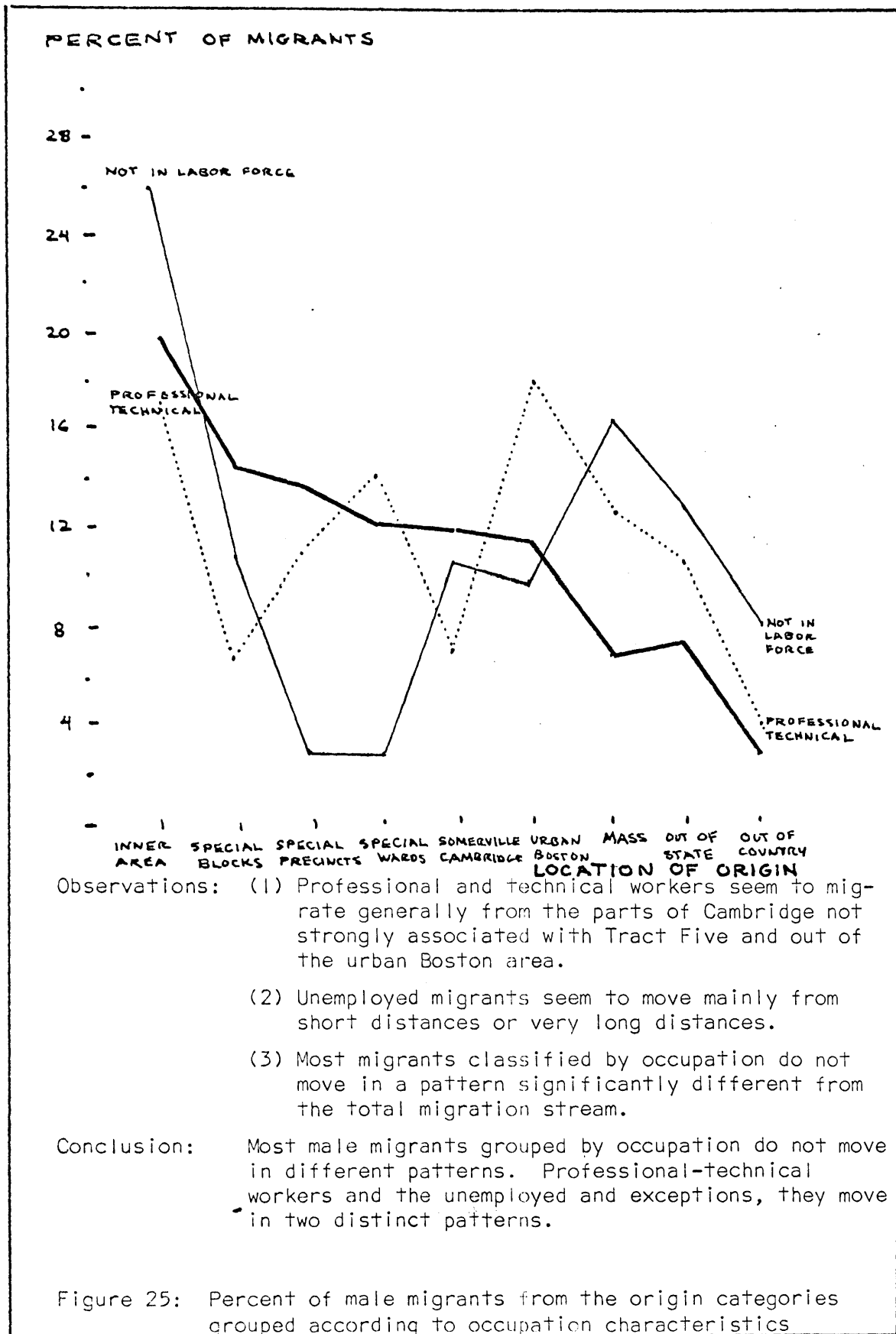
Figure 23: Percent of migrants from the origin categories grouped according to age characteristics (20 to 49)

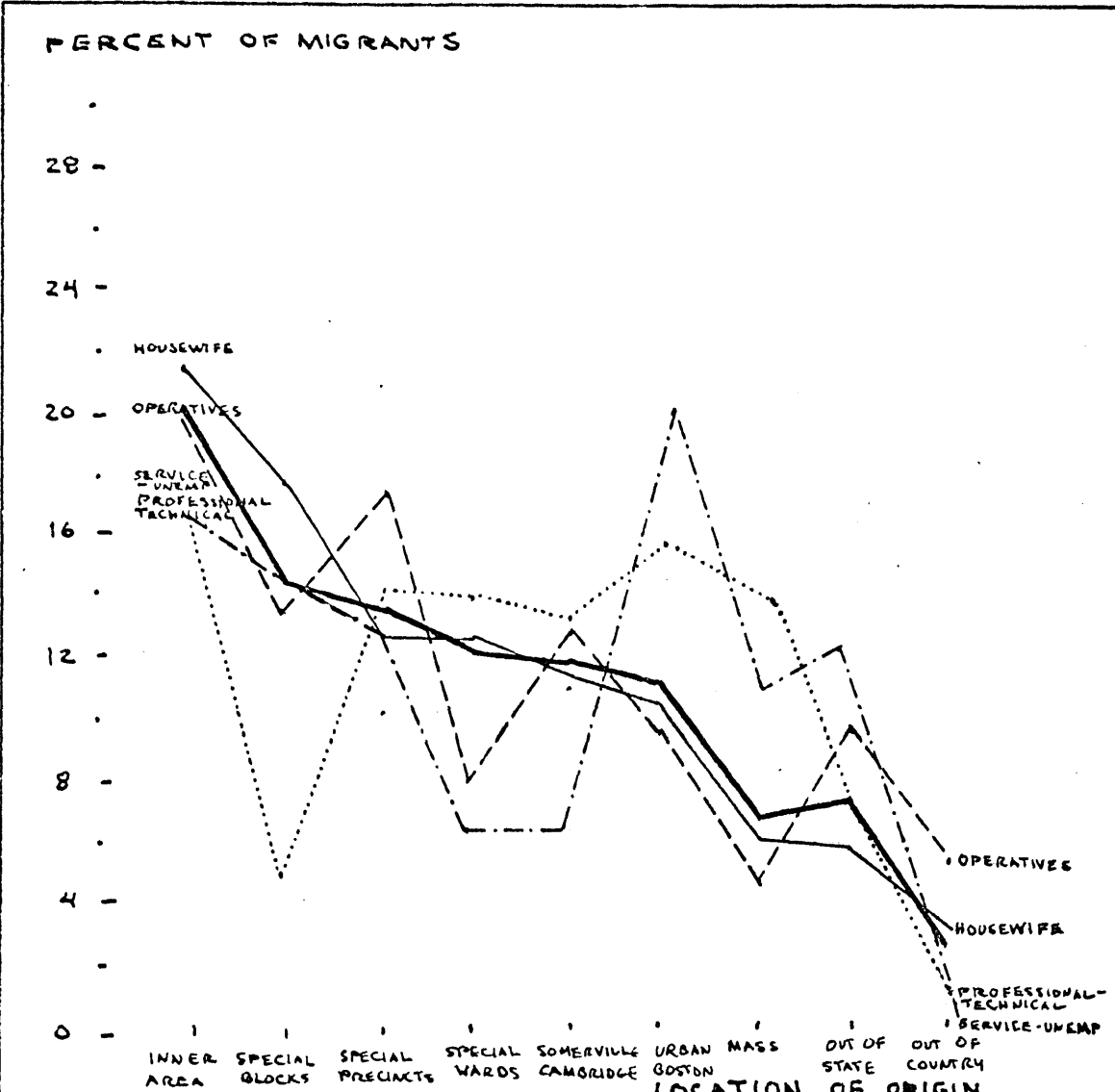


differences in the 50, 60 and 70 age groups for the middle distances also. By eliminating the short distance moves, the long distance moves, and all migrants over 50 years of age, the significance of the difference decreases to below the 30 percent level. Thus, it is possible to associate migrants under fifty with differential movement over the middle distances only 30 percent of the time - with very little assurance of being correct.

When examining male occupation categories with regard to distance the findings are more clear cut. The difference between the distribution of distances by male occupation and the general distance distribution is significant 99 percent of the time as indicated by this data. When those who are not currently in the labor force (unemployed, no answer, students and army) are eliminated from the table, the significant difference goes below 30 percent and when professional and technical workers are eliminated the distributions of distance for the remaining workers are significantly different in only 20 percent of the time which argues strongly against an association for most cases. It is clear that these two groups represent a large part of the difference between distributions. The distributions show a large proportion of those not in the labor force moving either very short or very long distances. They also show professionals as coming from nearby urban areas and other parts of Cambridge. By eliminating the long distance moves at most only a 5 percent change in the significance of the distribution is indicated. This should be expected since great differences among migrants exist in the middle ranges of distance also.

The different movement patterns for migrants classified by female occupation behave more like the pattern for the age groups than like the patterns for male occupations. Each stream of migrants classified by





Observations: (1) Workers seem to move shorter distances or come from nearer locations more frequently than non-workers.

(2) Professional female workers seem to come predominantly from sections of Massachusetts outside of Cambridge.

(3) Non-workers (housewives) seem to move either from areas close to Tract Five or far away from it, but generally not from other parts of Cambridge or Somerville.

Conclusion: Each migration stream of females classified by occupation moves in a different pattern from all other migration streams

Figure 26: Percent of female migrants from the origin categories grouped according to occupation characteristics.

female occupation contributes significantly to the difference indicated in the contingency table. When six categories of female occupation are used the difference is significant more than 99.5 percent of the time. If the occupation categories are combined so that there are only four occupations, grouping professional-technical-sales together and laborer-service-not reporting or unemployed together, the significant variation is greater than 99.9 percent. Moreover, even if one of the four categories is dropped, the significance does not reduce to less than 95 percent. Neither does the elimination of any of the distance categories alter the significance of the difference. Evidently, each place of origin provides an entirely different proportion of female workers and housewives than any other place of origin.

Chapter V

THEORETICAL AND PRACTICAL USE OF MIGRATION DETAIL

Chapter V

THEORETICAL AND PRACTICAL USE OF MIGRATION DETAIL

In many studies it is assumed that migrants behave in the same manner regardless of their age or occupation. In addition it is often assumed that movers are able to plan moves and accept rationally outlined compromises when necessary. There are reasons for believing that there are enough differences among the motivations and experiences of moves that these assumptions do not apply to many movers. This study tries to avoid these types of assumptions by using the detailed data of migration only to show differences in migration behavior, not motivation.

The conclusions of this study can be described in two ways. The theoretical implication of the findings will be presented first. On the one hand, the data can be interpreted as defining areas characterized by high proportions of residents of certain age groups or certain occupation groups which, in turn, are linked to Tract Five by migration streams. On the other hand, the data can be interpreted as defining dominant market areas described by a crude distance measure for certain migrant groups. This chapter will also outline a practical use for this information in current policy - the forced relocation of persons from the proposed Inner Belt route.

