CITY-WARD MIGRATION AND MIGRANT RETENTION DURING FRONTIER DEVELOPMENT IN BRAZIL'S NORTH REGION

By

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ABSTRACT

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In Latin America, frontier lands are regarded as havens of opportunity for labor surpluses of congested regions. Little is known, however, on the ability of frontier regions to retain the migrant labor they attract.

This research uses primary data to describe and analyze the process of the retention of male migrants in urban centers of northern Brazil's developing agricultural frontier. Four cities were selected at different orders of the functional hierarchy that correspond to various phases of economic development, thereby representing a cross-section of urban frontier evolution. At each urban center, interviews with one hundred heads of household provided information on their migration history, occupational change, as well as similar information on their living relatives.

The study argues that the ability of a city to retain its migrants varies according to the socioeconomic levels of the migrants, the order of functional hierarchy of the receiving center and the phase of economic development of

the region. Concerning the socioeconomic levels of migrants, individuals who come to the city with high socioeconomic levels are more likely to remain at the center than migrants with low socioeconomic levels. This is due to the migrant with a higher socioeconomic level having normally made a more rational decision. On the other hand, a migrant with a low socioeconomic level who finds he is able to advance socioeconomically at the receiving center is more likely to remain. Regarding the order of functional hierarchy of the receiving center and how it affects migrant retention, cities at higher orders of the functional hierarchy have a greater ability to retain their migrants than centers at lower orders. Generally, higher-order centers attract migrants with higher socioeconomic levels and, as stated previously, these migrants generally have made a more rational decision. With regards to the phase of economic development and how it influences migrant retention, as the region becomes more developed the ability of the receiving center to retain its migrants declines. The infrastructure and communication system of the region improve, thereby providing greater access to the urban center for migrants with low socioeconomic levels. These migrants in turn are more likely to become frustrated at their new center and thus move on.

During frontier development, the relationships above take place simultaneously. As the urban center ascends to

higher orders of the functional hierarchy with further frontier development, migrants proceed from more distant places, higher orders of the functional hierarchy, and come with higher socioeconomic levels. However, they experience less improvement at the receiving center, which contributes to maintain their socioeconomic levels at that place. In the process, declining opportunities for socioeconomic mobility of lower occupational groups adversely affect their residential stability, whereas higher occupational groups who retain jobs similar to ones held at their previous place of residence become residentially stable. The effect of these two trends is to maintain the mean migrant retention rate of the receiving center during urban frontier evolution. Also, at any order of the functional hierarchy, cities located in more advanced frontier regions attract more migrants from nearby places at lower orders of the functional hierarchy. These migrants come with lower socioeconomic levels and demonstrate lesser achievement at the receiving center. In the more developed regions, improved transportation and communication system enable well-prepared individuals within the in-migration field of the city to move directly to higher-order places, while the less skilled move directly to the center. Cities falling under the influence of more dynamic urban centers are less able to provide job opportunities for resident and potential migrants; therefore,

their retention rate decreases. Migrants not retained are unadjusted individuals relegated to continued movement within the frontier region.

DEDICATION

For Carmen Milena, Xavier, and
Lionel and Gisèle Mougeot

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CHAPTER I

INTRODUCTION

In Latin America, the internal migration process is undergoing a relative shift in direction. In the past, the national capitals and primate cities experienced the highest in-migration rates.[1] In some countries however, the movement of people to intermediate-size cities and sparsely populated regions is becoming a relatively important trend. In Mexico, Venezuela, Argentina and Peru, net in-migration rates of primate cities fell during the 1950s and 1960s, with intermediate centers growing at faster rates during the more recent decade.[2] As Latin American countries reach higher levels of urbanization, city-ward migration rates are predicted to fall.[3] In Brazil, frontier migration has increased in importance from the 1950s to the 1960s, with the sparsely settled west-central and northern regions experiencing higher net total and city-ward in-migration rates than the more densely peopled northeastern and southeastern regions.[4]

The development of frontier regions has been modelled, but few studies discuss the process of internal migration to these relatively unsettled areas.[5] Some attention has been devoted to the settlers' environmental perception and

adaptation, with research on circular, return and reverse hierarchical migration, and pioneer migration fields being more limited.[6] One aspect of internal migration to frontier areas that has been neglected concerns the ability of frontier regions to retain the migrant labor they attract. With the exceptions of James C. Malin's contribution on total population turnover and James P. Allen's more recent examination of persistence rates, few studies have addressed the residential stability of frontier populations.[7]

Research on geographic and socioeconomic dimensions of migrant retention in frontier regions can contribute both to the theory of migration and to regional development strategies. Many recognize that a weakness of contemporary migration research has been its disregard of factors that affect residential stability, especially as it relates to the success or failure of migrants to achieve their individual goals.[8] This is an aspect of frontier settlement which has serious social and economic implications in Latin America. Many development planners view frontier regions as places that have the potential to absorb surplus labor. Numerous case studies provide evidence that high spatial mobility prevails along with low socioeconomic mobility in these frontier regions. In most cases, however, study areas are approached with little comparative awareness as to how population stability may vary among regions characterized by different phases of development. Data

are usually drawn from surveys in rural areas, with little attention devoted to the significant urban growth associated with frontier development. Working definitions of stability and progress in living conditions vary and the two concepts are rarely measured and related one to another.[9]

Problem and Theoretical Framework

This study will attempt to answer the general question of how migrant retention varies among urban centers of northern Brazil's developing agricultural frontier.

Economic motives are dominant in the decision-making process in general, and of migrants to resource frontiers in particular.[10] Therefore, migration can be viewed as a strategy for individuals to maximize accessibility to opportunities that are both unevenly distributed in space and unequally available in time.[11] Individuals tend to move and remain where they perceive their chances to improve their living standards as being better than elsewhere. The extent to which achievement in the receiving area corresponds to expectations depends on the information people receive when constructing their search space and before they make their locational decision.[12] Individuals with higher socioeconomic levels are likely to be more informed, possess a wider range of alternatives, and make more rational decisions than people with lower socioeconomic

status.[13] From the viewpoint of the receiving area, the efficiency of migration streams will be high if intervening obstacles are numerous, which makes migrant selection more positive.[14] If a migrant's socioeconomic achievement can be used as a valid proxy to the quality of migrant selection, then some general propositions can be made on variations in the ability of urban centers to retain the migrant population. The experience of developed countries and of Latin American society indicates that city-ward migration is hierarchically selective, with the more skilled individuals reaching higher-order urban centers while the less prepared move to lower-order centers.[15] At any hierarchical order however, migrant selectivity is adversely affected by the level of development in transportation and communication systems.[16] One study of Brazil's metropolitan centers offers cross-sectional indication that migrant selectivity and retention decline in the more developed regions.[17] Rapidly developing frontier regions are an ideal environment to investigate the effect of space and time variables on migrant retention. It appears that an orderly process of development takes place in association with migration to an agricultural frontier region. The region undergoes a series of orderly transitions in economic activities that are conducive to the development of a more complex hierarchical organization of settlement. Furthermore, at any order of the functional hierarchy, as the organization

of settlement becomes more complex, intervening obstacles play a less significant role in the migration process. The study argues that the ability of a frontier center to retain its migrants is directly related to their average socioeconomic level at that place. This level varies directly with the order of functional hierarchy of the frontier center and inversely with the phase of development of the region where it is located. The socioeconomic levels of migrants at the receiving center reflect, on one hand, levels previously achieved in the generating areas, and on the other, socioeconomic mobility associated with migration. The average socioeconomic level should remain constant as the urban center ascends to higher orders of hierarchy with further regional development; socioeconomic selectivity should increase but socioeconomic mobility decrease.[18] At any given hierarchical order, the average socioeconomic level of migrants at the receiving center should decrease for those located in more developed regions, where socioeconomic selectivity and opportunities for socioeconomic mobility decline. Since the average socioeconomic level of migrants at lower-order urban centers in less developed frontier regions is the result of greater socioeconomic mobility, the effect of this variable on migrant retention should be more important initially than at a later stage in the evolution of urban frontier centers.

Organization of the Study

The study is organized in three sections. Chapter II characterizes the study areas as representative of urban centers with different orders in the functional hierarchy that correspond to frontier regions with different phases of economic development. Chapter III shows how spatial attributes of the functional hierarchy during frontier development affect the socioeconomic levels of migrants at the receiving centers. Chapter IV gives a comparative perspective on the socioeconomic selectivity of migration to frontier centers. Furthermore, it examines spatial variations in migrant retention rates and the relationship between socioeconomic mobility and migrant retention rates for the various occupational groups at the frontier centers.

Urban Evolution During Frontier Development

Chapter II characterizes the study areas as representative of urban centers with different hierarchical orders that correspond to frontier regions with different phases of economic development.

Assumptions

This characterization is based on two assumptions. Initially, the process of settlement follows a series of orderly transitions in economic activities: (a) self-sufficiency (i.e., hunting, fishing, gathering and/or subsistence agriculture); (b) seasonal employment related

to the export of nonperishable products (i.e., rubber, gums, lumber, minerals); (c) incipient commercial agropastoral activities; (d) increasing specialization and diversification of agropastoral activities; and (e) industrialization, initially the processing and conversion of local products, followed by the manufacturing of consumer goods for local and regional populations.[19] Developing frontier regions are characterized by either one of the three intermediate phases. They depend on the dynamism of regions characterized by phase (e) in order for them to encroach upon those regions characterized by phase (a).[20] This model was conceived in the North American context by Frederick Jackson Turner.[21] From a survey of the literature, Gilbert J. Butland concludes that the Brazilian experience provides Latin American supportive evidence; the relative discontinuity of the process in space, and its irregularity in time, have been pointed out in case studies by Leo H. Waibel and Otávio Guilherme Velho.[22]

A second assumption that characterizes urban evolution during frontier development indicates that economic development of a given region leads to the evolution of its functional hierarchy.[23] Initially, the undeveloped region supports a series of small settlements, relatively undifferentiated and self-sufficient. Since they are isolated these hamlets exert an influence over a relatively vast area.[24] As this region is penetrated by the transportation

network of more developed regions, its economic activities become more diversified and land-use systems more intensified.[25] Within the region, as a functional hierarchy develops, cities will reach higher orders but their relationship to other cities in the hierarchy will remain constant. Early points of penetration into the region dominate the hierarchy throughout its evolution.[26] Direct linkages between the dominant centers and their areas of influence grow in length, frequency, and volume over time. As a result, the relative autonomy of lower-order centers declines and it becomes increasingly difficult for them to ascend to higher orders of the functional hierarchy.[27]

Operational definitions

In this study, the urban centers selected are located in frontier regions characterized by different phases of economic development. These regions were identified by the Instituto Brasileiro de Geografia e Estatística (IBGE), which utilized results of a factorial and grouping analysis of northern Brazil's agrarian structure.[28] For this study, in each of these regions an urban center at a different order of functional hierarchy was selected. Hierarchical orders were defined according to the relative importance of the cities' functions within the urban system. The IBGE has classified the four thousand municípios of Brazil into five orders: (1) metropolitan; (2) regional; (3) subregional; (4) local; and (5) sublocal.[29] This functional hierarchy

is based on the results of a flow analysis that took into account the number of contacts, types of flows, 1970 total population, total number of contacts within the entire national territory and within the city's area of influence, the number of subordinate centers, and the weight of the infrastructure. The hierarchy has been described and used by Luis Eduardo Aragón in his study on the migration field of northern Goiás.[30] The present study has selected three urban centers with different orders of hierarchy located in frontier regions characterized by various phases of development. One additional urban center of lower-order was selected in a developed region to exemplify the case of frontier centers which fail to evolve as their region develops.

Limitations

The methodology of Chapter II has two principal limitations. One concerns the nature of the data used in the secondary source classifications; the other, their appropriateness to characterize the study areas. The regionalization of northern Brazil's agrarian structure is based on data for 1968 and 1970 aggregated at the micro-regional level, whereas Brazil's functional hierarchy makes use of 1970 data aggregated at the municipal level. For practical reasons, this study on migrant retention focuses on urban centers that have experienced rapid population growth related to migration, and which have developed

considerably since the late 1960s. It is difficult to assess the extent such changes have contributed to reduce differences among the study areas, in orders of functional hierarchy and phases of economic development.

City-Ward Migration During Frontier Development

Chapter III shows how, during frontier development, spatial attributes of the functional hierarchy affect migrant selectivity. Hypotheses are presented that examine the relationship between frontier development and a migrant's socioeconomic mobility as well as his spatial mobility. These quantitative trends are given geographic dimension in a simple diffusion model of city-ward migration during frontier development.

Distance and Socioeconomic Selectivity: Hypotheses and Working Definitions

This section seeks to answer two questions:

1. Does the average distance between the migrants' previous place of residence and the receiving center increase among urban centers of higher orders located in more developed regions? Is the average distance for receiving centers of equal order greater for those located in less developed regions?
2. Does the average socioeconomic level of migrants, upon arrival at the receiving centers, increase among urban centers of higher orders located in more developed regions? Is the average socioeconomic level of

migrants at receiving centers of equal order higher at those located in less developed regions?

Two hypotheses are tested:

1. The distance between migrant generating areas and receiving centers increases among urban centers of higher orders located in more developed regions. The average distance for receiving centers of equal order is greater for those located in less developed regions.
2. Upon arrival at the receiving centers, the average socioeconomic level of migrants does not increase dramatically among centers of higher order located in more developed regions. The average socioeconomic level of migrants at receiving centers of equal order is higher at those located in less developed regions.

Many agree that the occupation of an individual is the best indicator of his socioeconomic level.[31] In this study, the migrants' occupations are assigned a social score based on the Brazilian occupational scale (Appendix A).[32] Generally, migrants to lower-order urban centers tend to exhibit lower socioeconomic levels originally but attain greater socioeconomic mobility with migration, than do migrants to higher-order urban centers. In the case of an urban center that grows with further frontier development, migrants arrive with higher socioeconomic levels, but experience less socioeconomic mobility.

In Chapter III, the questions above are addressed in two tables (Tables III.1 and III.2). Table III.1 shows the frequency distribution of migrants, according to order of hierarchy of their previous place of residence and to frontier center of present residence. In addition to the frequency distribution, it shows the average distance between each receiving center and their migrants' previous places of residence. Table III.2 shows the average socio-economic level of migrants, both at their previous place of residence and upon arrival at the receiving center. Cases selected for these tables are all migrant informants, male, aged 10 or more when last arrived at the frontier center, for whom the município of their previous place of residence is known, as well as their occupation at previous residence, and their first occupation at the surveyed frontier centers. Whenever applicable, difference-of-means tests are used to verify the statistical significance of findings.

A Stagewise Model of City-Ward Frontier Migration

A simple model of diffusion shows how changes in the functional hierarchy during frontier development are associated with changes in the socioeconomic characteristics of city-ward frontier migrants. The model operates under the following assumptions (Figure I.1a through I.1d):

1. The region is physically homogeneous.
2. The original pattern of settlement is held constant throughout the entire sequence, both in numbers and locations.
3. The main penetration into the region proceeds from one single entry point.
4. Economic development spreads away from the entry point and is inversely related to the distance away from that point.
5. The evolution of the functional hierarchy is related to the economic development of the region. Promotion of a given center to a higher order of the functional hierarchy depends on the ability of the center to lead its region from one phase of development to a more advanced one. When such promotion occurs, it is called a stage.

Initially the leading center of a more primitive frontier region has a low hierarchical order; direct migration to this center proceeds mostly from nearby places (Figure I.1a). In Figure I.1 a sixth order which represents dispersed hamlets has been added to the five-order functional hierarchy. This sixth order is assumed to be characteristic of regions with a subsistence economy, and although not considered in this study, the promotion of a hamlet to a sublocal center produces stage one in the model. At this stage, migrants possess originally low socioeconomic

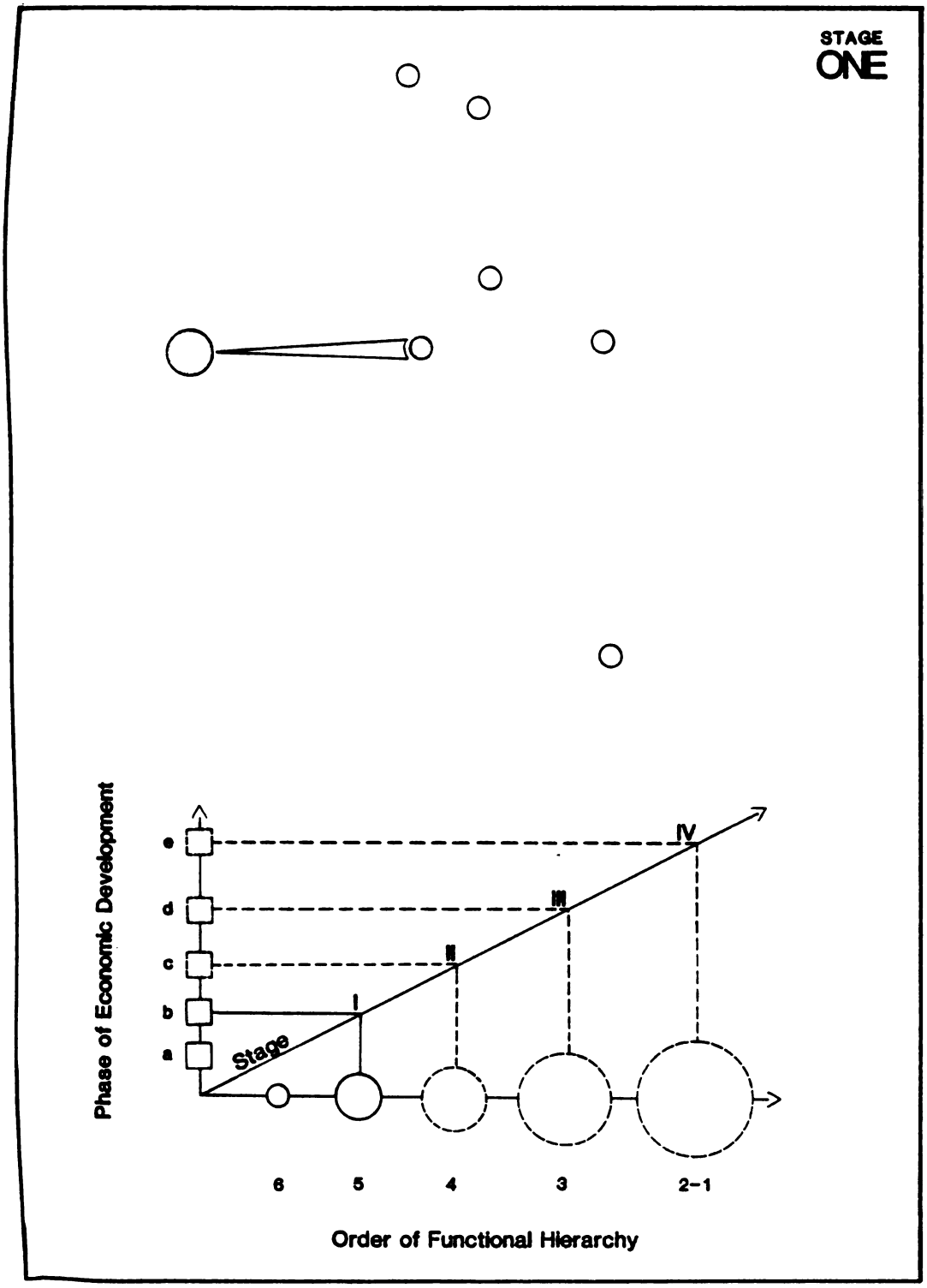

Figure I.1a Direct City-Ward Migration During Frontier Development

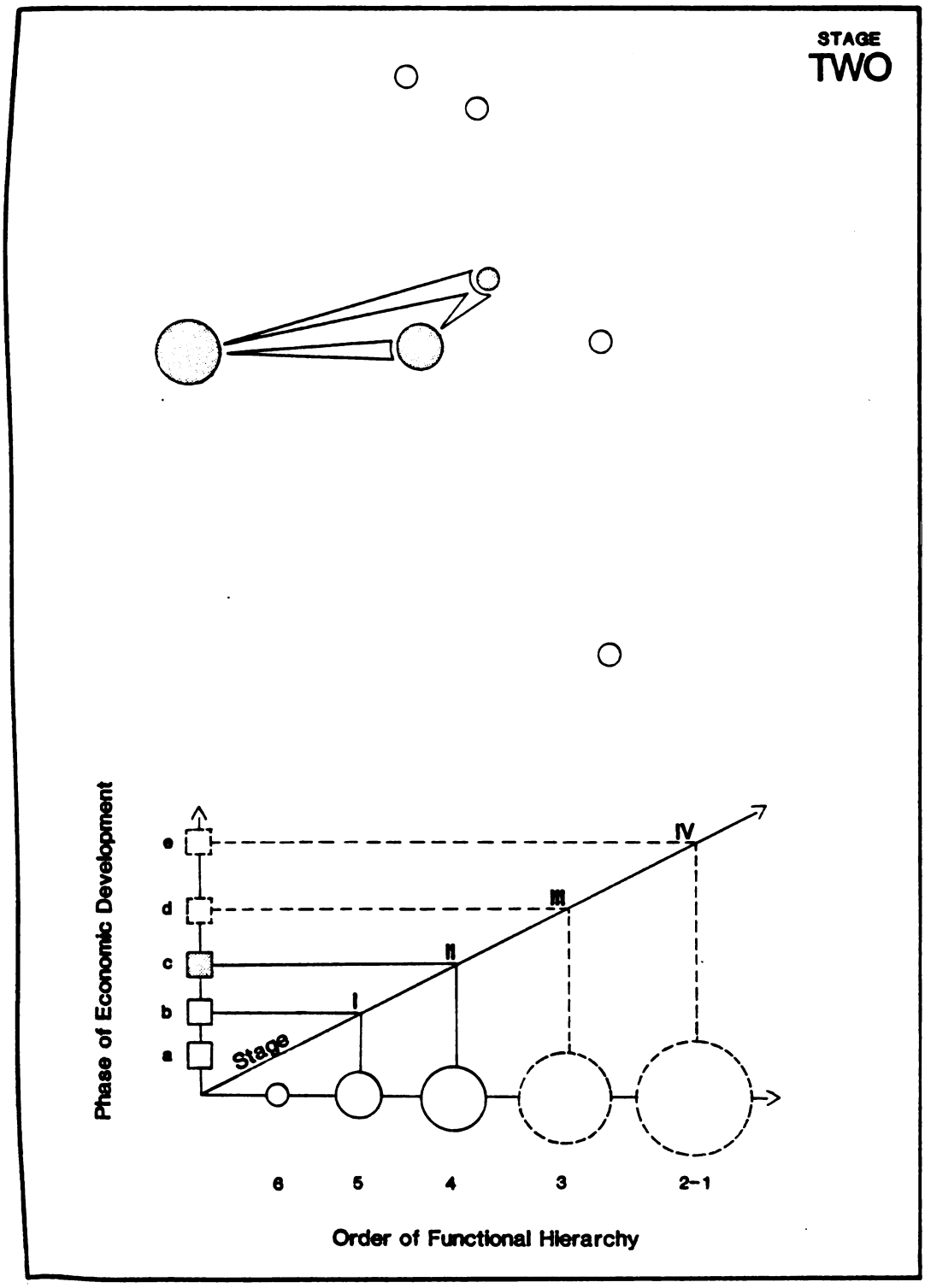

Figure L1b Direct City-Ward Migration During Frontier Development

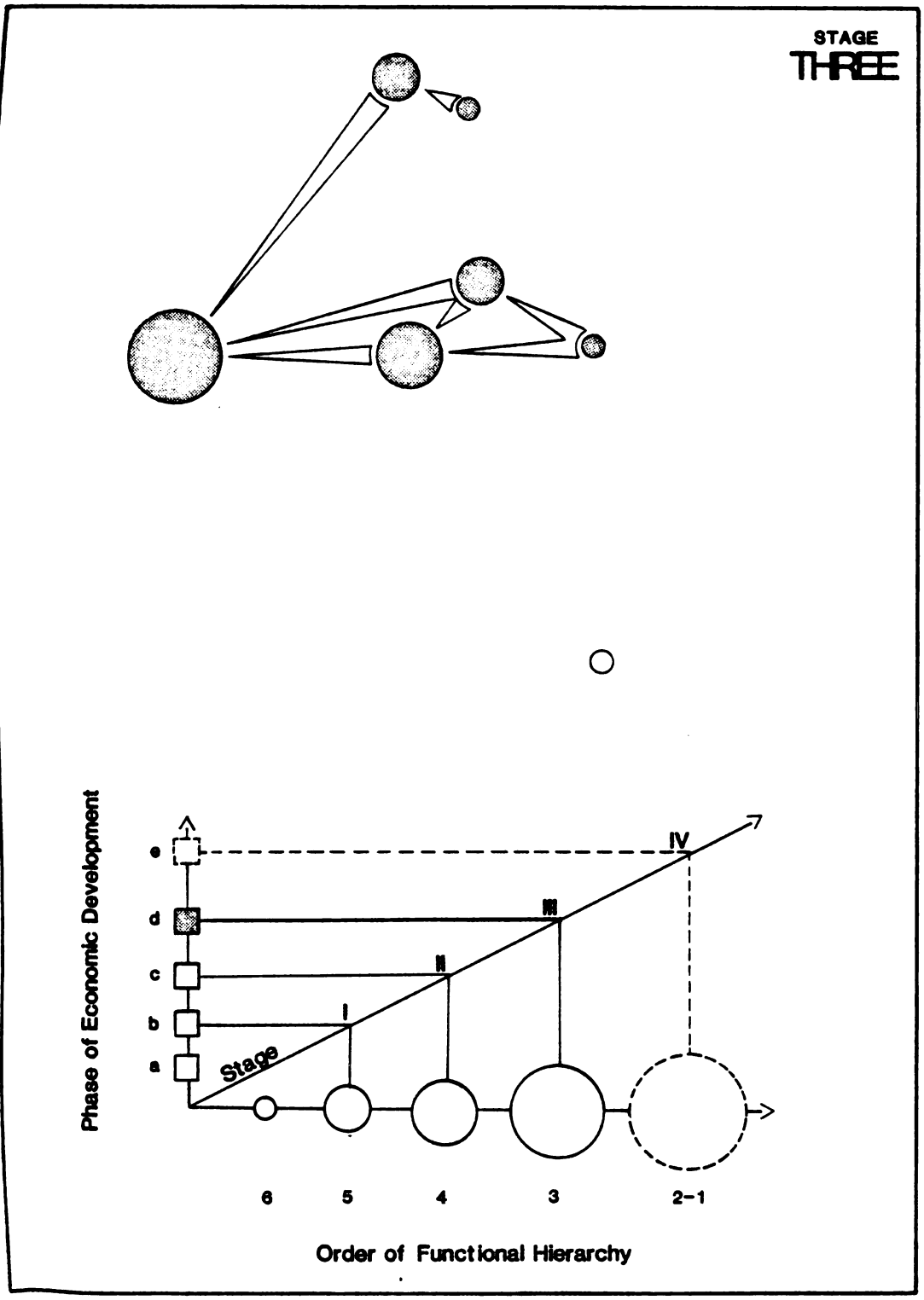

Figure I.1c Direct City–Ward Migration During Frontier Development

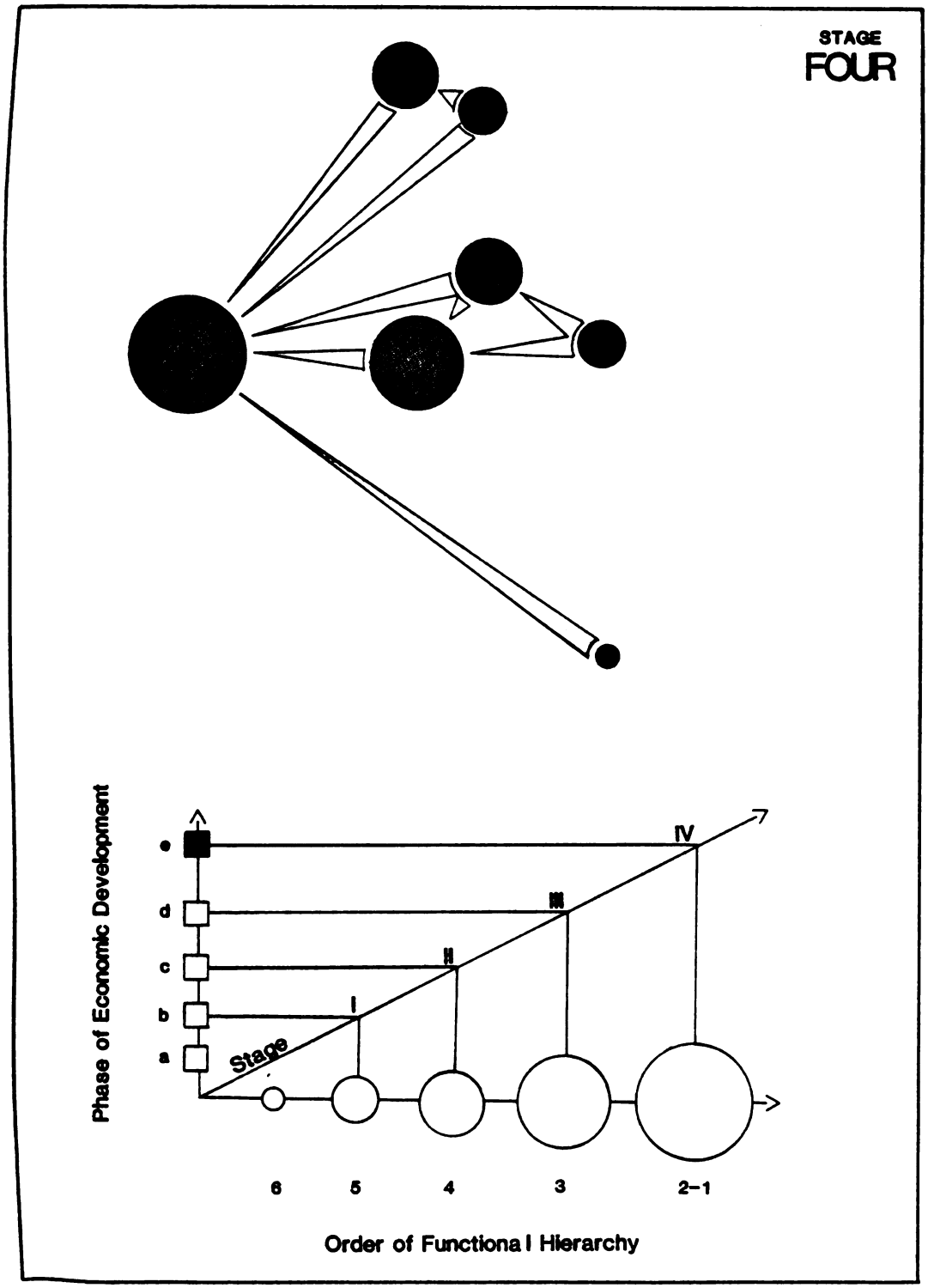

Figure I.1d Direct City-Ward Migration During Frontier Development

levels, but experience considerable socioeconomic upward mobility with relocation. With further frontier development, the functional hierarchy of the region becomes more differentiated (Figure I.1b through I.1d). As the leading urban center ascends to higher orders, its in-migration field encompasses nearby areas. Furthermore it draws more people from higher-order areas. As the area of influence of the leading urban center encroaches upon that of nearby lower-order centers, it becomes more difficult for the latter to ascend to higher orders. At any hierarchical order, urban centers in more developed regions should therefore lose more well-prepared individuals in their area of influence to higher-order centers and generate less opportunities for those attracted to improve their socioeconomic situation.

Limitations

The methodology of Chapter III has two limitations that concern the variables used to operationalize the concepts of distance and socioeconomic level. Distance between the places of previous and present residence is defined as the rectilinear distance, in kilometers, between the seats of the municípios of previous and present residence. The municipal seats are located on the map of municipal divisions of Brazil, with scale 1:5,000,000, established in 1967.[33] Rectilinear distances may differ from actual distances travelled by individuals. Their

values also may vary according to costs involved and the perception of those costs. Socioeconomic levels of migrants are quantified according to social scores of their principal occupations. The social scores are based on 1970 data about education and income, aggregated at the national level. It is not known to what extent the absolute social score values of occupations have changed since 1970, or how much these vary from one region of Brazil to another. Nor is it known how these time and space variables affect social score differences, or even rankings, among occupations. Finally, this section makes use of data about migrant heads of household (informants). These data are appropriate for comparisons among the various urban centers but they are not necessarily representative of other migrant populations at each one of these centers.

Migrant Retention During Frontier Development

Hypotheses and operational definitions

Chapter IV studies the migrants who reside or have resided at the surveyed frontier centers. A first series of questions compare the socioeconomic levels of migrants living in urban centers who never resided at the frontier centers, to those of migrants who reside or have resided at these centers. A second series of questions compare the migrants who reside at the frontier centers to those who have resided there but have left.

The first series of questions this section seeks to answer are as follows:

1. Is there a difference in socioeconomic levels between migrants living in urban centers who never resided at the surveyed frontier centers, and those who reside, or have resided at these centers? Are differences or similarities in socioeconomic levels maintained when the period of residence or the level of education is held constant?
2. How do socioeconomic levels vary among migrants with different periods of residence or different levels of education? What are differences in variations between the migrants who resided or have resided at the frontier centers and those who have not?
3. How do the socioeconomic levels of migrants who reside or have resided at the frontier centers vary among the different centers? What differences exist between the frontier centers in variations of socioeconomic levels among migrants with different periods of residence or different levels of education?

The following hypotheses are examined:

1. Migrants who reside or have resided at the frontier centers surveyed have lower socioeconomic levels than those living in urban centers who never resided at the frontier centers. The difference persists when the level of education or the period of residence is held constant.
2. Migrants with longer periods of residence or higher levels of education show higher socioeconomic levels.

Migrants who reside or have resided at the frontier centers show greater increases in socioeconomic levels concomitant with higher levels of education or longer periods of residence, than do migrants at their present place of residence who never resided at the frontier centers.

3. Migrants who reside or have resided at lower-order urban centers in less developed frontier regions show socioeconomic levels comparable to those at higher-order centers in more developed frontier regions. With longer periods of residence or higher levels of education, migrants at the former centers show greater increases in socioeconomic levels than do those at the latter.

In Chapter IV the first series of questions are addressed in Tables IV.1 through IV.4. Tables IV.1 and IV.3 concern city-ward migrants who never resided at the surveyed frontier centers; Tables IV.2 and IV.4 concern those who reside or have resided at these centers.