Theoretical Implications of Migration Differentials

The fact that certain groups of migrants settle in differing patterns, even when measured for a small area, has important theoretical implications. The implications are twofold but they both are possible and could easily work

together to influence a migrant's behavior. First, the different migration patterns seem to imply linked market areas defined by race, age characteristics or occupation characteristics. In addition, each linked area seems to have differential preferences for housing choices within Tract Five. Secondly, the different migration patterns associated with migrants' personal characteristics imply that the potential market area for older people is more limited in size than the market area for younger persons. The data implies that market areas might also differ for persons characterized by occupation.

Since the distribution of migrants by personal characteristics differs significantly from that of the total distribution, it is possible to conclude that separate areas in the Boston region are more likely than others to originate migrant streams of a specialized nature. The description of such migrant streams is probabilistic and not absolute; therefore, some of the patterns are weaker than others. It is logical to assume that the first conclusion would apply to large areas. For instance, it is well accepted that urban areas produce older migrants than suburban areas and that non-white resident areas are linked to each other by migration streams. This study shows that these links exist even for a small area within what might otherwise be called a specialized neighborhood. In other words, even for a seventeen block area there is enough difference in housing that the specialized migrant streams still can be defined probabilistically.

It is also possible to conclude from this data that persons from certain areas seem to have a differential attraction for particular types of housing. Again the preferences of migrants are not absolute but probabilistic. In this interpretation, the previous examples continue to apply for large areas.

It is logical to assume in many cases that migrants from the suburbs would prefer single family housing and those from the city would prefer apartments. Of course, the exact nature of the preference depends on where the migrant is moving to. It is also possible that migrants from certain sections of the city might have more of an aversion to living in a non-white area than others. But again what is important in this study is that these housing choices can be defined for a small area of seventeen blocks and the differential preferences can still be identified for migrants coming from different sections of the city.

The second type of influence on the migrant pattern is one related to the size of the potential market. Again both the characteristics of the migrants and migrant behavior relate to the market area concepts. The relation of market size to migrants' personal characteristics is easy to explain. Since the origins of the moves are defined in general terms of distance, it is quite possible that certain migrant streams are restricted and influenced by the nearness of a potential alternative housing area. It seems quite reasonable that certain housing markets, regardless of their nature, might be unattractive to many migrants simply because they are too far away. Evidently, young persons and professional-technical workers consider a very large market area when searching for housing. And at the same time, the unemployed are either restricted to considering alternatives close to where they are currently located or far away with the hope of a job offer. Fortunately, the concept of distance can also be related to housing choice in a limited way. It is possible that short distance migrants have much more knowledge about the local housing market and can therefore more frequently select the housing they prefer - either for social status reasons or economic reasons.

Fortunately, the concepts of linked areas and restricted markets are not mutually exclusive. The only theoretical problem that arises is that the areas interconnected by migration streams probably must be defined in terms of distance for certain groups of migrants. This is quite reasonable when the distance modification is dependent on age and occupation. Thus social and economic factors are needed to predict even the distance measures for such a theoretical model. The problem of reconciling the two views might present some difficulty when formulating a simulation model in quantitative terms. But still the importance of being able to extend the standard migration theory to small areas opens up a great deal of potential for such a simulation and the problem of reconciling the interpretation is secondary.

Planning for Forced Migrants in Blocks Threatened by the Inner Belt

The data developed in this study can easily be used to define market areas for forced migrants. Six of the blocks in Tract Five are probably going to be cleared to make way for the Inner Belt. Persons who live in these blocks are, by definition, linked to the Tract Five housing market. If we can assume that these persons will migrate in the same patterns as other migrants linked to the Tract Five housing market then an estimate of probable market demand can be defined.

The assumption that the in migration to Tract Five might also describe the out migration pattern is a major assumption. It is based on the impression that most moves are reactive moves and are seldom planned by migrants. Migrants moving to Tract Five or living in Tract Five are probably not using housing location as stepping stones in social recognition or in the context of incremental planned investment. At least as far as the short range moves are concerned there is no reason to believe that they will be overstated in

this analysis, rather there is reason to believe they might be understated, because many migrants will not retrace their long distance moves which were job connected. On the other hand, the area has not been characterized as one of very high "community attachment" which might alter the migration pattern so that a very large percentage of present residents would remain.

Using the precise data for in migrants to predict the market preferences of forced migrants does not depend on any theoretical interpretation of the data. The use of the data simply implies that the forces which contributed to defining the previous migration will continue to work in the same manner in attracting persons to alternative housing areas. The data for the 1965 residents of the Inner Belt threatened blocks was compiled from the Police Listing in a format compatible with the migration data. By considering the percentage frequency of locating in Tract Five as the probability of moving back to the origin locations, the number of persons by age, sex and occupation who would select specific housing market areas can be estimated.

Information gathered from this analysis can then be used by the planner to estimate the probable amount and type of pressure that the forced migration will release on the remaining area in Tract Five and the surrounding blocks. These figures can also yield some peripheral information which could be important to the planner. This data shows that a large number of the forced migrants are persons who generally do not move often, therefore the problem is simply moving people and not finding adequate alternatives for them. In general though, the method of estimation allows the planner to gain some quantitative impressions which he could not receive in any other way. Using these figures he can attempt to define the scope of the relocation problem, but not a specific solution.

The sample calculations for the Inner Belt are computed in Appendix C. The locations from which the migrants came were collapsed into four categories - the inner area and special blocks, the special wards and precincts, the surrounding urban area of Boston and Somerville, and the area outside of the urban Boston area. Migration was computed for age groups 20 through 39, 40 through 59, and over 60. Within these age groups the male and female occupation groups were used to estimate the probability of settling in a certain area.

APPENDICES

Appendix A

THE URBAN CONTEXT - A PHYSICAL AND SOCIAL DESCRIPTION OF
CENSUS TRACT FIVE AS A MARKET TYPE (1960)

This appendix attempts to provide background information about Census Tract Five. In addition, the information provides a means of assessing the way in which Tract Five is unique or typical of other urban areas in Cambridge or Boston. Using this analysis, a definition of the housing market potential of Tract Five should also be possible. The analysis is done using the 1960 Census of Population and Housing¹ and the Social Characteristics of Cambridge.² Information is presented on the physical characteristics of the area and the social characteristics of the population for 1960. Aspects of both the physical and social environment will be discussed in relation to Cambridge and Boston.

Physical Characteristics of the Area

Census Tract Five is located in Cambridge, a few blocks from the Central Square shopping district.³ It is midway between Harvard and M.I.T. but does not seem strongly related to university activities - either physically or socially. Only a few of the more than 3000 residents of the area work for the universities and students generally do not move into the area. It is a working class community which seems to have stronger ties with the Boston

¹U. S. Department of Commerce, Bureau of the Census, General Characteristics of the Population, by Census Tracts, 1960

²Cambridge Planning Board, Social Characteristics of Cambridge. (Cambridge: City of Cambridge), 1962.

³See Exhibit I: Map of Tract Five and Surrounding Cambridge Area.

metropolitan area than with the functions of the Cambridge universities.

There are three areas in the city of Cambridge with a similar orientation. North Cambridge and East Cambridge are also working class communities which have strong links with other parts of the Boston urban region, the first with Arlington and Medford and the second with Charleston and Somerville. A third area, Riverside, is also similar in orientation but it does not seem strongly linked with any outside areas except perhaps the city of Boston. These three areas in turn seem linked with Census Tract Five by similar physical characteristics and adjacency. Streams of local migration flow within and through these areas with strong emphasis on the latter areas of East Cambridge and Riverside. All of the tracts east of Harvard Square (with the exception of North Cambridge) are very different from Tract Five in most census categories.⁴

Census Tract Five is about two miles from the center of downtown Boston. It is linked with Boston by buses and a main subway line from Central Square. This area of Cambridge seems very much like other areas of similar distance from the Boston Center city, like Charlestown, East Boston, Roxbury and South Boston. Many of the physical features of the areas are similar.

The housing stock, consisting of more than 1000 dwelling units, is typical of much of the Boston area described above. About 33% of the structures are two family or less and another 22% are more than four family. Almost half the housing stock is three or four family wooden buildings, built at high densities. The area has a much larger percentage of these houses than either the rest of Cambridge or Boston. Like many parts of Boston the houses were built in the decades around 1900 and there have been very few additions to the housing stock in the last twenty-five years.

⁴Zisk, Betty. "Report on Poverty in Cambridge" (unpublished research report done for the Joint Center for Urban Studies), 1965, p. 8.

HOUSING TYPE FOR TRACT FIVE, CAMBRIDGE AND BOSTON

	Tract Five	Tract Five Percent	Cambridge	Cambridge Percent	Boston	Boston Percent
1 and 2 family	339	33.0	12,209	35.0	76,266	32.2
3 and 4 family	456	44.5	10,037	28.0	81,556	34.0
More than 4 family	<u>231</u>	<u>22.5</u>	<u>13,061</u>	<u>37.0</u>	<u>81,016</u>	<u>33.8</u>
	1,026	100.0	35,307	100.0	239,838	100.0

Tract Five has a larger percentage of spacious apartments than either Boston or Cambridge. In Tract Five the median number of rooms is 4.8 as against 4.6 and 4.5 in Boston and Cambridge. This can be discounted by the number of small apartments near the Boston core. On the other hand, none of the blocks in Tract Five are characterized by over crowding, except those that contain a convent and large apartment houses. Only 7% of the units in Tract Five have more than one person per room, this is a little more than the Cambridge average of 6.9% but less than the Boston average of 8.0%.

Home ownership in Tract Five is just slightly less than the rest of Cambridge, it is four percent less than that of Boston. There is a very large rental market in all of these areas, but the demand in Cambridge and Tract Five is normally high. The vacancy rate in Boston is 6% against that of 3% in Cambridge and 4% in Tract Five. The rental market in Cambridge is brisk and the median contract rent is \$63.00 versus \$60.00 in Boston. Tract Five, on the other hand, has a median contract rent of only \$47.00. Gross rent figures run \$78, \$79 and \$71 respectively. The split on rentals indicates that many renters supply their own heat to make up the difference in Tract Five. In general this would mean that the area would be attractive to persons with low incomes who would treat heat as a variable.

Tract Five has almost double the percentage of dilapidated housing and deteriorating housing than either the Boston or Cambridge average.

Tract Five has about 9 percent dilapidated housing and 31 percent deteriorating housing. It would seem, though, that parts of the Boston area would be very similar in percentages of sound, deteriorating and dilapidated housing. It is probably just these parts that would resemble Tract Five in physical appearance and age of housing. The percentage of sound units in Tract Five is only 60% versus 80% for Boston and 86% for the rest of Cambridge.