Tables IV.1 and IV.3 show the frequency distribution and average social scores of migrants who never resided at the centers, according to the order of functional hierarchy of their present urban center of residence. Table IV.1 controls the level of education, whereas Table IV.3 controls the period of years spent at the present residence. Cases selected for this pair of tables are all migrants, male,

aged 10 or more when last arrived at their present place of residence, living in urban centers, for whom the following data are known: occupation held at the present place of residence, hierarchical order of the place, years of residence at this place, grades of schooling completed.

Tables IV.2 and IV.4 provide the frequency distribution and average social scores of migrants who reside or have resided at the frontier centers, according to the center where they were surveyed. Table IV.2 shows the level of education; Table IV.4 shows the period of years spent there. Cases selected for this second pair of tables are all migrants, male, aged 10 or more when last arrived at the urban frontier center where they were surveyed, for whom the following data are known: occupation held at the frontier center, (for the migrants residing at the centers, the occupation selected is the one held at the present time; for those migrants who have left, it is the one held until departure from the center where they were surveyed), years of residence at the center where they were surveyed, grades of schooling completed. Whenever applicable, difference-of-means tests are used to verify the statistical significance of findings.

A second series of questions compare the socioeconomic levels of migrants who reside and have resided at the urban frontier centers:

1. At the frontier centers surveyed is there a difference

in socioeconomic levels held at these centers between migrants who reside there and those who have left? Are differences or similarities in socioeconomic levels maintained when the period of residence or the level of education is held constant?

2. How do the socioeconomic levels vary among migrants with different periods of residence or different levels of education? What are differences in variations between the migrants who reside at the frontier centers and those who have left?
3. How do the socioeconomic levels of migrants who have left vary among the various frontier centers?

The following hypotheses are examined:

1. Migrants who have left the urban centers where they were surveyed show lower socioeconomic levels at these centers than those who continue to reside there. The difference persists when the period of residence or the level of education is held constant.
2. Migrants who reside at the urban frontier centers show greater increases in socioeconomic levels, with longer periods of residence or higher levels of education, than those who have left, when they resided there.
3. Migrants who leave the lower-order urban centers in less developed regions show higher socioeconomic levels than do those who leave the higher-order urban centers in more developed regions.

In Chapter IV the second series of questions are addressed in Tables IV.5 through IV.8. Tables IV.5 and IV.7 concern the migrants who reside at the surveyed urban frontier centers; Tables IV.6 and IV.8 concern those who have resided but have left the centers where they were surveyed.

Tables IV.5 and IV.7 show the frequency distribution and average social scores of migrants who reside at the centers, according to the center of residence. Table IV.5 controls the level of education; Table IV.7 controls the period of years spent there. Cases selected for this pair of tables are all migrants, aged 10 or more when last arrived at the urban centers, for whom the following data are known: occupation held at the urban center, years of residence there, grades of schooling completed.

Tables IV.6 and IV.8 present the frequency distribution and average social socres of migrants who once resided but have left the frontier centers where they were surveyed. Table IV.6 controls the level of education; Table IV.8 controls the period of years spent there. Cases selected for this pair of tables are all migrants, male, aged 10 or more when last arrived at the frontier centers where they were surveyed, for whom the following data are known: occupation held there, years of residence at the center, grades of schooling completed. Whenever applicable, difference-of-means tests are used to verify the statistical significance of findings.

A third series of questions examines spatial variations in migrant retention rates, and the relationship between estimates of socioeconomic mobility and migrant retention rates among the various occupational groups of the frontier centers:

1. How do migrant retention rates vary among urban centers of different hierarchical orders in regions with different phases of economic development?
2. What is the relationship between socioeconomic mobility and migrant retention rates of different occupational groups in the various surveyed urban centers?
3. What are reasons for spatial variations in rates of socioeconomic mobility of the various occupational groups?

Concerning the first question, a model is used to show spatial variations in migrant retention rates. Assuming that the process of migrant retention is selective of individuals with high socioeconomic levels, places with migrant populations that have higher average socioeconomic levels should have higher migrant retention rates. Accordingly, migrant retention rates should be directly related to the hierarchical order of the place and inversely to the phase of economic development of its region (Figure I.2).

Social scientists have designed various indices to measure the concept of residential stability.[34] These differ according to research purposes and data availability.

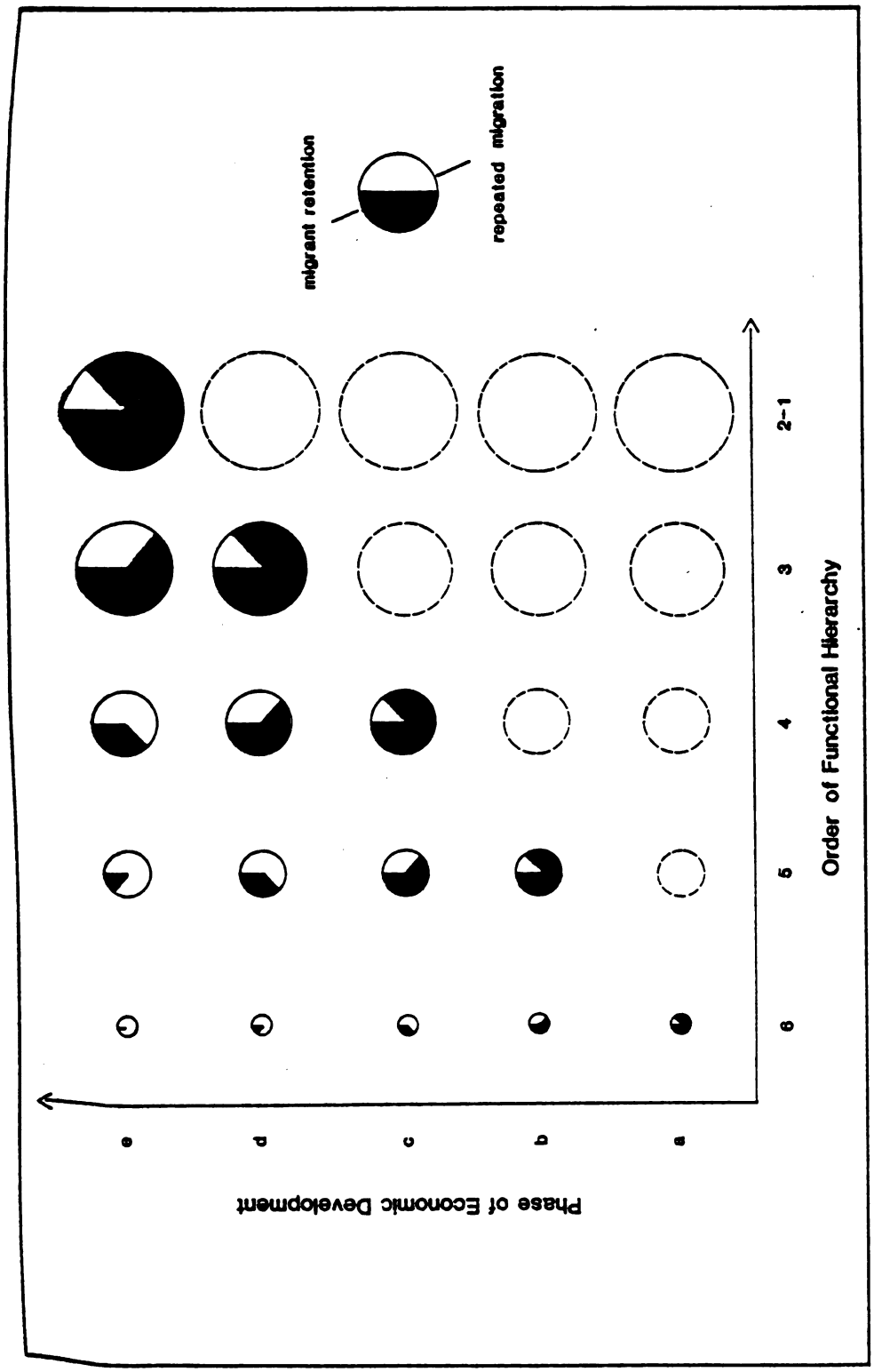

Figure I.2 Urban Migrant Retention During Frontier Development

The migrant retention rate measures the relative ability of places to retain the migrants they attract over a given period of time. This study uses primary data collected at a given place to estimate the rate of retention of a migrant population that goes through that place over a period of time. Data used concern living male relatives of the informants: father, brothers, and sons. The rate is the percentage of all migrants who have resided at a place over a period of time and who were still residing there at the end of that period. According to this definition, the rate considers three out of four possible types of migration involving a place over a given period of time: (1) non-native in-migrant residing at the place for the first time; (2) returnee in-migrant, either native or non-native, residing at the place; (3) non-native in-migrant and returnee native in-migrant who have left the place. A fourth type of migrant, composed of natives who have left the place for the first time, is not considered because the rate is designed to measure the retention of a flow-through. In order to test the significance of spatial variations in migrant retention rates, these need to be expressed in the form of "means" of individual rates. The criterion of classification, by which the migrant population should be grouped and individual rates calculated for each group, should respect the population's distribution of socioeconomic levels. Ideally, given sufficient amount of data, the criterion of classification should be the occupation itself. Due to data

limitations however, the criterion used in this study is the occupational group.

In relation to the second question above, migrants of a given occupational group may remain at a receiving center, depending on the extent to which they have experienced, or expect to experience, improvement in their living conditions. Migrants who have not reached, or expect to not reach, satisfactory levels of improvement after some time of residence are more prone to repeated-migration than those who do.[35] It is argued that the various occupational groups of migrants at the lower-order urban center in the less developed region are subject to greater expected and past socioeconomic mobility, than those at higher-order urban centers in more developed regions. Assuming that migrant retention rates for centers with higher hierarchical orders in correspondingly more advanced regions are similar, socioeconomic mobility should have a more important effect on migrant retention rates at lower-order urban centers in less developed regions.

In Chapter IV, Table IV.11 shows the group-specific migrant retention rates and their corresponding estimates of socioeconomic mobility, according to urban centers. At each center, and for each of the six occupational groups, a migrant retention rate is calculated for the decade preceding and including the year of the survey: the number of migrants who currently reside at the urban center and pertain to

the occupational group considered, is expressed as a percentage of all migrants who reside, or have resided at the center, and pertain(ed) to the same occupational group. The sum of group-specific migrant retention rates, when divided by the number of groups, provides a mean migrant retention rate for the urban center considered, along with its corresponding standard deviation. Mean rates of the various centers are tested for significant differences. Cases selected for this table are all migrants, male, aged 10 or more when they last arrived at the urban frontier centers, with known occupation held there. They have arrived, and left if such is the case, within the decade preceding and including the year of the survey. Informants are excluded from rates because they pertain to a different population at risk. The rates do not take into account deceased migrants. Migrants without relatives at the place, and out-migrants who leave no relatives behind them, are excluded from the rates. Whenever this produces bias, it is assumed to affect few interurban comparisons for which the rate is used. Risk of redundancy, due to multiple counting of the same relatives by two or more informants of the same family does exist. However, it is assumed to be low due to the relatively small samples scattered over a given area.

As to the socioeconomic mobility rates, the occupational history of migrant relatives who reside or have resided at the

surveyed frontier centers is not known. Two group-specific estimates of socioeconomic mobility are calculated, based on data provided by informants on themselves. These are rates of expected and past intergroup upward mobility. The rate of expected mobility for a given occupational group is the percentage of all migrants with occupations at a previous residence included in that group, whose present occupation at the frontier urban center is included in a higher occupational group. The estimate of past mobility for a given group is the percentage of all migrants with present occupation included in that group, whose occupation at a previous residence was included in a lower occupational group.

The estimate of expected mobility for the higher occupational group equals zero since migrants in that group cannot experience further inter-group upward mobility. Similarly, the estimate of past mobility for the lower occupational group equals zero since migrants in that group have not experienced any intergroup upward mobility. Spatial variations shown in the table are of descriptive value, since these data are not suited in their present form for statistical correlation analysis.

In relation to the third question, it is argued that migrants experience greater mobility at lower-order urban centers in less developed regions because individuals from lower occupational groups have more access to middle

occupational group opportunities associated to local development, than do similar migrants at higher-order urban centers in more developed regions. Case evidence is provided for this argument, based on data concerning migrant informants.

Limitations

The basic methodological limitations of Chapter IV concern the accuracy of primary data obtained through surrogate interviews. First, analyses involve data provided by informants on their living relatives. The accuracy of data about relatives depends on the informants' honesty, feelings toward those people, and on the frequency and nature of contacts with them. Observational errors, attributable to one or many of these factors, I believe, have been considerably reduced by grouping raw data for purposes of analysis. Secondly, in order to analyze the third series of questions, surrogate estimates are used that are imposed by data collection technique. Estimates of socioeconomic mobility based on the occupational histories of the migrant informants are assigned to the various occupational groups of migrants. Variables affecting socioeconomic mobility, for which informants and other migrants may show different distributions are not controlled. Differences are assumed to be distributed uniformly among the urban centers and to not greatly affect interurban comparisons.

Data Gathering

Field research in the four selected urban centers was conducted during the summer and fall of 1978 and the summer of 1979. Local malaria control field maps from the Superintendência de Campanhas contra a Malária (SUCAM) were used to define the population areas and distributions. These map data were supplemented by the use of municipal cadastral sheets and housing development plans.[36] SUCAM maps have advantages over IBGE census base maps. SUCAM maps are available locally, are not at scale, and in some centers "fenced" areas are not covered. However, they provide a good delimitation of the built-up urban area, an updated population count and distribution of housing units at the city block level. Ground-referential features are shown for field orientation.

The sample size was determined as a constant number of 100 interviews, coded 1 to 100 for each urban center surveyed. This fixed number was decided upon, taking into consideration the following conditions:

1. need to have a sufficient number of cases from each center for interregional comparisons;
2. need for the margin of sampling error in estimates to vary little from the sample of the less populated center to that of the more populated one;[37]
3. need to plan the period of field work in advance, prior to knowing the exact population of each center, and given limited resources.

The sampling procedure followed seven steps:

1. On the base map, the street pattern of the urban area was traced and identified; blocks and housing unit clusters were numbered in sequential order, following field recognition.
2. On a separate sheet, code numbers of blocks and clusters were listed, along with their respective number of housing units.
3. The total number of housing units contained in the urban area was divided by the sample size to obtain the sample fraction.
4. The list of city blocks and clusters was then stratified into larger contiguous groups of blocks and clusters, called sectors, each sector totalling the smallest multiple of the sample fractional denominator.
5. The number of sample elements allocated to each sector was based on the total number of housing units in that sector, multiplied by the sample fraction.
6. Blocks and clusters were selected randomly, as many times as there were interviews to be made in the sector.
7. The housing unit of a given block or cluster, where an interview was to be conducted, was determined as follows:
   a) Both the origin and direction of the path to select the housing unit were selected randomly.
   b) A random number, equal to or less than the number of housing units in the block or cluster, was drawn to determine how many housing units were to be

counted from the origin and in the direction selected.[38]

c) In blocks where many interviews were to be conducted, additional housing units were selected by applying the original count interval, away from the housing unit previously visited and in the direction selected.

City blocks, origin and direction of paths, house count intervals, and interview code numbers were noted on the base map.

The following rules of decision were applied in order to locate and conduct the interviews:

1. Whenever the point of origin of a path was not accessible on the ground, it was moved to the next corner of the block in the direction selected.
2. Whenever there were housing units behind those facing the street, they were included in the house count interval.
3. Whenever the housing unit contained various households, the first head of household available was selected. Head of household was considered as any person declaring him/herself as such. When the male head of household was declared to be regularly out of town for extensive periods, the wife generally assumed responsibility for the household.
4. Whenever the head of household was absent for short

periods of time and could be reached later during the field work period, an appointment was made to revisit the household; missing heads of household were usually reached within the two days following completion of the survey.

5. Different areas of the city were surveyed on different days of the week. Previous surveys in peripheral neighborhoods of a large urban center, pretest surveying, and field recognition in the selected urban centers indicated a greater degree of absenteeism on part of male heads of household on weekdays in peripheral areas. Whereas workers in central areas tend to reside closer to their work place, outskirt dwellers commute in large numbers to surrounding rural areas, either on a daily or weekly basis. It was decided to survey central areas on weekdays and peripheral on weekend days. This permitted less disturbance of the sampling pattern.
6. Whenever the housing unit selected was unoccupied when visited, or when the head of household negated the interview or was mentally or physically handicapped, the next housing unit lying in the path direction selected was chosen to conduct the interview.

The sampling procedure adopted in this study has the following limitations and advantages: as to limitations, an updated distribution of housing units at the block level must be available. Block numbering, house count,

sectorization, random selection of blocks, origin point and direction of paths, and count intervals are time-consuming operations. On the other hand, the allocation of sample elements follows the spatial distribution of population at a low level of aggregation. Also, locating housing units in the field is a straightforward procedure, regardless of housing density. This is a clear advantage over coordinate systems of sampling more appropriate to continuous distributions.[39]

A structured interview schedule was pretested, adapted, and then applied in the four urban centers selected (Appendix B).[40] Interviews were conducted only by the researcher, which ensured greater consistency in applying sampling decision rules, establishing contacts with the urban area, and drawing qualitative data from individuals' occupational experience and knowledge about the community. These data were recorded in a field diary and on index cards. Once the head of household was located, interviews took an average of three-quarters of an hour for a total of seven interviews per day. Duration of interview varied according to the number of family members reported by the informant. The number of interviews completed per day also varied, frequency being higher on week-end days.

Once the schedules were completed, they were revised. Some data were quantified after the survey, prior to data transcription. Occupations were coded according to the

Brazilian occupational scale. State, microregional, municipal, and rural/urban location of places, and their hierarchical order, were coded according to IBGE's functional hierarchy. Errors in proper state location were frequent on the part of informants in the case of municípios bordering states. In some instances respondents provided the name of a locality instead of a município. Most errors of both types were rectified.[41]

A codebook was prepared, according to which quantified data were transcribed by the researcher from the interview schedules onto eighty-column coding sheets. These were then handed to the computer center (SECOM) of the Universidade Federal do Pará, in Belém, where the data were punched on computer cards and checked.

The data were checked for consistency in two steps. A first check pointed out missing or duplicated cards and off-range and off-field digits. As a result, 177 cards were either corrected or added to the data set. The second check used control questions to discover logical inconsistencies. Forty statements were programmed to check the values of the following variables: place of residence, present age, year of last arrival at place of present residence, period of stay at present residence, contact with the urban frontier center surveyed, year of last arrival at the center surveyed, chronological order of migration stations, age at arrival at each station and period of

residence at each station. As a result of this check 86 cards were either corrected or added to the data set.

Data then were put on magnetic tape and filed. Programs from an adapted version of SPSS were used to process the data, mainly computation of new variables from raw data, descriptive statistics, cross-tabulations, and measures of association.[42] In some instances, results are more descriptive than predictive, with analytical frameworks needing further control of intervening variables and testing with larger samples and normally distributed data.

Summary

This chapter has presented the problem, the general organization of the study and the procedure followed to obtain primary data on which it is based. The study is organized in three sections. In each section, the assumptions, questions, hypotheses, data selection and tabulation, and methodological limitations have been discussed. The analyses are based on primary data collected through field work in the study areas. This chapter has described the sampling strategy and the technique of data collection applied, and the steps taken in revising, coding, checking and processing the data. The following chapter, Chapter II, provides a detailed characterization of the selected study areas, while various aspects of the data analyses are presented in subsequent chapters.

FOOTNOTES

[1]Robert T. Daland, "Urbanization Policy and Political Development in Latin America," American Behavioral Scientist 12/5 (May-June 1969):30.

[2]Based on data provided by Robert W. Fox, Urban Population Growth Trends in Latin America (Washington, D.C.: Inter-American Development Bank, 1975), pp. 53-58, 63-73, 78-80, 85-89, 93-96, 100-103.

[3]The World Bank, World Development Report, 1979 (Washington, D.C.: The World Bank, 1979), p. 72.

[4]Thomas W. Merrick and Ricardo Moran, "Annex I - Population," in Brazil--Human Resources Special Report, ed. The World Bank (Washington, D.C.: The World Bank, 1979), pp. 12-14.

[5]Definitions of the concept of frontier are in John C. Hudson, "Theory and Methodology in Comparative Frontier Studies," in The Frontier: Comparative Studies, ed. David Harry Miller and Jerome O. Steffen (Norman: The University of Oklahoma Press, 1977), pp. 11-32; and William W. Savage, Jr., and Stephen I. Thompson, "The Comparative Study of the Frontier," in The Frontier: Comparative Studies, vol. 2, ed. William W. Savage, Jr., and Stephen I. Thompson (Norman: University of Oklahoma Press, 1979) pp. 3-24. Theoretical contributions to various aspects of frontier development include Edward J. Taaffe, Richard L. Morrill, and Peter R. Gould, "Transport Expansion in Underdeveloped Countries: A Comparative Analysis," The Geographical Review 53/4 (October 1963):503-529; Derwent Whittlesey, "Sequent Occupance," Annals of the Association of American Geographers 19/3 (September 1929):162-165; William Norton and E. C. Conkling, "Land Use Theory and the Pioneering Economy," Geografiska Annaler 56B/1 (1974):44-56; Gerd Enequist and Lennart Bäck, "Central Places in Sparsely Populated Areas," Geografiska Annaler 48B/1 (1966): 36-50; William Norton and Daniel P. Smit, "Rural Settlement Surface Evolution: Cape Province, 1865-1970," Geografiska Annaler 59B/1 (1979):43-50. The process of migration associated to frontier settlement has been modelled by Erik Bylund, "Theoretical Considerations Regarding the

Distribution of Settlement in Inner North Sweden," Geografiska Annaler 42/4 (1960):225-231; and John C. Hudson, "A Location Theory for Rural Settlement," Annals of the Association of American Geographers 59/2 (June 1969):365-381; see also the pioneer-group-mass migration model of John S. Lindberg, The Background of Swedish Immigration to the United States: An Economic and Sociological Study in the Dynamics of Migration (Minneapolis: University of Minnesota Press, 1930).

[6]Janet G. Townsend, "Perceived Worlds of the Colonists of Tropical Rainforest, Colombia," Institute of British Geographers Transactions, New Series, 2/4 (1977):430-458; F. B. Golley, M. D. Olien, and D. R. Hoy, "Cognized Environments of San Carlos Valley Settlers," Revista Geográfica 74 (June 1971):33-50; Nigel John Smith, "Transamazonic Highway: A Cultural-Ecological Analysis of Settlement in the Humid Tropics," unpublished doctoral dissertation, Department of Geography, University of California at Berkeley, 1977; Emílio Federico Morán, "Pioneer Farmers of the Transamazon Highway: Adaptation and Agricultural Production in the Lowlands Tropics," unpublished doctoral dissertation, Department of Anthropology, University of Florida, 1975; William Taylor Vickers, "Cultural Adaptation to Amazonian Habitats: The Siona-Secoya of Eastern Ecuador," unpublished doctoral dissertation, Department of Anthropolgy, University of Florida, 1976; Rolf Wesche, "Recent Migration to the Peruvian Montaña," Cahiers de Géographie de Québec 15/35 (September 1971): 251-266, and Mary Ellen Conaway, "Circular Migration in Venezuelan Frontier Area," International Migration 15/1 (1977):35-42; David A. Preston, "Rural Migration to the Ecuadorian Oriente," Working Paper 223, School of Geography (Leeds: University of Leeds, 1978); Luis Eduardo Aragón, "Migration to Northern Goiás: Geographical and Occupational Mobility in Southeastern Amazonia, Brazil," unpublished doctoral dissertation, Department of Geography, Mighigan State University, 1978; John C. Hudson, "Two Dakota Homestead Frontiers," Annals of the Association of American Geographers 63/4 (December 1973):442-462.

[7]James C. Malin, "The Turnover of Farm Population in Kansas," Kansas Historical Quarterly 4/4 (November 1935): 339-372; James P. Allen, "Changes in the American Propensity to Migrate," Annals of the Association of American Geographers 67/4 (December 1977):577-587. See also a model of frontier population dynamics proposed by H. L. Lefferts, Jr., "Frontier Demography: An Introduction," in The Frontier: Comparative Studies, ed. David Harry Miller and Jerome O. Steffen (Norman: University of Oklahoma Press, 1977), pp. 33-55.

[8]Curtis C. Roseman, "Changing Migration Patterns Within the United States," Resource Papers for College Geography 77-2 (Washington, D. C.: Association of American Geographers, 1977):9; Sidney Goldstein, "Facets of Redistribution: Research Challenges and Opportunities," Demography 13/4 (November 1976):426.

[9]Recent case studies on Mexico, Colombia, Venezuela, Ecuador, Bolivia, include Felix Baez-Jorge, "La Tenencia de la Tierra entre los Zoques," América Indígena 36/2 (April-June 1976):385-402; Ingolf Vogeler, "The Dependency Model Applied to a Mexican Tropical Frontier Region," The Journal of Tropical Geography 43 (December 1976):63-68; Dieter Brunnschweiler, The Llanos Frontier of Colombia: Environment and Changing Land Use in Meta, Latin American Studies Center Monograph 9 (East Lansing: Michigan State University, 1972); John M. Kirby, "Agricultural Land Use and the Settlement of Amazonia," Pacific Viewpoint 17/2 (October 1976):105-132, and Janet G. Townsend, "Perceived Worlds of the Colonists of Tropical Rainforest, Colombia," Institute of British Geographers Transactions, New Series 2/4 (1977):430-458; Jean Revel-Mouroz, "Le haut-delta de l'Orénoque: un grenier pour Ciudad Guayana?" Bulletin de l'Association de Géographes français 447-448 (November-December 1977):307-317; Raymond J. Bromley, "Agricultural Colonization in the Upper Amazon Basin: The Impact of Oil Discoveries," Tijdschrift Voor Economische en Sociale Geografie 63 (July-August 1972):278-294; Mario Hiraoka, "Settlement and Development of the Upper Amazon: The East Bolivian Example," in The Role of Geographic Research in Latin America, ed. William M. Denevan (Muncie: Conference of Latin Americanist Geographers, 1978), pp. 165-167; E. Boyd Wennergren and Morris D. Whitaker, "Investment in Access Roads and Spontaneous Colonization: Additional Evidence from Bolivia," Land Economics 52/1 (February 1976): 88-95. Studies on Brazil will be referred to later in the study. General evidence for Latin America is found in Solon Barraclough and Arthur Domike, "Agrarian Structure in Seven Latin American Countries," Land Economics 42/4 (November 1960):391-424, and in Alistair Hennessy, The Frontier in Latin American History (Albuquerque: University of New Mexico Press, 1978), pp. 126-137.

[10]E. G. Ravenstein, "The Laws of Migration," Journal of the Royal Statistical Society 52 (June 1889):286; Everett S. Lee, "A Theory of Migration," Demography 3/1 (February 1966):48. One review of studies on frontier migration concludes that individuals "who move into resource frontiers tend to do so in response to strong economic incentives";

see Richard C. Jones, "Behavioral Causes and Consequences of Rural-Urban Migration: Special Reference to Venezuela," in Internal Migration Systems in the Developing World With Special Reference to Latin America, ed. Robert N. Thomas and John M. Hunter (Cambridge: Schenkman Publishing Company, Inc., 1980), p. 30.

[11]Migration has been broadly defined as a permanent or semi-permanent change of residence; one can further distinguish partial from total displacement migration depending on whether the residential move is associated to partial or total displacement of the household's activity space, that set of places with which the household interacts on a regular basis for work, shopping, recreational, social or educational purposes. See Everet S. Lee, "A Theory of Migration," p. 49; Curtis C. Roseman, "Changing Migration Patterns Within the United States," p. 4; Törsten Hagerstrand, "On the Definition of Migration," in Yearbook of Population Research in Finland XI, ed. Jarl Lindgren (Helsinki: Population Research Institute, 1969), pp. 63-72.

[12]Everett S. Lee, "A Theory of Migration," p. 51; Julian Wolpert, "Behavioral Aspects of the Decision to Migrate," Papers and Proceedings of the Regional Science Association 15 (1965):159-169; Stanley R. Lieber, "Place Utility and Migration," Geografiska Annaler 60B/1 (1978): 16-27; Curtis C. Roseman, "Changing Migration Patterns Within the United States," pp. 6, 7, 9. The search space is the set of places that a potential migrant seriously considers, and it is subject to socioeconomic and locational constraints; see Lawrence A. Brown and Eric G. Moore, "The Intra-Urban Migration Process: A Perspective," Geografiska Annaler 52B/1 (1970):6-10; Richard W. Wilkie and Jane Riblett Wilkie, "Environmental Perception and Migration Behavior: A Case Study in Rural Argentina." in Internal Migration Systems in the Developing World With Special Reference to Latin America, ed. Robert N. Thomas and John M. Hunter, pp. 138-142.

[13]Gino Germani, "Migração e Integração Cultural," in Manual de Pesquisa Social nas Zonas Urbanas, ed. Philip M. Hauser, translated by Magdalena Pizante Baptista (São Paulo: UNESCO, 1965), p. 161; J. M. Beshers and E. N. Nisihiura, "A Theory of Internal Migration Differentials," Social Forces 39 (1960):214-218; Mário Francisco Toniatti, "Migração Rural-Urbana no Estado do Ceará: Suas Causas," unpublished master's thesis, Universidade Federal do Ceará, 1976, p. 171; Ronald Skeldon, "The Evolution of Migration Patterns During Urbanization in Peru," The Geographical Review 67/4 (October 1977):401.

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[16]E. G. Ravenstein, "The Laws of Migration," p. 288; Omer R. Galle and Karl E. Taeuber, "Metropolitan Migration and Intervening Opportunities," American Sociological Review 31/1 (February 1966):7; Jorge Balán et al., Men in a Developing Society: Geographic and Social Mobility in Monterrey, Mexico, pp. 146-147; Robert N. Thomas and John C. Catau, "Distance and the Incidence of Step-Wise Migration in Guatemala," AAG Proceedings 6 (1974):113-116; Robert N. Thomas and James L. Mulvihill, "Temporal Attributes of Stage Migration in Guatemala," in Internal Migration Systems in the Developing World with Special Reference to Latin America, ed. Robert N. Thomas and John M. Hunter, p. 60; Luc J. A. Mougeot, "De la marginalité à l'intégration: les migrants du bidonville Siloé, Cali, Colombie," unpublished master's thesis, Department of Geography, University of Ottawa, 1976, pp. 34-50; Linda K. Romero and William L. Flinn, "The Effects of Structural and Change Variables on the Selectivity of Migration: The Case of a Colombian Peasant Community," Inter-American Economic Affairs 29/4 (Spring 1976):35-58.

[17]George Martine and José Carlos P. Peliano, Migrantes no Mercado de Trabalho Metropolitano, pp. 52-53.

[18]The extent to which individuals experience socio-economic mobility with migration is inversely related to the hierarchical order of the receiving center; see Peter M. Blau and Otis Dudley Duncan, The American Occupational Structure, pp. 261, 273; Luis E. Aragón, "Geographical and Occupational Mobility in Southeastern Amazonia, Brazil," p. 84.

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[22]Gilbert J. Butland, "Frontiers of Settlement in South America," Revista Geográfica 65 (December 1966): 97-100, 104-105; Leo H. Waibel, "As Zonas Pioneiras do Brasil," Revista Brasileira de Geografia 17/4 (October-December 1955):409-414; Otávio Guilherme Velho, Frentes de Expansão e Estrutura Agrária: Estudo do Processo de Penetração numa Área da Transamazônica (Rio de Janeiro: Zahar Editores, 1972), pp. 22-144.

[23]For a discussion and graphic representation of the relationship between development and the emergence of an urban hierarchy, see Brian J. L. Berry, Edgar C. Conkling and D. Michael Ray, The Geography of Economic Systems (Englewood Cliffs: Prentice-Hall, Inc., 1976), pp. 237-239, after James E. Vance, Jr., The Merchant's World: The Geography of Wholesaling (Englewood Cliffs: Prentice-Hall, Inc., 1970), p. 151. Empirical studies include Thomas R. Leinbach, "Transportation Development and Modernization in Malaya," Geografiska Annaler 57B/1 (1975):63; Howard J. Nelson, "Town Founding and the American Frontier," Yearbook Association of Pacific Coast Geographers 36 (1974):7-24. Waibel's three-phase model of pioneer agricultural development is based on local changes in rural land-use and urban functions and Velho reconstituted the evolution of a frontier town associated to the development of its hinterland; see Leo H. Waibel, "As Zonas Pioneiras do Brasil," pp. 404-409; Otávio Guilherme Velho, Frentes de Expansão e Estrutura Agrária: Estudo do Processo de Penetração numa Área da Transamazônica.

[24]Gerd Enequist and Lennart Bäck, "Central Places in Sparsely Populated Areas," p. 36.

[25]Isaiah Bowman, The Pioneer Fringe (New York: American Geographical Society, 1931), pp. 216-219; Peter R. Gould, "The Development of the Transportation Pattern in Ghana," Northwestern University Studies in Geography 5 (1960):14; William Norton and E. C. Conkling, "Land Use Theory and the Pioneering Economy," p. 45.

[26]Thomas R. Leinbach, "Transportation Development and Modernization in Malaya," p. 66; William Norton and Daniel P. Smit, "Rural Settlement Surface Evolution: Cape Province, 1865-1970," p. 47; Martin T. Katzman, "Regional Development Policy in Brazil: The Role of Growth Poles and Development Highways in Goias," Economic Development and Cultural Change 24/1 (October 1975):84-85.

[27]Gunnar Norling, "Abandonment of Rural Settlement in Västerbotten Lappmark, North Sweden, 1930-1960," Geografiska Annaler 42/4 (1960):240.

[28]Maria Elizabeth C. de Sá Távora Maia, "Atividade Agrária," in Geografia do Brasil--Região Norte, ed. IBGE (Rio de Janeiro: IBGE 1977), pp. 380-390. The study grouped 28 microregions into 13 regional types, according to their scores on 9 factors derived from 25 variables on population, area cultivated, value of production and employment in various primary activities, and mechanization.

[29]IBGE, Divisão do Brasil em Regiões Funcionais Urbanas (Rio de Janeiro: IBGE, 1972), pp. 1-112.

[30]Luis E. Aragón, "Geographical and Occupational Mobility in Southeastern Amazonia, Brazil," pp. 43-57.

[31]According to D. V. Glass, individuals' occupations have been used frequently in the past as indices of their social status. When examining Weber's prestige strata and Marx's economic classes, Peter M. Blau and Otis Dudley Duncan note that both hierarchies have their roots in the occupational structure of society. Manuel Vaz Pato and John B. Williamson argue that, in the case of the working poor, the occupational position is a more useful indicator of the individual's socioeconomic status than his total labor income; see D. V. Glass, ed. Social Mobility in Britain (London: Routledge & Kegan Ltd., 1954), p. 5; Peter M. Blau and Otis Dudley Duncan, The American Occupational Structure, pp. 7-8; Manuel Vaz Pato and John B. Williamson, "Socioeconomic Achievement: The Case of the Working Poor," Journal of Sociology and Social Welfare 7/2 (March 1979):252.

[32]Nelson do Vale Silva, "Posição Social das Ocupações," Rio de Janeiro: IBGE, 1973. (Mimeo.) The seven-group categorization of this scale has been used by George Martine and José Carlos P. Peliano, Migrantes no Mercado de Trabalho Metropolitano, and by IBGE, Indicadores Sociais--Tabelas Selecionadas (Rio de Janeiro: IBGE, 1979).

[33]IBGE, Brasil--Divisão Municipal; Situação Vigente em 30-VI-1967 (Rio de Janeiro: IBGE, n.d.).

[34]See Henry S. Shryock's rate of effectiveness of migration, George Martine's migrant retention rate, and James P. Allen's persistence rate, in Henry S. Shryock and Jacob S. Siegel, The Methods and Materials of Demography, vol. 2 (Washington, D. C.: Government Printing Office, 1975), p. 656; George Martine, "Adaptação de Migrantes ou Sobrevivência dos Mais Fortes?" Projeto de Planejamento de Recursos Humanos BRA/70/550, Relatório Técnico 30 (September 1976):30-32; and James P. Allen, "Changes in the American Propensity ot Migrate," Annals of the Association of American Geographers 67/4 (December 1977):578.

[35]The migrant's past period of residence at the receiving center has been suggested in geography as a measure of his adjustment by Akin L. Mabogunje; its correlation with socioeconomic status on the basis of data for surviving migrant stocks has led researchers to

optimistic conclusions on the social process associated to city-ward migration in Latin America. Martine and Peliano counter argue that the socioeconomic improvement exhibited by "net" migrants with further time of residence is also the result of a selective process of retention. In Brazil, poor people conform the majority of migrants and almost 60 percent of urban migrants with less than 5 years of residence in their enumeration tract in 1970 earned about one minimum salary: this percentage is higher for more recent arrivees. See Akin L. Mabogunje, "System Approach to a Theory of Rural-Urban Migration," Geographical Analysis 2/1 (January 1970):1-18; E. Wilbur Bock and Sugiyama Yutaka, "Rural-Urban Migration and Social Mobility: The Controversy on Latin America," Rural Sociology 34/3 (September 1969):343-355; Manoel Augusto Costa, Urbanização e Migração Urbana no Brasil (Rio de Janeiro: IPEA/INPES, 1975), pp. 137, 147; George Martine and José Carlos P. Peliano, Migrantes no Mercado de Trabalho Metropolitano, pp. 21, 33, 37, 54, 89, 129, 172-173, 182.

[36]The survey was held from 08/30/78 to 09/12/78 in Conceição do Araguaia, from 10/16/78 to 10/31/78 in Altamira, from 11/16/78 to 11/29/78 in Humaitá, and from 06/23/79 to 07/12/79 in Marabá. SUCAM house counts correspond to the following fumigation cycles: 5/29/78 in Conceição do Araguaia, 4/24/78 in Altamira, 11/13/78 in Humaitá, and 6/21/79 in Marabá. Base maps were completed using the following documents: 1978 city-block cadastral sheets provided by the Departamento Municipal de Agricultura, Arquivo e Cadastro, Prefeitura de Conceição do Araguaia; Planta do Bairro Nova Brasília (12/2/76) 1:1000, provided by Serviços Topográficos Altamira; 1978 city-sector cadastral sheets provided by the Divisão de Serviços Urbanos e Documentos Cadastrais, Prefeitura de Humaitá; 1978 city-sector cadastral sheets provided by the Divisão de Cadastro e Imóveis Urbanos, Prefeitura de Marabá.

[37]Samples were drawn from the following housing unit populations: 2,619 (3.82 percent) in Conceição do Araguaia, 4,626 (2.16 percent) in Altamira, 1,796 (5.57 percent) in Humaitá, and 9,587 (1.04 percent) in Marabá. Degrees of reliability of the various samples corresponding to a 95 percent confidence level and a 70 percent rate of occurence, are respectively, 4.49, 4.53, 4.45, and 4.56. Procedure followed is in Herbert Arkin and Raymond R. Colton, Tables for Statisticians (New York: Barnes & Noble, Inc., 1963), pp. 22-23, 151.

[38]Hubert M. Blalock, Jr., Social Statistics, 2nd ed. (New York: McGraw-Hill Book Company, 1972), pp. 554-557.

[39]Maurice Yeates, An Introduction to Quantitative Analysis in Human Geography (New York: McGraw-Hill Book Company, 1974), p. 49.

[40]Pretest conducted in Açailândia, Maranhão, on May 6-7 of 1978, where 188 (6 percent) heads of household were interviewed with the collaboration of my students from the Núcleo de Altos Estudos Amazônicos, Universidade Federal do Pará.

[41]Locational information was drawn from: IBGE, Índice dos Topônimos da Carta do Brasil ao Milionésimo (Rio de Janeiro: IBGE, 1960); IBGE, Carta Internacional do Mundo ao Milionésimo--Brasil (Rio de Janeiro: IBGE 1972); IBGE, Divisão do Brasil em Regiões Funcionais Urbanas (Rio de Janeiro: IBGE, 1972); IBGE, Divisão do Brasil em Micro-Regiões Homogêneas (Rio de Janeiro: IBGE, 1970); IBGE, Atlas de Rondônia, 2nd ed. (Rio de Janeiro: IBGE, 1977); Polimapas Editora Ltda., Estado do Pará--Mapa Rodoviário, Turístico, Escolar, Polivisual, 2nd ed., 1:2,000,000 (São Paulo: Polimapas, 1979) and Mapa Polivisual do Maranhão e Piauí, 1st ed., 1:1,135,000 (São Paulo: Polimapas, 1979080); Departamento de Estradas de Rodagem do Pará, Mapa Rodoviário, 1:2,000,000 (Belém: Governo do Estado do Pará, 1973); Sociedade Comercial e Representações Gráficas Ltda (SCRG), Mapa do Estado do Amazonas, 1:1,500,000 (Curitiba: SCRG, n.d.); Quatro Rodas, Brasil 1979, Mapa Rodoviário, 1:2,500,000 (São Paulo: Editora Abril Ltda., 1979).

[42]Norman H. Nie et al., Statistical Package for the Social Sciences, 2nd ed. (New York: McGraw-Hill Book Company, 1975).

CHAPTER II

URBAN EVOLUTION DURING FRONTIER DEVELOPMENT

This chapter characterizes the four study areas, namely: Humaitá in the state of Amazonas and Altamira, Marabá and Conçeicão do Araguaia, in the state of Pará, northern Brazil. It stresses comparative traits that afford a view of the selected urban centers at various orders of the functional hierarchy that correspond to different phases of economic development. The study areas are presented in an ascending order, starting with the lower-order urban center located in the less developed region and concluding with higher-order urban centers located in more developed regions. The chapter is divided into three parts: The first two parts characterize one study area each, and the third part, the remaining two study areas. Each part, in turn, is organized in four sections. Section One defines the regional, microregional, and municipal location of the urban center and makes use of secondary source information based on late census data. Sections Two and Three review the local development and population growth during the rubber-boom (1895-1912) and the post-rubber-boom (1912-1969) periods, respectively. These sections utilize secondary source information, and whenever available, primary source data. Section Four discusses extension of

Figure II.1 Brazil: Political Organization

road networks, growth in rural economic activities, and expansion of urban functions during the 1970s. It is based largely upon primary source data.

Humaíta, Southern Amazonas: A Sublocal Center in a Region Characterized by Seasonal Employment Related to Export of Nonperishable Products

Brazil's North Region is undergoing rapid transformations in its agrarian economy. Plant extraction contributed 41.1 percent of the value of the regional gross primary product (GPP) in 1960, but fell to 22.6 percent by 1969.[1] During the 1960s, agropastoral activities became more important in areas devoted formerly to the extraction of rubber, the brazil nut, and nonelastic gums. This is particularly true of eastern Amazonia, where the share of plant extraction in this region's gross primary product fell from 31.1 percent to 12.9 percent.[2] In western Amazonia changes have been less pronounced, with plant extraction in 1969 still retaining 34.1 percent of this region's GPP.[3] Accessibility to regional and extraregional market centers is dominant in the spatial organization of the North Region's changing agrarian economy.[4] Outside Belém's belt of truck-farming and industrial crops, southeastern Pará, in eastern Amazonia, is an area increasingly specialized in agropastoral activities. This subregion's accessibility to northern and southern metropolitan markets was increased during the late 1950s with the construction of the Belém-Brasília Highway and with further extension of the state and municipal

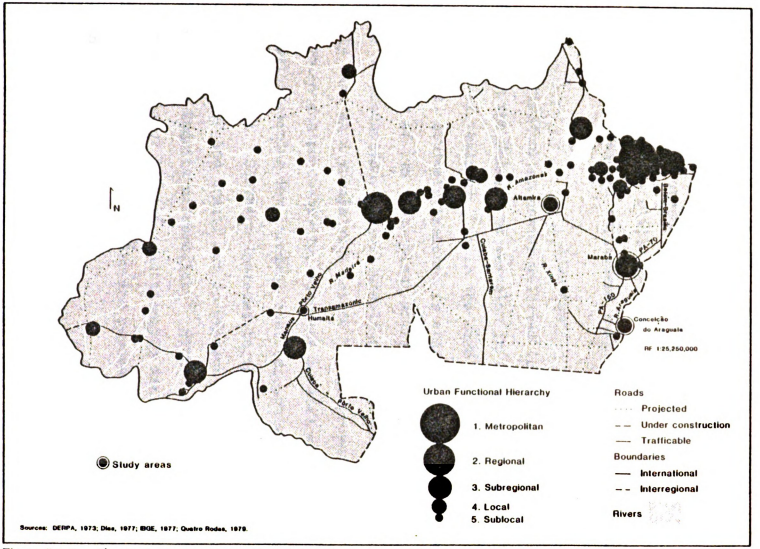

Figure II.2 Brazil's North Region: Urban Functional Hierarchy and Transportation Networks

road networks in the 1960s. Less developed are agropastoral activities in the corridor of the Amazonas river system, the traditional route of westward penetration. In the state of Amazonas, upstream areas to the north and south of this central corridor are still tied closely to a subsistence economy with seasonal employment related to plant extraction.[5]

Location

The first urban center selected is of sublocal order, located in the Madeira microregion in the southern part of the state of Amazonas. As in the case of its northern counterpart, southern Amazonas is characterized by the low productivity of its land; plant extraction dominates the value of production; agriculture is not mechanized and is mainly done at a subsistence level: crops grown show low production and productivity, with the related working population earning low incomes; pastoral activities generate a small output. Southern Amazonas is the major producing area of rubber and brazil nut in western Amazonia, particularly the Madeira microregion.[6] Within that microregion, the <u>município</u> of Humaitá traditionally has had its economy dominated by plant extraction and possesses a sublocal urban center (Table II.1).[7]

The Rubber-Cycle Period

Humaitá participated as a rubber export and supply import outpost during northern Brazil's rubber-boom period.[8] The Portuguese explorer, José Francisco Monteiro, himself a

Table II.1. Percent Distribution of Municipal and Micro-regional Primary Production Value, by Type of Product and Selected Urban Frontier Center, 1970.

SOURCES: *IBGE, VIII Recenseamento Geral, Censo Agropecuário 1970--Amazonas (Rio de Janeiro: IBGE, 1975), p. 153.

**IBGE, VIII Recenseamento Geral, Censo Agropecuário 1970--Pará (Rio de Janeiro: IBGE, 1975), p. 200.

NOTE: Currency equivalent at the average exchange rate was US$217.723 per CR$1,000.00 in 1970; The World Bank, Brazil--Human Resources Special Report (Washington, D.C.: The World Bank, 1979).

Table II.1. Percent Distribution of Municipal and Microregional Primary Production Value, by Type of Product and Selected Urban Frontier Center, 1970.

Primary Products	Humaitá*		Altamira**		Marabá**		Conceicao do Araguaia**	
	Município	Microregion	Município	Microregion	Município	Microregion	Município	Microregion
Livestock Slaughtering	5.31	5.50	16.52	16.38	34.63	27.87	25.09	28.44
Large Animals	2.19	1.43	9.51	8.39	33.27	24.97	17.67	19.36
Middle-sized Animals	0.58	0.60	1.69	1.59	0.98	1.74	2.77	2.69
Small Animals	2.54	3.47	5.32	6.40	0.38	1.16	4.65	6.39
Permanent Crops (jute, pepper, cacao, sugar cane, tobacco, mallow, etc.)	2.62	4.48	6.04	9.17	1.49	3.79	5.71	5.05
Temporary Crops (cassava, maize, rice, etc.)	28.62	35.97	57.67	53.13	8.59	24.59	55.01	53.68
Plant Extraction (nuts, rubber, non-elastic gums,etc.)	63.45	54.05	19.74	21.32	55.28	43.75	14.19	12.83
Total								
Percent	100.00	100.00	99.97	100.00	99.99	100.00	100.00	100.00
Value (ooos CR$)	4,927	18,290	3,196	3,704	10,546	17,460	3,503	4,054

producer, founded the settlement in June of 1869.[9] According to a Ceará native who arrived in 1908, the pre-1920 village was strung along the western banks of the Madeira River, with a population not exceeding a thousand persons.[10] It published a newspaper, maintained a musical band, and housed twenty pianos. It had an ice factory, a cinema, and a thermoelectric plant. Still functioning today are a municipal hall and a public school which were built by the founder. Street vending was forbidden. Buildings were required to be constructed at a minimal distance from the walk-ways and to carry glassed openings only. Jewish and Syrian merchants imported foodstuffs, implements, and luxuries from Belém and Manaus, and traded them for rubber products.[11]

The Post-Rubber-Cycle Period

During this period, the município of Humaitá experienced slow population growth. Data for the 1950s onward show that between 1950 and 1970 the municipal population grew from 12,790 to 14,877, a relative increase of only 16.32 percent: the population of the municipal seat increased by only 50.45 percent, from 781 to 1,175 (Table II.2). Falling employment related to plant extraction in the município and job opportunities outside the município partly explain the depopulation. Interviews with returnee male heads of household suggest that although some rubber tappers and nut pickers acquired tracts of local deserted seringais, many left the município

Table II.2. Population Change in Four Selected Urban Frontier Centers and Their Município, North Region of Brazil, 1950-78.

SOURCES: *National census figures in José Alberto Magno de Carvalho and Morvan de Mello Moreira, Migrações Internas na Região Norte I (Belém: Ministério do Interior/SUDAM, 1976). Anexo 2, pp. 2-3, 7-11; and in Catharina Vergolino Dias, "Sistema Urbano" in Geografia do Brasil - Região Norte, ed. IBGE (Rio de Janeiro: IBGE, 1977), p. 438.

**Population estimates from IBGE, Brasil: Estimativa da População Residente nas Regiões Fisiográficas, Unidades da Federação, Microregiões Homogêneas, Areas Metropolitanas em 1 º de Julho de 1975 (Rio de Janeiro: IBGE, 1975), pp. 3, 5-6.

***Population estimates obtained by multiplying the most recent SUCAM housing unit count (see note †) by the 1970 IBGE municipal average household size (see note††).

†Unpublished SUCAM housing unit counts corresponding to the June 1978 fumigation cycle. In Humaitá, count available for the urban center only. June 1979 housing unit counts for the urban center and município of Marabá are 9,587 and 13,251, respectively; 1979 populations estimated on the basis of these data are 52,249 and 72,218.

††Quotient of the 1970 municipal resident population divided by the 1970 municipal total of permanently occupied households, from IBGE, VIII Recenseamento Geral Censo Demográfico 1970 - Amazonas (Rio de Janeiro: IBGE, 1973), pp. 195, 258, and IBGE, VIII Recenseamento Geral, Censo Demográfico 1970 - Pará (Rio de Janeiro: IBGE, 1973), pp. 245, 272, 290, 410, 412. Municipal average household size figures based on IBGE data are generally smaller than average size figures of the 100 households surveyed at the urban centers in 1978 and 1979: Humaitá (6.90), Altamira (6.75), Marabá (6.32), Conceição do Araguaia (5.45).

NOTES: [a]Cumulative population increase as a percentage of the 1950 population base.

[b]Includes 1978 estimated population within the 1970 IBGE-defined area of the urban center (7,685), plus that within the neighborhood of Serraria (5,150).

[c]Excludes populations of the municípios of São Felix do Xingu (2,332) and Senador José Porfírio (2,971), both created with parts of the município of Altamira during the 1960s.

[d]Excludes population of the município of São João do Araguaia (15,328) created with parts of the município of Marabá during the 1960s.

[e]Excludes population of the município of Santana do Araguaia (9,085) created with parts of the município of Conceição do Araguaia during the 1960s.

Table II.2. Population Change in Four Selected Urban Frontier Centers and Their Município, North Region of Brazil, 1950-78.

Year	Name and Hierarchical Order of Urban Frontier Centers							
	Humaitá 5 Population		Altamira 4 Population		Marabá 3 Population		Conceição do Araguaia Population	
	Município	Urban Center	Município	Urban Center	Município	Urban Center	Município	Urban Center
1950*	12,790	781	7,669	1,809	11,130	4,536	6,322	1,334
	0.00[a]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1960*	14,712	1,184	11,987	2,283	20,089	8,342	11,283	2,270
	15.03	51.60	56.30	26.20	80.49	83.91	78.47	70.16
1970*	14,877	1,175	15,345[c]	5,741	24,447[d]	14,593	28,953[e]	4,969
	16.32	50.45	100.09	217.36	119.65	221.72	357.97	272.49
1975**	16,650	--	18,586	--	31,099	--	41,218	--
	30.18	--	142.35	--	179.42	--	551.98	--
1978***	--	12,835[b]	61,049	26,931	69,329	46,091	135,100	14,666
	--	1,543.41	696.05	1,388.72	522.90	916.12	2,036.98	999.40
Housing Units[†]	--	2,111	10,226	4,511	12,721	8,457	24,125	2,619
Municipal Average Household Size[††]	6.08	6.08	5.97	5.97	5.45	5.45	5.60	5.60

to work as placer miners in Mato Grosso, as sorva tappers and railroad maintenance workers in the territory of Rondônia, or as street hawkers and construction workers in its capital city, Pôrto Velho. Local merchants left for Manaus, Belém, and Pôrto Velho.[12]

The 1970s

During the past decade, as road accessibility increased, the município of Humaitá became an active frontier area when its functions as a municipal seat were expanded and changes began to occur in the land-use system. Until 1973, the village had minimal road accessibility to other settlements. A single pathway was opened in 1958, which connected this rubber shipping point to Lábrea, a similar outpost located two hundred and twenty kilometers westward on the Purus River.[13] Surface exchanges with other settlements were by water way; access to Pôrto Velho required twenty-four hours upstream and to Manaus, four days downstream. A twelve hundred meter landing strip functioned during the dry season only, and accommodated DC-3 planes twice a week. Mail took four days to reach Manaus, but eight to arrive in Rio de Janeiro or São Paulo. Most telephone communications in the early 1970s were oriented downstream toward Manaus, Itacoatiara, Manicoré, and Manacapuru.[14]

In 1972 the sublocal center was reached by the Transamazonic Highway, and in 1973, by the Manaus-Pôrto Velho Highway.[15] Both highways, along with complementary

rural projects, have contributed to articulate incipient transformations in rural land-use within the município.[16] On the first eighty-five kilometers of the northeast-bound Humaitá-Itaituba segment of the Transamazonic, the Instituto Nacional de Colonização e Reforma Agrária (INCRA) assigned lots to rural settlers as part of the Madeira Agrarian Project. However, only 170 permits of occupancy were issued between 1972 and 1978, when settlement was delayed due to insufficient pedological information, land tenure conflicts, and frequent land abandonment. Most settlers still practice subsistence agriculture.[17] In other areas, government-sponsored plantation projects are underway to further develop rubber production; the Superintendência do Desenvolvimento da Hevéa (SUDHEVEA) provides technical assistance, and the Banco da Amazônia (BASA) financial support.[18] Transportation along the Transamazonic Highway remains difficult; in 1978 there was no regular commercial bus service on the west-bound Humaitá-Lábrea two hundred and twenty kilometer segment, and only one truck traversed weekly the first one hundred kilometers of the northeast-bound Humaitá-Itaituba one thousand kilometer segment.[19]

The Manaus-Pôrto Velho Highway, paved in 1974, has reduced surface travel time between Humaitá and Pôrto Velho to four hours, and to Manaus, to twelve hours by bus. The eight hundred and forty-six kilometer highway still functions mainly as a linkage between Pôrto Velho and Manaus, with Humaitá being the only town on the way. According to a

major local rubber producer most of the export to Manaus is still done by waterways.[20] The northern segment of the Manaus-Pôrto Velho intersects with the Transamazonic Highway at thirty kilometers west of Humaitá and its southern segment at eight kilometers west of it, with the result that local business has been little affected by through-traffic. For the daily microbuses that travel the route, one from Manaus to Pôrto Velho, the other in the opposite direction, Humaitá is a stopping point only. On the other hand, as observed in fall of 1978, particularly south of kilometer 465, much land had been cleared along the highway, where one sees fenced ranches, pastures, and some livestock. Pastoral activities in general are still incipient due to problems similar to those mentioned in the case of the Madeira Agrarian Project and to local shortage of cheap labor.[21]

Along with growth in road accessibility, the town experienced considerable upgrading of its urban functions after 1975. Viewed by municipal officials as a foresighted attempt to divert southern Amazonas' rural development away from the influence of Rondônia's capital, state and federal governments have invested heavily to transform Humaitá from a rubber outpost into a local institutional and administrative center. Since 1975 Humaitá has acquired a station for retransmission of telecommunications, a direct dial telephone station, two bank agencies, two schools, one hospital and

one social welfare office, regional headquarters for various institutions of rural development, a military base, and living quarters for functionaries, and workers and technicians of state and national departments of public works.[22] Expansion in the built-up area related to these additions is concentrated mostly on the western and northwestern outskirts of the original riverfront settlement, along the urban segment of the Transamazonic Highway. Between 1970 and 1978 the urban population grew by 992.34 percent from 1,175 to 12,835; this growth is partly due to population increase within the 1970 urban perimeter, which grew by 554.04 percent, and partly to the merging of this area with a rural neighborhood, Serraria, which contained an estimated 40.12 percent of the urban agglomerated population in 1978 (Table II.2).

Altamira, Central Pará: A Local Center in a Region Characterized by Incipient Agropastoral Activities

Location

More accessible to the traditional eastern entry point of northern Brazil and more densely settled, the central corridor of the Amazonas River system is characterized by newly developed agropastoral activities. The second town selected is a local center of the Xingu microregion in this central corridor. The corridor is narrow along the Japurá-Solimões-Amazonas River in the state of Amazonas but gradually broadens in the middle course of the

Amazonas River to encompass most of the state of Pará west of Belém.[23] Agropastoral activities vary from one microregion to another according to varying natural conditions and local markets: livestock and jute in the Solimões-Japurá; jute, maize, rice, and milk in the Médio Amazonas (serving Manaus); maize and livestock in Roraima; rice and livestock in the Médio Amazonas Paraense; rice, maize, beans, sugar cane and livestock in the Baixo Tocantins; and mallows in the Guajarina.[24] Productivity of land and crops is relatively low throughout the region, and the working populations earn low incomes. Although mechanization is apparent, the region has more labor intensive activities than the previous study area.[25] The Xingu microregion is characterized by incipient agropastoral activities, and its principal producing município, Altamira, exports livestock, rice, maize, and beans surpluses to Belém.[26] The município contains a local center and has become an active frontier area during the last decade.

The Rubber-Cycle Period

After a failed attempt by Father Rogue Hunderpfund to settle a religious mission in 1752, José Porfírio de Miranda Junior, then intendant of the neighboring município of Souzel, firmly established the settlement of Alta Mira in 1896.[27] During the rubber-boom period, the hamlet was ruled by its founder, a large landowner who also was the leading local rubber producer, river transporter, and urban

developer. In 1909, Altamira had two hundred permanent residents and one hundred houses; both figures are indicative of population fluctuations in settlements living from seasonal rural activities. It had a post office, a commercial area, a cemetery, a prison, and military quarter. In 1917 Altamira officially became a town and had acquired a musical band and a social club.[28]

The Post-Rubber-Cycle Period

The município of Altamira had reverted to a subsistence economy in 1930 but had shown gradual improvement in its economic life by the 1960s.[29] Between 1940 and 1950 the town increased its population by only 15.00 percent from 1,573 to 1,809 persons.[30] Financed by the BASA, it exported only small quantities of rubber, brazil nuts, and furs.[31] Many rubber tappers migrated to the experimental plantations of Fordlândia and Belterra in the município of Santarém during the World War II period.[32] During the 1960s as a result of a growing demand for food staples in Belém, the road transportation network was extended and agropastoral activities developed in the Médio Amazonas and Xingu microregions. In the Médio Amazonas, INCRA's predecessor settled an agricultural colony in Monte Alegre; in the Xingu, the state Secretary of Agriculture encouraged agricultural settlement in the município of Altamira.[33] In 1971 the values of production of plant and animal extraction had fallen to 44.16 and 41.16 percent of their respective 1966

levels. However, during the same period the value of agricultural production increased by 31.68 percent. Data for livestock production during the 1963-71 period show a value increase of 36.35 percent.[34] Between 1960 and 1970 the population of the município of Altamira grew by 61.88 percent from 9,479 to 15,345, and its urban population along grew by 151.47 percent, from 2,283 to 5,741 (Table II.2).

The 1970s

The region of Altamira, already recuperating during the 1960s, experienced considerable growth in road accessibility, agropastoral activities, and urban functions during the last decade. Extension of the federal and municipal road networks has increased Altamira's surface accessibility to its area of influence and to metropolitan markets. Before 1970 the town was very much isolated: one ex-prefect remembers that in 1943, a hydra airplane landed once a week on the Xingu River on its way from Belém to Santarém. Animal-drawn carts transported rubber balls and brazil nut sacks to a shipping point, Vitória, forty-nine kilometers downstream on the same river.[35] Hours of river travel time to other settlements were as follows: Senador José Porfírio (3:45), Pôrto de Moz (9:00), Prainha (18:00), Aveiro (60:00), Belém (72:00).[36] The west-bound Estreito-Altamira segment of the Transamazonic Highway reached

Altamira in 1971; this seven hundred and twenty kilometer dirt road linked the town to the Belém-Brasília Highway, thereby reducing surface travel time to Belém to forty-eight hours. In 1978 a daily bus service operated between Altamira and Belém during the dry season; ten other destinations located in eastern Pará can be reached directly from Altamira.[37]

During the first half of the 1970s the INCRA developed the Integrated Colonization Project (PIC) of Altamira in a 20 by 150 kilometer area along the Transamazonic Highway, with Altamira as its principal service center.[38] Most of the area was settled between 1970 and 1974, and by 1978, 3,611 lots were occupied by an equal number of colono families within the area of the PIC.[39] During the 1970-73 period the value of agricultural production reported for the município increased by 158.13 percent and that of livestock by 35.28 percent.[40] Although a large part of the PIC is located outside the município, its population depends primarily on the local center for legal, financial, technical, marketing, and other social services. In 1978 daily bus transportation linked Altamira to at least eight of the PIC's rural centers and to nine urban centers and localities of central Pará.[41] Some of the agricultural surplus is now exported to southern markets via the Cuiabá-Santarém and the Belém-Brasília Highways.

After 1971 the town underwent rapid population growth and physical expansion as a result of its increased

importance as a service center. Between 1970 and 1978 its population grew from 5,741 to 26,931 a relative growth of 369.10 percent (Table II.2). Federal and private enterprises initiated land-use planning in order to improve urban services. Downtown Altamira had paved streets, a sewage system, while slums had been erradicated; the river-front avenue and docks were widened and refurbished.[42] The large number of functionaries and government-assisted colonos provided a large market for manufactured imports from Manaus and São Paulo. In this central area, schools, one hospital, and three bank agencies were built. At present INCRA's headquarters for the Altamira Agrarian Project, living quarters, an agricultural cooperative, and a federal warehouse occupy an area west of downtown. SUDAM acquired from rural occupants and the municipality a section west and north of downtown, to build recreational, educational, fiscal, and transportation facilities. The area to the northeast is being developed into residential neighborhoods under private and municipal initiative. Aparecida is a municipal relocation site for low income victims of recent floods; settled as of 1974, it claimed 9.22 percent of the urban population in 1978. Nova Brasília is part of a one-square kilometer private rural estate subdivided into urban lots; since 1974 it has been settled by lower middle class families, housing 25.05 percent of the urban population in 1978.[43] With most of its periphery appropriated by developers, the small city has little marginal land that can

receive squatters: Jaburú, a densely populated sector of substandard housing, follows closely the course of the Altamira Creek in a northwest-southeast direction between downtown Altamira and the Nova Brasília-Aparecida sector.

Marabá and Conceição do Araguaia, Southeastern Pará: Subregional and Local Centers in a Region Characterized by Diversified and Specialized Agropastoral Activities

Location

Southeastern Pará includes the microregions of Marabá and the Araguaia Paraense. Initially penetrated during the second quarter of the seventeenth century by way of the Tocantins-Araguaia river system, the region participated in the rubber-boom economy.[44] During the post-World War II period its accessibility to the growing population centers of Belém and of southern Brazil was increased by extension of the road network. Family-scale agriculture and large-scale agropastoral activities penetrated the region during that period.[45]

By comparison to other study areas, the microregion of Marabá is characterized by more land-intensive livestock raising, a greater equilibrium between food and industrial crops, and greater labor productivity. The microregion remains the North Region's largest producer of brazil nuts. Its principal município is Marabá, which contains a sub-regional center and was an active frontier region during the last decade.[46] Located immediately to the south of the Marabá microregion is the microregion of Araguaia Paraense.

Its principal município, Conceicão do Araguaia, had a diversified primary economy in the early 1960s. It became increasingly specialized in large-scale livestock activities during the late 1960s and 1970s.[47] The município possesses a local urban center.

The Rubber-Cycle Period

Like the other settlements selected, the once hamlets of Marabá and Conceição do Araguaia participated in the rubber-boom economy. After an unsuccessful attempt by North Goianese political dissidents to establish an agro-pastoral colony, Marabá was settled in June of 1898 on the confluence of the Itacaiúnas with the Tocantins Rivers. It was founded by merchants and cattle ranchers attracted by opportunities to supply the rubber market of the Itacaiúnas valley.[48] In 1913 the hamlet had some 500 permanent residents, but its population tripled during the rubber harvest periods.[49] Conceição do Araguaia, on the other hand, was founded in April of 1897 by Dominican Father Gil Vilanova. In 1898 the missionary outpost had a population of some 1,000 and participated as a rubber shipping point.[50] Although economic relations were commercialized during that period a subsistence economy prevailed in the rural area, and little value was given to private land ownership.[51]

The Post-Rubber-Cycle Period

Decline of the rubber economy had fewer adverse effects on population growth in Marabá than it did in Conceição do Araguaia.[52] This is attributed to the fact that Marabá was able to substitute an alternate product for rubber.[53] Whereas municipal rubber production slid from 327,000 kilograms in 1913 to 43,632 kilograms in 1923, brazil nut production rose from 20 hectoliters in 1913 to 120,417 hectoliters in 1926.[54] Rubber related transactions and business were paralyzed for some time due to credit loss by local merchants vis-à-vis Belém exporters, and migration from the town did take place toward sítios and fazendas in the município, to Northeast areas of origin, and to placer-mining sites in Mato Grosso.[55] According to Velho, however, the rise of brazil nut extraction greatly diminished the rate of depopulation. Initially, the proximity of castanhais (concentrations of nut carrying trees) favored absolute urban population growth and demand for agricultural surpluses from outskirt subsistence plots.[56] In 1923 Marabá was incorporated as a city, in 1927 it became comarca, and in 1929 it acquired a thermoelectric plant and street lighting. By 1935 one-half of its 3,000 persons were permanent residents.[57]

Marabá's municipal population became more socio-economically stratified with the further development of its rural economy. State legislation which encouraged the leasing of castanhais on public land to individuals attracted

large merchants and nut pickers. A middle class of castanhal renters emerged, castanhal ownership became concentrated. This contributed to a reduction in unemployment and an increase in the urban population. The latter grew by 66.71 percent, from 2,283 to 4,973 between 1940 and 1950.[58] During the 1950s the opening of a local branch of BASA, along with additional legislation, encouraged lease renewal, long-term rise in land value and concentration of ownership, extension of the feeder road network, and a "spectacular" growth and improvement of the cattle livestock population. The labor released from the castanhais was allocated to land-deficient, year-round pasture growing activities.[59] Between 1950 and 1960 municipal and urban populations grew by 80.49 and 83.91 percent, respectively. During the 1960s, the agricultural frontier advanced from the region of Imperatriz and Araguaína in the neighboring states of Maranhão and Goiás toward the region of Marabá. The movement was favored by a variety of factors: the opening of the Belém-Brasília Highway, homestead-style issuance of land titles by the State of Pará, the introduction of a liberal credit policy to small rural producers, favorable national market conditions of rice, the establishment of governmental purchasing and warehousing agencies in Marabá, and the opening of the PA-70, 220 kilometer penetration line between the city and the Belém-Brasília Highway. Some of the farmed land along that

road was rapidly acquired by entrepreneurs from the Central-South Region, who began large-scale livestock raising.[60]

Between 1960 and 1970 the municipal and urban populations grew by 98.11 and 74.93 percent. As of 1970 the local socioeconomic groups were made up of a small number of entrepreneurs, modest castanhal owners and well-to-do farmers, local merchants, small castanhal leasees and subleasees, nut pickers, and small rural occupants.[61]

In the município of Conceição do Araguaia the rural economy reverted to subsistence farming and ranching, and the population decreased during most of the post-rubber-boom period. From 1920 to 1940 agricultural production fell, but the number of establishments increased. Fazendas and sítios co-existed under untitled ownership, and land was extensively and irregularly used.[62] From 1911 to 1940 the municipal population fell from 15,000 to 4,715, with the município approaching annexation in 1930.[63] During the 1940-60 period its population reached the 1920 level, 11,283, and that of the municipal seat grew by 119.53 percent from 1,034 to 2,270.[64] Population growth is attributed to the migration of placer miners and to natural growth along with an increase of primitive manufacturing in the village.[65] With the construction of the Belém-Brasília in the late 1950s, the município entered upon a period of change that, as observed in Humaitá in 1978,

would mark the dawn of a new phase of local economic development. According to one old resident, the first team of land surveyors related to cattle enterprises penetrated the município in 1958, some eight years before SUDAM's local policy for agropastoral activities was launched.[66]

The 1970s

The regions of Marabá and Conceição do Araguaia further benefited from governmental investments in their road network and primary economy.[67] In the region of Marabá the INCRA developed an Integrated Colonization Project as of 1970: in 1976, 1,540 colono families were living in the 10 kilometer project area running along the first 376 kilometers of the Estreito-Marabá-Altamira segment of the Transamazonic Highway.[68] On the other hand, government-sponsored, large-scale livestock enterprises that initially advanced from the Belém-Brasília in a southwest direction along the PA-70 toward Marabá have now bypassed the city and are proceeding southward along the PA-150 into the município of Conceição do Araguaia.[70] The value of municipal livestock production increased by 81.42 percent during the 1968-73 period.[71] Between 1978 and 1979 the population, settled along the PA-150 between the city of Marabá and the border with the município of Conceição do Araguaia, increased by 63.49 percent from 1,887 to 3,085 persons. Five federal or state highways converge on the city of

Marabá which in 1978 had daily bus connections with twelve urban centers and localities in eastern Pará and nineteen connections to other points in western Pará.[72]

South of the município of Marabá, that of Conceição do Araguaia experienced a dramatic increase in large-scale livestock activities. Thirty-three of the eighty projects approved between 1966 and 1975 by SUDAM for Amazônia Legal are located in the município; their area varies between 2,526 and 69,748 hectares.[73] Between 1968 and 1973 the bovine population increased by 62.79 percent from 17,290 to 28,147; the value of livestock production rose by 11.94 percent, that for cattle livestock showing an increase of 279.48 percent.[74] The town was linked to Marabá by the PA-150 in 1969 and to the Belém-Brasília Highway via Couto Magalhães, in Goiás, in 1971.[75] From 1970 to 1972 the number of temporary rural workers increased from 218 to 7,011.[76] The Polamazônia program, launched in 1974 by SUDAM, released additional funds for large-scale agro-pastoral activities.[77]

The município underwent massive expansion of its settlement network. During the 1960s the area comprised within 1960 municipal boundaries increased its population by 237.16 percent, from 11,283 to 38,042 (Table II.2). Besides the town of Conceição do Araguaia, in 1974 the município had sixteen other settlements of varying size.[78] Redenção created in 1969 at one hundred kilometers west of Conceição do Araguaia on the PA-150, had some 12,000 people in 1978.