The land use pattern of the area is also typical of many sections of urban Boston. Within the fifty acres of residential land there are a few factories and a dozen or so small stores. The main commercial district, Central Square, is within walking distance of the area, but it has lost much of its financial importance. Little space is devoted to recreation in the area, no more than 2000 square feet in the area, although there is an adjacent play area of more than an acre. The schools in the area are outdated and one is soon to be abandoned. Two small settlement houses are within a dozen blocks of the area, but their facilities are inadequate and their staff is overworked.⁵

Regardless of its physical disadvantages, the housing stock seems to be a scarce commodity in this type of market. There seems to be an increasing demand for the supply of houses in Cambridge, but in addition there continues the usual demand for renters to find urban apartments and investors to find a town close to Boston with a low and steady tax rate. The area is important to investors and homeowners because the housing supply is there. In addition, in the past few years a great demand has existed for these units. The type of demand is outlined in the following sections.

⁵See Exhibit II: Map of Land Use and Community Facilities in Tract Five.

If the future is to be predicted, certain threats to the housing supply in the neighborhood must be outlined. These threats play a major part in affecting the desirability of the area. First is the Inner Belt. In 1948 a route was proposed that would cut through the tract eliminating six of the residential blocks. As of 1966 the Belt is not built nor have the people been forced to move from the blocks slated for razing. The effect of this constant threat is examined in the detailed data. Some other factors like urban renewal on the northern segment of the area and industrial expansion on the eastern sector are important also.

Social Characteristics of the Population

The area has little sense of a social identity that would give rise to an easy description. Socially, as well as physically, it represents a housing market similar to those found in many places throughout the Boston area. The area represents a mixture of housing types, rental levels and a varied ethnic and racial environment for persons with low or moderate income. It clearly belongs to a larger metropolitan market and has little to do with the newly developing technologies or the scientific industrial and governmental expansion in Cambridge - at least up to 1965.

Tract Five has twice the average Cambridge percentage of Negroes and they are concentrated in eight of the twenty blocks. Occupancy by non-whites ranges from five percent to fifty percent of the houses in these blocks. These blocks are not exclusively Negro occupied and there is visible racial intermixture. Tract Five is obviously important to groups whose other alternatives are limited by either racial or financial constraints. The area has a larger percentage of non-whites than the city of Boston as a whole but there are certainly many census tracts in Boston which have a similar percentage of non-whites as Tract Five.

The area does not have an easy ethnic tag for its residents. It contains no dominant ethnic group nor does any single community or religious organization speak for its residents. While it can easily be estimated that most of the residents are Roman Catholic, their ethnic background is very diverse. Ethnic customs influence styles of living more than religion in most cases and this area is probably no exception. The area houses proportionally more Irish and Polish than the rest of Cambridge. In addition there are a larger number of Canadians in the area. Further ethnic information is not available, but it is enough to note that a strong mixture exists throughout the tract.

Family life patterns are not easy to analyze, but some strong factors seem significant. The area shows a higher than average population per household. 3.01 against 2.80 for Cambridge and 2.93 for Boston. This is caused by many factors - high proportion of aged or very young living in family households. This measure is increased by the lower number of single persons living in institutional or group quarters. The intensity of this pattern is also not offset by the large number of divorced females or large percentage of single persons, so it has greater significance. This pattern is probably similar to many tracts in Boston where a large percentage of residents are family oriented.

In general, the age distribution in Tract Five is close to that of the age distribution in Boston. There seems to be a large number of children and older people settled in the area with a slightly sparser population in the mid twenties and early thirties. This is to be expected in almost any urban area. The comparisons of profiles with Boston shows the proportions in each age group for the tract not significantly different from the city proportions.⁶

⁶See Exhibit III: Age Profile Comparisons.

There seems little in the age distribution or the family composition figures which indicate the extent to which the area generates individuals with social problems. The area contains a significant share of the city's welfare cases, truancy and delinquency. However, the residents do use the social agencies that are available to help them.⁷ Even so, most of the residents are poorly educated and poorly prepared for the technical advances of the next decade. The area residents have only a median of 10.2 school years completed while the cities of Boston and Cambridge have medians of 11.2 and 12.0

While the future of jobs and prosperity may not look too promising for this group, their present standard of living is not as bad as one might expect. The area is one of stable working class households. Most of the residents are working in unskilled or semiskilled jobs and have incomes between \$4000.00 and \$8000.00 per year. There is a great deal of homogeneity of income and occupation in the area, more so than either Boston or Cambridge.

The income level in Tract Five is slightly lower than the rest of Cambridge unless unrelated individuals are included. In this latter case, the income level is slightly higher than the Cambridge mean because of the large number of students as unrelated individuals. The median income in Boston for families is only \$25.00 more per year. The distribution of income is also very similar in the Boston distribution - with the exception of the high incomes (over \$15,000) which are not frequent in Tract Five.⁸ Income

⁷Cambridge Planning Board, Social Characteristics, op. cit.

⁸See Exhibit IV: Income Profile Comparison

comparisons indicate an important aspect of the working class nature of the area but it also shows the number of people with either present or potential financial problems since their incomes are less than \$3000.00.

The impressions gained by an examination of the income profile of the area are reinforced by the occupational structure.⁹ Tract Five lacks professional and managerial residents. At the same time it has only an average amount of laborers. As a result there is a greater proportion of operatives and service workers in the area than would be expected from the Cambridge proportions. The distribution of jobs seems to correspond in proportion with the Boston figures which again seems to stress the urban quality of the area.

⁹See Exhibit V: Occupation Profile Comparison.