North of it, and on the same road, Rio Maria (1974) had some 10,000 people; Xinguara (1976) had 6,000; and Rio Branco (1977) 7,000.[79] In 1978 only, 106 new localities were recorded by SUCAM, of which fifty were cattle ranches.[80] The município also contained six small agricultural colonies totaling 2,400 people. Another colony was created in 1976 at kilometers north of Conceição do Araguaia, and had 700 families.[81] Most colonies were experiencing difficulties in financing production and marketing surpluses, and according to a local INCRA official, prospects for expansion of small-scale agricultural land-use were limited given the increasing governmental support to large-scale cattle enterprises in the município.[82]

Whereas the rural economy has rapidly developed in both municípios, becoming more diversified in Marabá and specialized in Conceição do Araguaia, the urban functions of the municipal seats have been affected in different ways.

The subregional center of Marabá has become a complex agglomeration. Since 1970, building within the urban area includes ten schools, a water processing plant, an energy redistributing station, a central telephone station, a jet airport, and five bank branch offices. Furthermore, headquarters have now been established in Marabá for institutions working in health, rural development, public works, and national security within the region. Chain department stores selling hardware, furniture, agricultural implements, and auto parts have sprung up, along with food

supermarkets. Between 1970 and 1978 the small city's population grew by 215.84 percent from 14,593 to an estimated 46,091 (Table II.2). It was distributed in eight neighborhoods grouped in three well-defined sectors: the old core of Marabá, the Nova Marabá urban relocation site, and the Cidade Nova urban expansion area.

In 1970 in Conceição do Araguaia, the local government took control of urban growth by regulating new urban settlement. However, as compared with Altamira--also a local center with a similar population size in 1970--the town has gained few additional facilities to serve its hinterland's growing population. In 1971 the municipality implemented urban land tenure regulation and construction norms, and channelled an orderly expansion of the town south and westward from the original missionary core.[83] During the last decade the town acquired health facilities to accommodate rural workers, and a public marketplace. Energy and water supplying systems are relatively deficient. A water reservoir, bank branch office and a riverfront hotel were under construction, and a television retransmission tower was being installed. The industrial park, however, still had not attracted the expected soap factories and furniture and leather-processing establishments. Interviews with heads of household suggest that, for the urban population, opportunities in civil construction and river transportation would have declined after 1975; the

urban economy is affected by unemployment particularly during the rainy season, due to lack of alternate activities.[84] Increased road accessibility to higher-order urban centers may be responsible for the weak development of the town's urban functions. Municipal livestock production is exported to slaughterhouses of small cities along the Belém-Brasília Highway; a bridge under construction on the Araguaia River, south and upstream of the town, will further permit the southern part of the município to export and import from urban centers along the highway, without going through the town. Basic food staples, such as rice, are imported from Marabá, northern Goiás, and western Maranhão, and are processed by seven small-scale mills for local consumption. On the other hand, the subregional center of Marabá has extended its influence over the rapidly developing northwestern part of the município; two daily bus routes were created in 1977 linking that area to Marabá.[85]

Conclusion

This chapter has presented a cross-section of urban evolution associated with frontier development. The four selected urban centers were established during the late nineteenth century and participated as staple export and supply import centers in the rubber-cycle period of 1875-1912. Subsequently, with the depression of their local economy by declining international demand for Brazilian rubber, these centers and their municípios experienced slow population

growth. The four localities demonstrated a much differentiated ability to recuperate during the 1960s, as they underwent various degrees of improvement in their surface accessibility to principal market centers and of expansion in their local rural economy.[86] By 1970 the urban centers exhibited different orders of functional hierarchy corresponding to different phases of frontier development. Governmental programs of road construction and incentives to agropastoral activities in the 1970s encouraged rapid population growth at all urban centers.

The following chapter examines the process of migration related to urban evolution during frontier development; it analyzes the spatial and socioeconomic characteristics of city-ward migration fields during the process.

FOOTNOTES

[1]In the Brazilian literature Amazonia is usually referred to by one of the following concepts: Pan-Amazonia, Legal Amazonia or North Region. Pan-Amazonia is that South American ecological domain characterized by tropicality; it includes portions of Brazil, Bolivia, Peru, Ecuador, Colombia, Venezuela, Guiana, Surinam, and French Guiana, totalling an area of 7,275,300 square kilometers (44.5 percent of South America) and a population of 9,802,000 in 1970. Defined in Brazil for purposes of regional development planning, Legal Amazonia retains the same hydrographic, biogeographic, phytogeographic, and economic attributes of Pan-Amazonia; however, it is delimited by different political and geodesic criteria and includes the total area of the states of Amazonas, Pará, and Acre, and of the territories of Amapá, Roraima, and Rondônia, as well as parts of the states of Maranhão (west of the 44th meridian), Goiás (north of the 13th parallel) and Mato Grosso (north of the 16th parallel). It extends over an area of 4,873,487 square kilometers, with a population of 7,133,119 in 1970. The North Region of Brazil, defined by IBGE for census purposes, encompasses the states of Pará, Amazonas and Acre, and the territories of Amapá, Rondônia and Roraima, with a total area of 3,554,000 square kilometers and 3,650,750 inhabitants in 1970. This is the regional concept used in this chapter. See Armando D. Mendes, Estradas para o Desenvolvimento, Cadernos Paraenses IDESP 6 (Belém: Governo do Estado do Pará, 1971) p. 71; Djalma Batista, O Complexo da Amazônia: Análise do Processo de Desenvolvimento (Rio de Janeiro: Conquista, 1976), pp. 32, 34; Elza C. De Souza Keller, "População," in Geografia do Brasil--Região Norte, ed. IBGE (Rio de Janeiro: IBGE, 1977), pp. 167. Regional agrarian production figures are from Maria Elizabeth C. de Sá Távora Maia, "Atividade Agrária," in Geografia do Brasil--Região Norte, p. 366.

[2]Ibid., p. 366.

[3]Ibid., p. 366.

[4]Ibid., pp. 386-390.

[5]Ibid., pp. 388-389.

[6]Ibid., p. 368.

[7]Humaitá is located at 7°31' latitude south, and 63°02' longitude west of G.M., at an average altitude of 90 meters a.s.l. See SUDAM, Desenvolvimento Integrado: Município de Humaitá (AM)--Relatório Preliminar (Manaus: SUDAM, 1972), p. 14.

[8]On the rubber cycle of Amazonia see Martin T. Katzman, "Paradoxes of Amazonian Development in a 'Resource-Starved' World," The Journal of Developing Areas, 10/4 (July 1976):446-448; Celso Furtado, The Economic Growth of Brazil (Berkeley: University of California Press, 1968), pp. 141-148.

[9]SUDAM, Desenvolvimento Integrado: Município de Humaitá (AM)--Relatório Preliminar, p. 13.

[10]Informal interview, Humaitá, 11/29/78.

[11]Ibid.

[12]Survey interviews nos. 27, 73, 76, 90, 93.

[13]SUDAM, Desenvolvimento Integrado, p. 15.

[14]Ibid., p. 17.

[15]Myriam G. Gomes Coelho Mesquita, "Transportes," in Geografia do Brasil--Região Norte, p. 291.

[16]Informal interview with executive director of the Madeira Agrarian Project, Humaitá, 11/30/78.

[17]Ibid.

[18]Informal interview with BASA technical advisor for rural projects, Marabá, 7/5/79.

[19]All lengths of federal highways quoted in this chapter are from Eliseu Resende, As Rodovias e o Desenvolvimento do Brasil (Munich: VII World Congress of the International Highway Federation, 1973).

[20]Survey interview no. 9.

[21]Informal interviews with BASA technical advisor and various large landholders during field work in Humaitá.

[22]Informal interview with municipal prefect, Humaitá, 11/13/78. Projects for 1979 included a hotel, a bus terminal, two rice mills, one rubber processing plant, one slaughter-

house, one urban social club, a public market place, and a technical school.

[23]Maria Elisabeth C. de Sá Távora Maia, "Atividade Agrária," in Geografia do Brasil--Região Norte, pp. 350-365.

[24]Ibid., p. 388.

[25]Ibid., p. 388.

[26]Ibid., p. 384.

[27]Vânia Figueiredo, Altamira, Latitude Esperança (Belém: Gráfica Falangola Ltda., 1976), pp. 69, 73. Altamira is located at 3° 12' latitude south, and 52° 13' longitude west, at an average altitude of 80 meters a.s.l. See IDESP, Diagnóstico do Município de Altamira, Série Relatórios de Pesquisa 8 (Belém: Governo do Estado do Pará, 1977), p. 4.

[28]Vânia Figueiredo, Altamira, Altitude Esperança, pp. 76-77.

[29]Ibid., p. 80.

[30]Catharina Vergolino Dias, "Sistema Urbano," in Geografia do Brasil--Região Norte, p. 438.

[31]Survey interviews nos. 5 and 7.

[32]Survey interview no. 54.

[33]Elza Coelho de Souza Keller, "População," in Geografia do Brasil--Região Norte, p. 233, and informal interview with former municipal prefect, Altamira, 10/16/78.

[34]IDESP, Diagnóstico do Município de Altamira. pp. 143, 149, 167, 169, 183.

[35]Survey interview no. 5.

[36]IDESP, Diagnóstico do Município de Altamira, p. 46.

[37]Unpublished data on principal and secondary bus routes, as of 2/14/78, were provided by the Departamento de Estradas de Rodagem do Pará, Divisão de Transito, Belém, Pará.

[38]INCRA, Altamira-1 (Brasília: Ministério da Agricultura, 1973); INCRA, PIN: Colonização da Amazônia (Brasília: Ministério da Agricultura, 1972), p. 32; unpublished annual operational programs of INCRA's Coordenadoria da Região Norte were obtained from the same regional office;

Elza Coelho de Souza Keller, "População," in Geografia do Brasil--Região Norte, p. 260.

[39]Unpublished data provided by INCRA, Coordenadoria Regional do Norte, Belém, November 1979.

[40]IDESP, Diagnóstico do Município de Altamira, pp. 167, 183.

[41]See footnote 37.

[42]Informal interview with former municipal prefect, Altamira, 10/16/78.

[43]Informal interviews with municipal prefect, head of Serviços Urbanos, Prefeitura Municipal de Altamira, and employees of SOCEGO urban development company, Altamira, 10/13-14/78.

[44]Roberto da Mata and Roque de Barros Laraia, Índios e Castanheiros: A Empresa Extrativa e os Índios no Médio Tocantins (Rio de Janeiro: Paz e Terra, 1979), pp. 61-72; Otávio Guilherme Velho, Frentes de Expansão e Estrutura Agrária: Estudo do Processo de Penetração numa Área da Transamazônica (Rio de Janeiro: Zahar Editores, 1972), pp. 16-57; Octavio Ianni, A Luta pela Terra (Petrópolis: Vozes, 1978), pp. 18-56.

[45]Otávio Guilherme Velho, Frentes de Expansão, pp. 73-144; Octavio Ianni, A Luta pela Terra, pp. 97-143.

[46]Maria Elizabeth C. de Sá Távora Maia, "Atividade Agrária," in Geografia do Brasil--Região Norte, pp. 381, 383, 389.

[47]Ibid., pp. 383, 385, 390.

[48]Otávio Guilherme Velho, Frentes de Expansão, pp. 29-30. Marabá is located at 8° 15' latitude south and 49° 12' longitude west, at an average altitude of 125 meters above sea level. See IDESP, Diagnóstico do Município de Marabá, Série Relatórios de Pesquisa 5 (Belém: Governo do Estado do Pará, 1977), p. 3.

[49]Ibid., p. 45.

[50]Octavio Ianni, A Luta pela Terra, p. 14, after José M. Audrin, Entre Sertanejos e Índios do Norte: O Bispo--Missionário Dom Domingos Carrerot (Rio de Janeiro: Edições Pugil Ltda--Livraria Agir Editora, 1946), p. 79; and ibid., p. 27, after Estevão-Maria Gallais, Uma Catequese entre os

Índios do Araguaya (São Paulo, 1903), pp. 43-44, quoted in Darcy Ribeiro, Os Índios e a Civilização (Rio de Janeiro: Editora Civilização Brasileira, 1970), p. 69. Conceição do Araguaia is located at 8° 15' latitude south and 49° 16' longitude west, at an altitude of 151 meters above sea level (meteorological station). See IDESP, Diagnóstico do Município de Conceição do Araguaia, Série Relatorios de Pesquisa 4 (Belém: Governo do Estado do Pará, 1977), p. 3; Edmon Nimer, "Clima," in Geografia do Brasil-Região Norte, p. 54.

[51]Octavio Ianni, A Luta pela Terra, p. 40.

[52]Otávio Guilherme Velho, Frentes de Expansão, p. 46, quoting José M. Audrin, Entre Sertanejos e Índios do Norte, pp. 162-163.

[53]Otávio Guilherme Velho, Frentes de Expansão, p. 47.

[54]Ibid., pp. 45-47.

[55]José M. Audrin, Entre Sertanejos e Índios do Norte, p. 162.

[56]Otávio Guilherme Velho, Frentes de Expansão, pp. 66-68.

[57]Ibid., pp. 48, 57, after Julio Paternostro, Viagem ao Tocantins (São Paulo: Companhia Editora Nacional, 1945), p. 107.

[58]See footnote 30.

[59]Otávio Guilherme Velho, Frentes de Expansão, p. 79.

[60]Ibid., pp. 118-123, 140-143, 157.

[61]Ibid., pp. 116, 141, 153.

[62]Octavio Ianni, A Luta pela Terra, pp. 79-80.

[63]José M. Audrin, Entre Sertanejos e Índios do Norte, p. 102; Octavio Ianni, A Luta pela Terra, p. 63.

[64]See footnote 30.

[65]Octavio Ianni, A Luta pela Terra, pp. 79-82.

[66]Survey interview, no. 41.

[67]IDESP/SEPLAN, "Projeto Vale do Tocantins-Araguaia," Belém: Governo do Estado do Pará, 1979. (Mimeographed.)

[68]José Alberto Magno de Carvalho et al. "Migrações Internas na Região Norte: Estudo de Campo da Região de Marabá," vol. 2 (Belo Horizonte: Centro de Planejamento e Desenvolvimento Regional/UFMG, 1977), pp. 177, 200, 233.

[70]Ibid., pp. 85, 92.

[71]IDESP, Diagnóstico do Município de Marabá, p. 199.

[72]See footnote no. 37. Population figures corresponding to highway segments are unpublished data provided by SUCAM's regional office for the district of Tocantins-Araguaia, in Marabá, 6/29/79.

[73]Octavio Ianni, A Luta pela Terra, pp. 91, 130; Dennis J. Mahar, Desenvolvimento Econômico da Amazônia: Uma Análise das Políticas Governamentais (Rio de Janeiro: IPEA/INPES, 1978), pp. 144-165.

[74]IDESP, Diagnóstico do Município de Conceição do Araguaia, pp. 157-158.

[75]Survey interview no. 40.

[76]INCRA figures quoted by Octavio Ianni, A Luta pela Terra, p. 118.

[77]Hugo de Almeida, O Desenvolvimento da Amazônia e a Política de Incentivos Fiscais (Belém: SUDAM, 1978), pp. 17-20, and informal interview with beneficiary, Conceição do Araguaia, 8/27/78.

[78]Octavio Ianni, A Luta pela Terra, p. 109.

[79]Dates and population estimates provided by local Dominican parish priest, Conceição do Araguaia, 9/3/78.

[80]SUCAM, "Relação de Localidades Novas do 2° Ciclo/78," Belém: Ministério da Saude/SUCAM, 1978. (Mimeographed.)

[81]Octavio Ianni, A Luta pela Terra, pp. 141-142.

[82]Informal interview with local INCRA lawyer, Conceição do Araguaia, 9/13/78.

[83]Informal interview with head of Departamento Municipal de Agricultura, Arquivo e Cadastro, Prefeitura Municipal de Conceição do Araguaia, Conceição do Araguaia, 8/28/78.

[84]Survey interviews nos. 4, 49, 60, 62, 70, 84, 95.

[85]IDESP, Diagnóstico do Município de Marabá, p. 47.

[86]A 1973 study on 74 urban centers of Amazonia assigned the following population potentials to the frontier centers: 2.74 to Humaitá, 7.47 to Altamira, 16.89 to Marabá, and 6.69 to Conceição do Araguaia. See José Freire da Silva Ferreira, Rede Urbana Amazônica: Subsídios para uma Política de Desenvolvimento Regional e Urbano, Cadernos NAEA 3 (Belém: Universidade Federal do Pará, 1977), pp. 104-125.

CHAPTER III

DIRECT CITY-WARD MIGRATION DURING FRONTIER DEVELOPMENT

This chapter argues that as the urban frontier center ascends to higher orders of the functional hierarchy with further frontier development, it attracts more migrants from distant areas who originally had high socioeconomic levels. In the process, however, individuals undergo less socio-economic mobility with migration. Spatial attributes of generating areas and receiving centers are discussed that are associated with the occupational selectivity and mobility behavior of migrants during urban evolution with frontier development. The chapter is organized into two sections. The first part examines differences in migrants' average length of moves from, and socioeconomic levels at, their previous place of residence; it also analyzes differences in these individuals' ability to improve upon previous achievement when moving to the urban frontier centers. General findings on the four cities are presented, followed by trends during frontier development. The second part interprets changes in the size, hierarchical composition and pattern of the frontier center's immediate in-migration field. These changes relate to changes in the spatial and socio-economic selectivity of migrants, providing evidence for a stagewise model of city-ward frontier migration. Quantitative

data in this chapter concern male heads of household from the original samples, who were ten years of age or older when they last arrived at the frontier centers. These represent 73.5 percent of the household sample, with proportions varying little between study areas.[1] Of these, 86.1 percent last arrived at the surveyed urban centers between 1968 and 1978; in general, percentages vary little between cities.[2]

Length of Moves from, and Socioeconomic Levels in, Generating Areas, and Improvement with Migration to the Urban Frontier Centers

General Findings

Migrants to the selected urban centers come from both rural and urban areas at lower orders of the functional hierarchy (Table III.1). In the four urban centers combined, migrants from rural areas account for 50.3 percent of all migrants; those from within the *município* of the receiving centers claim 28.6 percent of the total. Intermunicipal migrants from rural areas proceed mostly (71.0 percent) from sublocal *municípios*. The majority of intermunicipal migrants come from urban areas (69.9 percent) however, and more so from places at lower orders of the hierarchy: 34.3 percent came from sublocal centers, 18.2 percent from local centers, 15.4 percent from subregional centers, 10.5 percent from regional centers and 22.4 percent from metropolitan centers. This result suggests that direct migration to the selected urban centers proceeds in an orderly fashion with

Table III.1. Mean Distances Between Previous Places of Residence of Male Migrant Informants and Receiving Urban Frontier Centers, by Receiving Urban Frontier Center and by Hierarchical Order and Environmental Type of Previous Place of Residence.

Name and Hierarchical Order of Receiving Urban Frontier Centers	Intra-Municipal Migrants	Previous Places Intermunicipal						
		Metropolitan-regional 1-2			Subregional 3			
	Total n=83	Rural n=1	Urban n=44	Total n=48	Rural n=9	Urban n=22	Total n=31	Rural n=8
Humaitá 5 n=70	0.00[b]	11.75	22.62	21.79	3.25	8.72	6.77	--
	--[c]	--	13.98	13.72	0.00	5.26	4.94	--
	45.71[d]	1.43	17.14	18.57	7.14	12.86	20.00	0.00
Altamira 4 n=79	0.00	--	22.62	22.62	12.42	12.80	12.71	9.65
	--	--	14.94	14.94	5.90	7.93	7.07	5.87
	34.18	0.00	15.19	15.19	2.53	7.59	10.13	2.53
Marabá 3 n=70	0.00	--	19.72	19.72	9.95	13.34	12.49	8.62
	--	--	9.82	9.82	0.21	12.19	10.42	0.53
	5.71	0.00	25.71	25.71	2.86	8.57	11.43	2.86
Conceicão do Araguaia 4 n=71	0.00	--	15.88	15.88	--	5.75	5.75	3.12
	--	--	1.23	1.23	--	--	--	0.24
	29.58	0.00	7.04	7.04	0.00	1.41	1.41	5.63
Total n=290	0.00	11.75	21.26	21.06	6.78	10.96	9.75	6.13
	--	--	12.11	12.06	4.76	8.18	7.53	3.93
	28.62	0.34	16.21	16.55	3.10	7.59	10.69	2.76

SOURCE: Interviews with 400 heads of household in the North Region of Brazil, 1978-79

[a] Four cases excluded due to missing values.

[b] Mean of individual distances expressed in centimeters. Each centimeter is equal to 50 kilometers.

[c] Standard deviation of mean value.

[d] Row percentage of cases.

of Residence Migrants								Intra and Intermunicipal Migrants		
Local 4		Sublocal 5			All Orders 1-5			All Orders 1-5		
Urban n=26	Total n=34	Rural n=44	Urban n=49	Total n=93	Rural n=62	Urban n=144	Total n=206	Rural n=146	Urban n=144	Total n=290[a]
46.25	46.25	9.93	21.81	11.67	7.50	17.74	14.24	2.59	17.74	7.73
--	--	13.29	13.12	11.57	10.04	13.37	13.15	6.59	13.37	11.99
1.43	1.43	8.57	5.71	14.29	18.57	35.71	54.29	64.29	35.71	100.00
27.67	20.46	16.94	13.49	14.76	15.25	17.38	16.75	5.21	17.38	11.03
17.22	15.95	11.03	8.70	9.57	9.89	12.31	11.70	9.44	12.31	12.39
3.80	6.32	12.66	21.52	34.18	17.72	48.10	65.83	51.90	48.10	100.00
10.13	9.90	6.22	7.13	6.69	6.94	13.19	11.58	5.62	13.19	10.92
10.07	9.22	10.50	4.69	7.88	9.20	10.27	10.31	8.68	10.27	10.37
15.71	18.57	18.57	20.00	38.57	24.29	70.00	94.29	30.00	70.00	100.00
6.16	5.35	7.86	6.77	7.30	6.12	8.71	7.96	3.34	8.71	5.61
4.08	3.72	8.01	5.66	6.79	7.15	7.50	7.46	6.30	7.50	7.24
15.49	21.13	19.72	21.13	40.84	25.35	45.07	70.42	54.93	45.07	100.00
11.86	10.51	9.90	9.75	9.76	8.90	14.03	12.51	4.76	14.03	10.74
12.80	11.56	10.74	7.35	9.11	9.47	11.36	11.01	13.78	11.36	24.07
8.97	11.72	15.17	16.90	32.07	21.38	49.66	71.03	50.34	49.66	100.00

migrants originating from places at neighboring orders of the hierarchy.

Migrants from urban areas come from more remote places and show higher socioeconomic levels at the generating areas than those from rural areas. Mean distances, in kilometers, between generating and receiving centers are 701.5 and 445, respectively, and mean social scores at the generating areas 9.50 and 6.61.[3] Migrants from high orders of the functional hierarchy proceed from more distant places than those from low orders, with rural/urban differences maintained at all but the sublocal order. Mean distances in kilometers for migrants from rural and urban areas are 587.5 and 1,063, respectively, at the metropolitan-regional order, 339 and 548 at the subregional, 306.5 and 640 at the local, and 487.7 and 495 at the sublocal.[4] Furthermore, migrants left high-order generating areas with higher socioeconomic levels than those from low-order areas. The mean social scores are 11.20 at the metropolitan-regional order, 8.78 at the subregional, 7.43 at the local, and 7.29 at the sublocal order (Table III.2).[5] The relationship is not clear however, when the environmental type, rural or urban, is held constant. Findings confirm conclusions from other studies that intermunicipal migrants from urban places, high orders of the hierarchy, and remote generating areas show higher socioeconomic levels originally than their counterparts from rural places, low orders of the hierarchy, and

Table III.2. Mean Social Scores of Male Migrant Informants According to Occupations Held at Previous Place of Residence and Upon Arrival at the Urban Frontier Center, by Receiving Urban Frontier Center and by Hierarchical Order and Environmental Type of Previous Place of Residence.

Name and Hierarchical Order of Receiving Urban Frontier Centers	Intra-Municipal Migrants	Previous Places Intermunicipal						
		Metropolitan-regional 1-2			Subregional 3			
	Total n=83	Rural n=1	Urban n=47	Total n=48	Rural n=9	Urban n=22	Total n=31	Rural n=8
Humaitá 5 n=70								
$\bar{X}_1$[a]	5.58	6.11	10.13	9.82	4.54	11.38	8.94	--
S_1[b]	3.47	--	5.89	5.75	0.45	9.23	8.00	--
$\bar{X}_2$[c]	7.43	6.11	16.04	15.27	4.41	14.88	11.14	--
S_2[d]	4.84	--	8.13	8.25	0.36	11.29	10.27	--
Altamira 4 n=79								
$\bar{X}_1$	11.35	--	9.97	9.97	7.04	8.63	8.11	13.50
S_1	6.93	--	7.59	7.59	0.80	4.87	4.18	3.78
$\bar{X}_2$	9.69	--	13.42	13.42	12.17	11.96	12.02	10.19
S_2	6.04	--	8.40	8.40	6.76	5.08	5.00	8.46
Marabá 3 n=70								
$\bar{X}_1$	9.27	--	12.02	12.02	6.42	6.08	5.83	4.62
S_1	12.22	--	4.12	4.12	1.37	1.25	2.49	0.58
$\bar{X}_2$	12.13	--	11.55	11.55	6.14	9.42	7.39	6.68
S_2	13.56	--	7.04	7.04	1.76	3.93	4.40	1.00
Conceicão do Araguaia 4 n=71								
$\bar{X}_1$	6.07	--	14.95	14.95	--	27.50	27.50	4.52
S_1	4.92	--	8.32	8.32	--	--	0.00	0.73
$\bar{X}_2$	3.52	--	15.67	15.67	--	17.97	17.97	5.24
S_2	6.95	--	8.21	8.21	--	--	0.00	1.61
Total n=290								
$\bar{X}_1$	7.65	6.11	11.31	11.20	5.52	10.12	8.78	7.30
S_1	6.04	--	6.10	6.08	1.34	7.57	6.71	4.23
$\bar{X}_2$	8.54	6.11	13.66	13.50	6.52	12.74	10.94	6.84
S_2	6.28	--	7.79	7.78	4.12	8.06	7.63	4.02

SOURCE: Interviews with 400 heads of household in the North Region of Brazil, 1978-79.

NOTE: *Four cases excluded due to missing values.

[a] $\bar{X}_1$ mean of individual social scores corresponding to occupation held at previous place of residence.

[b] S_1 standard deviation of $\bar{X}_1$.

[c] $\bar{X}_2$ mean of individual social scores corresponding to first occupation held upon last arrival at urban frontier center.

[d] S_2 standard deviation of $\bar{X}_2$.

of Residence Migrants								Intra and Intermunicipal Migrants		
Local 4		Sublocal 5			All Orders 1-5			All Orders 1-5		
Urban n=26	Total n=34	Rural n=44	Urban n=49	Total n=93	Rural n=62	Urban n=144	Total n=206	Rural n=146	Urban n=144	Total n=290
0.00	0.00	8.84	9.01	8.89	6.98	10.04	8.39	5.94	10.04	7.42
0.00	0.00	6.98	3.44	5.92	5.38	7.09	6.65	4.11	7.09	5.67
13.93	13.93	9.05	9.79	9.59	7.28	14.79	12.22	7.35	14.79	10.01
--	--	8.81	2.08	7.26	6.73	8.78	8.81	5.37	8.78	7.62
7.06	9.64	8.10	8.95	8.63	8.72	9.07	8.76	10.28	9.07	9.70
3.63	4.75	5.29	5.61	5.40	4.97	5.94	5.86	6.28	5.94	6.11
4.94	7.04	10.15	12.91	11.89	10.44	12.29	11.80	9.95	12.29	11.08
2.10	5.32	5.25	16.70	13.53	5.35	12.26	10.82	5.76	12.26	9.47
10.55	9.64	7.15	10.66	8.97	6.77	10.63	9.62	7.24	10.63	9.56
6.30	6.17	6.27	8.59	7.63	5.50	6.11	6.16	6.90	6.11	6.55
9.35	8.94	6.70	10.48	8.66	6.63	10.47	9.46	7.68	10.47	9.62
7.99	7.36	6.75	8.70	7.91	5.87	7.34	7.15	7.75	7.34	7.52
5.55	5.27	4.56	5.96	5.28	4.55	7.90	6.69	4.12	7.90	6.41
2.37	2.09	1.38	5.44	4.02	1.24	6.95	5.81	5.03	6.95	5.58
6.09	5.86	5.13	9.46	7.37	5.16	9.54	7.96	6.97	9.54	8.13
4.22	3.67	1.97	5.87	4.88	1.85	6.53	5.71	5.46	6.53	6.06
7.62	7.43	6.72	8.53	7.29	6.61	9.50	8.59	6.96	9.50	8.34
5.21	4.99	5.14	6.56	4.66	4.65	6.46	6.10	5.69	6.46	6.09
7.62	7.45	7.45	10.97	8.49	7.20	11.50	10.20	8.02	11.50	9.74
6.15	5.67	5.82	11.22	6.12	5.36	9.09	8.37	5.96	9.09	7.85

nearby generating areas.[6] Individuals' search spaces vary in breadth according to the environmental and hierarchical characteristics of their place of residence; they are wider for those located at high-order urban centers, which enable them to gain direct access to long-distance opportunities.[7]

More importantly, although all individuals in general do improve upon former socioeconomic levels with migration to the frontier centers, those who experience the greatest mobility are a minority coming from urban areas at high orders of the hierarchy. The increase in mean social scores for all intermunicipal migrants is 1.61, and 1.40 when intramunicipal migrants are included.[8] Migrants from metropolitan-regional and subregional municípios gain more, however, than migrants from local and sublocal municípios; social score increases for those from the former orders are 2.30 and 2.16 (2.23 when intramunicipal migrants are included), respectively; whereas equivalent increases for the latter are 0.02 (0.39) and 1.20 (1.35), respectively. At all but the local order, interurban migrants experience more improvement than migrants from rural areas; social score increases for the former are, respectively, 2.35 at the metropolitan-regional order, against 0.00 for the latter, 2.62 against 1.00 (0.81) at the subregional order, 0.00 against -0.46 (0.17) at the local order, and 2.44 against 0.73 (1.17) at the sublocal order.[9] Assuming that social

score increases provide valid estimates of socioeconomic mobility, it is made clear that direct migration to frontier centers is less profitable for individuals coming from less distant, rural areas, at low orders of the functional hierarchy.

General statements above concerning distances travelled, socioeconomic backgrounds and improvement of city-ward frontier migrants are subject to variations, however, depending on the stage of urban frontier evolution considered.

Changes During Frontier Development

The extent to which an urban center receives migrants with high socioeconomic levels directly depends upon its hierarchical order and on the incidence of intervening obstacles between it and generating areas.[10] Or, in other words, the higher the hierarchical order of the receiving center, the fewer the competing centers and the more likely those migrants reaching it will have high socioeconomic levels. Migrant selectivity however at any order is greater the lower its accessibility to higher-order places. Further improvement upon socioeconomic levels held by migrants at the previous residence is inversely associated to the hierarchical order of the receiving center.[11] Migrants to low-order urban centers are likely to experience greater socioeconomic mobility than those to urban centers of higher orders. In the process of urban change during frontier development, the receiving center should attract more

migrants with high socioeconomic levels; but at any order, it should in more developed regions lose more of these to competing centers of higher orders, and become itself more accessible to migrants with low socioeconomic levels. Moreover, people moving to the urban frontier center should experience less socioeconomic mobility as it reaches higher orders of hierarchy with further frontier development.