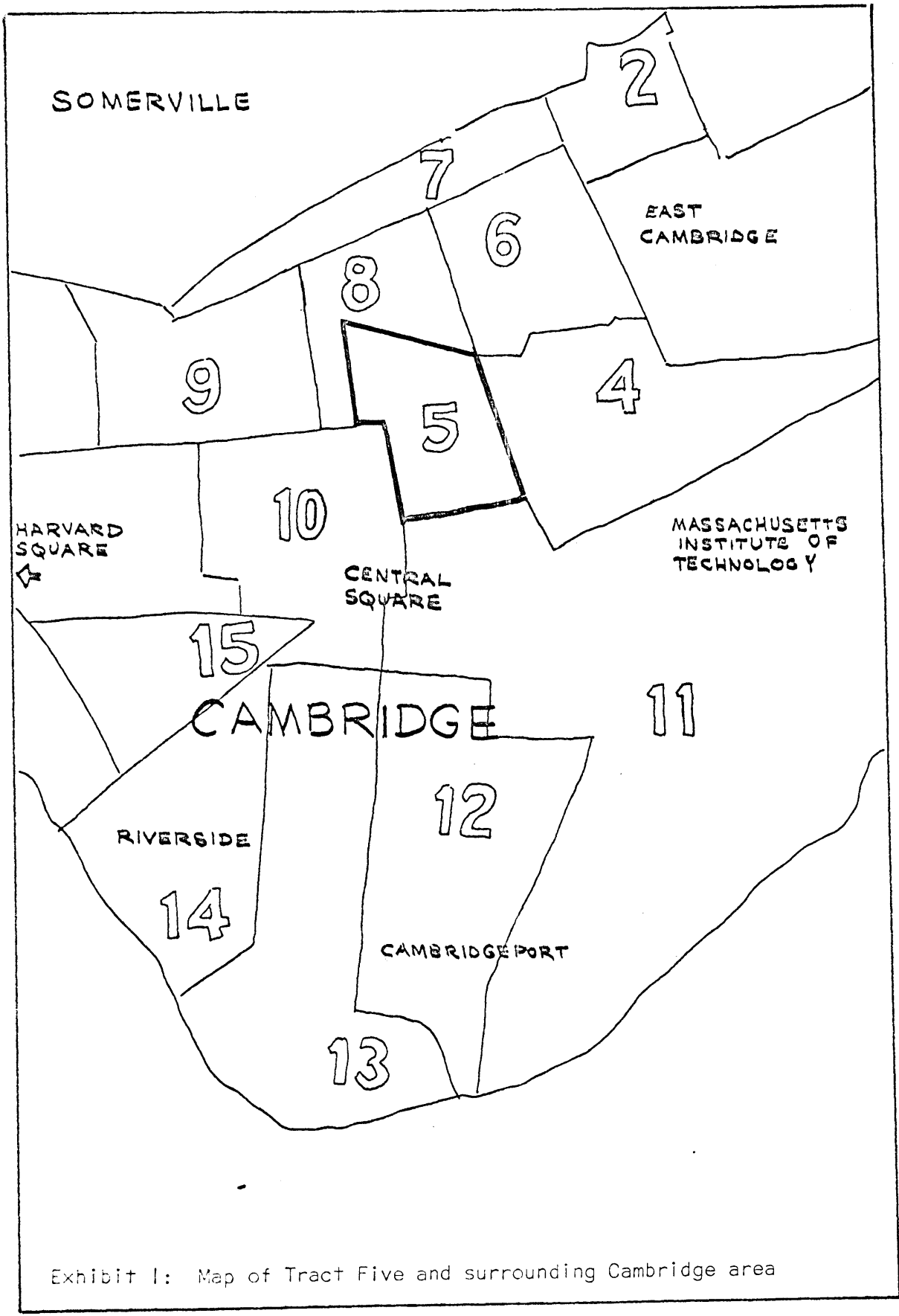


Exhibit I: Map of Tract Five and surrounding Cambridge area

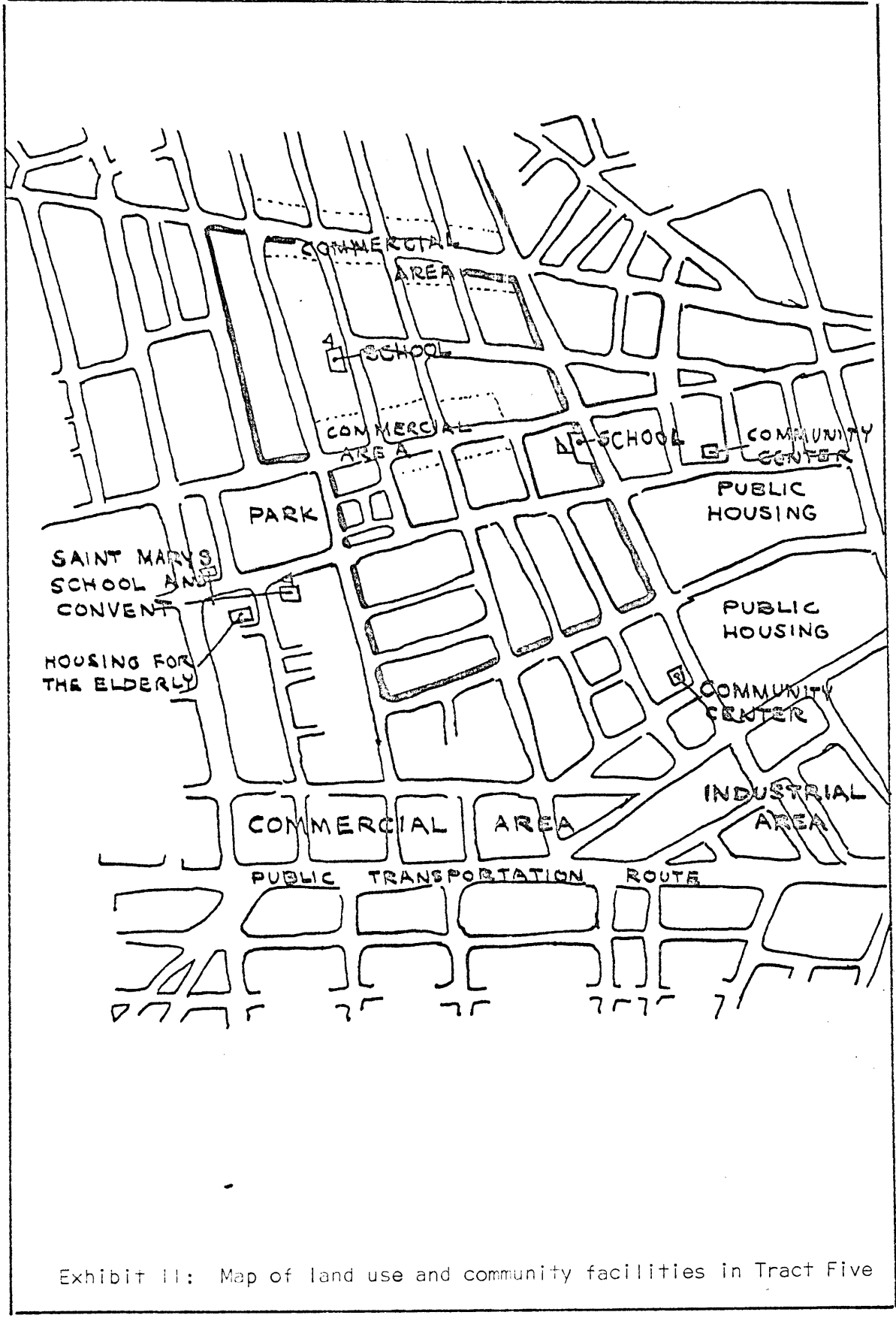


Exhibit II: Map of land use and community facilities in Tract Five

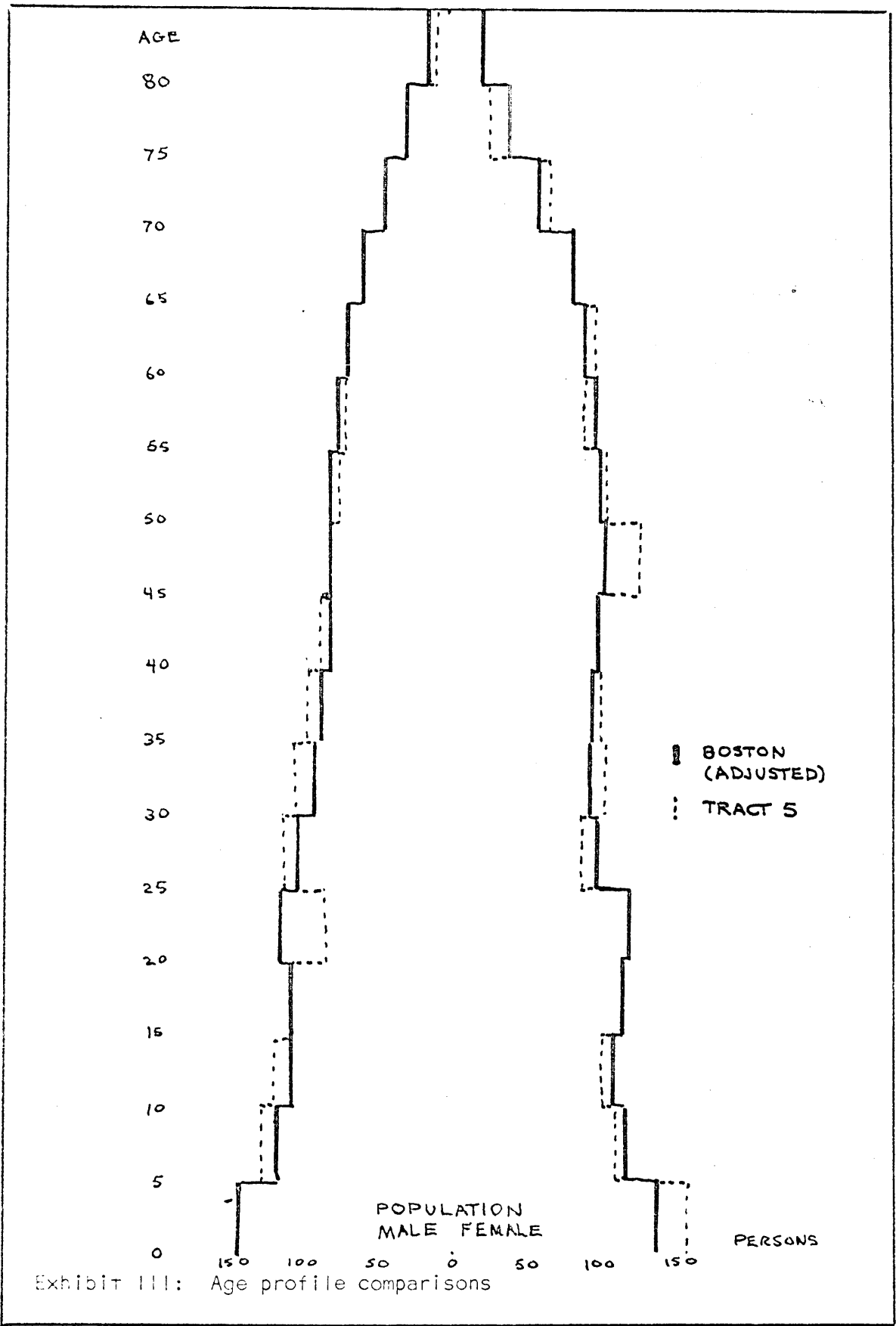
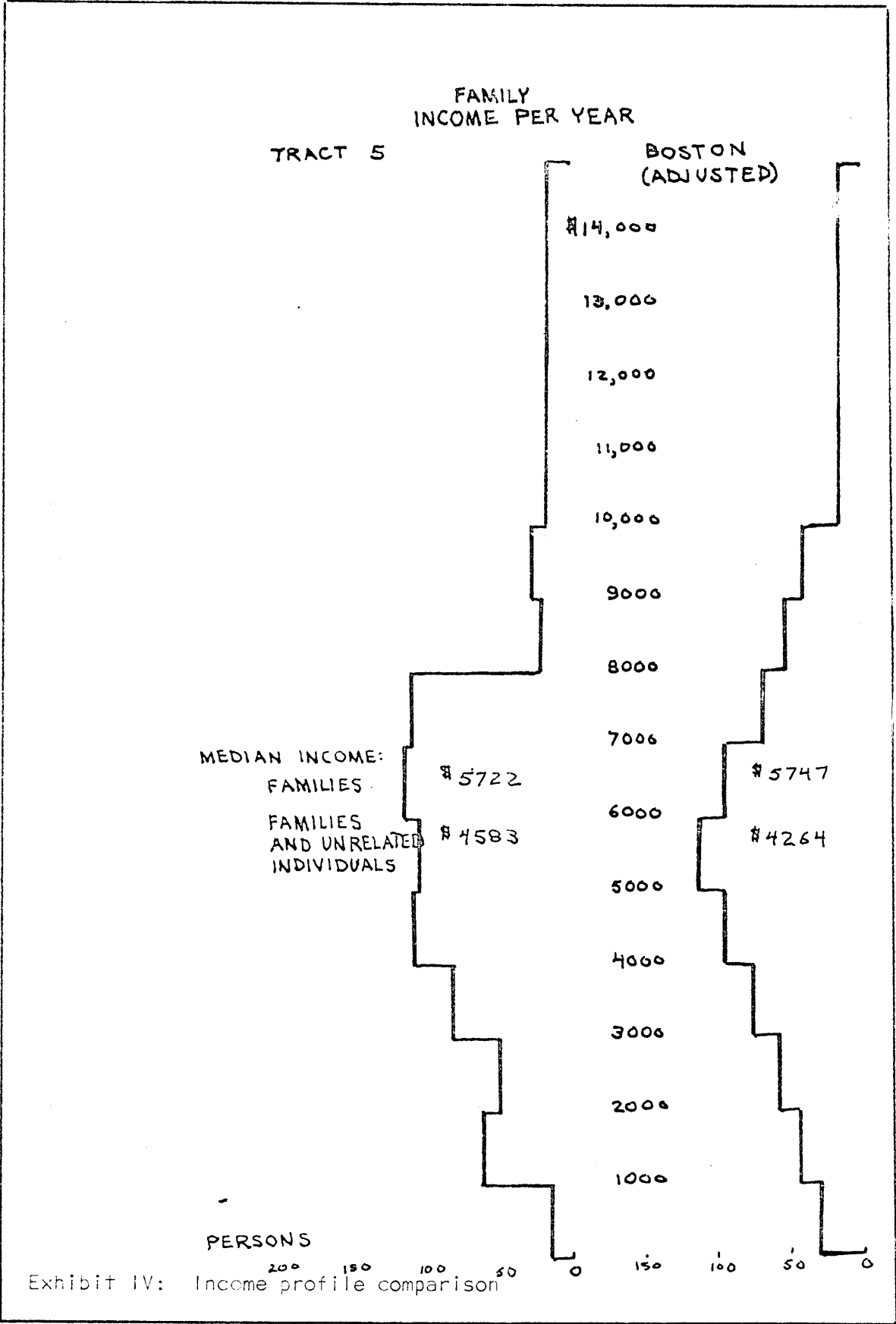
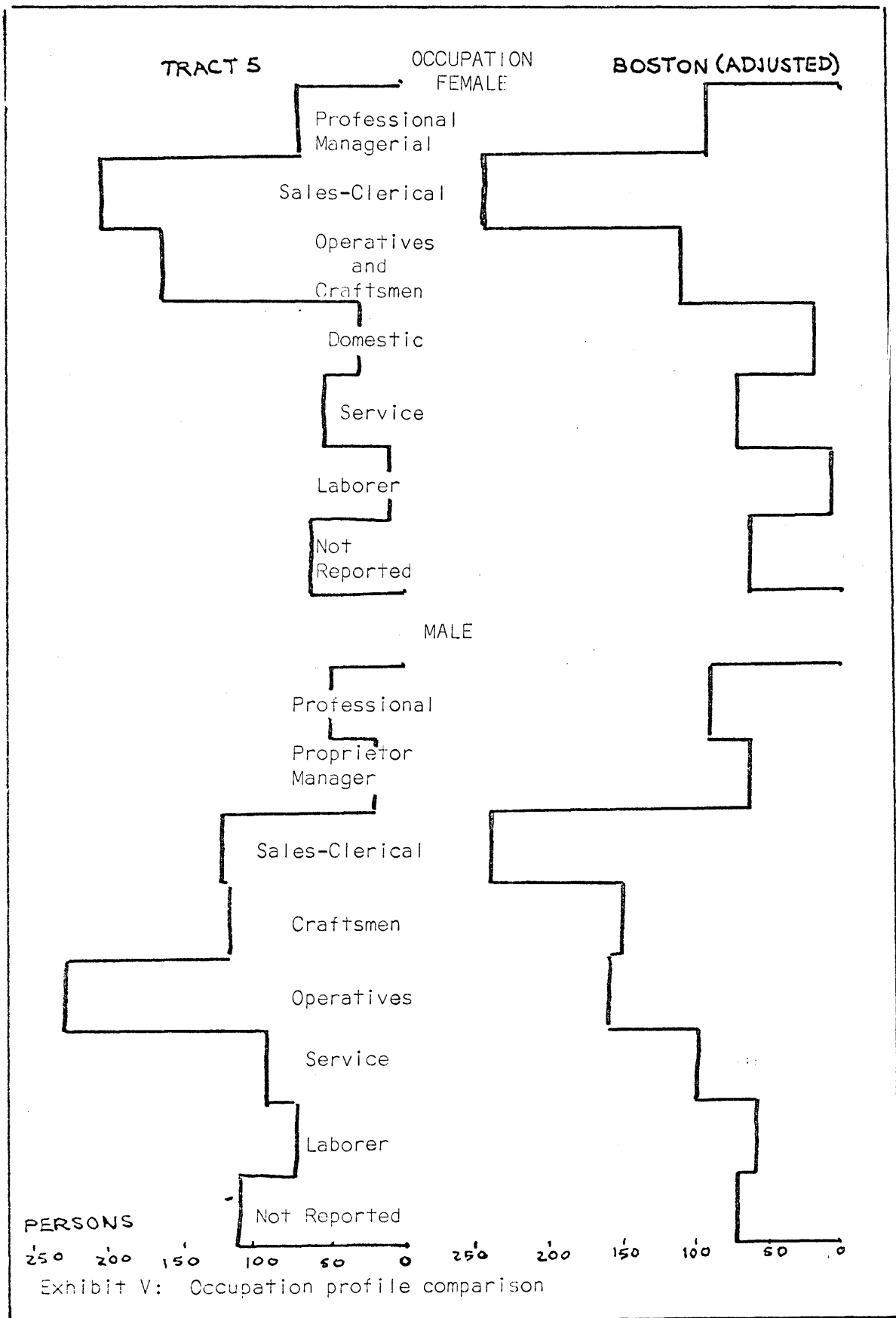


Exhibit III: Age profile comparisons





Appendix B

CONTINGENCY TABLES FOR DETAILED MIGRATION ANALYSIS

- A. Housing Choice or Behavior of the Migrants
 - 1. Racial occupancy
 - a. Racial occupancy by distance
 - b. Racial occupancy by age
 - c. Racial occupancy by male occupation
 - d. Racial occupancy by female occupation
 - 2. Inner Belt effect
 - a. Inner Belt effect by distance
 - b. Inner Belt effect by age
 - c. Inner Belt effect by male occupation
 - d. Inner Belt effect by female occupation
 - 3. Social status measure - racial occupancy and condition
 - a. Social status measure by distance
 - b. Social status measure by age
 - c. Social status measure by male occupation
 - d. Social status measure by female occupation
 - 4. Economic saving measure - rent and owner occupancy
 - a. Economic saving measure by distance
 - b. Economic saving measure by age
 - c. Economic saving measure by male occupation
 - d. Economic saving measure by female occupation
- B. Personal Characteristics of the Migrants
 - 1. Age
 - a. Age by distance
 - b. Age below 50 by middle distance moves
 - 2. Male occupation
 - a. Male occupation by distance
 - b. Male occupation (eliminate professionals and persons not currently working) by distance
 - 3. Female occupation
 - a. Female-occupation by distance
 - b. Regrouped female occupation by distance.

DECK

CONTINGENCY TABLE NO. 8

VAR 40 RACE

	HI W	LO W	TOTAL
IA	20.4	18.9	(19.7)
	175	134	309
SA	17.3	11.1	(14.5)
	148	79	227
SP PRE	11.9	15.6	(13.6)
	102	111	213
SP WDS	12.8	11.1	(12.1)
	110	79	189
C-SOM- OK	11.2	12.7	(11.9)
	96	90	186
BOS-0	9.0	13.9	(11.2)
	77	99	176
M DIST	7.9	5.5	(6.8)
	68	39	107
OS	6.1	8.9	(7.3)
	52	63	115
OC	3.4	2.3	(2.9)
	29	16	45

VAR 2
DISTANCE1

TOTAL 857 710 1567
PERCENT (54.7) (45.3) (100.0)

CHISQUARE STATISTIC = 33.999 WITH 8 DEGREES OF FREEDOM
(99.95 < P_n)

DECK

CONTINGENCY TABLE NO. 2

VAR 40 RACE

	HI W	LO W	TOTAL
20-29	35.7	36.3	(36.0)
	306	258	564
30-39	25.0	24.2	(24.6)
	214	172	386
40-49	20.3	18.2	(19.3)
	174	129	303
50-59	10.3	9.2	(9.8)
	88	65	153
60-69	5.7	7.5	(6.5)
	49	53	102
70 AND OVER	3.0	4.6	(3.8)
	26	33	59
TOTAL	857	710	1567
PERCENT	(54.7)	(45.3)	(100.0)

VAR 16
AGE BY 10 YRS

CHISQUARE STATISTIC = 6.046 WITH 5 DEGREES OF FREEDOM
(60.0 < P_n < 70.0)

DECK

CONTINGENCY TABLE NO. 3

		VAR 40 RACE		
		HI W	LO W	TOTAL
PROF-TECH	I	9.6	10.6	(10.1)
	I			
	I	40	36	76
MGR-PROP	I	3.1	2.3	(2.8)
	I			
	I	13	8	21
CLERK-SALES	I	10.6	7.9	(9.4)
	I			
	I	44	27	71
CFTS	I	12.5	12.0	(12.3)
	I			
	I	52	41	93
OPER	I	20.7	21.1	(20.9)
	I			
	I	86	72	158
SERV	I	11.6	12.3	(11.9)
	I			
	I	48	42	90
LABOR	I	17.3	18.2	(17.7)
	I			
	I	72	62	134
NOT IN LF	I	10.4	8.8	(9.7)
	I			
	I	43	30	73
RET	I	4.1	6.7	(5.3)
	I			
	I	17	23	40
TOTAL		415	341	756
PERCENT		(54.9)	(45.1)	(100.0)

VAR 23
4 OCC1

CHISQUARE STATISTIC = 5.181 WITH 8 DEGREES OF FREEDOM
(10.8 < P_n < 20.0)

DECK

CONTINGENCY TABLE NO. 4

VAR 40 RACE

	HI W	LO W	TOTAL
PRO-TF	4.3	4.9	(4.6)
C-M	19	18	37
CLER-S	12.2	10.3	(11.3)
ALE	54	38	92
OPER-C	13.3	15.2	(14.2)
FT	59	56	115
LAB-SF	4.8	8.1	(6.3)
RVE	21	30	51
NON L	1.1	3.0	(2.0)
F	5	11	16
RET-HS	64.3	58.5	(61.7)
WF	284	216	500
TOTAL	442	369	811
PERCENT	(54.5)	(45.5)	(100.0)

VAR 28
F OCC1

CHISQUARE STATISTIC = 9.480 WITH 5 DEGREES OF FREEDOM
(90.0 < Pn < 95.0)
NO. OF MISSING UNITS = 756

DECK

CONTINGENCY TABLE NO. 5

VAR 47 INNER BELT EFFECT

	BELT R T	NON RE LT	TOTAL
IA	I 15.2	I 21.9	I (19.7)
	I	I	I
	I 76	I 233	I 309
	I-----I	I-----I	I-----I
SA	I 13.6	I 14.9	I (14.5)
	I	I	I
	I 68	I 159	I 227
	I-----I	I-----I	I-----I
SP PRE	I 16.4	I 12.3	I (13.6)
	I	I	I
	I 82	I 131	I 213
	I-----I	I-----I	I-----I
SP WDS	I 15.0	I 10.7	I (12.1)
	I	I	I
	I 75	I 114	I 189
	I-----I	I-----I	I-----I
C-SDM- OK	I 12.6	I 11.5	I (11.9)
	I	I	I
	I 63	I 123	I 186
	I-----I	I-----I	I-----I
BCS-O	I 9.2	I 12.2	I (11.2)
	I	I	I
	I 46	I 130	I 176
	I-----I	I-----I	I-----I
M DIST	I 5.0	I 7.7	I (6.8)
	I	I	I
	I 25	I 82	I 107
	I-----I	I-----I	I-----I
OS	I 8.6	I 6.8	I (7.3)
	I	I	I
	I 43	I 72	I 115
	I-----I	I-----I	I-----I
OC	I 4.6	I 2.1	I (2.9)
	I	I	I
	I 23	I 22	I 45
	I-----I	I-----I	I-----I

VAR 2
DISTANCE1

TOTAL 501 1066 1567
PERCENT (32.0) (68.0) (100.0)

CHISQUARE STATISTIC = 33.332 WITH 8 DEGREES OF FREEDOM
(99.96 < P_n)

DECK

CONTINGENCY TABLE NO. 6

VAR 47 INNER BELT EFFECT

	BELT R T	NON BE LT	TOTAL
20-29	36.3	35.8	(36.0)
	182	382	564
30-39	22.2	25.8	(24.6)
	111	275	386
40-49	19.4	19.3	(19.3)
	97	206	303
50-59	10.2	9.6	(9.8)
	51	102	153
60-69	8.6	5.5	(6.5)
	43	59	102
70 AND OVER	3.4	3.9	(3.8)
	17	42	59
TOTAL	501	1066	1567
PERCENT	(32.0)	(68.0)	(100.0)

VAR 16
AGE BY 10 YRS

CHISQUARE STATISTIC = 7.124 WITH 5 DEGREES OF FREEDOM
(70.0 < P_n < 80.0)