The average distance between generating areas and the receiving urban center tends to increase as the latter reaches higher orders of hierarchy. This is due to the decreasing frequency of intramunicipal migration in the process. Mean and median distances between previous places of residence and the sublocal, local, and subregional receiving centers located in different regions are, respectively, 386.5 and 162.5 for Humaitá, 551.5 and 425 for Altamira, and 546 and 437.5 in Marabá. These measures are incomplete indicators of interurban variations: data distributions are positively skewed, and more so at the lower orders of the hierarchy where intramunicipal migrants, who are assigned a zero value for distance, are more frequent; they account for 45.7 percent of all migrants to Humaitá, 34.2 percent in Altamira, and 5.7 percent in Marabá. Assuming representative samples, the declining rate at which median distances increase is probably due, in the study areas, to Marabá facing more severe competition on part of higher-order centers than expected and/or long-distance

migrants from urban areas to Altamira being more frequent than normal, as a result of governmental assistance provided in the relocation of colonization project-related personnel and settlers. The mean distance travelled by intercity migrants to Marabá is 659.5, as opposed to 869 in the case of Altamira. Average socioeconomic levels originally held by migrants at the generating areas also tend to increase in the process, but again, in the case of Marabá, the city draws more low-skilled workers from the countryside than Altamira, located in a less pressured environment. Aspects of the frontier centers' immediate in-migration fields are discussed later in this chapter.

Migrants' average socioeconomic levels upon arrival at the receiving urban center do not differ greatly as the city reaches higher orders of hierarchy with further frontier development. Mean social scores of migrants upon arrival are 10.01 for Humaitá, 11.08 for Altamira, and 9.62 for Marabá.[12] It follows that for migrants in general, opportunities for socioeconomic mobility are greater at low-order urban centers in less developed regions. There, migrants may experience more mobility not only because they initially have lower socioeconomic levels than those in higher-order urban centers in more developed regions. Under greater influence of intervening obstacles, migrants are more positively selected and face less competition on part of other well-prepared individuals; also, the receiving center

is able to generate more opportunities when less accessible to higher-order centers. This is further evidenced by comparing two urban frontier centers of equal order located in regions with different phases of development. Both the average distance from generating areas and socioeconomic levels of migrants, there and at the receiving center, are less for that center located in the more developed region. Mean and median distances are 551.5 and 425, respectively, in Altamira, and 280.5 and 156 in Conceição do Araguaia.[13] Percentages of intramunicipal migrants are similar (34.18 and 29.58 percent), and when these are excluded, there is a marked difference in distances. Mean social scores at generating areas are 9.70 and 6.41, and those at the receiving center, 11.08 and 8.13, respectively.[14]

Intermunicipal migrants particularly from urban areas, are responsible for the overall declining socioeconomic levels of migrants at the receiving center, during frontier development. In the process, the urban center draws increasingly more migrants from urban areas. At each stage these individuals show higher socioeconomic levels than migrants from rural areas; this finding is consistent with an earlier general result where the hierarchical order of the generating areas was held constant. In the process, however, interurban migrants experience less socioeconomic mobility with migration. Mean social scores at generating areas and

receiving centers are, respectively, 10.04 and 14.79 for Humaitá, 9.07 and 12.29 for Altamira, and 10.63 and 10.47 for Marabá.[15]

The spatial and socioeconomic selectivity of interurban migration is affected by the regional location of the receiving urban center. For cities of equal order in regions with different phases of economic development, interurban migrants to the more developed region come from less distant centers, at lower hierarchical orders. Mean distances in kilometers are 869 for Altamira and 435.5 for Conceição do Araguaia.[16] Percentages of migrants from local and sublocal centers are 52.6 percent for Altamira and 81.2 percent for Conceição do Araguaia. Here, interurban migrants show lower previous socioeconomic levels and less improvement with migration. Mean social scores at generating areas and the receiving centers are, respectively, 9.07 and 12.29 in Altamira, and 7.90 and 9.54 in Conceição do Araguaia.[17] Therefore it appears that not only does spatial and socioeconomic selectivity diminish in more developed regions, but also opportunities become more limited for reasons mentioned earlier.

To summarize; as the frontier center ascends to higher orders of hierarchy with further frontier development, changes occur in spatial attributes of both the generating areas and the receiving center that contribute to maintain the socioeconomic levels of migrants upon arrival at the

receiving center. As higher orders are reached, the frontier center draws more migrants from other municípios; as it extends its influence over surrounding lower-order places, interurban migrants come increasingly from these lower-order places; under normal conditions, this contributes to raise the socioeconomic levels of migrants reaching the frontier center. Additionally, as this center ascends to higher orders, the margin of improvement gained with migration decreases. Socioeconomic levels of all migrants at the receiving center are not higher at earlier stages, however, since migrants from rural areas experience generally less improvement than migrants from urban areas, and since they are more numerous at earlier stages. The next section explores changes in the spatial attributes of in-migration fields that, in the process, affect the selectivity of migration to the frontier city.

The Immediate In-Migration Field of the Urban Frontier Center

In-migration fields permit one to examine changes in the functional hierarchy during frontier development.[18] The process is schematized in Figure I.1a through I.1c. As the receiving center of a frontier region ascends to higher orders of the hierarchy, changes occur in the size, hierarchical composition and pattern of its area of influence in general, and of its in-migration field in particular. Changes that occur within the field over time reflect growth in potential

migrants' accessibility to spatial opportunities. One additional systematic dimension that affects migrant selectivity in the process is not pictured in the closed system representation. Just as the spatial organization of northern Brazil is tied to that of the national space-economy, so do various subregions within northern Brazil, characterized by different phases of development, have their own internal process tied to regional and national ones. At the local level in the case of the selected urban centers, stage-specific in-migration fields should reflect not only the growing accessibility of the receiving center to its own area of influence, but also its growing accessibility to higher-order centers (Figure I.1d). With increasing accessibility of the urban center to others of higher orders, two things should happen: First, higher-order centers should gradually encroach upon the in-migration field of the urban frontier center, and divert more well-prepared migrants away from it; secondly, the urban frontier center should gradually become part of the out-migration field of higher-order centers, and receive more migrants with high socioeconomic levels from those centers. The immediate in-migration fields of the selected urban centers provide confirmative and indicative evidence for these arguments.

Stage One

In a frontier region dominated by a subsistence economy with seasonal employment related to export of

nonperishable products, undifferentiated settlements prevail that are weakly interlinked. Under these conditions, Figure I.1a suggests that the in-migration field of the frontier center is mainly limited to its rural hinterland.[19] Figure III.1 shows that this is the case for Humaitá. This figure, as well as Figures III.1 through III.4, represents the functional hierarchy of areas generating direct migrants to the city; flows are not shown, since they involve small numbers (from 1 to 3 mainly). Migrants to the sublocal center generally come from nearby rural areas (64.3 percent), and most of them proceed from within the município of the receiving center (71.1 percent). These individuals have left nearby small hamlets, such as Três Casas, Carapanatuba, Paraíso, Beén, São Raimundo, and Ilha São João, and travelled by river to Humaitá. Others come from small settlements in neighboring municípios, namely Manicoré, Canutama and Pôrto Velho. At this stage, migration from the countryside is more rewarding: most migrants to Humaitá were rural people engaged in subsistence farming and/or plant extraction before moving in and most retain access to their land. Upon arrival at the urban center, nearly 70 percent became manual workers for road and civil construction companies or local governmental agencies. In Humaitá, little value given to land in marginal terrain south and southwest of the original nucleus encourages urban squatting; this further lowers the cost of migration from the countryside.

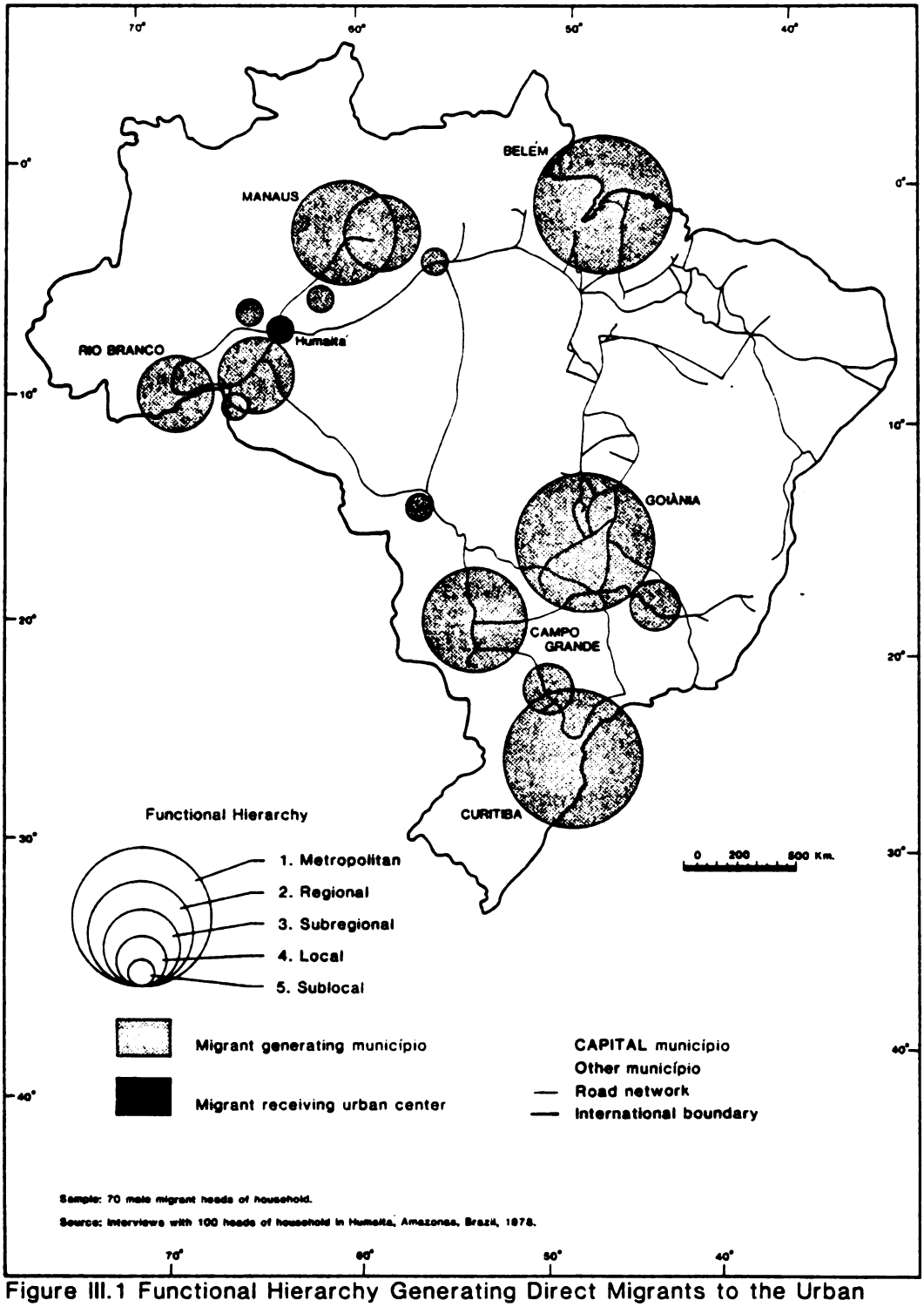

Figure III.1 Functional Hierarchy Generating Direct Migrants to the Urban Center of Humaitá, Amazonas, Brazil, 1978

Migration from other municípios, urban areas, and metropolitan centers is less important at this stage. Intermunicipal migrants comprise 54.3 percent of all migrants, 65.8 percent of whom are interurban migrants; of these 16.0 percent come from metropolitan areas. The percentage of migrants from metropolitan-regional centers is probably higher than would be expected at this stage due to the exceptional presence of Manaus, state capital and free-trade zone, and to the absence of intervening centers at intermediate orders between it and Humaitá. Migrants from high-order centers have travelled distances similar to their counterparts at later stages, but they have lower socioeconomic levels originally and show greater improvement with relocation. Many are young career-oriented functionaries who, in addition to promotion, are provided cheap social services, with the opportunity of venturing into the rural estate business. In Blau and Duncan's words they become "big fish in small ponds." The urban frontier center begins to draw migrants from distant and highly developed regions.[20] Immediately southwest of Humaitá, the territory of Rondônia, which has experienced dramatic population growth and agricultural development over the last decade, supplies 12.9 percent of Humaitá's migrants; but 11.4 percent also come from states further to the south and from eastern Pará.[21]

Stage Two

At a more advanced stage, with the development of agropastoral activities, the urban center ascends to a higher order of the hierarchy. As settlement becomes more dense and the infrastructure more developed, the center extends its influence to surrounding smaller places. Figure II.1b suggests that, under these conditions, the in-migration field of the urban frontier center encompasses more low-order places outside its rural hinterland.

Figure III.2 shows that this is the case for Altamira. Migration from the interior of the município tends to decrease as a better local road network and transportation system provide the neighboring rural population greater access to services in the town without the need to resettle in the urban center. In Altamira, migrants from within the município now account for only 34.2 percent of all migrants. Some settlers living outside the município may perceive themselves to be located originally within the município, as a result of the high accessibility provided by the Transamazonic Highway; therefore the percentage of intramunicipal migrants could be lower than indicated above. By comparison to stage one, these migrants show higher socioeconomic levels at previous residence and experience less improvement with migration. Mean social scores within the município and at the receiving center are, 5.58 and 7.43, respectively, for Humaitá, but 11.35 and 9.69

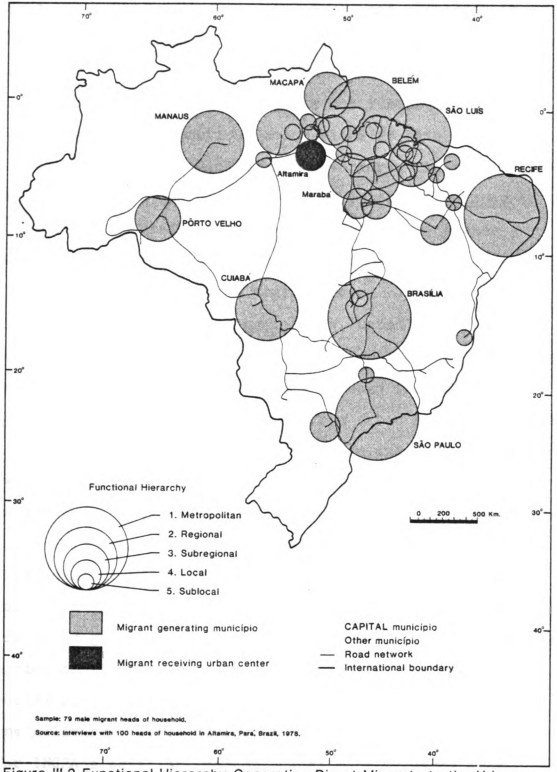

Figure III.2 Functional Hierarchy Generating Direct Migrants to the Urban Center of Altamira, Para, Brazil, 1978

for Altamira.[22] It appears therefore that migration from the rural hinterland is less related to occupational improvement than at an earlier stage. In Altamira, 36.6 percent of migrants are subsistence occupants and rubber tappers who survive with their previous occupations or have become street vendors or unskilled manual workers. Another 30.0 percent of those who leave the countryside are colonos of Altamira's Integrated Colonization Project who either continue with the project, or have abandoned it to invest in a small business or become taxi drivers.

Migration from other municípios, urban areas, metropolitan and sublocal centers is more important at this stage. Nearly two-thirds of all migrants proceed from other municípios, 73.1 percent of whom from urban areas; of these, 23.7 and 44.7 percent from metropolitan and sublocal centers, respectively. Migrants from both orders show previous socioeconomic levels similar to their counterparts at stage one. Furthermore, those from metropolitan centers proceed from equal distances, but earn less improvement than at an earlier stage. Individuals from sublocal centers have travelled greater distances and improve little upon previous socioeconomic levels. In the latter case, the high mean social score upon arrival (12.91) is skewed ($s = 16.70$) by one military (13.60) having become lawyer (75.63) to work for INCRA's Agrarian Project. That more migrants from metropolitan and sublocal centers with previous socioeconomic

levels similar to those of their counterparts at stage one, travel comparable or greater distances to earn less improvement, indicates a declining spatial selectivity at this stage. More than at an earlier stage, the frontier center draws migrants from the more developed Middle North Region and southern Brazil, east and south of regions reached later by the agricultural settlement movement, such as northern Goiás and Mato Grosso.[23] In the state of Maranhão local and subregional centers, like Imperatriz, Santa Inês, and Monção, send more individuals than smaller centers.

Stage Three

With further diversification and specialization of the agropastoral economy, the leading urban center of the region ascends to a higher order of the hierarchy. As settlement becomes more concentrated and organized and the infrastructure more developed, local and sublocal places in the vicinity of the subregional center now fall within its in-migration field (Figure I.1c).

This simulation appears to be the case for Marabá. Only 5.7 percent of its migrants proceed from within the município. Further concentration of settlement and expansion of the road network and transportation system may encourage more local settlers to substitute commuting for short-distance migration. Instead, migrants with lower socio-economic levels than at earlier stages come from rural areas of nearby municípios. These are usually rural occupants,

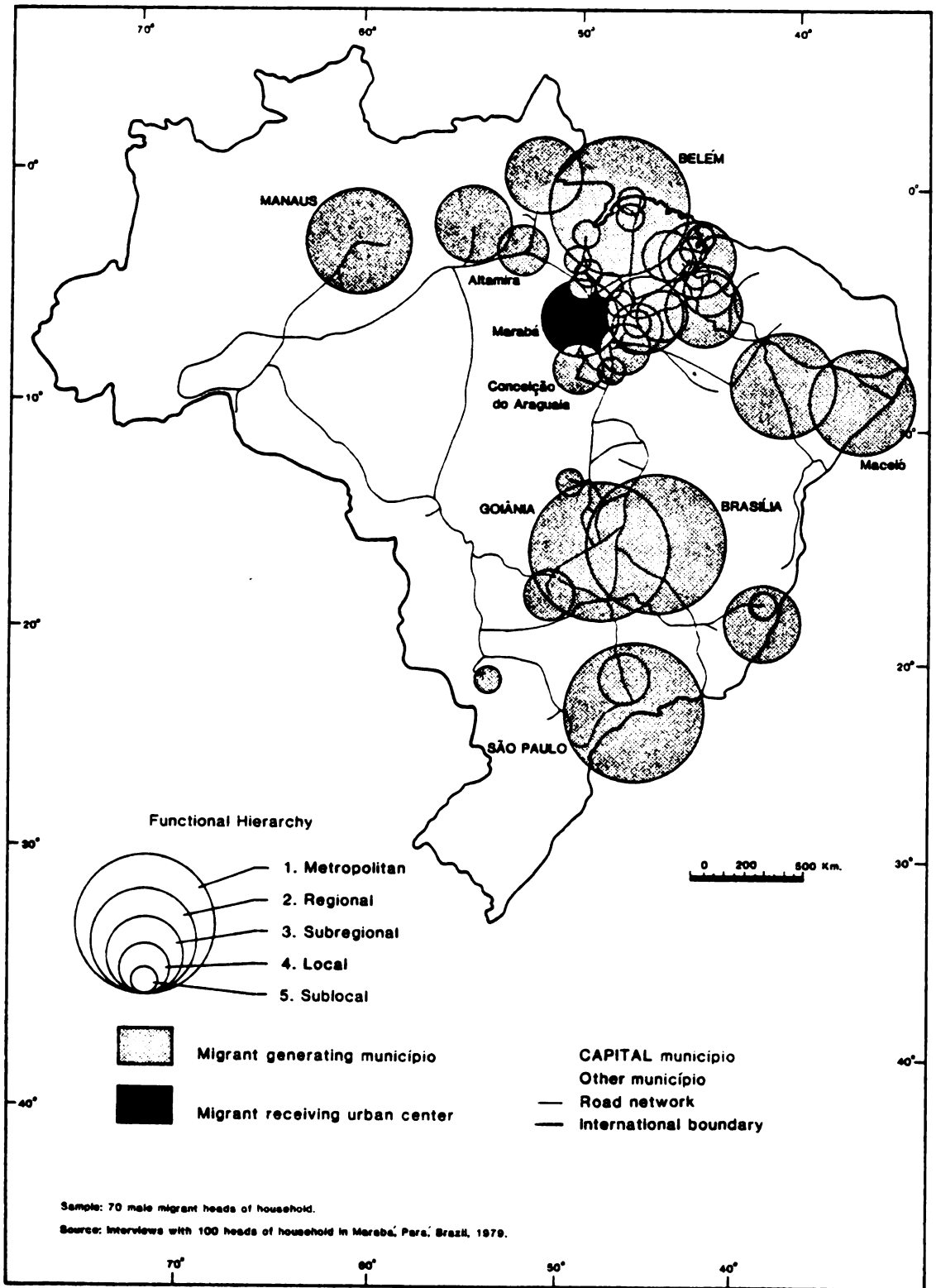

Figure III.3 Functional Hierarchy Generating Direct Migrants to the Urban Center of Marabá, Pará, Brazil, 1979

cattle ranch jobbers and seasonal workers who gain little with migration, possibly due to greater competition on part of interurban migrants at this stage. Less short-distance, selective, and rewarding city-ward migration suggests that migration from rural areas to the urban center becomes coercive. By this it is meant that at this stage, the inability to obtain titled land ownership as well as full-time rural employment encourages subsistence farmers to leave for the city. This situation is in sharp contrast to what occurred at stage one.[24] Migration to less developed regions involves overcoming distances and an element of risk that subsistence farmers probably cannot afford.

At this stage, migration is essentially intermunicipal. In the case of Marabá the proportion of interurban migrants is greater in comparison to Altamira. However, although more of them come from metropolitan and local centers, these proceed from less distant municípios. At each order of the hierarchy, migrants have original socioeconomic levels similar or lower than those of their counterparts at an earlier stage. They also undergo less improvement with migration; in fact, only migrants from subregional centers progress. This implies that migrant selectivity in the case of Marabá is markedly affected by competing urban centers (Figure III.2).[25] Well-prepared migrants from

Marabá's in-migration field may either move directly to metropolitan centers at the extremes of the Belém-Brasília Highway, or as the eastern portion of Altamira's in-migration field indicates, to low-order urban centers located in less developed regions (Figure III.2). The pattern of generating areas, which at stage one was dispersed and at stage two became concentrated, is even more compact at stage three. Marabá's direct in-migration field comprises: 1) sublocal municípios within its immediate area of influence, in the lower-portion of the northward flowing Araguaia-Tocantins river system, between Conceição do Araguaia upstream and Mocajuba downstream (17.1 percent of all migrants); 2) sublocal, local, and sub-regional municípios in the state of Goiás along the Belém-Brasília Highway, between Colinas de Goiás and Imperatriz, (17.1 percent); and 3) municípios of similar orders in the state of Maranhão, traversed by the roadway linking Santa Inês, Presidente Dutra, Barra do Corda, and Grajaú to Pôrto Franco, on the Belém-Brasília Highway (40 percent).[26] Outside this field, however, the frontier center attracts few long-distance migrants from low-order places such as those along the southern section of the Belém-Brasília Highway. Metropolitan-regional centers on the periphery of the field send to Marabá individuals who seek sufficiently large, yet less competitive, cities where they can retain previous, or take up similar, high-scored occupations.

The spatial and socioeconomic selectivity of migration to urban centers weakens in more developed regions. This is revealed by comparing two local centers, one located in a less advanced, the other, in a more advanced region: Altamira and Conceição do Araguaia (Figures III.2 and III.4). At both centers intramunicipal migrants retain similar shares of total inflows (34.2 percent and 29.6 percent, respectively); but socioeconomic levels at previous residence and upon arrival at the receiving center, are lower for migrants to the city in the more developed region. Migrants to Conceição do Araguaia are subsistence farmers and cattle ranch jobbers (85.7 percent); of these, 55.6 percent had discontinued working the land and had become mainly unskilled manual workers.

As to intermunicipal migrants, those who settled in the center of the more developed region come from less distant generating areas (398 kms against 837.5 kms), show lower socioeconomic levels at their former residence (7.96 against 11.80) and less improvement with migration (social score increase of 1.27 against 3.04).[27] Conceição do Araguaia attracts fewer migrants from higher-order municípios, who furthermore demonstrate less improvement. Only 12 percent proceed from metropolitan-regional and subregional hierarchical orders, as opposed to 38.5 percent in Altamira; and increases in mean social scores between previous residence and upon arrival is 0.75 for those from metropolitan-

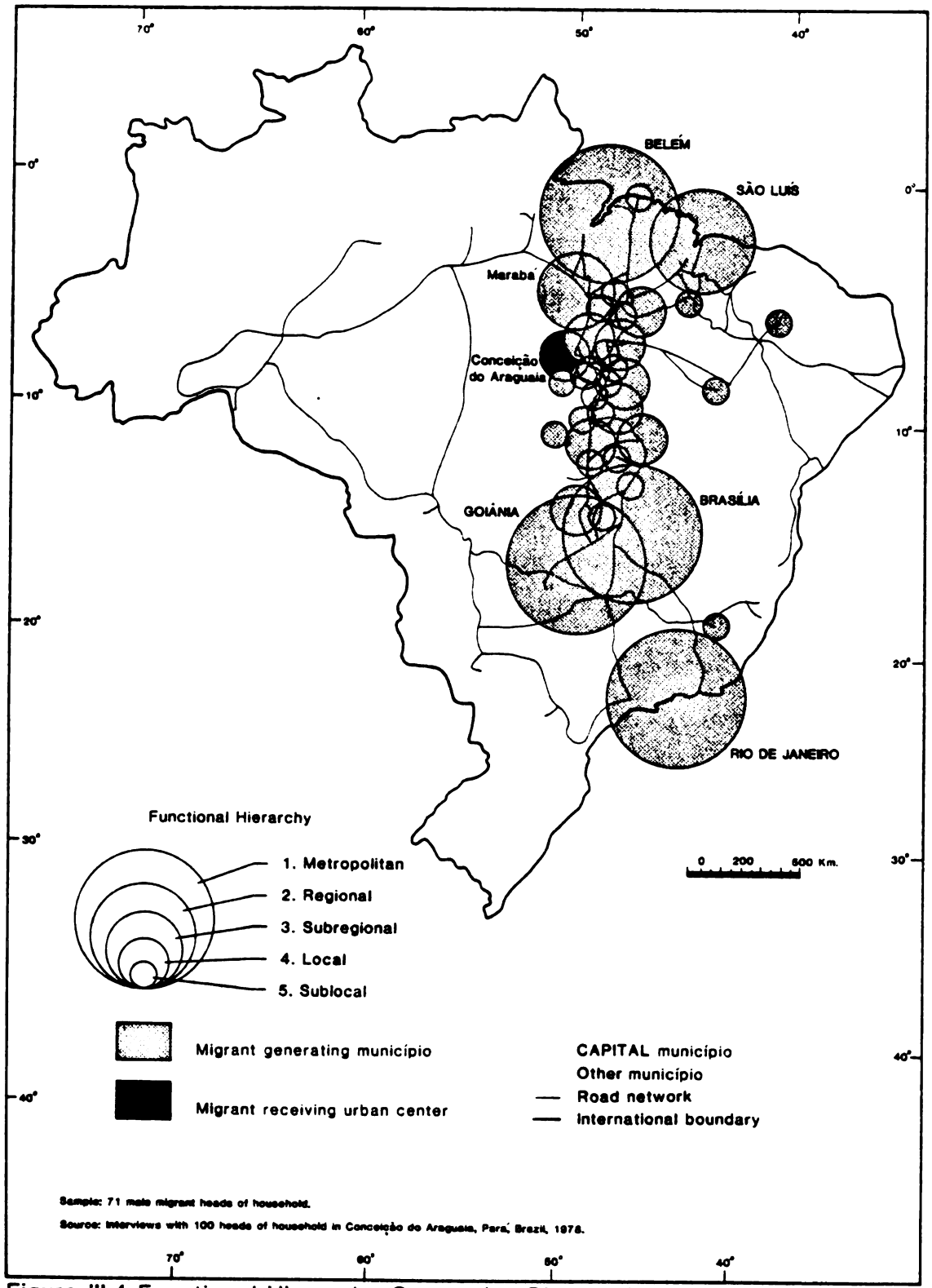

Figure III.4 Functional Hierarchy Generating Direct Migrants to the Urban Center of Conceição do Araguaia, Pará, Brazil, 1978

regional municípios and -9.53 for those from subregional municípios to Conceição do Araguaia, as opposed to 3.45 and 3.91, respectively, for those to Altamira.[28] It follows that whenever frontier centers fail to lead the development of their region they lose that functional centrality needed to generate occupational opportunities appealing to well-prepared migrants. In those circumstances, they may offer basically a refuge for migrants unable to cope in more dynamic environments. This seems to be the case of Conceição do Araguaia. The urban center draws its migrants mainly (68 percent) from local and sublocal municípios traversed by, or in the vicinity of, the highway between Marabá to the north and Goiânia to the south. Nearly 53 percent of these migrants were formerly workers of the primary sector: rural occupants, many of whom forced to abandon or sell their plot of land, and cattle ranch jobbers living in urban centers. Others were unemployed, or skilled manual workers who are ambulant to practice their craft.[29] Given the absence of subregional centers on the southern segment of the Belém-Brasília Highway and the greater accessibility of low-order places to metropolitan centers in this corridor, well-prepared migrants from local and sublocal municípios now fall directly in the field of larger urban centers. Those better-off individuals who despite metropolitan attraction seek socio-economic improvement with migration, may find cities of equivalent

or lower orders in less developed regions more attractive. Migrants from local and sublocal municípios to Humaitá and Altamira, for instance, proceed from more distant places and show higher socioeconomic levels originally than those to Conceição do Araguaia. Under this assumption, it becomes clear that individuals who ignore either alternative above, but instead migrate to low-order nearby centers, such as Conceição do Araguaia, do so because their low socioeconomic levels would render survival in metropolitan environments hazardous. They may also perceive major obstacles to settlement in truly remote regions.

Conclusion

This chapter has discussed general and interurban differences in the spatial and socioeconomic selectivity of migration to urban centers during frontier development. In general, migrants from urban areas, or from places at high orders of the functional hierarchy, travel greater distances and come with higher socioeconomic levels. Furthermore, they experience greater improvement in their socioeconomic levels with migration to the urban frontier centers. Stagewise variations indicate that under normal circumstances distances travelled and former socioeconomic standing of migrants increase as the urban center ascends to higher orders of the hierarchy with further frontier development. It was observed that, in the process: 1) migra-

tion from within the município of the receiving center decreases, probably as a result of gradual substitution of short-distance migration by commuting; 2) the average distance between generating areas and the receiving center increases, however less so in Marabá where competing urban centers severely encroach on the receiving center's peripheral in-migration field, 3) the central in-migration field of the receiving center becomes more compact as interurban migration increases in more densely populated regions; 4) migrants furthermore experience less improvement with migration, particularly those from urban areas. These results provide urban evidence for settlement theory that migration from more to less developed regions becomes more important and less profitable as the receiving region becomes more advanced. Findings support the statement, presented in classical and contemporary geographic literature, that the dynamism of frontier migration lies in a never ending search for equilibrium between economic efficiency and social equity.[30] Individuals from both rural and urban areas participate in the quest. Initially, few enterprising and well-informed individuals from remote and highly developed regions take advantage of occupational opportunities arising in the primitive urban frontier center. Local rural settlers have their greatest chances to rise at this early stage, when they can readily seize vacancies in the nearby expanding urban job market. Those who succeed

in doing so at this stage widen their search space, thereby enabling them to perceive more alternatives whenever competition increases. As the region develops, the urban labor market grows and becomes more specialized. Surface interconnection of the urban center and information exchange with advanced regions are more intense. Competition increases for job openings as interurban migrants gain better access to the frontier center. These individuals perceive themselves as less fit to remain in or move to competitive environments; they instead escape to less constraining markets where they have better chances to retain previous or similar occupations. It therefore becomes increasingly difficult for rural settlers to improve themselves by moving directly to the urban center. Under growing pressures on land those unable to retain access to it and survive without resettling, become along with low-skilled interurban migrants, short-distance movers between low-order places within the now more developed frontier region. There, only those individuals who can perceive and gain access to new opportunities in remote and primitive regions experience greater socioeconomic improvement. These people are a minority who possess a wide search space; they originally have higher socioeconomic levels and proceed from higher-order centers than most city-ward frontier migrants.

That opportunities for socioeconomic improvement decline as the urban frontier develops raises concern about the ability of receiving centers to retain their migrant labor force in the process. The next chapter attempts to understand why some migrants, upon arrival in the city are more likely to repeat migration, and how migrant retention varies in the process. It is contended that people moving to the urban frontier become part of a migrant group that is unable to cope in the larger urban centers; also, their chances of remaining in cities to where they escape vary sharply from one socioeconomic group to another at various stages of urban frontier evolution.

FOOTNOTES

[1]Equivalent percentages are 70 percent in Humaitá, 79 percent in Altamira, 70 percent in Marabá, and 71 percent in Conceição do Araguaia. Data were collected on female migrants but these are not considered in this study. Female migrant informants comprise a minority of original samples, which did not justify parallel analysis. In Latin America female participation in the labor market is typically limited, low-graded, and irregular, when compared to male participation. However, the role of women in the economy and spatial mobility of households is the subject of growing research in frontier environments. See George Martine and José Carlos C. Peliano, Migrantes no Mercado de Trabalho Metropolitano (Brasília: IPEA, 1978) pp. 41-47, 178-182; Elisabete Dória Bilac, Famílias de Trabalhadores: Estratégias de Sobrevivência (São Paulo: Símbolo, 1978), pp. 61-69; Mary Elmendorf, "The Dilemma of Peasant Women: A View from a Village in Yucatan," in AAAS Seminar on Women in Development: Women and World Development, ed. Irene Tinker and Michele Bo Bramsen (Washington, D.C.: Overseas Development Council, 1976), pp. 88-94; Judith Lisansky, "Women in the Brazilian Frontier," Latinamericanist 15/1 (December 1, 1979):1-2; Susan H. Armitage, "Housework and Chidlrearing on the Frontier: The Oral History Record," Sociology and Social Research 63/3 (April 1979):467-474; Anthony Leeds, "Women in the Migratory Process: A Reductionist Outlook," Anthropology 49 (1976):69-76.

[2]Equivalent percentages are 90.3 percent in Humaitá, 81.2 percent in Altamira, 81.7 percent in Marabá, and 85.9 percent in Conceição do Araguaia.

[3]Difference between mean distances significant at the 0.05 level ($Z = 4.1502$). Difference between mean social scores significant at the 0.05 level ($Z = 4.3455$).

[4]Differences between mean distances not significant at the 0.05 level in a one-tailed test, neither at the subregional nor at the sublocal order ($t = 1.3896$ and 0.0694, respectively); difference significant at the local order ($t = 1.9358$).

[5]Difference between mean social scores at metropolitan-regional and subregional orders not significant at the 0.05 level in a one-tailed test ($t = 1.6271$). Mean social score

at the latter order not significantly greater than that at a local order ($t = 0.9012$); this in turn not significantly greater than that at a sublocal order ($t = 0.1459$).