DECK

CONTINGENCY TABLE NO. 7

VAR 47 INNER BELT EFFECT

	BELT R T	NON BE LT	TOTAL
PROF-T ECH	8.5	10.8	(10.1)
	21	55	76
MGR-PR OP	2.4	2.9	(2.8)
	6	15	21
CLERK- SALES	6.5	10.8	(9.4)
	16	55	71
CFTS	14.6	11.2	(12.3)
	36	57	93
OPER	19.5	21.6	(20.9)
	48	110	158
SERV	14.6	10.6	(11.9)
	36	54	90
LABOR	17.5	17.3	(17.7)
	43	91	134
NCT IN LF	10.2	9.4	(9.7)
	25	48	73
RET	6.1	4.9	(5.3)
	15	25	40
TOTAL	246	510	756
PERCENT	(32.5)	(67.5)	(100.0)

VAR 23
M OCC1

CHISQUARE STATISTIC = 9.010 WITH 8 DEGREES OF FREEDOM
(60.0 < P_n < 70.0)

DECK

CONTINGENCY TABLE NO. 8

VAR 47 INNER BELT EFFECT

	BELT R T	NON PE LT	TOTAL
PRO-TF	5.9	4.0	4.6
C-M	15	22	37
CLER-S	9.0	12.4	11.3
ALE	23	69	92
OPER-C	16.5	13.1	14.2
FI	42	73	115
LAB-SE	6.7	6.1	6.3
RVE	17	34	51
NON L	3.1	1.4	2.0
WF	8	8	16
RET-HS	58.8	62.9	61.7
WF	150	350	500
TOTAL	255	556	811
PERCENT	(31.4)	(68.6)	(100.0)

VAR 28
F OCC1

CHISQUARE STATISTIC = 7.692 WITH 5 DEGREES OF FREEDOM
(20.0 < P < 90.0)
NO. OF MISSING UNITS = 756

DECK

CONTINGENCY TABLE NO. 9

VAR 37 SSI-WHITE, COND

VAR 2
DISTANCE1

	HH	HL	LH	LL	TOTAL
IA	19.5 29.2	23.9 17.5	26.5 18.1	15.6 25.2	(19.7)
	121	54	56	78	309
SA	18.6 51.1	13.6 14.1	4.3 4.0	14.0 30.8	(14.5)
	116	32	9	70	227
SP PRE	7.6 28.2	17.9 19.7	10.9 10.8	17.6 41.3	(13.6)
	60	42	23	88	213
SP WCS	13.5 44.4	11.1 13.8	15.2 16.9	9.4 24.9	(12.1)
	84	26	32	47	189
G-SCM- CW	11.4 38.2	10.6 13.4	15.2 17.2	11.6 31.2	(11.9)
	71	25	32	58	186
BOS-C	9.6 34.1	7.2 9.7	15.2 18.2	13.4 38.1	(11.2)
	60	17	32	67	176
M DIST	9.3 54.2	4.3 9.3	2.8 5.6	6.6 30.8	(6.8)
	58	10	6	33	107
CS	6.3 33.9	5.5 11.3	8.5 15.7	9.0 39.1	(7.3)
	39	13	18	45	115
CC	2.1 29.9	6.8 35.6	1.4 6.7	2.6 28.9	(2.9)
	13	16	3	13	45
TOTAL	622	235	211	499	1567
PERCENT	(39.7)	(15.0)	(13.5)	(31.8)	(100.0)

CHISQUARE STATISTIC = 101.668 WITH 24 D.F.
(99.95 < P_n)

DECK

CONTINGENCY TABLE NO. 10

VAR 16 AGE BY 10 YRS

	20-29	30-39	40-49	50-59	60-69	70 AND OVER	TOTAL
HH	39.0	41.2	40.3	42.5	34.3	35.6	39.7
	220	159	122	65	35	21	622
HL	15.2	14.2	17.2	15.0	13.7	8.5	15.0
	86	55	52	23	14	5	235
LH	13.1	12.2	14.2	15.7	12.7	16.9	13.5
	74	47	43	24	13	10	211
LL	32.6	32.4	28.4	26.8	39.2	39.0	31.8
	184	125	86	41	40	23	499
TOTAL	564	386	303	153	102	59	1567
PERCENT	(36.0)	(24.6)	(19.3)	(9.8)	(6.5)	(3.8)	(100.0)

VAR 37
SS1-WHITE,COND

CHISQUARE STATISTIC = 11.470 WITH 15 DEGREES OF FREEDOM
MIGRANTS (20.0 < P_n < 30.0)

CHISQUARE STATISTIC = 11.208 WITH 15 DEGREES OF FREEDOM
STATIC (1960) (20.0 < P_n < 30.0)
RESIDENTS

DECK

15 MARCH 1960

CONTINGENCY TABLE NO. 11

VAR 23 M OCC1

	PROF-T ECH	MGR-PR OP	CLERK- SALES	CFTS	OPER	SERV	LABOR	NOT IN LF	RET	TOTAL
HH	38.2	47.6	47.9	44.1	36.7	41.1	40.3	37.0	27.5	(39.8)
	29	10	34	41	58	37	54	27	11	301
HL	14.5	14.3	14.1	11.8	17.7	12.2	13.4	21.9	15.0	(15.1)
	11	3	10	11	28	11	18	16	6	114
LH	19.7	19.0	14.1	12.9	11.4	12.2	14.9	6.8	10.0	(13.1)
	15	4	10	12	18	11	20	5	4	99
LL	27.6	19.0	23.9	31.2	34.2	34.4	31.3	34.2	47.5	(32.0)
	21	4	17	29	54	31	42	25	19	242
TOTAL	76	21	71	93	158	90	134	73	40	756
PERCENT	(10.1)	(2.8)	(9.4)	(12.3)	(20.9)	(11.9)	(17.7)	(9.7)	(5.3)	(100.0)

VAR 31
SSI-WHITE, COND

CHISQUARE STATISTIC = 21.456 WITH 24 DEGREES OF FREEDOM
MIGRANTS (30.0 < P_n < 40.0)
NO. OF MISSING UNITS = 811

CHISQUARE STATISTIC = 23.124 WITH 24 DEGREES OF FREEDOM
STATIC (1960) (40.0 < P_n < 50.0)
RESIDENTS

DECK

CONTINGENCY TABLE NO. 12

VAR 28 F OCC1

	PRO-TE C-M	CLER-S ALE	OPER-C FT	LAB-SE RVE	NON L F	RET-HS WF	TOTAL
HH	32.4	38.0	35.7	29.4	25.0	42.8	39.6
	12	35	41	15	4	214	321
HL	18.9	20.7	15.7	11.8	6.2	14.0	14.9
	7	19	18	6	1	70	121
LH	18.9	16.3	14.8	17.6	18.7	12.2	13.8
	7	15	17	9	3	61	112
LL	29.7	25.0	33.9	41.2	50.0	31.0	31.7
	11	23	39	21	8	155	257
TOTAL	37	92	115	51	16	500	811
PERCENT	(4.6)	(11.3)	(14.2)	(6.3)	(2.0)	(61.7)	(100.0)

VAR 37
SS1-WHITE,COND

CHISQUARE STATISTIC = 16.073 WITH 15 DEGREES OF FREEDOM
MIGRANTS (60.0 < P_n < 70.0)
NO. OF MISSING UNITS = 756
CHISQUARE STATISTIC = 15.953 WITH 15 DEGREES OF FREEDOM
RESIDENTS (60.0 < P_n < 70.0)

DECK

CONTINGENCY TABLE NO. 13

VAR 34 EC1-RENT, DICC

VAR 2
DISTANCE1

	LL	LM	FL	HM	TOTAL
IA	22.7	22.8	16.3	18.3	19.7
	22.3	36.2	30.4	11.0	
	69	112	94	34	309
SA	15.9	18.9	15.0	22.6	14.5
	22.0	21.6	37.9	18.5	
	50	49	86	42	227
SP PRL	14.3	14.4	14.3	8.1	13.6
	21.1	33.3	30.5	7.0	
	45	71	82	15	213
SP WCS	14.3	11.0	11.5	11.3	12.1
	23.8	30.2	34.9	11.1	
	45	57	66	21	189
C-SCM-CW	8.3	12.8	12.5	13.4	11.9
	14.0	32.9	38.7	13.4	
	26	63	72	25	186
BCS-C	8.0	13.6	11.5	9.7	11.2
	14.2	38.1	37.5	10.2	
	25	67	66	18	176
M DIST	7.0	4.3	8.0	9.7	6.8
	20.6	19.6	43.0	16.8	
	22	21	46	18	107
CS	4.1	8.9	8.2	5.9	7.3
	11.3	38.3	40.9	9.6	
	13	44	47	11	115
CC	6.1	1.0	2.8	1.1	2.9
	42.2	17.8	35.6	4.4	
	19	8	16	2	45
TOTAL	314	492	575	186	1567
PERCENT	(20.0)	(31.4)	(36.7)	(11.9)	(100.0)

CHISQUARE STATISTIC = 70.342 WITH 24 D.F.
(99.95 < P_n)

DECK

CONTINGENCY TABLE NO. 14

VAR 16 AGE BY 10 YRS

	20-29	30-39	40-49	50-59	60-69	70 AND OVER	TOTAL
LL	20.4	20.5	19.8	20.3	18.6	16.9	20.0
	115	79	60	31	19	10	314
LH	32.8	29.8	32.7	27.5	29.4	35.6	31.4
	185	115	99	42	30	21	492
HL	34.8	38.3	35.0	40.5	39.2	39.0	36.7
	196	148	106	62	40	23	575
HH	12.1	11.4	12.5	11.8	12.7	8.5	11.9
	68	44	38	18	13	5	186
TOTAL	564	386	303	153	102	59	1567
PERCENT	(36.0)	(24.6)	(19.3)	(9.8)	(6.5)	(3.8)	(100.0)

VAR 38
EC1-RENT.OOCC

CHISQUARE STATISTIC = 5.334 WITH 15 DEGREES OF FREEDOM
MIGRANTS (1 < P_n < 2.5)
CHISQUARE STATISTIC = 13.738 WITH 15 DEGREES OF FREEDOM
STATIC (1960) RESIDENTS (40.0 < P_n < 50.0)

DECK

15 MARCH 1966

CONTINGENCY TABLE NO. 15

VAR 23 M OCC1

	PROF-T ECH	MGR-PR OP	CLERK- SALES	CFTS	OPER	SERV	LABOR	NOT IN LF	RET	TOTAL
LL	13.2	4.8	23.9	21.5	17.7	24.4	21.6	23.3	10.0	(19.6)
	10	1	17	20	28	22	29	17	4	148
LH	32.9	47.6	31.0	32.3	28.5	27.8	37.3	24.7	25.0	(31.1)
	25	10	22	30	45	25	50	18	10	235
HL	35.5	19.0	35.2	33.3	43.7	35.6	29.1	41.1	57.5	(37.0)
	27	4	25	31	69	32	39	30	23	280
HH	18.4	28.6	9.9	12.9	10.1	12.2	11.9	11.0	7.5	(12.3)
	14	6	7	12	16	11	16	8	3	93
TOTAL	76	21	71	93	158	90	134	73	40	756
PERCENT	(10.1)	(2.8)	(9.4)	(12.3)	(20.9)	(11.9)	(17.7)	(9.7)	(5.3)	(100.0)