[6]George Martine and José Carlos P. Peliano, Migrantes no Mercado de Trabalho Metropolitano, p. 80; Stillman Bradfield, "Some Occupational Aspects of Migration," Economic Development and Cultural Change, 14/1 (October 1965):69; Stillman Bradfield and Leila Bradfield, "Migrant Receiving Centers in Developing Countries: The Case of Chimbote, Peru," in Internal Migration Systems in the Developing World With Special Reference to Latin America, ed. Robert N. Thomas and John M. Hunter (Cambridge: Schenkman, 1980), p. 74; Luis Eduardo Aragón, "Migration to Northern Goiás: Geographical and Occupational Mobility in Southeastern Amazonia, Brazil," unpublished doctoral dissertation, Department of Geography, Michigan State University, 1978, p. 84.

[7]One Argentina case study suggests that search spaces of individuals with low socioeconomic levels are bound by intervening urban centers on the way to large metropolitan centers. Actual spatial mobility is consistent with this, as indicated by data on leavers in a later chapter of the present study. See Richard W. Wilkie and Jane Riblett Wilkie, "Environmental Perception and Migration Behavior: A Case Study in Rural Argentina, in Internal Migration Systems in the Developing World, pp. 138-142.

[8]Difference between mean social scores significant at the 0.05 level both for intermunicipal migrants alone, and all migrants ($Z = 2.2276$ and 2.0220, respectively).

[9]Differences between mean social scores not significant at the 0.05 level, neither at the metropolitan-regional, nor at the subregional, local, or sublocal orders ($Z = 1.5797$, 1.1612, 0.0157, and 1.5041, respectively).

[10]On the effect of weakening intervening obstacles on migrant selectivity, see Omer R. Galle and Karl E. Taeuber, "Metropolitan Migration and Intervening Opportunities," American Sociological Review 31/1 (February 1966):10-11; Jorge Balán, Harley L. Browning, and Elizabeth Jelín, Men in a Developing Society: Geographic and Social Mobility in Monterrey, Mexico (Austin: University of Texas Press, 1973), pp. 147-151; Robert N. Thomas and John C. Catau, "Distance and the Incidence of Step-Wise Migration in Guatemala," Proceedings of the Association of American Geographers 6 (1974):114,116; J. Barry Riddell, "African Migration and Regional Disparities," in Internal Migration Systems in the Developing World, pp. 118-119.

[11]Peter M. Blau and Otis Dudley Duncan, The American Occupational Structure (New York: John Wiley & Sons Inc., 1967), pp. 261, 273.

[12]Difference between mean social scores farther apart, 9.6191 and 11.0766, not significant at the 0.05 level (Z = 1.0353).

[13]Difference between mean distances significant at the 0.05 level (Z = 4.4973).

[14]Difference between mean social scores significant at the 0.05 level (Z = 2.2694).

[15]Difference between mean social scores significant in Humaitá, but not in Altamira nor in Marabá, at the 0.05 level in a one-tailed test (t = 2.0618, 1.4403 and 0.1032, respectively).

[16]Difference between mean distances significant at the 0.05 level in a one-tailed test (t = 3.5699).

[17]Difference between mean social scores not significant at the 0.05 level in a one-tailed test (t = 0.7411). Social score increases at either urban center not significant at the 0.05 level in a one-tailed test (t = 0.7411 and 0.9590).

[18]Kurt Lewin introduced the concept of dynamic social field as an empirical multidimensional space, in which a multitude of facts show certain types of interdependence . The concept was adapted by Brian J. L. Berry in geography as a component of a general field theory; it consists of a spatial system with places, their characteristics and interactions. Migration fields are one type of geographical field, defined on the basis of interaction between an attribute space and a behavior space. See, respectively, Kurt Lewin, Field Theory in Social Science: Selected Theoretical Papers (New York: Harper and Brothers, 1951) p. 44-45; Brian J. L. Berry, "Essays on Commodity Flows and the Spatial Structure of the Indian Economy," Department of Geography Research Papers 111 (Chicago: University of Chicago, 1966) ; Paul J. Schwind, "A General Field Theory of Migration: United States, 1955-1960," Economic Geography 51/1 (January 1975): 3-4. Also, Curtis C. Roseman, "Changing Migration Patterns Within the United States," Resource Papers for College Geography 77-2 (Washington D.C.: AAG, 1977), pp. 11-16.

[19]This is consistent with classical theory, characteristic of mobility patterns at initial stages of urbanization in Latin America, and of settlement in frontier regions.

See E. G. Ravenstein, "The Laws of Migration, Journal of the Royal Statistical Society 48 (June 1885):199; Robert N. Thomas and Charles M. Croner, "Migrant Paths to Tegucigalpa and San Pedro Sula, Honduras: The Role of Accessibility," Social and Economic Studies 24/4 (December 1975):450; Ronald Skeldon, "The Evolution of Migration Patterns During Urbanization in Peru," The Geographical Review 67/4 (October 1977):395; David Grossman, "The Process of Frontier Settlement: The Case of Nikeland (Nigeria)," Geografiska Annaler 53B/2 (1971):115; Erik Bylund, "Theoretical Considerations Regarding the Distribution of Settlement in Inner North Sweden," Geografiska Annaler 42/4 (1960):227.

[20]Long-distance pioneer migration increases in proportion to the density of the "mother settlements", drawing from regions which have no direct economic influence on the new land: David Grossman, "The Process of Frontier Settlement," p. 115; Gerd Enequist, "Advance and Retreat of Rural Settlement in Northwestern Sweden," Geografiska Annaler 42/4 (1960):218; Gerd Enequist and Lennart Back, "Central Places in Sparsely Populated Areas," Geografiska Annaler 48B/1 (1966):36; John C. Hudson, "Theory and Methodology in Comparative Frontier Studies," in The Frontier: Comparative Studies, eds. David Harry Miller and Jerome O. Steffen (Norman: University of Oklahoma Press, 1977), p. 20.

[21]Official agricultural colonies were settled in the former Distrito de Terras de Rondônia e Acre as early as 1945 and the Cuiabá--Pôrto Velho Highway, opened in 1960; see IBGE, Atlas de Rondônia, 2nd ed. (Rio de Janeiro: IBGE, 1977), pp. 24, 26. Between 1950 and 1970, the population of the territory of Rondônia doubled from 36.935 to 116.620 (216 percent increase) with the economically active population tripling from 4,678 to 20,563 (340 percent) in the same period. In-migration became more important after 1974, and by mid-1976 the territory's population was estimated at 450 thousands. According to data collected by INCRA and the Brazilian Ministry of Internal Affairs, in 1976 alone some 3,005 families totalling about 17,000 people would have entered Rondônia by roadway. By mid-1977, some 28 thousand families had been settled by INCRA in its seven project areas along the Cuiabá-Pôrto Velho Highway in Rondônia, 45 percent of whom in precarious conditions with some 36 thousand additional families on the on-site waiting list; see George Martine, "Migrações Internas e Alternativas de Fixação Produtiva: Experiencias Recentes de Colonização no Brasil," Projeto de Planejamento de Recursos Humanos BRA/70/550, Relatório Técnico 37 (Brasília: Ministério do Interior, 1978), pp. 33, 35, 38.

[22]Differences between mean social scores not significant at the 0.05 level, neither in Humaitá nor in Altamira (Z = 1.377 and 0.2496, respectively).

[23]Labor surplus associated to modernization of industry and agriculture in southern Brazil and the North-East Region is studied by: José de Souza Martins, O Cativeiro da Terra (São Paulo: Livraria Editora Ciências Humanas, 1979), pp. 7-94; Elbio Neris Gonzales and Maria Inês Bastos "Migração Rural e o Trabalho Volante na Agricultura Brasileira," in Encontro Brasileiro de Estudos Populacionais: Contribuições Apresentadas (Rio de Janeiro: IBGE, 1976), p. 241; Hans-Jurgen Krüger, "Migration, Landliche Uberbevolkerung und Kolonisation im Nordosten Brasiliens," Geographische Rundschau 30/1 (1978):14-20 (according to a geographical abstract of the article); Leonardo Guimarães Neto, O Emprego Urbano no Nordeste: Situação Atual e Evolução Recente 1950-70 (Fortaleza: Ministério do Interior/BNB, 1976), pp. 54-96. On the settlement of Mato Grosso and Goiás, see John H. Sanders and Frederick L. Bein, "Agricultural Development on the Brazilian Frontier: Southern Mato Grosso," Economic Development and Cultural Change 24/3 (April 1976):596; Martin T. Katzman, "Regional Development Policy in Brazil: The Role of Growth Poles and Development Highways in Goias," Economic Development and Cultural Change 24/1 (October 1975):77-82, 91-105.

[24]This seems common at late phases of frontier development: Joseph Persky, "Push and Pull in Migration from Southern Farms," The Review of Regional Studies 2/2 (Winter 1972):51-55; Gunnar Norling, "Abandonment of Rural Settlement in Västerbotten Lappmark, North Sweden, 1930-60," Geografiska Annaler 42/4 (1960):233, 240; Jorge Balán, Harley L. Browning, Elizabeth Jelín, Men in a Developing Society, p. 138; Carlos Osório, "Migrações Recentes e Desigualdades," Revista Pernambucana de Desenvolvimento 5/2 (July-December 1978):224; William S. Saint and William W. Goldsmith, "Sistemas de Lavoura, Mudança Estrutural e Migração Rural-Urbana no Brasil," in Valor, Força de Trabalho e Acumulação Monopolista, ed. Conceição Tavares et alii, Estudos CEBRAP 25 (Petrópolis: Vozes, n.d.), pp. 136-163; Judith Lisansky, "Women in the Brazilian Frontier," pp. 1-2.

[25]Robert N. Thomas, Robert I. Wittick and Daniel C. Clay, "Accessibility Measures Influencing In-Migration to Tunja, Colombia: A Path Analytic Approach," in The Role of Geographical Research in Latin America, ed. William M. Denevan (Muncie: Conference of Latin Americanist Geographers, 1978), pp. 130-131, 136; Robert N. Thomas and Kevin F. Byrnes, "Intervening Opportunities and the Migration Field of a Secondary Urban Center: The Case of Tunja, Colombia,"

in Latin America: Search for Geographical Explanations, ed. Robert J. Tata (Boca Raton, Florida: Clag Publications, Inc., 1976), pp. 83-88; Curtis C. Roseman, "Changing Migration Patterns Within the United States," p. 13.

[26]Early development of the region is reviewed in Otávio Guilherme Velho, Frentes de Expansão e Estrutura Agrária: Estudo do Processo de Penetração numa Área de Transamazônica (Rio de Janeiro: Zahar Editores, 1972), pp. 95-123, and in E. W. Shaw and J. L. Riddell, "A Frontier Region in Brazil; Southwestern Maranhao," The Geographical Review 16/2 (April 1926):177-195. Rising landholding concentration and agricultural modernization led this region to experience rural depopulation and net out-migration as of 1970; see Elza Coelho de Souza Keller, "População," in Geografia do Brasil--Região Norte, ed. IBGE (Rio de Janeiro: IBGE, 1977), pp. 209, 221; Olga Maria Schild Becker et alii, "Áreas de Atração e Evasão Populacional no Brasil no Período 1960-70," paper presented at 3° Encontro Nacional da Associação dos Geógrafos Brasileiros, Fortaleza, July 1978, (Mimeographed.) In this region, the situation is apparently reached when population overspill from pre-existing nuclei generates a true demographic expansion of the frontier by providing population base for the growth of the forefront, in this case the region of Marabá; see Delgado de Carvalho, "Colonização e Núcleos em Expansão," Revista Brasileira de Geografia 3/1 (January-March 1941):126.

[27]Difference between mean distances significant at the 0.05 level in a one-tailed test ($t = 4.4972$). Difference between mean social scores also significant ($t = 1.7781$). Increases in mean social scores not significant in Conceição do Araguaia, but significant in Altamira ($t = 1.0679$ and 1.7606, respectively).

[28]Increases in mean social scores not significant at the 0.05 level in a one-tailed test for the metropolitan-regional order, neither in Conceição do Araguaia, nor in Altamira ($t = 0.1229$ and 0.0166, respectively). Increase in mean social scores not significant for the subregional order in Altamira ($t = 1.4438$).

[29]Short-distance repeated migration in typical of low - skilled workers as observed is northern Goiás, by Luis Eduardo Aragón, "Migration to Northern Goiás: Geographical and Occupational Mobility in Southwestern Amazonia, Brazil," pp. 88-94. In the present study, nearly 30 percent of male migrant informants in Conceição do Araguaia had moved five times or more by the time of the survey. The equivalent percentage in Altamira was 22 percent.

[30]Compare Frederick Jackson Turner's 1893 statement, in Stephen I. Thompson, "The Contemporary Latin American Frontier," Comparative Frontier Studies I (Fall 1975):7, with Ernest Paget, "Comments on the Adjustment of Settlement in Marginal Areas," Geografiska Annaler 42/4 (1960):324.

CHAPTER IV

MIGRANT RETENTION DURING FRONTIER DEVELOPMENT

This chapter examines the socioeconomic levels of city-ward frontier migrants and discusses the process of migrant retention at urban centers during frontier development. Divided into three sections, it differentiates between the socioeconomic levels of migrants who reside or have resided at the frontier centers and city-ward migrants in general. Furthermore, this chapter compares those migrants presently living in the frontier cities with those migrants who have left. In these first two instances, differences between the two groups of migrants are examined holding the hierarchical order of their place of residence constant, along with their educational level or period of residence. In addition, the chapter looks at only migrants who presently reside in the urban frontier settlements. It discusses the retention rates of migrant relatives as they relate to rates of socioeconomic mobility based on the occupational history of migrant informants.

Socioeconomic Levels of City-Ward Migrants

General Differences Between City-Ward Frontier Migrants and Other City-Ward Migrants

Migrants who reside or have resided at frontier centers typically possess lower socioeconomic levels than do other

city-ward migrants. Mean social scores for all city-ward frontier migrants and all other city-ward migrants are 8.73 and 15.31, respectively (Tables IV.1 and IV.2); while median values are 7.13 and 9.56, respectively.[1] This difference persists once the hierarchial order of their present place of residence is held constant, along with their educational level, or period of residence. For instance, when migrants in Humaitá are compared to those at other sublocal centers, mean social scores are 6.84 and 7.83, respectively, for the uneducated, 8.40 and 9.58 for the primary-educated, 13.53 and 16.95 for the secondary-educated, 15.13 and 29.10 for those with college education or more.[2] Equivalent differences usually occur between migrants in Conceição do Araguaia, or in Altamira, and those at other local centers. Differences generally hold between migrants in Marabá and those at other subregional centers, where mean social scores are 6.03 and 10.30, respectively, for the uneducated, 8.48 and 8.76 for the primary-educated, 15.96 and 10.94 for the secondary-educated. For college-educated migrants, mean and median social scores are 11.30 and 5.56, respectively, at Marabá, and 16.60 and 8.87 at other subregional centers.[3] Therefore, city-ward frontier migrants are individuals who probably move to the frontier because they have been, or at least perceive themselves as, less apt to achieve high socioeconomic levels. The greater ability of migrants at other urban centers to secure high-scored

Table IV.1. Mean Social Scores of City-Ward Male Migrants Who Never Resided at the Surveyed Frontier Centers, by Education Level and Hierarchical Order of Present Place of Residence.

SOURCE: Interviews with 400 heads of household in the North Region of Brazil, 1978-79.

[a]Row percentage

[b]Mean of individual social scores

[c]Standard deviation of mean value

[d]Column percentage

Table IV.1. Mean Social Scores of City-Ward Male Migrants who Never Resided at the Surveyed Frontier Centers, by Education Level and Hierarchical Order of Present Place of Residence.

Educational Level (grades completed)	Hierarchical Order of Urban Centers: Metropolitan-Regional 1-2	Subregional 3	Local 4	Sublocal 5	All 1-5
	n=102	n=54	n=35	n=57	n=248
none	21.6[a]	31.4	21.5	25.5	100.0
(0)	8.76[b]	10.30	9.29	7.83	9.11
n=51	5.39[c]	7.88	8.45	7.93	7.40
	10.8[d]	29.6	31.4	22.8	20.6
primary	38.3	23.4	12.1	26.2	100.0
(1-7)	9.03	8.76	9.01	9.58	9.11
n=107	3.67	5.39	3.85	7.23	5.17
	40.2	46.3	37.1	49.1	43.1
secondary	59.4	12.5	9.4	18.7	100.0
(8-11)	12.44	10.94	10.58	16.94	12.92
n=32	9.53	5.08	3.27	5.96	8.12
	18.6	7.4	8.6	10.5	12.9
college	53.4	15.5	13.8	17.3	100.0
(12 or more)	45.08	16.60	13.42	29.10	33.54
n=58	30.51	26.44	16.38	23.90	29.82
	30.4	16.7	22.9	17.6	23.4
All	41.1	21.8	14.1	23.0	100.0
(0 or more)	20.58	10.68	10.24	13.38	15.31
n=248	23.81	12.06	9.24	13.91	18.42
	100.0	100.0	100.0	100.0	100.0

Table IV.2. Mean Social Scores of Male Migrants Who Reside or Have Resided at the Surveyed Frontier Centers by Educational Level and Urban Frontier Center of Residence.

SOURCE: Interviews with 400 heads of household in the North Region of Brazil, 1978-79.

[a]Row percentage

[b]Mean of individual social scores

[c]Standard deviation of mean value

[d]Column percentage

Table IV.2. Mean Social Scores of Male Migrants who Reside or Have Resided at the Surveyed Frontier Centers by Educational Level and Urban Frontier Center of Residence.

Educational Level (grades completed)	Name and Hierarchical Order of Frontier Centers: Humaitá 5 n=249	Altamira 4 n=198	Marabá 3 n=191	Conceição do Araguaia 4 n=193	All n=831
none (0) n=236	33.9[a] 6.84[b] 4.97[c] 32.1[d]	18.6 7.48 6.93 22.2	23.3 6.03 5.90 28.8	24.2 6.49 5.03 29.5	100.0 6.69 5.62 28.4
primary (1-7) n=462	29.0 8.40 6.79 53.8	25.1 8.50 6.27 58.6	22.7 8.48 8.29 55.0	23.2 7.89 6.65 55.4	100.0 8.33 7.27 55.6
secondary (8-11) n=76	23.4 13.53 11.67 7.2	25.0 14.13 7.21 9.6	28.9 15.96 9.22 11.5	22.4 8.69 7.92 8.8	100.0 13.30 9.36 9.1
college (12 or more) n=57	30 0 15.13 10.60 6.9	33 3 12.96 17.49 9.6	15 7 11.30 13.19 4.7	21 0 17.92 27.89 6.3	100 0 14.39 17.69 6.9
All (0 or more) n=831	30.0 8.73 7.41 100.0	23.8 9.24 8.41 100.0	23.0 8.77 9.09 100.0	23.2 8.17 9.40 100.0	100.0 8.73 8.53 100.0

occupations is also revealed when holding period of residence constant (Table IV.3 and IV.4). Social score distributions for specific periods are more dispersed around mean values than distributions for specific educational levels. Given the limited number of cases for comparative purposes, the effect of education in relation to socioeconomic achievement and time or residence was not controlled. Educational attainment is obviously a better predictor of the migrants' socioeconomic situation than their period of residence at the receiving center. Notwithstanding, most city-ward migrants score higher on the occupational scale than do individuals with identical periods of residence at equal-order frontier centers (Tables IV.3 and IV.4). Mean (and median) social scores for other city-ward migrants and frontier migrants with two years of residence or less are respectively, 25.78 (16.95) at sublocal centers and 7.24 (5.30) at Humaitá, 15.02 (6.94) at local centers and 9.39 (7.40) at Conceição do Araguaia and 7.35 (5.82)at Altamira, 8.57 (6.94) at subregional centers and 9.42 (7.39) at Marabá. For those with eleven years of residence or more, mean social scores are 12.00 at sublocal centers and 10.19 at Humaitá, 10.52 at local centers and 9.10 at Conceição do Araguaia and 9.37 at Altamira, 9.67 at subregional centers, and 8.71 at Marabá.[4] These results imply that relatives who have moved to centers other than the frontier cities are more successful. Given equal education or equal period

Table IV.3. Mean Social Scores of City-Ward Male Migrants Who Never Resided at the Surveyed Frontier Centers, by Period of Residence and Hierarchical Order of Present Place of Residence.

SOURCE: Interviews with 400 heads of household in the North Region of Brazil, 1978-79.

[a]Row percentage

[b]Mean of individual social scores

[c]Standard deviation of mean value

[d]Column percentage

Table IV.3. Mean Social Scores of City-Ward Male Migrants Who never Resided at the Surveyed Frontier Centers, by Period of Residence and Hierarchical Order of Present Place of Residence.

Period of Residence in Years	Hierarchical Order of Urban Centers: Metropolitan-Regional 1-2 n=102	Subregional 3 n=54	Local 4 n=35	Sublocal 5 n=57	All 1-5 n=248
0-2	9.59[b] [28.6][a]	8.57 [28.6]	15.02 [17.1]	25.78 [25.7]	14.39 [100.0]
n=35	6.27[c] [9.7][d]	5.39 [18.5]	19.27 [17.1]	25.60 [15.8]	16.67 [14.1]
3-5	19.54 [38.6]	14.88 [24.6]	6.98 [10.5]	8.90 [26.3]	14.28 [100.0]
n=57	23.90 [21.6]	21.07 [25.9]	2.20 [17.1]	5.80 [44.1]	18.72 [23.0]
6-10	21.18 [33.3]	8.61 [19.4]	8.29 [19.4]	12.12 [27.9]	13.71 [100.0]
n=36	25.81 [11.8]	2.69 [13.0]	8.08 [20.1]	12.12 [29.4]	17.05 [14.5]
11 or more	22.75 [48.3]	9.67 [19.2]	10.52 [13.3]	12.00 [19.2]	16.55 [100.0]
n=120,	25.16 [56.9]	7.66 [42.6]	5.18 [45.7]	9.67 [40.3]	19.27 [48.4]
0-10	17.72 [34.4]	11.43 [24.2]	10.00 [14.8]	14.32 [26.6]	14.15 [100.0]
n=128	21.87 [43.1]	14.58 [57.4]	11.78 [54.3]	14.24 [59.7]	17.58 [51.6]
0 or more	20.58 [41.1]	10.68 [21.8]	10.24 [14.1]	13.38 [23.0]	15.31 [100.0]
n=248	23.81 [100.0]	12.06 [100.0]	9.24 [100.0]	13.91 [100.0]	18.42 [100.0]

Table IV.4. Mean Social Scores of Male Migrants Who Reside or Have Resided at the Surveyed Frontier Centers, by Period of Residence and Urban Frontier Center of Residence.

SOURCE: Interviews with 400 heads of household in the North Region of Brazil, 1978-79.

[a]Row percentage

[b]Mean of individual social scores

[c]Standard deviation of mean value

[d]Column percentage

Table IV.4. Mean Social Scores of Male Migrants Who Reside or Have Resided at the Surveyed Frontier Centers, by Period of Residence and Urban Frontier Center of Residence.

Period of Residence in Years	Name and Hierarchical Order of Frontier Centers: Humaitá 5	Altamira 4	Marabá 3	Conceição do Araguaia 4	All
	n=249	n=198	n=191	n=193	n=831
0-2	a 39.2 / b 7.24 / c 6.96 / d 47.4	19.3 / 7.35 / 6.98 / 29.3	17.3 / 9.42 / 13.29 / 27.2	24.2 / 9.39 / 12.85 / 37.8	100.0 / 8.16 / 9.95 / 36.2
n=301					
3-5	28.3 / 9.62 / 7.76 / 23.3	23.9 / 10.09 / 10.75 / 24.8	26.8 / 6.38 / 3.87 / 28.8	21.0 / 7.81 / 6.77 / 22.3	100.0 / 8.48 / 7.73 / 24.7
n=205					
6-10	21.4 / 10.66 / 7.51 / 15.6	23.1 / 10.72 / 7.13 / 21.2	22.0 / 11.28 / 8.21 / 21.0	33.5 / 6.71 / 5.67 / 31.6	100.0 / 9.49 / 7.25 / 21.9
n=182					
11 or more	23.8 / 10.19 / 7.45 / 13.7	34.3 / 9.37 / 8.16 / 24.7	30.8 / 8.71 / 7.88 / 23.0	11.1 / 9.10 / 8.04 / 8.3	100.0 / 9.33 / 7.83 / 17.2
n=143					
0-10	31.2 / 8.50 / 7.39 / 86.3	21.7 / 9.20 / 8.52 / 75.3	21.4 / 8.79 / 9.45 / 77.0	25.7 / 8.09 / 9.53 / 91.7	100.0 / 8.61 / 8.66 / 82.8
n=688					
0 or more	30.0 / 8.73 / 7.41 / 100.0	23.8 / 9.24 / 8.41 / 100.0	23.0 / 8.77 / 9.09 / 100.0	23.2 / 8.17 / 9.40 / 100.0	100.0 / 8.73 / 8.53 / 100.0
n=831					

of adjustment, they have obtained better occupations than their frontier counterparts. This could be due to their having received a better education, greater exposure to urban environments in their previous migration history, or to differences in life-cycles.[5] Today most live in metropolitan-regional and subregional centers, where they show higher average socioeconomic levels with longer periods of residence. Although they may not represent migrant populations of large cities in general, their high occupational status may be due to the fact that former, less successful migrants among their lot, have left.[6] It is unlikely that most of those who remain will ever consider moving to the frontier cities.[7] Conversely, migrants at the urban frontier centers probably perceive these cities as being less competitive, thereby enabling them to retain or improve their socioeconomic levels more easily.

Although frontier cities may appear as havens of opportunity, considerable differences exist in time and space within the urban frontier. Shifts can be observed in the range of opportunities and the kind of people who benefited as the frontier city evolves.

Changes in Socioeconomic Levels of Migrants During Frontier Development

As the urban center ascends to higher orders of hierarchy in the frontier development process, average socioeconomic levels of migrants tend to remain constant.

For example, mean and median social scores are 8.73 and 7.13 in Humaitá, 9.24 and 7.39 in Altamira and 8.77 and 7.39 in Marabá.[8] For urban centers of equivalent order in regions with different phases of economic development, places located in a more advanced region show lower average socio-economic levels. Mean and median social scores are 9.24 and 7.39 in Altamira, but 8.17 and 6.94 in Conceição do Araguaia. It follows that the stage-specific variations observed earlier in this study with respect to socioeconomic levels upon arrival, are not affected by occupational change with continued residence in the city. Social scores for all city-ward frontier migrants during residence show inter-urban variations consistent with those observed in the case of informants upon their arrival at the centers (Tables III.2 and IV.2).

Although it was seen earlier that with equal education city-ward frontier migrants have lower socioeconomic levels than other city-ward migrants, with more education they appear to improve their status to a greater extent than do other city-ward migrants. This situation changes however, as the urban frontier evolves. The difference in mean social scores between the uneducated and the primary-educated is 1.64 for frontier migrants and 0.00 for the others, whereas between the secondary-educated and the primary-educated it is 4.97 for the frontier migrants and 3.81 for the other migrants (Tables IV.1 and IV.2).[9] These differences

between frontier and other city-ward migrants persist when the hierarchical order of their urban center of residence is held constant. The distance in socioeconomic terms between more and less educated migrants is greater at the frontier centers; individuals unable to take higher-scored occupations with equal education may enhance their socio-economic status by moving to frontier centers. However, differences between specific educational levels among the frontier cities lends evidence to a changing pattern of occupational opportunities during urban frontier evolution (Table IV.2). As the urban frontier center reaches higher orders of hierarchy, the social scores of the uneducated decrease, those of the primary-educated remain constant, those of the secondary-educated increase, and those for the college-educated decrease.[10] Therefore, opportunities for migrants at the extremes of the educational scale appear to collapse in the process. The trend is more pronounced when comparing centers of equal order in different regions. Migrants at Conceição do Araguaia located in a more advanced region show limited additional achievement with further education as compared to those at Altamira. Therefore, during urban frontier evolution socioeconomic opportunities for migrants become more limited which, in terms of numbers, should be particularly detrimental to less-educated individuals. When holding the hierarchical order of the receiving center constant, migrants with less education in the city in the more developed region should be more affected.

As seen earlier, with equal period of residence city-ward frontier migrants demonstrate lower socioeconomic status than other city-ward migrants. However, with more time of residence frontier migrants seem to improve their situation to a greater extent than do other city-ward migrants; this general statement is subject to variations during urban frontier evolution. Mean and median social scores for migrants with two years or less of residence are 8.16 and 6.94, for migrants with three to five years, 8.48 and 7.13, and for those with six to ten years, 9.49 and 7.39. Migrants with eleven years or more of residence have mean and median values of 9.33 and 7.39, probably due in part to an aging factor (Tables IV.3 and IV.4).[11] Differences in mean social scores between periods of residence among the frontier centers further imply a growing rigidity of the socio-economic fabric during urban frontier evolution (Table IV.4). In the process, recent arrivees show higher socioeconomic levels, but individuals with more time of residence demonstrate lesser improvement in relation to recent arrivees. Mean social scores increase from 7.24 to 10.19 in Humaitá, and from 7.35 to 9.36 in Altamira; in Marabá no increase is clearly observable.[12] The trend above is also evident when comparing equal-order frontier cities located in different regions. At the local center in the more developed region, migrants with up to ten years of residence show decreasing socioeconomic levels with more time of residence. This

result adds another dimension to previous findings concerning stagewise trends. As the urban frontier evolves, migrants should experience less socioeconomic mobility with further residence at the frontier center. This should particularly affect the residential stability of low-status migrants; given that socioeconomic levels of all city-ward frontier migrants at the receiving center do not improve in the process, more low-status migrants should be prone to repreated migration at later stages. When the hierarchical order of the frontier city is held constant, low-status migrants should be more prone to repeated migration at the urban center in the more developed region.

The implications that these findings have on migrants who reside or have resided at the frontier centers are further explored in the following section. Socioeconomic levels of repeated-migrants are contrasted with those of migrants presently residing in the frontier cities; it is contended that the socioeconomic selectivity of repeated migration declines during frontier development.

Socioeconomic Levels of City-Ward Frontier Migrants

General Differences Between Repeated-Migrants and Present Residents

Migrants who have left the frontier centers had lower socioeconomic levels than those who presently reside at these centers. This difference is maintained during frontier development and when the migrants' educational

level or period of residence is held constant. Mean social scores for leavers and residents are, respectively, 7.20 and 9.18 (Tables IV.5 and IV.6). This general difference holds as the urban center ascends to higher orders: mean social scores for leavers and residents are 7.01 and 9.06 in Humaitá, 9.08 and 9.68 in Altamira, and 5.88 and 9.53 in Marabá. In the latter center, the social score distribution for residents is positively skewed, but median scores support the general rule above with values of 4.90 and 7.39, respectively.[13] The distribution of repeated-migrants and present residents among the various educational levels is similar; however, mean social scores of leavers and residents are 4.86 and 7.11, respectively, for the uneducated, and 7.37 and 8.57 for the primary-educated.[14] Social score distributions are positively skewed for remaining educational levels, but mean (and median) values indicate consistent differences: they are 10.28 (7.39) and 14.05 (13.60) for the secondary-educated, and 16.20 (9.77) and 17.91 (11.35) for the college-educated. General differences between residents and leavers hold true in most cases at the various frontier centers. Migrants who have left the frontier centers generally were short-term residents in the city. Holding length of residence constant however, they demonstrate lower socioeconomic levels than those who reside at these centers (Tables IV.7 and IV.8). Nearly 44 percent spent two years or less at the receiving centers, against 34.08

Table IV.5. Mean Social Scores of Male Migrants Residing at the Surveyed Frontier Centers, by Educational Level and Urban Frontier Center of Residence.

SOURCE: Interviews with 400 heads of household in the North Region of Brazil, 1978-79.

[a]Row percentage

[b]Mean of individual social scores

[c]Standard deviation of mean value

[d]Column percentage

Table IV.5. Mean Social Scores of Male Migrants Residing at the Surveyed Frontier Centers, by Educational Level and Urban Frontier Center of Residence.

Educational Level (grades completed)	Name of Hierarchical Order of Frontier Centers: Humaitá 5	Altamira 4	Marabá 3	Conceiçao do Araguaia 4	All
	n=202	n=164	n=152	n=154	n=672
none (0) n=194	7.30[b] [33.0][a] 5.33[c] [31.6][d]	7.97 [20.1] 7.18 [23.8]	6.60 [21.1] 6.62 [27.0]	6.61 [25.8] 5.22 [32.4]	7.11 [100.0] 5.98 [28.9]
primary (1-7) n=379	8.78 [29.3] 7.11 [55.0]	8.55 [26.1] 6.56 [60.4]	9.00 [22.2] 10.10 [55.3]	7.87 [22.4] 6.93 [55.2]	8.57 [100.0] 7.69 [56.4]
secondary (8-11) n=60	12.20 [23.3] 9.90 [7.0]	16.25 [21.7] 7.68 [7.9]	16.06 [35.0] 9.43 [13.8]	10.33 [20.0] 8.52 [7.8]	14.05 [100.0] 9.13 [8.9]
college (12 or more) n=39	16.71 [33.3] 11.46 [6.4]	16.64 [33.3] 20.02 [7.9]	13.98 [15.4] 15.40 [3.9]	25.85 [17.9] 35.01 [4.6]	17.91 [100.0] 20.20 [5.8]
0 or more n=672	9.06 [30.0] 7.50 [100.0]	9.67 [24.4] 8.97 [100.0]	9.53 [22.7] 9.82 [100.0]	8.47 [22.9] 10.19 [100.0]	9.18 [100.0] 9.05 [100.0]

Table IV.6. Mean Social Scores of Male Migrants Who Have Resided at the Surveyed Frontier Centers, by Educational Level and Urban Frontier Center of Residence.

SOURCE: Interviews with 400 heads of household in the North Region of Brazil, 1978-79.

[a]Row percentage

[b]Mean of individual social scores

[c]Standard deviation of mean value

[d]Column percentage

Table IV.6. Mean Social Scores of Male Migrants Who Have Resided at the Surveyed Frontier Centers, by Educational Level and Urban Frontier Center of Residence.

Educational Level (grades completed)	Name and Hierarchical Order of Frontier Centers: Humaitá 5	Altamira 4	Marabá 3	Conceição do Araguaia	All
	n=44	n=34	n=37	n=36	n=151
none (0) n=42	4.87[b] [35.7][a] 2.64[c] [34.1][d]	4.54 [11.9] 1.55 [14.7]	4.50 [35.7] 3.47 [40.5]	5.63 [16,7] 3.64 [19.4]	4.86 [100.0] 2.92 [27.8]
primary (1-7) n=76	6.75 [27.6] 5.59 [47.7]	9.03 [22.4] 4.18 [50.0]	6.02 [22.4] 4.70 [46.5]	8.19 [27.6] 5.76 [61.8]	7.37 [100.0] 5.21 [50.3]
secondary (8-11) n=16	18.61 [25.0] 21.55 [9.1]	8.68 [37.5] 2.29 [17.6]	11.02 [12.5] 4.12 [5.4]	4.14 [25.0] 3.78 [11.8]	10.28 [100.0] 10.53 [10.6]
college 12 or more n=17	7.40 [23.5] 3.34 [9.1]	13.90 [35.3] 14.73 [17.7]	6.90 [17.6] 9.77 [8.1]	25.93 [23.5] 33.67 [11.8]	16.20 [100.0] 19.42 [11.3]
0 or more n=151	7.01 [29.1] 7.38 [100.0]	9.08 [22.6] 6.40 [100.0]	5.88 [24.5] 4.63 [100.0]	8.58 [23.8] 11.09 [100.0]	7.62 [100.0] 7.78 [100.0]

Table IV.7. Mean Social Scores of Male Migrants Residing at the Surveyed Frontier Centers, by Period of Residence and Urban Frontier Center of Residence.

SOURCE: Interviews with 400 heads of household in the North Region of Brazil, 1978-79.

[a]Row percentage

[b]Mean of individual social scores

[c]Standard deviation of mean value

[d]Column percentage

Table IV.7. Mean Social Scores of Male Migrants Residing at the Surveyed Frontier Center, by Period of Residence and Urban Frontier Center of Residence.

Period of Residence in Years	Name and Hierarchical Order of Frontier Centers				
	Humaitá 5	Altamira 4	Marabá 3	Conceição do Araguaia 4	All
	n=202	n=164	n=152	n=154	n=672
0-2	7.62[b] 40.2[a]	7.24 19.7	11.14 15.7	10.11 24.4	8.71 100.0
n=229	7.54[c] 45.5[d]	7.45 27.4	15.49 23.6	14.26 36.4	11.06 34.1
3-5	9.06 31.3	10.46 24.5	7.05 26.4	8.39 17.8	8.75 100.0
n=163	6.57 29.3	11.80 24.4	3.99 28.3	7.33 18.8	7.86 24.2
6-10	11.96 19.1	11.06 23.5	11.63 22.8	6.70 34.6	9.85 100.0
n=162	7.70 15.3	7.39 23.2	8.34 24.4	5.88 36.4	7.50 24.1
11 or more	10.56 23.7	10.27 34.7	8.71 30.6	9.20 11.0	9.74 100.0
n=118	7.92 13.9	8.43 25.0	8.38 23.7	8.94 8.4	8.28 17.6
0-10	8.82 31.4	9.47 22.2	9.78 20.9	8.40 25.5	9.06 100.0
n=554	7.43 86.1	9.17 75.0	10.24 76.3	10.32 91.6	9.21 82.4
0 or more	9.06 30.0	9.67 24.4	9.53 22.7	8.47 22.9	9.18 100.0
n=672	7.50 100.0	8.97 100.0	9.82 100.0	10.19 100.0	9.05 100.0

Table IV.8. Mean Social Scores of Male Migrants Who Have Resided at the Surveyed Frontier Centers, by Period of Residence and Urban Frontier Center or Residence.

SOURCE: Interviews with 400 heads of household in the North Region of Brazil, 1978-79.

[a]Row percentage

[b]Mean of individual social scores

[c]Standard deviation of mean value

[d]Column percentage

Table IV.8. Mean Social Scores of Male Migrants Who Have Resided at the Surveyed Frontier Centers, by Period of Residence and Urban Frontier Center of Residence.

Period of Residence in Years	Name and Hierarchical Order of Frontier Centers: Humaitá 5 n=44	Altamira 4 n=34	Marabá 3 n=37	Conceição do Araguaia 4 n=36	All n=151
0-2 n=66	5.55[b] [37.9][a] / 4.44[c] [56.8][d]	7.78 [19.7] / 5.28 [38.2]	5.43 [21.2] / 4.18 [35.1]	7.37 [22.7] / 6.07 [41.7]	6.42 [100.0] / 5.00 [43.7]
3-5 n=41	13.55 [14.6] / 15.12 [13.6]	8.26 [22.0] / 3.17 [25.0]	3.68 [29.3] / 2.07 [32.4]	6.60 [34.1] / 5.48 [38.9]	7.21 [100.0] / 7.25 [27.2]
6-10 n=21	7.54 [38.1] / 6.87 [18.2]	7.47 [19.0] / 2.40 [11.8]	4.85 [23.8] / 5.20 [13.5]	6.89 [19.1] / 2.69 [11.1]	6.78 [100.0] / 4.93 [13.9]
11 or more n=22	6.78 [22.7] / 2.77 [11.4]	9.18 [31.8] / 2.39 [23.5]	9.08 [31.8] / 5.80 [18.9]	7.63 [13.7] / 3.16 [8.3]	8.39 [100.0] / 3.66 [15.2]
0-10 n=129	7.32 [30.2] / 7.91 [88.6]	7.90 [20.2] / 4.17 [76.5]	4.69 [23.2] / 3.70 [81.1]	7.00 [26.4] / 5.36 [91.7]	6.73 [100.0] / 5.76 [85.8]
0 or more n=151	7.01 [29.1] / 7.38 [100.0]	9.08 [22.6] / 6.40 [100.0]	5.88 [24.5] / 4.63 [100.0]	8.58 [23.8] / 11.09 [100.0]	7.62 [100.0] / 7.78 [100.0]

percent of residents, and only 14.57 percent of leavers had spent between six and ten years at the receiving centers, against 24.11 percent of residents. As to a comparison of social scores of leavers vs. residents at the frontier centers, those who left had lower socioeconomic levels than residents; mean scores are 6.42 and 8.71, respectively, for those with less than two years of residence. This distribution is skewed, but median values are 5.30 and 6.94, respectively. Mean social scores for other periods of residence are 7.21 and 8.75 for those with three to five years, 6.78 and 9.85 for those with six to ten years, and 8.39 and 9.74 for those with eleven years or more of residence.[15] This general difference holds true in most cases at each urban center. Although differences between repeated-migrants and present residents could be affected by their difference in life-cycle stages, migrants who have left the frontier centers were probably less able than present residents to obtain better occupations with equal education or time of residence. Differences in mean social scores between educational levels or periods of residence in the frontier cities for either group support this contention (Tables IV.5 through IV.7). Whereas migrants residing at the centers exhibit higher socioeconomic levels with more education or longer periods or residence, this is not necessarily the case for leavers. Therefore, repeated-migrants comprise a group for whom

improving their situation at the frontier centers was an uncertain prospect, as compared to present residents. This general statement is subject to variations during urban frontier evolution, however. It was seen earlier that, as the urban center ascends to higher orders of the functional hierarchy, opportunities for socioeconomic mobility become more limited. The socioeconomic selectivity of repeated-migration should therefore decline in the process.

Changes in Socioeconomic Levels of Repeated-Migrants During Frontier Development

The socioeconomic status of repeated-migrants generally declines during urban frontier evolution. Not only do migrants leaving Humaitá (stage one) have socioeconomic levels higher than their counterparts in Marabá (stage three), but the difference between their own levels and those of present residents is less in Humaitá than in Marabá. The tendency for leavers to demonstrate lower socioeconomic levels than residents during frontier development, is verified by comparing two centers of equal order in two different regions. Leavers at the local center in a more developed region have lower occupational status than at the center in a less developed region; mean (and median) social scores for leavers and residents are, 9.08 (7.39) and 9.68 (7.39) in Altamira, and 7.20 (7.16) and 8.47 (6.42) in Conceição do Araguaia, respectively.[16] An exchange of migrants takes place between areas at different orders

of the functional hierarchy during urban frontier evolution. At early stages, repeated-migrants represent high socio-economic levels and move to high-order places, while migrants at later stages demonstrate lower socioeconomic levels and move to lower-order places. For instance, in Humaitá (stage one) some 55 percent of leavers worked in group 4 and 5 activities in the city and 48 percent were living in regional and subregional centers at the moment of the survey. On the other hand, 65 percent were in group 5 and 6 while in the city and 58 percent went to places of sublocal order. At a late stage, individuals moving to the frontier center are those who did not perceive themselves fit for coping in higher-order centers. Whenever they fail to improve, they are likely to migrate downward in the hierarchy.[17]

Generally, migrants who have left the frontier cities have higher socioeconomic levels at their present place of residence than when living at frontier centers of equal hierarchical order (Tables IV.6 and IV.9). For example, migrants living in municípios of sublocal order have mean and median social scores of 10.08 and 7.39, compared to 7.01 and 5.83 for those who lived in Humaitá. Those residing in municípios of local order exhibit mean and median social scores of 9.31 and 5.45, compared to 9.08 and 7.39 for those who lived in Altamira and 8.58 and 7.16 for those who lived in Conceição do Araguaia. Migrants in subregional municípios show a mean social score of 10.73, compared to 5.88 for

Table IV.9. Mean Social Scores of Male Migrants Who Have Resided at the Surveyed Frontier Centers, by Educational Level and Hierarchical Order of Present Place of Residence.

SOURCE: Interviews with 400 heads of household in the North Region of Brazil, 1978-79.

[a]Row percentage

[b]Mean of individual social scores

[c]Standard deviation of mean value

[d]Column percentage

Table IV.9. Mean Social Scores of Male Migrants Who Have Resided at the Surveyed Frontier Centers, by Educational Level and Hierarchical Order of Present Place of Residence.

Educational Level (grades completed)	Hierarchical Order of Urban Centers: Metroplitan-Regional 1-2 n=23	Subregional 3 n=21	Local 4 n=46	Sublocal 5 n=61	All 1-5 n=151
none (0) n=42	10.27[b] [2.5][a] / 4.3[d] -- [c]	8.02 [20.0] / 38.1 5.21	4.53 [37.5] / 32.6 4.21	6.84 [40.0] / 26.2 5.20	6.30 [100.0] / 27.8 4.90
primary (1-7) n=76	7.59 [10.5] / 34.8 4.04	9.64 [11.8] / 42.9 4.72	10.80 [31.6] / 52.2 6.70	9.63 [46.1] / 57.4 5.77	9.78 [100.0] / 50.3 5.80
secondary (8-11) n=16	6.34 [52.9] / 39.1 6.32	19.76 [11.8] / 9.5 17.61	23.83 [11.8] / 4.3 26.00	16.25 [23.5] / 6.6 11.83	12.31 [100.0] / 10.6 12.46
college (12 or more) n=17	10.73 [27.8] / 21.8 13.40	17.47 [11.1] / 9.5 0.74	10.67 [27.8] / 10.9 10.34	17.24 [33.3] / 9.8 9.35	13.63 [100.0] / 11.3 10.22
(0 or more) n=151	7.90 [15.2] / 100.0 7.45	10.73 [13.9] / 100.0 7.08	9.31 [30.5] / 100.0 8.45	10.08 [40.4] / 100.0 7.11	9.60 [100.0] / 100.0 7.56

those who lived in Marabá. When the level of education is held constant migrants who have left frontier cities have higher socioeconomic levels than when living at equal-order frontier centers (Tables IV.6 and IV.9). Leavers with no formal education possess higher mean social scores at their present place of residence (6.30) than when they lived in a frontier city (4.86); equivalent scores for leavers with primary education are 7.37 and 9.78, respectively, and for those with secondary education, 10.28 and 12.31, respectively. Leavers with college education have mean (and median) scores of 16.20 (9.77) and 13.63 (16.44).[18] When the hierarchical order is held constant differences are maintained in most cases. Differences between equivalent social scores also hold when the period of residence is kept constant (Tables IV.7 and IV.10). Leavers with two years of residence or less possess higher mean social scores at their present residence (8.72) than when they lived in the frontier cities (6.42); equivalent social scores for leavers with three to five years of residence are, respectively, 11.15 and 7.21, for those with six to ten years, 8.19 and 6.78, and for those with eleven years of residence or more 8.39 and 11.97.[19] When the hierarchical order is held constant, differences again are maintained in most cases. These results make it clear that repeated-migration has enabled most leavers to achieve higher socio-economic levels with equal education or equal period of

Table IV.10. Mean Social Scores of Male Migrants Who Have Resided at the Surveyed Frontier Centers, by Period of Residence and Hierarchical Order of Present Place of Residence.

SOURCE: Interviews with 400 heads of household in the North Region of Brazil, 1978-79.

[a]Row percentage

[b]Mean of individual social scores

[c]Standard deviation of mean value

[d]Column percentage

Table IV.10. Mean Social Scores of Male Migrants Who Have Resided at the Surveyed Frontier Centers, by Period of Residence and Hierarchical Order of Present Place of Residence.

Period of Residence in Years	Hierarchical Order of Urban Centers: Metropolitan-Regional 1-2 n=23	Subregional 3 n=21	Local 4 n=46	Sublocal 5 n=61	All 1-5 n=151
0-2 n=79	4.74[b] 7.6[a] 26.1[d] 6.21[c]	9.06 17.7 66.7 5.46	8.53 35.4 60.9 8.74	9.50 39.3 50.8 6.58	8.72 100.0 52.3 7.21
3-5 n=30	7.74 23.3 30.4 5.65	32.22 3.3 4.8 --	9.22 26.7 17.4 6.37	12.46 46.7 23.0 7.89	11.15 100.0 19.9 8.02
6-10 n=20	8.65 20.0 17.4 1.49	8.39 15.0 14.3 2.13	9.18 30.0 13.0 6.42	6.99 35.0 11.5 5.54	8.19 100.0 13.2 4.72
11 or more n=22	10.75 27.3 26.1 11.99	13.74 13.6 14.3 5.57	15.08 18.2 8.7 13.03	10.80 40.9 14.7 8.49	11.97 100.0 14.6 9.60
0-10 n=129	6.90 13.2 73.9 5.22	10.23 14.0 85.7 7.31	8.76 32.6 91.3 7.90	9.96 40.3 85.3 6.93	9.20 100.0 85.4 7.12
0 or more n=151	6.90 15.2 100.0 5.22	10.23 13.9 100.0 7.31	8.76 30.5 100.0 7.90	9.96 40.4 100.0 6.93	9.20 100.0 100.0 7.12

residence. But, when leaving they move essentially (77.63 percent) to places at local or sublocal orders of the functional hierarchy, mainly to rural areas (59.6 percent). Considering that a good percentage of them were recent arrivees in the frontier cities as well as at their present place of residence, and that most reside at low orders of the hierarchy in rural areas, many are unlikely to have improved their occupational situation where they lived. They find it necessary to move to less competitive environments, namely the countryside, in order to hold previous achievement or undergo some improvement.

Migrant Retention Rates and Socioeconomic Mobility Rates During Frontier Development

People remain where they perceive living conditions to be better than elsewhere. Previous results in this chapter show that migrants who reside in frontier cities improve their socioeconomic levels with longer time of residence. Migrants who have not improved their status after a given period of residence are more prone to repeated migration. For instance, it was less certain that leavers would raise their socioeconomic levels with additional time of residence. The probability of migrating again increases with each additional move. Leavers were recent arrivees at the frontier cities as well as at their present place of residence. The socioeconomic improvement they underwent with repeated-migration may be only short-lived. Studies

have shown that frequent movers experience more occupational change than significant socioeconomic improvement.[20]

The extent to which a migrant will improve his socioeconomic situation at the receiving center is limited not only by his previous achievement, but also by competition on the part of other individuals.[21] According to Hennessy, the market for individuals with experience in high-order occupations increases during frontier development. Therefore, in the more developed frontier regions of Latin America, upward socioeconomic mobility is "virtually" impossible for rural dwellers, but there exists a high spatial mobility. Numerous case studies refer to reduced opportunities in the countryside which act as an incentive to migrate.[22] On the other hand, while population concentration in urban areas is apparent at later phases of frontier development, little is known on variations in the socioeconomic mobility of occupational groups, and on the effect of this socioeconomic mobility on their residential stability. The following discussion addresses spatial variations in migrant retention rates and the relationship between migrant retention rates and socioeconomic mobility rates for various occupational groups.

It was seen that the average socioeconomic levels of migrants at the receiving center do not increase as the urban center ascends to higher orders of hierarchy. Therefore, the relative ability of the frontier center to

retain its migrants should not improve during urban evolution. At an early stage, its retention ability is due to the fact that more migrants who come with low-order occupations obtain improvement in the city, whereas at a later stage individuals with higher-order occupations seeking to retain their previous achievement are more numerous. That the frontier center does not improve its ability to retain migrants during urban evolution would be attributed to declining opportunities for migrants with low-order occupations to improve their status. When the relative ability of the city to retain its migrants is measured by means of a rate, this hypothesis is generally confirmed. Humaitá, Altamira, and Marabá have rates of 76.58, 76.62 and 80.14, respectively, and Altamira's rate is higher than that shown by an urban center of equal order located in a more developed region where Conceição do Araguaia has a rate of 68.16 (Table IV.11).[23] Interurban variations in the migrant retention rates and socioeconomic mobility rates of occupational groups indicate that this is due to two facts: on one hand, the extent to which migrants with an agrarian background experience intergroup upward mobility directly affects their residential stability. Both mobility and stability decline in the process. On the other hand, the extent to which migrants with other occupational backgrounds experience intergroup upward mobility influences more their residential stability initially than later in the process.

Table IV.11. Migrant Retention Rates and Intergroup Upward Mobility Rates by Occupational Group and Urban Frontier Center.

SOURCE: Interviews with 400 heads of household in the North Region of Brazil, 1978-79.

NOTES: [a]MRR Migrant retention rate: the percentage of all migrant relatives last arrived at the urban center during the decade prior to, and including the year of the survey, who were residing at the urban center at the time of the survey. The decade corresponds to the 1968-78 period in Humaitá, Altamira, and Conceição do Araguaia, and to the 1969-79 period in Marabá.

[b]IUMR Intergroup upward mobility rate. The rate of past IUM for a given occupational group is the percentage of all male migrant informants with occupations in that group at the time of the survey, who pertained to lower occupational groups at their previous place of residence. The rate of expected IUM for a given occupational group is the percentage of all male migrant informants with occupations in that group at their previous place of residence, who pertained to upper occupational groups at the time of the survey.

[c]Unweighted means of group-specific migrant retention rates, with their corresponding standard deviation (s=). Equivalent means weighted according to case frequency in each occupational group are: 80.1 (1-7) and 80.6 (3-7) in Humaitá, 69.3 (1-7) and 68.9 (3-7) in Altamira, 73.7 (1-7) and 73.3 (3-7) in Marabá, 64.8 (1-7) and 63.6 (3-7) in Conceição do Araguaia, and 73.1 (1-7 and 72.8 (3-7) for all four urban centers.

Table IV.11. Migrant Retention Rates and Intergroup Upward Mobility Rates by Occupational Group and Urban Frontier Center

Occupational Group at the Time of the Survey or When Last Left the Frontier Center	Name and Hierarchical Order of Urban Frontier Centers: Humaitá 5 n=146		Altamira 4 n=75		Marabá 3 n=76		Conceicao do Araguaia 4 n=105		All n=402	
	MRR[a]	IUMR[b] Expected and Past	MRR	IUMR Expected and Past	MRR	IUMR Expected and Past	MRR	IUMR Expected and Past	MRR	IUMR Expected and Past
1-2		0.0		0.0		0.0		0.0		0.0
n=9	50.0	72.7	100.0	75.0	100.0	63.6	83.3	25.0	80.0	64.5
3		9.1		4.5		46.2		0.0		16.3
n=33	90.0	60.9	60.0	48.2	100.0	63.6	75.0	63.7	81.2	56.9
4		66.7		25.0		18.8		9.1		24.5
n=101	78.8	87.6	60.0	35.0	94.7	54.1	50.0	55.0	70.3	56.2
5		83.3		54.6		55.6		50.0		58.5
n=105	81.4	71.4	64.7	61.6	66.7	46.7	71.4	80.0	73.3	64.0
6		61.1		59.2		81.2		53.6		60.8
n=65	81.8	0.0	75.0	0.0	46.2	0.0	50.0	5.9	61.5	2.4
7		90.0		100.0		50.0		100.0		88.5
n=89	77.8	0.0	100.0	0.0	73.3	0.0	79.2	0.0	80.9	0.0
1-7 uw[c]	76.6	s=13.7	76.6	s=18.9	80.1	s=21.8	68.2	s=14.6	74.6	s=7.8
3-7 uw	82.0	s= 4.8	71.9	s=16.8	76.2	s=21.9	65.1	s=14.1	73.5	s=8.2

Stage One

Initially, during this stage the majority of city-ward migrants at their previous place of residence were engaged in low - skilled rural activities. However, once in the city they become upwardly mobile. The extent to which they enter higher occupational groups reflect the lack of competition on the part of individuals better fit for any vacancy which may exist. The intergroup mobility matrix of migrant informants indicates that 61.1 percent of individuals formerly in low-skilled rural activities worked at the time of the survey, 11.1 percent in group 5, 30.6 percent in group 4, 11.1 percent in group 3, and 8.3 percent in group 1-2 (Table IV.12). Most individuals entering group 5 are former subsistence farmers and/or rubber tappers who frequently retain access to land, but now work as construction workers in urban projects or as road maintenance workers in the area. Unlike what occurs at later stages, group 5 activities function as means for migrants to survive initially in the town, while one waits for better opportunities to arise; some 30.6 percent of primary sector workers entered group 5 upon arrival, but only 11.1 percent were in it at the time of the survey. The transitional character of group 5 activities at this stage is illustrated by one Pernambuco native; after farming under lease until 1951, in São Paulo in the later 1950s, in Paraná during 1960s, and in Mato Grosso in the early 1970s, he arrived at

Table IV.12. Male Migrant Informants, by Occupational Group at Their Previous Place of Residence and at the Time of the Survey in Humaitá, Amazonas, Brazil.

Occupational Group at Previous Place of Residence	Occupational Group in the Frontier Center at the Time of the Survey						
	1-2	3	4	5	6	7	1-7
1-2	3[a] 100.0[b] 27.3[c] 4.2[d]						3 100.0 4.2 4.2
3	1 9.1 9.1 1.4	9 81.8 39.1 12.5		1 9.1 14.3 1.4			11 100.0 15.3 15.3
4	3 50.0 27.3 4.2	1 16.7 4.3 1.4	2 33.3 12.5 2.8				6 100.0 8.3 8.3
5		5 83.3 21.7 6.9		1 16.7 14.3 1.4			6 100.0 8.3 8.3
6	3 8.3 27.3 4.2	4 11.1 17.4 5.6	11 30.6 68.8 15.3	4 11.1 57.1 5.6	13 36.1 100.0 18.1	1 2.8 50.0 1.4	36 100.0 50.0 50.0
7	1 10.0 9.1 1.4	4 40.0 17.4 5.6	3 30.0 18.8 4.2	1 10.0 14.3 1.4		1 10.0 50.0 1.4	10 100.0 13.9 13.9
1-7	11 15.3 100.0 15.3	23 31.9 100.0 31.9	16 22.2 100.0 22.2	7 9.7 100.0 9.7	13 18.1 100.0 18.1	2 2.8 100.0 2.8	72 100.0 100.0 100.0

SOURCE: Interviews with 100 heads of household in Humaitá, Amazonas, Brazil, 1978.

[a]Count

[b]Row percentage

[c]Column percentage

[d]Percentage on the total number of cases.

Humaitá in 1978 where he sold fruits and vegetables, while waiting to be assigned a tract of land by INCRA.

Primary sector workers moving to group 4 take up skilled manual occupations as masons, carpenters, or mechanics, with private or governmental companies. The lack of competition from experienced labor at this stage is shown by the labor-hiring practices of public works departments that recruit and train in Humaitá (stage one), but subsequently transfer personnel from other cities to Marabá (stage three). Opportunities for low-skilled workers may also explain why cattle ranchers expressed difficulties in finding cheap labor in the city.

Individuals who ascend to group 3 are rural occupants favored by the Madeira Agrarian Project, where they become proprietors of 100 hectare landtracts. It will be seen at a later stage that group 4 workers compete with agrarian workers to become middle-size rural proprietors. Most agriculturists living in Humaitá have their tract nearby, which they rent to others while they themselves develop a city-based business. Also in group 3 one local ex-rubber tapper who failed to remain in Pôrto Velho buys fish and food surplus from small producers and sells them in the urban area. Another has pooled family resources to open a store in Humaitá, where he supplied rubber tappers with work implements and transportation. Other rural workers have risen to group 1-2 by acquiring tracts of abandoned

rubber estates or going into partnerships to operate large livestock businesses.

At this stage, migrants find positions in the occupational scale more difficult to obtain elsewhere. Given the extensive intergroup upward mobility experience by rural workers, many individuals now in higher occupational groups were formerly in the primary sector and give these groups high rates of past mobility. Percentages of migrants in groups 5 and 4 formerly engaged in the primary sector are 57.1 and 68.8 percent, respectively. The high rates of past and expected mobility in all groups at this stage reveals the dynamism of the migrants' socioeconomic structure. This accounts for generally high rates of retention. In fact, most leavers experience little intergroup upward-mobility. For example, individuals in Humaitá with occupations in group 4, as mechanics, drivers, signalmen, bricklayers or masons, now work in identical or similar occupations in the interior of the município or in the city of Pôrto Velho. These are the experienced migrants who, at a later stage, as in Marabá, compete advantageously with low-skilled rural workers in the urban job market. The same can be said of group 5 leavers. Group 6 workers who left the town went to the interior of the município where they retain their occupation or else have become machinists.

Stage Two

The majority of migrants with low-skilled rural occupations at their previous place of residence are upwardly mobile (Table IV.13). However, the extent to which they gain access to higher occupational groups is more limited. Some 59.26 percent of migrant informants formerly in the primary sector moved to upper occupational groups: 22.2 percent entered group 5, 11.1 percent went to group 4 and 25.9 percent to group 3 (Table IV.13). At this stage, group 5 occupations are less transitional since an equal percentage of agrarian workers were in group 5 both upon arrival and at the time of survey. If primary workers were not favored by government-sponsored agricultural projects, it would be difficult to enter group 3, and their retention rate would probably fall, as for example in the case of Conceição do Araguaia. People in group 4 and 5 at the time of the survey show lower mobility rates than earlier; percentages of individuals in either group who also were in those groups prior to in-migration are greater in Altamira than in Humaitá. Opportunities for these migrants to improve their situation in the city are fewer. Leavers who had occupations as unskilled manual jobbers, street vendors, bakers, or assistant masons, in group 5 while in Altamira have mainly engaged in low-skilled rural activities in the interior of neighboring municípios or else have become INCRA colonos. More leavers with group 4 occupations, as skilled

Table IV.13. Male Migrant Informants, by Occupational Group at Their Previous Place of Residence and at the Time of the Survey in Altamira, Pará, Brazil.

Occupational Group at Previous Place of Residence	Occupational Group in the Frontier Center at the Time of the Survey						
	1-2	3	4	5	6	7	1-7
1-2	1[a] 50.0[b] 20.0[c] 1.3[d]	1 50.0 3.7 1.3					2 100.0 2.5 2.5
3	1 4.5 20.0 1.3	13 59.1 48.1 16.3	4 18.2 20.0 5.0	1 4.5 7.7 1.3		3 13.6 50.0 3.8	22 100.0 27.5 27.5
4	1 8.3 20.0 1.3	2 16.7 7.4 2.5	9 75.0 45.0 11.3				12 100.0 15.0 15.0
5	1 9.1 20.0 1.3	3 27.3 11.1 3.8	2 18.2 10.0 2.5	4 36.4 30.8 5.0		1 9.1 16.7 1.3	11 100.0 13.8 13.8
6		7 25.9 25.9 8.8	3 11.1 15.0 3.8	6 22.2 46.2 7.5	9 33.3 100.0 11.3	2 7.4 33.3 2.5	27 100.0 33.8 33.8
7	1 16.7 100.0 1.3	1 16.7 3.7 1.3	2 33.3 10.0 2.5	2 33.3 15.4 2.5			6 100.0 7.5 7.5
1-7	5 6.3 100.0 6.3	27 33.8 100.0 33.8	20 25.0 100.0 25.0	13 16.3 100.0 16.0	9 11.3 100.0 11.3	6 7.5 100.0 7.5	80 100.0 100.0 100.0

SOURCE: Interviews with 100 heads of household in Altamira, Pará, Brazil, 1978.

[a]Count

[b]Row percentage

[c]Column percentage

[d]Percentage on total number of cases.

construction workers, live in rural areas of other municípios, where they hold INCRA colonias. As during stage one, group 6 workers who leave the town return to the countryside where they pursue primary activities.

Stage Three

Most migrants formerly with low-skilled rural occupations who remain in the city are upwardly mobile (Table IV.14), but their access to higher occupational groups is even more limited than at stage two (Table IV.14). Eighty-one percent of migrants originally engaged in the primary sector are now in higher occupational groups (43.8 percent in group 5, 31.3 percent in group 4 and 6.3 percent in group 1-2). However, 46.7 percent of migrants in group 5 were formerly in group 6, but fewer (20.8 percent) members of group 4 came from group 6. When living in the urban area is more expensive and access to subsistence farming more difficult, city-ward migrants who remain with agrarian occupations have a very low retention rate. Those in Marabá who work in the countryside need also to work in the city. For instance, many men in the sector of Cidade Nova work both as assistant masons and rural jobbers in order to meet urban living expenses. Families in the neighborhood were reported to have returned to the countryside because the family head could not find city-based employment.

The high mean retention rate of Marabá is caused principally by the high rate of group 4 workers. By

Table IV.14. Male Migrant Informants, by Occupational Group at Their Previous Place of Residence and at the Time of the Survey in Marabá, Pará, Brazil.

Occupational Group at Previous Place of Residence	Occupational Group in the Frontier Center at the Time of the Survey						
	1-2	3	4	5	6	7	1-7
1-2	4[a] 100.0[b] 36.4[c] 5.6[d]						4 100.0 5.6 5.6
3	6 46.2 54.5 8.5	4 30.8 36.4 5.6	2 15.4 8.3 2.8	1 7.7 6.7 1.4			13 100.0 18.3 18.3
4		3 18.8 27.3 4.2	9 56.3 37.5 12.7	2 12.5 13.3 2.8		2 12.5 28.6 2.8	16 100.0 22.5 22.5
5		2 11.1 18.2 2.8	8 44.4 33.3 11.3	5 27.8 33.3 7.0	1 5.6 33.3 1.4	2 11.1 28.6 2.8	18 100.0 25.4 25.4
6	1 6.3 9.1 1.4		5 31.3 20.8 7.0	7 43.8 46.7 9.9	2 12.5 66.7 2.8	1 6.3 14.3 1.4	16 100.0 22.5 22.5
7			2 50.0 18.2 2.8			2 50.0 28.6 2.8	4 100.0 5.6 5.6
1-7	11 15.5 100.0 15.5	11 15.5 100.0 15.5	24 33.8 100.0 33.8	15 21.1 100.0 21.1	3 4.2 100.0 4.2	7 9.9 100.0 9.9	71 100.0 100.0 100.0

SOURCE: Interview with 100 heads of household in Marabá, Pará, Brazil, 1979.

[a]Count

[b]Row percentage

[c]Column percentage

[d]Percentage on the total number of cases.

entering group 5 agrarian workers improve their chances to remain in the city where the market for crafts, street vending and low-skilled personal services is greater. As to group 4 migrants, they have a very high rate of retention despite the fact that the group recruits from, or sends to other occupational groups, fewer workers than any other group. Their residential stability could be explained by their accessibility to an unusual number of employment sites. They find jobs in the construction and transportation sectors, such as the federally-subsidized urban relocation sector of Nova Marabá, bridge construction over the Itacaiúnas River, the Tucuruí hydroelectric project, and civil engineering sites along the PA-150 and PA-70 highways. Twenty-six out of thirty-four migrant informants in groups 4 and 5 worked in these corridors. In general they found work within the município or nearby areas of Itupiranga, Conceição do Araguaia and São Domingos do Capim, for periods varying from one week to nine months. The city is also the recruiting base for manual labor needed for the installation of the Serra dos Carajás iron ore mining project.

At this stage it becomes difficult for low-skilled rural workers to survive in the competitive urban market, where migrants with better skills retain previous or similar occupations. Leavers with low-skilled agrarian occupations in Marabá returned to the countryside as rural occupants in the municípios of Portel, São Domingos do

Capim, in Pará, and Grajaú and Pindaré Mirim in Maranhão. Leavers with group 5 occupations in Marabá (potters, street vendors, sawyers, assistant masons, garbage collectors, ceramists, stokers), went to the interior of Portel, Itupiranga, São Domingos do Capim and São João do Araguaia, where they are either rural jobbers, colonos or manual workers.

In the more developed region, centers that fail to ascend to higher hierarchical orders have a lesser ability to retain their migrants than cities of equal order in less developed regions. This is caused by more limited opportunities for low-skilled and skilled manual workers. For example, similar percentages of migrants originally with agrarian occupations are upwardly mobile in Altamira and Conceição do Araguaia, but those in the latter city undergo less improvement (Table IV.15). Here, some 55.66 percent of agrarian workers had moved to higher occupational groups. However, when compared to equivalent percentages for Altamira (subsequently given in parenthesis), the distribution of upwardly mobile individuals in Conceição do Araguaia is lower-graded: 54.06 percent (37.46) in group 5, comprising 80.0 percent (46.2) of group 5 effectives, 31.87 percent (18.73) in group 4, retaining 35.0 percent (15.0) of group 4 effectives, but only 13.60 percent (43.71) in group 3, claiming 27.3 percent (25.9) of group 3 effectives (all at the time of the survey).

Table IV.15. Male Migrant Informants, by Occupational Group at Their Previous Place of Residence and at the Time of the Survey in Conceicão do Araguaia, Pará, Brazil.

Occupational Group at Previous Place of Residence	Occupational Group in the Frontier Center at the Time of the Survey						
	1-2	3	4	5	6	7	1-7
1-2	3[a] 75.0[b] 75.0[c] 4.2[d]	1 25.0 9.1 1.4					4 100.0 5.6 5.6
3		3 100.0 27.3 4.2					3 100.0 4.2 4.2
4		1 9.1 9.1 1.4	9 81.8 45.0 12.7		1 9.1 5.9 1.4		11 100.0 15.5 15.5
5	1 16.7 25.0 1.4	1 16.7 9.1 1.4	1 16.7 5.0 1.4	3 50.0 20.0 4.2			6 100.0 8.5 8.5
6		3 7.3 27.3 4.2	7 17.1 35.0 9.9	12 29.3 80.0 16.9	15 36.6 88.2 21.1	4 9.8 100.0 5.6	41 100.0 57.7 57.7
7		2 33.3 18.2 2.8	3 50.0 15.0 4.2		1 16.7 5.9 1.4		6 100.0 8.5 8.5
1-7	4 5.6 100.0 5.6	11 15.5 100.0 15.5	20 28.2 100.0 28.2	15 21.1 100.0 21.1	17 23.9 100.0 21.1	4 5.6 100.0 21.1	71 100.0 100.0 100.0

SOURCE: Interviews with 100 heads of household in Conceicão do Araguaia, Pará, Brazil, 1978.