CHISQUARE STATISTIC * 34.645 WITH 24 DEGREES OF FREEDOM
 MIGRANTS (90.0 < P_n < 95.0)
 NO. OF MISSING UNITS * 811
 CHISQUARE STATISTIC : 34.948 WITH 24 DEGREES OF FREEDOM
 (90.0 < P_n < 95.0)

DECK

CONTINGENCY TABLE NO. 16

VAR 28 F OCC1

	PRO-TE C-M	CLER-S ALE	OPER-C FT	LAB-SE RVE	NON L F	RET-HS WF	TOTAL
LL	18.9	8.7	21.7	19.6	18.7	22.6	(20.5)
	7	8	25	10	3	113	166
LH	29.7	22.8	33.0	43.1	25.0	32.2	(31.7)
	11	21	38	22	4	161	257
HL	48.6	47.8	33.9	33.3	50.0	33.8	(36.4)
	18	44	39	17	8	169	295
HH	2.7	20.7	11.3	3.9	6.2	11.4	(11.5)
	1	19	13	2	1	57	93

VAR 38
EC1-RENT.OOCC

TOTAL 37 92 115 51 16 500 811
PERCENT (4.6) (11.3) (14.2) (6.3) (2.0) (61.7) (100.0)

CHISQUARE STATISTIC = 31.345 WITH 15 DEGREES OF FREEDOM
MIGRANTS (99.0 < P_n < 99.5)
NO. OF MISSING UNITS = 756
CHISQUARE STATISTIC = 17.827 WITH 15 DEGREES OF FREEDOM
(70.0 < P_n < 80.0)

DECK

CONTINGENCY TABLE NO. 17

VAR 16 AGE BY 10 YRS

	20-29	30-39	40-49	50-59	60-69	70 AND OVER	TOTAL
IA	17.4	17.4	25.7	19.6	25.5	16.9	19.7
	98	67	78	30	26	10	309
SA	10.1	16.8	17.5	16.3	19.6	11.9	14.5
	57	65	53	25	20	7	227
SP PRE	13.5	11.7	14.5	10.5	21.6	16.9	13.6
	76	45	44	16	22	10	213
SP WDS	13.8	10.4	9.6	15.7	7.8	16.9	12.1
	78	40	29	24	8	10	189
C-SOM-DW	11.7	11.7	11.9	11.8	9.8	18.6	11.9
	66	45	36	18	10	11	186
BOS-D	13.1	11.9	10.6	8.5	4.9	10.2	11.2
	74	46	32	13	5	6	176
M DIST	6.7	7.0	5.3	10.5	5.9	6.8	6.8
	38	27	16	16	6	4	107
OS	9.2	9.8	4.0	5.2	3.9	1.7	7.3
	52	38	12	8	4	1	115
DC	4.4	3.4	1.0	2.0	1.0		2.9
	25	13	3	3	1		45
TOTAL	564	386	303	153	102	59	1567
PERCENT	(36.0)	(24.6)	(19.3)	(9.8)	(6.5)	(3.8)	(100.0)

VAR 2
DISTANCE1

CHISQUARE STATISTIC = 81.171 WITH 40 DEGREES OF FREEDOM (99.95 < P_n)

DECK

CONTINGENCY TABLE NO. 18

VAR 50 SF AGE 10 YRS

	20-29	30-39	40-49	TOTAL
SP-PRE	22.9	22.2	28.0	(23.8)
	76	45	44	165
SP WDS	23.5	19.7	18.5	(21.2)
	78	40	29	147
C-SCM- OW	19.9	22.2	22.9	(21.2)
	66	45	36	147
BCS	22.3	22.7	20.4	(22.0)
	74	46	32	152
MDIST	11.4	13.3	10.2	(11.7)
	38	27	16	81
TOTAL	332	203	157	692
PERCENT	(48.0)	(29.3)	(22.7)	(100.0)

VAR 45
DIST MOD 3

CHISQUARE STATISTIC = 4.693 WITH 8 DEGREES OF FREEDOM
(20.0 < P_n < 30.0)

NO. OF MISSING UNITS = 875

DECK

15 MARCH

CONTINGENCY TABLE NO. 19

VAR 34 M OCC1

	PROF-T ECH	MGR-PR OP	CLERK- SALES	CFTS	OPER	SERV	LABOR	NOT IN LF	RET	TOTAL
IA	17.1	19.0	21.1	22.6	19.0	17.8	17.9	26.0	12.5	119.4
	13	4	15	21	30	16	24	19	5	147
SA	6.6	23.8	15.5	11.8	17.1	15.6	15.7	9.6	17.5	114.3
	5	5	11	11	27	14	21	7	7	108
SP PRE	10.5	14.3	11.3	11.8	14.6	17.8	14.2	2.7	17.5	112.8
	8	3	8	11	23	16	19	2	7	97
SP WCS	14.5	9.5	15.5	20.4	11.4	11.1	13.4	2.7	17.5	113.0
	11	2	11	19	18	10	18	2	7	98
C-SOM- OW	6.6	19.0	14.1	9.7	10.8	16.7	12.7	11.0	22.5	112.4
	5	4	10	9	17	15	17	8	9	94
BOS-0	18.4	9.5	8.5	9.7	6.3	12.2	15.7	9.6	7.5	111.0
	14	2	6	9	10	11	21	7	3	83
OS	13.2		4.2	4.3	8.9	6.7	5.2	16.4	5.0	77.7
	10		3	4	14	6	7	12	2	58
M DIST	10.5	4.8	5.6	6.5	7.6	2.2	3.7	13.7		66.3
	8	1	4	6	12	2	5	10		48
OC	2.6		4.2	3.2	4.4		1.5	8.2		30.0
	.2		3	3	7		2	6		23
TOTAL	76	21	71	93	158	90	134	73	40	756
PERCENT	(10.1)	(2.8)	(9.4)	(12.3)	(20.9)	(11.9)	(17.7)	(9.7)	(5.3)	(100.0)

VAR 11
DISTANCE1

CHISQUARE STATISTIC = 96.736 WITH 64 DEGREES OF FREEDOM
(99.0 < Pn < 99.5)

DECK

15 MARCH

CONTINGENCY TABLE NO. 2D

VAR 36 M UCC3

	MGR-PR OP	CL-SAL	CFTS	OPER	SERV	LABOR	RET	TOTAL
IA	19.0	21.1	22.6	19.0	17.8	17.9	12.5	10.91
	4	15	21	30	16	24	5	115
SA	23.8	15.5	11.8	17.1	15.6	15.7	17.5	15.8
	5	11	11	27	14	21	7	96
SP PRE	14.3	11.3	11.8	14.6	17.8	14.2	17.5	14.3
	3	8	11	23	16	19	7	97
SP WDS	9.5	15.5	20.4	11.4	11.1	13.4	17.5	14.0
	2	11	19	18	10	18	7	85
C-SOP- DW	19.0	14.1	9.7	10.8	16.7	12.7	22.5	13.3
	4	10	9	17	15	17	9	81
BOS-O	9.5	8.5	9.7	6.3	12.2	15.7	7.5	10.2
	2	6	9	10	11	21	3	62
OS		4.2	4.3	8.9	6.7	5.2	5.0	5.9
		3	4	14	6	7	2	36
M DIST	4.8	5.6	6.5	7.6	2.2	3.7		4.9
	1	4	6	12	2	5		30
OC		4.2	3.2	4.4		1.5		2.5
		3	3	7		2		15
TOTAL	21	71	93	158	90	134	40	607
PERCENT	(3.5)	(11.7)	(15.3)	(26.0)	(14.8)	(22.1)	(6.6)	(100.0)

VAR 11
DISTANCE1

CHISQUARE STATISTIC = 42.154 WITH 48 DEGREES OF FREEDOM
(20.0 < P_n < 30.0)

DECK

CONTINGENCY TABLE NO. 21

VAR 39 F OCC1

	PRO-TE C-M	CLER-S ALE	OPER-C FT	LAB-SE RVE	NON L F	RET-HS WF	TOTAL
IA	18.9	15.2	20.9	13.7	25.0	21.2	(20.0)
	7	14	24	7	4	106	162
		6.5	13.0	15.7	12.5	17.6	(14.7)
		6	15	8	2	88	119
SA	10.8	15.2	18.3	15.7	6.2	13.6	(14.3)
	4	14	21	8	1	68	116
SP PRE	21.6	13.9	7.8	7.8		12.0	(11.2)
	8	10	9	4		60	91
SP WDS	13.5	13.0	13.0	5.9	6.2	11.2	(11.3)
	5	12	15	3	1	56	92
C-SOM- OW	18.9	15.2	8.7	19.6	25.0	9.6	(11.5)
	7	14	10	10	4	48	93
BOS-O	5.4	7.6	9.6	7.8	25.0	5.8	(7.0)
	2	7	11	4	4	29	57
OS	8.1	16.3	4.3	13.7		5.8	(7.3)
	3	15	5	7		29	59
M DIST	2.7		4.3			3.2	(2.7)
	1		5			16	22
OC							
TOTAL	37	92	115	51	16	500	811
PERCENT	(4.6)	(11.3)	(14.2)	(6.3)	(2.0)	(61.7)	(100.0)

VAR 11
DISTANCE1

CHISQUARE STATISTIC = 71.412 WITH 40 DEGREES OF FREEDOM
(99.5' < P_n < 99.9)

DECK

CONTINGENCY TABLE NO. 22

VAR 55 SP FEM CCC

	PRC CL ER	CPER	SER NL F	FSWF	TOTAL
IA	16.3	20.9	16.4	21.2	20.0
	21	24	11	106	162
SA	4.7	13.0	14.9	17.6	14.7
	6	15	10	88	119
SP PRF	14.0	18.3	13.4	13.6	14.3
	18	21	9	68	116
SP WDS	14.0	7.8	6.0	12.0	11.2
	18	9	4	60	91
C-SCM- OW	13.2	13.0	6.0	11.2	11.3
	17	15	4	56	92
BCS-0	16.3	8.7	20.9	9.6	11.9
	21	10	14	48	93
M DIST	14.0	4.3	10.4	5.8	7.3
	18	5	7	29	56
OS	7.0	9.6	11.9	5.8	7.0
	9	11	8	29	57
OC	0.8	4.3		3.2	2.7
	1	5		16	22
TOTAL	129	115	67	500	811
PERCENT	(15.9)	(14.2)	(8.3)	(61.7)	(100.0)

VAR 2
DISTANCE 1

CHISQUARE STATISTIC = 52.889 WITH 24 DEGREES OF FREEDOM
(99.9 < Pn < 99.95)

Appendix C

MARKET AREA ESTIMATES FOR RESIDENTS
FORCED TO MOVE BY THE INNER BELT

A. Male Migrants

1. Age (20-39) by occupation by distance
2. Age (40-59) by occupation by distance
3. Age (over 60) by occupation by distance

B. Female Migrants

1. Age (20-39) by occupation by distance
2. Age (40-59) by occupation by distance
3. Age (over 60) by occupation by distance

C. Estimated Market Pressure

1. Male residents (1965) age by occupation by distance
2. Female residents (1965) age by occupation by distance

DECK

15 MARCH 1966

CELL PERCENT BASED ON COLUMN SUM

CONTINGENCY TABLE NO. 4

SUB-TABLE OF UNITS WITH

20-39 CN VAR 19

AGE BY LIFE CYCLE

VAR 22 P OCC1

VAR 4
DISTANCE?

	PROF-T ECH	MGR-PR OP	CLERK- SALES	CFTS	OPER	SERV	LABOR	NOT IN LF	RET	TOTAL	PERCENT
IA+SA	20.8	33.3	28.0	35.6	30.3	38.2	22.8	29.5		140	29.1
	11	4	14	21	30	21	21	18			
	22.6	25.0	28.0	32.2	31.3	23.6	31.5	6.6			
SP WDS-PRF	12	3	14	19	31	13	29	4		125	26.0
	26.4	33.3	26.0	23.7	14.1	29.1	31.5	21.3			
	14	4	13	14	14	16	29	13			
SUR A	30.2	8.3	18.0	8.5	24.2	9.1	14.1	42.6		99	20.6
	16	1	9	5	24	5	13	26			
	TOTAL	53	12	50	59	99	55	92	61		
PERCENT	11.0	2.5	10.4	12.3	20.6	11.4	19.1	12.7			

CHISQUARE STATISTIC = 52.934 WITH 24 DEGREES OF FREEDOM

DECK

15 MARCH 1966

CELL PERCENT BASED ON COLUMN SUM

CONTINGENCY TABLE NO. 4

SUB-TABLE OF UNITS WITH 40-59 CN VAR 19 AGE BY LIFE CYCLE

VAR 22 M OCC1

	PROF-T ECH	MGR-PR OP	CLERK- SALES	CFTS	OPER	SERV	LABOR	NOT IN LF	RET	TOTAL	PERCENT
	26.3	57.1	58.8	27.6	48.9	26.7	52.9	66.7			
IA+SA											
	5	4	10	8	23	8	18	6		82	41.6
	31.6	28.6	23.5	34.5	12.8	30.0	20.6		60.0		
SP WDS-PRE											
	6	2	4	10	6	9	7		3	47	23.9
	26.3	14.3	11.8	13.8	25.5	33.3	23.5	22.2	40.0		
SUR A											
	5	1	2	4	12	10	8	2	2	46	23.4
	15.8		5.9	24.1	12.8	10.0	2.9	11.1			
DIST											
	3		1	7	6	3	1	1		22	11.2
TOTAL	19	7	17	29	47	30	34	9	5	197	
PERCENT	9.6	3.6	8.6	14.7	23.9	15.2	17.3	4.6	2.5		100.0

CHISQUARE STATISTIC = 33.710 WITH 24 DEGREES OF FREEDOM

DECK

15 MARCH 1966

CELL PERCENT BASED ON COLUMN SUM

CONTINGENCY TABLE NO. 4

SUB-TABLE OF UNITS WITH 60 PLUS CN VAR 19 AGE BY LIFE CYCLE

VAR 22 M CCC1

	PROF-T FCH	MGR-PR CP	CLERK- SALES	CFIS	OPER	SERV	LABOR	NOT IN LF	RET	TOTAL	PERCENT
	50.0	50.0	50.0	60.0	33.3	20.0	75.0	66.7	34.3		
IA+SA	2	1	2	3	4	1	6	2	12	33	42.3
	25.0		25.0	20.0	33.3	80.0	12.5		31.4		
SP WDS-PRF	1		1	1	4	4	1		11	23	29.5
		50.0	25.0		8.3		12.5		28.6		
SUR A			1	1	1		1		10	14	17.9
	25.0			20.0	25.0			33.3	5.7		
DIST	1			1	2			1	2	8	10.3
TOTAL	4	2	4	5	12	5	8	3	35	78	
PERCENT	5.1	2.6	5.1	6.4	15.4	6.4	10.3	3.8	44.9		100.0

CHISQUARE STATISTIC = 26.518 WITH 24 DEGREES OF FREEDOM

NO. OF MISSING UNITS = 811 (FOR TABLE NO. 4)

CROSSTABS PRINT PHASE END

DECK

CELL PERCENT BASED ON COLUMN SUM

CONTINGENCY TABLE NO. 2

SUB-TABLE OF UNITS WITH

20-39 CN VAR 19

AGE BY LIFE CYCLE

VAR 55 SP FEM CCC

	PRC CLER	OPFR	SER NLF	HSWF	TOTAL	PERCENT
	17.6	26.2	30.6	36.6		
IA+SA	15	16	11	105	147	31.3
	27.1	24.6	19.4	24.0		
SP WDS-PRE	23	15	7	69	114	24.3
	29.4	29.5	22.2	22.0		
SUR A	25	18	8	63	114	24.3
	25.9	19.7	27.8	17.4		
DIST	22	12	10	50	94	20.0
TOTAL	85	61	36	287	469	
PERCENT	18.1	13.0	7.7	61.2		100.0

CHISQUARE STATISTIC = 14.563 WITH 9 DEGREES OF FREEDOM

DECK

CELL PERCENT BASED ON COLUMN SUM

CONTINGENCY TABLE NO. 2

SUB-TABLE OF UNITS WITH

40-59 CN VAR 19

AGE BY LIFE CYCLE

VAR 55 SP FEM OCC

	PRC CLER	OPER	SER MLF	FSWF	TOTAL	PERCENT
	26.8	44.9	34.6	43.4		
IA+SA	11	22	9	62	104	40.2
SP WJS-PRE	29.3	24.5	15.4	26.6		
VAR 4 DISTANCE2	12	12	4	38	66	25.5
SUR A	29.3	12.2	34.6	18.2		
	12	6	9	26	53	20.5
DIST	14.6	18.4	15.4	11.9		
	6	9	4	17	36	13.9
TOTAL	41	49	26	143	259	
PERCENT	15.8	18.9	10.0	55.2		100.0

CHISQUARE STATISTIC = 11.264 WITH 9 DEGREES OF FREEDOM

DECK

CELL PERCENT BASED ON COLUMN SUM

CONTINGENCY TABLE NO. 2

SUB-TABLE OF UNITS WITH 60 PLUS CN VAR 19 AGE BY LIFE CYCLE

VAR 55 SP FEM CCC

	PRC CLER	OPER	SER ALF	ISWF	TOTAL	PERCENT
	33.3	20.0	20.0	38.6		
IA+SA	1	1	1	27	30	36.1
	33.3	60.0	40.0	30.0		
SP WDS-PRE	1	3	2	21	27	32.5
	33.3	20.0	20.0	21.4		
SUR A	1	1	1	15	18	21.7
			20.0	10.0		
DIST			1	7	8	9.6
TOTAL	3	5	5	70	83	
PERCENT	3.6	6.0	6.0	84.3		100.0

CHISQUARE STATISTIC = 3.766 WITH 9 DEGREES OF FREEDOM

NO. OF MISSING UNITS = 756 (FOR TABLE NO. 2)

MALE RESIDENCE (1965): AGE BY OCCUPATION BY DISTANCE

Group I: 20-39

	PROF TECH	MGR	CLER SALES	CFTS	OPER	SERV	LABOR	NLF	RET	
IA+SA	2	3	3	6	2	6	5	3		30
SD WDS-PRE	3	2	3	5	2	3	6	1		25
SUR A	3	3	2	4	1	4	6	3		27
DIST	3		1	1	2	1	3	5		16
Total Residents	11	8	9	15	7	14	20	15	0	

Group II: 40-59

IA+SA	1	3	7	6	2	2	14	5		40
SD WDS-PRE	2	2	3	7	1	2	5			22
SUR A	1	1	1	3	1	3	6	2		18
DIST	1		1	5	1	1	1	1		11
Total Residents	5	6	12	21	5	8	26	8	0	

Group III: 60 Plus

IA+SA	4	2	4	7	1	2	15	1	3	39
SD WDS-PRE	2		2	2	1	7	3		3	20
SUR A		1	1				3		3	8
DIST	2			2						4
Total Residents	8	3	7	11	2	9	21	1	9	

Summary Table
Forced Migrants: Age by Distance (Market Pressure)

	20-39	40-59	60 Plus	Total
IA+SA	30	40	39	109
DS WDS-PRE	25	22	20	67
SUR A	20	18	8	46
DIST	16	11	4	31

FEMALE RESIDENCE (1965): AGE BY OCCUPATION BY DISTANCE

Group I: 20-39

	PRO CLER	OPER	SER NLF	HSWF	
IA+SA	7	4	1	22	32
SP WDS-PRE	11	3		14	28
SUR A	12	4		13	29
DIST	11	3	1	11	26
Total Residents	41	14	2	60	

Group II: 40-49

IA+SA	6	11	2	34	53
SP WDS-PRE	6	6	1	22	35
SUR A	6	3	2	14	25
DIST	3	4	1	10	18
Total Residents	21	24	6	80	

Group III: 60 Plus

IA+SA	4	1	1	23	29
SP WDS-PRE	4	2	2	18	26
SUR A	4	1	1	12	18
DIST			1	6	7
Total Residents	12	4	5	59	

Summary Table
Forced Migrants: Age by
Distance (Market Pressure)

	20-39	40-59	60 plus	total
	34	53	29	116
	28	35	26	89
	29	25	18	72
	26	18	7	51

Appendix C

SUMMARY

At least 576 residents over 20 of Tract Five will be displaced by the Inner Belt route. If those forced move in a pattern similar to most migrants moving to Tract Five there will be a significant increase in market pressure on the area close to Tract Five. 225 forced migrants will seek housing within the fifty blocks surrounding their old residence. 151 will try to remain in Cambridge, close to Central Square or East Cambridge. 118 will try to locate in Somerville or Boston while only 82 will seek residence outside of the nearby urban Boston area.

Of the residents seeking housing in the local area, 68 will be over 60 years old. Only two dozen or so of these migrants have worked at well paying jobs, so that many will be looking for inexpensive housing. Between thirty to sixty of the remaining migrants below sixty years old are employed in either craftsman, sales, clerical, managerial, technical or professional jobs. This leaves 100 additional migrants who will be searching for low cost housing within a few blocks of the inner belt.

This summary about the effect of the Inner Belt forced migration is effective for only six of the many residential blocks being eliminated to make way for the road. The net effect of the road building must be calculated for residents along the whole route, rather than just one part. However, these figures indicate the scope of some problems that must be faced in re-locating displaced residents with a minimum degree of satisfaction.

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