[a]Count

[b]Row percentage

[c]Column percentage

[d]Percentage on total number of cases.

The above statistics indicate that agrarian workers moving to a local center have their residential stability adversely affected by the advanced phase of development of the frontier. They cannot depend on urban employment and commuting access to land for their own subsistence as readily as in Humaitá, (stage one), nor on prospects of becoming middle-size rural proprietors as in Altamira (stage two). In the 1960s, work opportunities on nearby cattle ranches permitted rural jobbers and construction workers to work in the countryside while residing in the urban center. With the termination of these activities and the westward movement of the labor front, migrants with rural occupations living in the urban center must travel great distances and remain for long periods of time on ranches or at placer-mining sites, thereby depressing residential stability. In fact, most leavers (77.7 percent) with agrarian occupations during their stay in Conceição do Araguaia have moved to the interior of the município, mainly to the rapidly growing settlements along PA-150, where they keep similar occupations. In the absence of a vigorous urban market for crafts and personal services as in Marabá, seasonal unemployment affects those migrants at Conceição do Araguaia entering group 5 activities, such as potters or assistant masons. According to workers of this group, many accept any job available during wintertime, sell their possessions, or even move to unclaimed areas in order to survive. Some who

took short-term jobs on cattle ranches would leave the city if they could own a tract of land in the countryside. While agrarian workers have been penalized by the concentration of landholdings and the practice of labor-extensive livestock activities, group 4 workers in the city have been disadvantaged by the lack of construction projects and expansion in transportation functions.[24] Most leavers (69.2 percent) with group 4 occupations in Conceição do Araguaia live in the interior of the município where they remain in the same group or else have fallen to an even lower level.

Conclusion

This chapter has examined comparative aspects of the socioeconomic levels of city-ward frontier migrants. Also, it has discussed the relationship between socioeconomic mobility and migrant retention at urban centers during frontier development. As a rule, migrants who reside or have resided at the frontier centers possess lower socioeconomic levels than other city-ward migrants who never resided at the frontier cities. Frontier migrants' lower socioeconomic achievement generally persists when the hierarchical order of their place of residence and educational level, or period of residence, are held constant. Migrants to the urban frontier appear to be the less successful; to retain or improve their socioeconomic levels they move to less competitive job markets. There they more

easily improve their occupational levels with further education or time of residence than other city-ward migrants.

During urban frontier evolution, opportunities become fewer for individuals at the extremes of the educational scale and those with more time of residence show lesser increase in socioeconomic levels in relation to recent arrivees. These two findings, along with the fact that average socioeconomic levels of migrants remain fairly constant in the process, support the argument that migrant populations' socioeconomic levels in the city do not increase markedly on the average as a result of declining opportunities. Migrants who leave the frontier centers after some time of residence form a group for whom achieving higher socioeconomic levels is a relatively uncertain prospect. Just as in-migration becomes less rewarding, the socioeconomic selectivity of repeated migration weakens. Whereas leavers show high-scored occupations and a pronounced tendency to move to high-order places at an early stage, they show lower socioeconomic levels and the majority move to low-order places at a late stage. In more developed regions, leavers are recent arrivees at the frontier center as well as at their present residence. They have improved their occupational status by moving to low-order and rural areas, suggesting that many are likely to be frequent movers seeking short-lived improvement.

As a result of declining opportunities for low-skilled

workers, the ability of the city to retain its migrants tends not to increase during urban frontier evolution. Retention rates for migrant relatives and socioeconomic mobility rates for migrant informants make it clear that during urban frontier evolution socioeconomic mobility affects the retention rate for the occupational groups in the following manner: 1) when experiencing mobility, migrants with low occupational backgrounds become residentially more stable; both mobility and stability decline in the process; 2) when experiencing mobility, middle occupational groups improve their stability more at an early than at a later stage, that is, when opportunities to retain previous occupational levels become more important.

Based on the situation at centers in more developed regions, one can speculate on scenarios that could unfold in the less advanced frontier centers. In Humaitá, for example, unless on-going rural settlement programs are strengthened as it has been the case in Altamira, growing numbers of local subsistence farmers will be forced to move to less accessible frontier areas or take up residence in the nearest urban center to engage in low-level jobs on ranches. This is the situation typically encountered in Conceição do Araguaia. In the process, migrants' spatial mobility should increase, while their socioeconomic mobility decreases. As to Altamira, settlement on the government-sponsored colonization project was approaching full-capacity

in the fall of 1979; many ex-colonos indicated that abandoned colonias in the project had been acquired and consolidated by individuals who transformed them into cattle ranches. This situation was found along the Altamira-Marabá segment. Officials in Belém confirmed that further discriminatory actions were requested by INCRA to expand for settlement the area under their jurisdiction, involving 500 hectare landtracts for livestock activities. These changes, part of a larger post-1974 turnabout in development priorities, are likely to limit access of rural workers to land property and means to take up residence in the city.[25] The retention rate of group 6 should decrease in the future. On the other hand, Altamira expects some expansion of its transportation and construction activities. Although group 4 workers may then earn less socioeconomic mobility through the PIC, alternate sources of employment, such as the projected dam site on the Xingu River, new road linkages with São Felix do Xingu and Santarém, and the SUDAM-sponsored urban housing project, should raise their residential stability.

FOOTNOTES

[1]No difference-of-means test was conducted due to data not being normally distributed.

[2]The difference between mean social scores is not significant at the 0.05 level in a one-tailed test, for the uneducated as well as for the primary-, secondary-, and college-educated ($t = 0.4183$, 0.8239, 0.6583, and 1.6642, respectively).

[3]The difference between mean social scores is significant at the 0.05 level in a one-tailed test for the uneducated ($t = 2.2879$), but not significant for the primary- and secondary-educated ($t = 0.2012$ and 1.0176, respectively).

[4]Concerning individuals with two years or less of residence, the difference between mean social scores of migrants in Humaitá and of migrants at other sublocal centers is significant at the 0.05 level in a one-tailed test ($t = 2.0435$). Due to data not being normally distributed, no difference-of-means test was conducted on scores of migrants in Altamira, and Conceição do Araguaia, and of migrants at other local centers, as well as on scores of migrants in Marabá and of migrants at other subregional centers. Concerning individuals with eleven years or more or residence, the differences between mean social scores of migrants in Humaitá, Conceição do Araguaia, Altamira, and Marabá, and of migrants in other equal-order centers are not significant at the 0.05 level in a one-tailed test ($t = 0.7849$, 0.5785, 0.6504, and 0.4731, respectively).

[5]The education people receive varies in quality depending upon where and when it is acquired; see Peter M. Blau and Otis Dudley Duncan, The American Occupational Structure (New York: John Wiley & Sons, Inc., 1967), pp. 250, 262, 265; Jorge Balán, Harley L. Browning, and Elizabeth Jelín, Men in a Developing Society: Geographic and Social Mobility in Monterrey, Mexico (Austin: University of Texas Press, 1973), p. 126. A living experience in large cities further enables the migrant to adjust rapidly at a new place of residence, to better relate himself socially, and to develop his awareness of opportunities; see Wayne A. Cornelius, Jr., "Urbanization as an Agent in Latin American Political Instability: The Case of Mexico," American Political Science Review 53/3 (September 1969):837; Milton E. Harvey

and Richard R. Brand, "The Spatial Allocation of Migrants in Accra, Ghana," The Geographical Review 64/1 (January 1974):3; Daniel Courgeau, "Les réseaux de relations entre personnes. Etude d'un milieu urbain," Population 30/2 (March-April 1975):275; E. Valencia, "Cali: Estudio de los Aspectos Sociales de Su Urbanización e Industrialización," Documento E/LACCY/BP/L.6, Dirección de los Asuntos Sociales (Santiago, Chile: CEPAL, 1965):46; Luc J. A. Mougeot, "De la marginalité à l'intégration: les migrants du bidonville Siloé, Cali, Colombie," unpublished master's thesis, Department of Geography, University of Ottawa, 1976, pp. 45-50, 131-132; Gisélia Potenguy Grabois, "O Processo de Inserção do Migrante na Sociedade Urbano-Industrial," in Mudança na Composição do Emprego e na Distribuição da Renda: Efeitos sobre as Migrações Internas do Brasil, ed. Brasil--Ministério do Interior (Brasília: OIT/BNH, 1976), p. 80; Olga Maria Schild Becker and Zuleika Lopes Cavalcanti de Oliveira, "Proposição Metodológica para Análise dos Diferenciais entre Migrantes e Nativos nas Areas Metropolitanas do Sudeste," Revista Brasileira de Geografia 37/2 (April-June 1975):12.

[6]Peter M. Blau and Otis Dudley Duncan, The American Occupational Structure, pp. 243-244; George Martine and José Carlos P. Peliano, Migrantes no Mercado de Trabalho Metropolitano (Brasília: IPEA, 1978), pp. 21, 172-173; Maria Conceição d'Incao e Mello, O 'Bóia-Fria': Accumulação e Miséria, 6th ed. (Petrópolis: Vozes, 1978), p. 75.

[7]They have achieved high socioeconomic levels and have been living at their present place of residence for a long period of time. See George C. Myers, Robert McGinnis and George Masnik, "The Duration of Residence Approach to a Dynamic of Internal Migration: The Axiom of Cumulative Inertia," Eugenics Quarterly 14/2 (June 1967):121-126; Gerald R. Leslie and Arthur H. Richardson, "Life-Cycle, Career Pattern, and the Decision to Move," American Sociological Review 26/6 (December 1961):898-899; Curtis C. Roseman, "Changing Migration Patterns Within the United States," Resource Papers for College Geography 77-2 (Washington, D.C.: AAG, 1977):6.

[8]The difference between mean social scores of migrants in Humaitá and Altamira is not significant at the 0.05 level ($Z = 0.6706$); that between scores of migrants in Humaitá and Marabá is not significant ($Z = 0.0491$); and the difference between scores of migrants in Altamira and Marabá is not significant ($Z = 0.0557$). No test was conducted on scores of migrants in Altamira and Conceição do Araguaia due to data not being normally distributed.

[9]The difference between mean social scores of frontier migrants with no formal education and those with primary education is significant at the 0.05 level ($Z = 3.280$); the difference between scores of other migrants with equivalent educational levels is not significant ($Z = 0.0016$). The difference between mean social scores of frontier migrants with primary and of those with secondary education is significant at the 0.05 level ($Z = 4.3911$); the difference between scores of other migrants with equivalent educational levels is also significant ($Z = 2.5090$).

[10]The difference between mean social scores of migrants in Humaitá and of those in Marabá is not significant at the 0.05 level, neither for the uneducated, nor for the primary- and secondary-educated ($Z = 0.8180$ and 0.0789, and $t = 0.7165$, respectively). However, median values for the uneducated in Humaitá, Altamira, and Marabá are 5.83, 5.30, and 5.04, respectively. Median values for the primary-educated in the three urban centers are 7.31, 7.39, and 7.39, respectively. And median values for the secondary-educated in the same cities are 13.60, 12.60, and 12.80, respectively. No test was conducted on scores of migrants with college education because of non-normality, but median values in the three frontier cities are 13.60, 8.11, and 5.56, respectively.

[11]No difference-of-means test was performed on social scores of migrants with specific educational levels due to data not being normally distributed in the case of both frontier and other city-ward migrants. However, median social scores of migrants in the latter group for individuals with two years or less, three to five, and six to ten years of residence are 10.42, 8.87, and 7.39, respectively.

[12]No difference-of-means test was carried out on social scores of recent arrivees in Humaitá and Marabá because of non normal data distributions. However, median scores of recent arrivees in Humaitá, Altamira, and Marabá are 5.30, 5.82, and 7.39, respectively. The difference between mean social scores of migrants with two years or less of residence and of those with six to ten years of residence is significant at the 0.05 level in Humaitá and Altamira ($Z = 2.4869$ and 2.3308, respectively). No test was conducted on scores of migrants in Marabá due to non-normality, but median scores of individuals with two years or less, three to five, and six to ten years of residence are 7.39, 6.94, and 10.75, respectively.

[13]The difference between mean social scores of leavers and resident migrants is not significant at the 0.05 level in Humaitá nor in Altamira (Z = 1.6460 and 0.4458, respectively). Data for either group in Conceição do Araguaia are not normally distributed, but median scores are 7.16 and 6.42 respectively.

[14]The difference between mean social scores of leavers and resident migrants is significant at the 0.05 level for the uneducated and for the primary-educated (Z = 3.4555 and 1.6669, respectively).

[15]The difference between mean social scores of leavers and resident migrants is not significant at the 0.05 level for those with three to five years and eleven years or more of residence (Z = 1.1856 and 1.2384, respectively), but is significant for those with six to ten years of residence (Z = 2.5039).

[16]The difference between mean social scores of leavers in Humaitá and Marabá is not significant at the 0.05 level (Z = 0.8006).

[17]Luis Eduardo Aragón, "Migration to Northern Goiás: Geographical and Occupational Mobility in Southeastern Amazonia, Brazil," unpublished doctoral dissertation, Department of Geography, Michigan State University, 1978, p. 63.

[18]The difference between mean social scores held by leavers in frontier cities and at their present place of residence is not significant at the 0.05 level for the uneducated and the secondary-educated, but is significant for the primary-educated (Z = 1.5858, 0.4887, and 2,6820, respectively).

[19]The difference between mean social scores held by leavers in frontier cities and at their present place of residence is significant at the 0.05 level for those with two years or less and with three to five years of residence (Z = 2.2401 and 5.8796, respectively), but is not significant for those with six to ten years and with eleven years or more of residence (Z = 0.2877 and 1.5977, respectively).

[20]Case studies on metropolitan centers and a mature frontier region of Brazil conclude that the geographical mobility of the labor force is associated to frequent occupational change but to limited upward social mobility; see George Martine and José Carlos P. Peliano, Migrantes no Mercado de Trabalho Metropolitano, p. 177; Luis E. Aragón, "Migration to Northern Goiás," p. 114. See also Joan M.

Nelson, "Sojourners versus New Urbanites: Causes and Consequences of Temporary versus Permanent City-ward Migration in Developing Countries," Economic Development and Cultural Change 24/4 (July 1976):743; Lêda Maria Fraenkel and Mario Duayer de Souza, "Diferencas na Composição do Emprego, Distribuição da Renda e Migrações Internas," in Mudanças na Composição do Emprego e na Distribuição da Renda, ed. Brasil--Ministério do Interior, p. 33.

[21]Otis Dudley Duncan, "How Destination Depends on Origin in the Occupational Mobility Table," American Journal of Sociology 84/4 (January 1979):793. This article also contains a methodological discussion of occupational mobility tables used later in this chapter.

[22]Alistair Hennessy, The Frontier in Latin American History (Albuquerque: University of New Mexico Press, 1978), pp. 111, 127; Linda K. Romero and William L. Flinn, "The Effects of Structural Change Variables on the Selectivity of Migration: The Case of a Colombian Peasant Community," Inter-American Economic Affairs 29/4 (Spring 1976):57; Hélène Rivière d'Arc et Christine Apesteguy, "Les nouvelles franges pionnières en Amazonie brésilienne -- La vallée de l'Araguaia," Etudes rurales 69 (January-March 1978): 90-94; Jean-François Dupon and André Vant, "Contrastes et changements dans l'agriculture du Goias central," Les Cahiers d'Outre-Mer 32/127 (July-September 1979):239-243.

[23]The differences between mean retention rates of Humaitá and Altamira, Humaitá and Marabá, Altamira and Marabá, and Altamira and Conceição do Araguaia, are not significant at the 0.05 level ($t = 0.0011$, 0.2727, 0.3044, and 0.7914, respectively).

[24]José Alberto Magno de Carvalho et al., "Migrações Internas na Região Norte: Estudo de Campo da Região de Marabá," vol. 2 (Belo Horizonte: Centro de Planejamento e Desenvolvimento Regional/UFMG, 1977), p. 97 (Mimeographed.); Jean Hébette and Rosa Acevedo Marín, "Colonização Espontânea, Política Agrária e Grupos Sociais," in Amazônia: Desenvolvimento e Ocupação, ed. José Marcelino Monteiro da Costa (Rio de Janeiro: IPEA/INPES, 1979), pp. 158-169.

[25]Brasil--Ministério do Interior, II Plano Nacional de Desenvolvimento: Programa de Ação do Governo para a Amazônia 1975-79 (Belém: Ministério do Interior/SUDAM, 1975), pp. 19-20; Charles H. Wood and Marianne Schmink, "Blaming the Victim: Small Farmer Production in an Amazon Colonization Project," paper presented at the Interciencia Association Symposia on Nutrition and Agriculture: Strategies for Latin America, Washington, D.C., February

1978, pp. 18-25 (Mimeographed.); Stephen G. Bunker, "Barreiras Burocráticas e Institucionais à Modernização: O Caso da Amazônia," Pesquisa e Planejamento Econômico 10/2 (August 1980):555-600.

CHAPTER V

SUMMARY AND RECOMMENDATIONS

This study describes and analyzes the retention of the male migrant labor force in fast-growing urban centers of northern Brazil's developing agricultural frontier. Four cities that served as export and import centers in the rubber-cycle period of 1875-1912 were selected. By 1970 these urban settlements were found at different orders of the functional hierarchy corresponding to various phases of frontier development, thereby representing a cross-section of urban frontier evolution.

The study presents the relationship between the process of migrant retention and urban frontier evolution. It argues that the ability of an urban center to retain its migrant population is a direct function of the migrants' socioeconomic achievement at that center. The level of achievement remains constant as the receiving center ascends to higher hierarchical orders with further frontier development. It declines for centers of equal order located in more developed regions. The socioeconomic level of migrants is dependent upon their achievement in the generating area and changes individuals have undergone at the receiving center. The extent to which an urban center receives

migrants with high socioeconomic levels directly depends upon its hierarchical order. Larger urban centers draw migrants with higher socioeconomic levels while smaller cities attract individuals with lower occupational status. In the process, migrants proceed from more distant places, higher orders of the functional hierarchy, and come with higher socioeconomic levels as the frontier center reaches higher hierarchical orders. However, migrants to equal-order frontier centers in more developed regions should proceed from less distant places, lower orders of the functional hierarchy and possess lower socio-economic levels. In the more developed regions, weakened intervening obstacles cause well-prepared individuals within the in-migration field of the center to move directly to higher-order centers while less-prepared individuals from low-order places move directly to the city. As to socioeconomic improvement at the receiving urban center, migrants experience more advancement by moving to low-order urban centers. Migrants undergo less improvement at the receiving frontier center as it reaches higher orders of the functional hierarchy with further frontier development. Migrants to equal-order urban centers in more developed regions demonstrate less socioeconomic advancement.

Direct City-Ward Frontier Migration

Data show that during urban frontier evolution: 1) the average distance between generating areas and the receiving center tends to increase; 2) migrants proceed from higher orders of the functional hierarchy and originally show higher socioeconomic levels. At frontier centers of equal order located in more developed regions both distances and socioeconomic levels decline. In the process of urban frontier evolution, the average socioeconomic level of migrants at the receiving center remains constant, due to the declining rate at which they experience socioeconomic mobility. At urban centers of equal order located in more developed regions, socioeconomic levels at the receiving center decrease. There, migrants' limited improvement demonstrates that, holding hierarchical order constant, socioeconomic opportunities are fewer in advanced frontier regions where cities that fall under the influence of more dynamic centers are less able to provide jobs for resident and potential migrants.

As the urban center ascends to higher orders of the functional hierarchy with further frontier development, direct migrants proceed from more distant places at higher hierarchical orders. City-ward in-migration fields during frontier development provide geographical meaning to the relationships above and support a simple model of city-ward frontier migration. In a primitive frontier region, the

in-migration field of the sublocal urban center is confined to its rural hinterland. Migrants from the nearby countryside have their greatest chances to progress in the absence of competing skilled migrants. At this stage, enterprising and well-informed individuals from distant high-order places seek job opportunities in the growing frontier center.

With the development of agropastoral activities, the urban center ascends to a higher order of functional hierarchy. At this advanced stage, migration from nearby rural areas decreases in intensity and migrants from urban areas travel greater distances to reach the frontier center. Migrants come with higher socioeconomic levels than at stage one and undergo less occupational improvement at the receiving center.

With further diversification and specialization of its agropastoral economy, the frontier center rises to a higher hierarchical order. More migrants from high-order places reach the urban center and migration from within the município declines. However, Marabá may present an exception to this thesis since the areal extent of its in-migration field decreases while the contribution of rural migrants to the total inflow remains significant. Migrants proceed from high-order places at this stage and come with higher socioeconomic levels. However, they experience less improvement at the receiving center. Rural dwellers who find it troublesome to survive without resettling, must

move either to less settled rural areas or to the urban center, where they find it difficult to compete with the more skilled. Along with less-prepared intercity migrants, they become frequent movers within the more developed frontier region, where only those who seek job openings in primitive regions show greater socioeconomic advancement. This minority possesses a wide search space that permits it to overcome intervening obstacles. They originally have higher socioeconomic status and come from higher-order places than the migrants who follow. According to Lee, these vanguard migrants are the real frontiermen, whereas the more numerous migrants with low socioeconomic standing, by virtue of constrained search spaces, "fill up the territory" passed over by vanguard migrants.

Migrant Retention During Frontier Development

In general, the urban frontier acts as a refuge for unsuccessful city-ward migrants. However, as the frontier evolves the comparative advantages migrants enjoyed decline, thereby adversely affecting the migrants' residential stability, especially that of agrarian workers. Compared to their relatives living in other urban centers, city-ward frontier migrants demonstrate less occupational achievement. They typically show lower socioeconomic levels with equal educational attainment or period of residence. And, although individuals unable to secure high-level occupations

may enhance their standing by moving to frontier centers, opportunities decline for the least and most educated during urban frontier evolution. Furthermore, prospects for socioeconomic mobility with further residence are brighter in frontier centers, due to rapid development along with less competition. The migrants' socioeconomic fabric becomes more rigid as the urban frontier evolves. In the process, recent arrivees show higher socioeconomic levels but individuals with more time of residence show less improvement in relation to recent arrivees. Migrants who left had little opportunity to advance socioeconomically, and as the urban frontier evolves these migrants show lower occupational achievement in the city. Moreover, nearly half of the repeated-migrants moved to higher-order places at an early stage, whereas the majority went to lower-order places at a late stage.

Migrants' socioeconomic levels vary little as the city ascends to higher hierarchical orders with further frontier development, and decline at centers of equal order in more developed regions. It is confirmed that the ability of the receiving center to retain its migrants should vary according to the migrants' socioeconomic levels. Mean retention rates remain constant during the process and are the result of two general trends. On one hand, the socioeconomic mobility of migrants with low-skilled rural occupations favors their residential stability; however,

both mobility and stability decline during urban frontier evolution. On the other hand, improvement of migrants who belong to middle occupational groups influences their stability more at an early rather than at a late stage. At stage one, a large share of these were engaged in low-level occupations but now hold positions difficult to obtain at other places within their search space. Later on, migrants in middle occupational groups come with previous experience in similar or identical activities. To retain their previous socioeconomic levels they compete successfully with agrarian workers, and having made this move quite likely feel less threatened than at their previous residence.

Recommendations

Findings of this empirical research have raised many issues which require further analysis and additional information. The propensity of individuals to improve their socioeconomic levels and to change their residence frequently coincides with specific stages of their life-cycle.[1] Differences between city-ward frontier migrants and migrants to other urban areas could be due to differences in life-cycle stages, once other variables are held constant. In this particular comparison the difference between them and other city-ward migrants could be due to the quality of education and/or previous exposure to urban environments. In this study of migrant retention, migrants

to other cities are relatives of city-ward frontier migrants; and therefore it seems relevant to explore how members of a kin group who settle in frontier regions may enable others to live in large urban centers, and how migrants in large cities in return, may provide assistance to relatives on the frontier. Additional research could exclude from the comparison other city-ward migrants living in cities within a predefined frontier region. To control the life-cycle variable should reduce data variation concerning migrants who reside or have resided at the frontier centers. Given a larger number of cases, the analysis of retention rates and socioeconomic mobility rates may benefit from the following refinements: 1) calculate retention rates for occupational categories, or occupations, which would provide a finer profile of distributions summarized by mean social scores; 2) hold constant the stage of life-cycle of migrant relatives and informants, when comparing retention and socioeconomic mobility rates; 3) use data on migrant informants who move to the city during the period encompassed by the retention rate. More information is needed from informants on migrant relatives enabling the researcher to better assess the effect of economic and non-economic variables on residential stability.[2] The migration history and concomitant occupational changes would permit: 1) the study of the effect of past spatial mobility on migrant retention; and 2) the calculation of socioeconomic

mobility rates for a consistent population at risk. More efforts are needed in survey research design to substantiate the role of socioeconomic mobility, spatial mobility, investment in local community, and alternate sources of employment on the residential stability of people.[3] Hopefully, findings of this study will stimulate researchers to undertake further inquiry on the ability of places to retain people, using data on populations at hierarchical orders and in phases of development other than those considered here.

Still neglected is the study of the ability of places to retain the migrant populations they attract. This type of investigation is particularly needed in Latin American countries with developing frontiers. Since Everett S. Lee defined migration stream efficiency, little attention has been given to the ability of places to retain migrants and to the socioeconomic development of those places. This neglect led Curtis C. Roseman to point out:

> "Perhaps a weakness in contemporary migration research is a preoccupation with movers, with less attention being paid to factors that influence the stability of significant proportions of the population."[4]

In an earlier review article on facets of population redistribution, Sidney Goldstein warned that our "estimates of the number of net migrants, while better than no information at all, yield only limited insights into what the migration process is all about." He urged that more analysis

be conducted on "the relationship between the in- and out-movement and success or failure in the achievement of individual goals."[5] The study of such relationship is critical to the understanding of migration in the context of frontier development. In Latin America most policies relating to the occupation of frontier lands regard these areas as havens of opportunity for labor surpluses of congested regions. In Brazil however, openings for socio-economic advancement decline rapidly for low occupational groups as the frontier develops, thus inspiring Martin Katzman's comment:

> "Despite the avowed goal of settling the Amazon, there is considerable evidence that Brazilian government perceives people as an obstacle rather than an asset for development."[6]

According to this study conducted in localities developed with governmental assistance, during early phases of development migrants' urban residential stability increases when migrants have the ability to improve themselves socioeconomically. As development continues, new job opportunities enable middle occupational group migrants to retain their skills and thus improve their stability. However, declining opportunities for low occupational groups at these frontier centers adversely affect their residential stability, thereby relegating these unadjusted individuals to continued movement within the frontier region.

FOOTNOTES

[1]Jorge Balán, Harley L. Browning, and Elizabeth Jelín, Men in a Developing Society: Geographical and Social Mobility in Monterrey, Mexico (Austin: University of Texas Press, 1973), p. 142; Ishmael O. Okraku, "The Family Life-Cycle and Residential Mobility in Puerto Rico," Sociology and Social Research 55/3 (April 1971):324-340.

[2]Sidney Goldstein and Alice Goldstein, "A Test of the Potential Use of Multiplicity in Research on Population Movement," Population Studies and Training Center, Brown University, 1979. (Mimeographed.) The authors stress that "Still lacking is any experience using kin networks to obtain information on mobility.", p. 25.

[3]Alden Speare, Jr., "Residential Satisfaction as an Intervening Variable in Residential Mobility," Demography 11/2 (May 1974):173-188; R. J. Johnston, "Resistance to Migration and the Mover/Stayer Dichotomy: Aspects of Kinship and Population Stability in an English Rural Area," Geografiska Annaler 53B/1 (1971):16-27; Peter Ulhenberg, "Noneconomic Determinants of Nonmigration: Sociological Considerations for Migration Theory," Rural Sociology 38/3 (Fall 1973):296-311; Sidney Goldstein, "Repeated Migration as a Factor in High Mobility Rates," American Sociological Review 19/5 (October 1954):536-541.

[4]Curtis C. Roseman, "Changing Migration Patterns Within the United States," Resource Papers for College Geography 77-2 (Washington, D.C.: AAG, 1977):9.

[5]Sidney Goldstein, "Facets of Redistribution: Research Challenges and Opportunities," Demography 13/4 (November 1976):426.

[6]Martin T. Katzman, Cities and Frontiers in Brazil: Regional Dimensions of Economic Development (Cambridge: Harvard University Press, 1977), p. 81.

APPENDICES

APPENDIX A

CLASSIFICATION OF OCCUPATIONS, OCCUPATIONAL CATEGORIES, AND OCCUPATIONAL GROUPS

APPENDIX A

CLASSIFICATION OF OCCUPATIONS, OCCUPATIONAL CATEGORIES, AND OCCUPATIONAL GROUPS

Occupations listed in SILVA's Classification*	Social Scores*	Occupational Categories*	Occupational Groups**
Administrators-Proprietors			
1. Bank and insurance comp. managers	42.22	1	1
2. Industrials	41.83	1	1
Highly Skilled Professionals and Technicians			
1. Magistrates	88.75	2	1
2. Physicians	85.98	2	1
3. Engineers	84.57	2	1
4. Architects	77.97	2	1
5. Procurators, etc.	76.53	2	1
6. Lawyers and defensors	75.63	2	1
7. University professors	63.99	2	1
8. Geologists	63.00	2	1
9. Chemists	58.17	2	1
10. Agronomists	52.52	2	1
11. Veterinaries	50.26	2	1
12. Commercial aviators	48.18	2	1
13. Dentists	47.41	2	1
14. Bookkeepers	45.41	2	1
15. Pharmacists	44.51	2	1
16. Delegates and commissioners	42.48	2	1

SOURCES: *Nelson do Valle Silva, "Posição Social das Ocupações," (Rio de Janeiro: IBGE, 1973). (Mimeographed.)

**George Martine and José Carlos P. Peliano, Migrantes no Mercado de Trabalho Metropolitano, (Brasília: IPEA, 1978) p. 198.

Occupations listed in SILVA's Classification*	Social Scores*	Occupational Categories*	Occupational Groups**
17. Sociologists	42.17	2	1
18. Labor inspectors	40.31	2	1
19. Writers and journalists	40.06	2	1
Proprietors		3	2
1. Poultry and cattle breeders	38.57	3	2
2. Other proprietors	35.07	3	2
3. Cattle raisers	26.49	3	2
Administrators			
1. Public service administrators	34.27	4	2
2. Other administrators	32.33	4	2
Professionals and Technicians		5	2
1. Licensed nurses	38.56	5	2
2. Naturalists	38.18	5	2
3. Statisticians	37.03	5	2
4. Programmers	35.33	5	2
5. Editors	34.66	5	2
6. Interpreters and translators	33.22	5	2
7. Social assistants	33.07	5	2
8. Custom inspectors	32.54	5	2
9. High school teachers	32.15	5	2
10. Stockbrokers	31.87	5	2
11. Insurance brokers	30.92	5	2
12. Merchant marine officials	29.62	5	2
13. Notaries and registry officials	29.56	5	2
14. Tachygraphers	28.43	5	2
15. Propagandists	27.80	5	2
16. Officials and administrative technicians	27.59	5	2
17. Accounting technicians	27.50	5	2
18. Educational inspectors	26.82	5	2
19. Meteorologists	26.18	5	2
20. Collectors and tax-gatherers	25.68	5	2

Occupations listed in SILVA's Classification*	Social Scores*	Occupational Categories*	Occupational Groups**
21. Realtors	24.94	5	2
22. Religious	24.87	5	2
23. Commercial representatives	20.94	5	2
Primary Sector Technicians and Administrators		6	3
1. Surveyors	18.61	6	3
2. Petroleum extraction workers, etc.	18.57	6	3
3. Agricultural technicians	17.99	6	3
4. Cattle-raising managers	9.77	6	3
Middle-level Proprietors			
1. Agriculturists	17.97	7	3
2. Hotel and pension owners	17.87	7	3
3. Merchants	16.95	7	3
Technicians and Assistants		8	3
1. Sports technicians	24.72	8	3
2. Purchasers	23.22	8	3
3. Other agents and brokers	23.13	8	3
4. Librarians and documentalists	22.97	8	3
5. Flight stewardess	22.81	8	3
6. Tracers (drafts men)	22.51	8	3
7. Scriveners and assistants	22.09	8	3
8. Police detectives	21.17	8	3
9. Salemen and travellers	20.94	8	3
10. Decorators and scenographers	20.45	8	3
11. Social agents	20.33	8	3
12. Operators	18.75	8	3
13. X-ray operators	18.61	8	3
14. Sculptors and painters	18.58	8	3
15. Cinema and theatre artists, etc.	18.50	8	3

Occupations listed in SILVA's Classification*	Social Scores*	Occupational Categories*	Occupational Groups**
16. Proof-readers and graphics industry workers	18.05	8	3
17. Telegraphers and radio-telegraphers	17.91	8	3
18. Physiotherapists	17.81	8	3
19. Linotypists	17.23	8	3
20. Inspectors and fiscals	17.18	8	3
21. Cashiers and treasurers	16.80	8	3
22. Prosthodontists	16.17	8	3
23. Speakers	15.92	8	3
24. Mail and telegraph officials	15.26	8	3
25. Stamp vendors	15.24	8	3
26. Cinegraphers and operators	15.14	8	3
27. Vessel maquinists	15.08	8	3
28. Pharmacy practicians	15.00	8	3
29. Railway agents, transport despatching inspectors	14.42	8	3
30. Train captains and conductors	13.58	8	3
31. Stereotypists and engravers	13.05	8	3
32. Other cinema technicians	12.68	8	3
33. Musicians	12.62	8	3
34. Photographers	12.60	8	3
35. Laboratory technicians	11.35	8	3
Elementary School Teachers and alike		9	3
1. Unspecialized teachers	21.87	9	3
2. Elementary teachers	13.83	9	3
3. Student inspectors	13.11	9	3
Office Occupations			
1. Office assistants	13.93	9	3
2. Typists	12.83	10	3
3. Storekeepters	12.79	10	3

Occupations listed in SILVA's Classification*	Social Scores*	Occupational Categories*	Occupational Groups**
Masters and Foremen		11	3
1. Masters, foremen and industrial technicians	16.98	11	3
2. Master-builders	16.44	11	3
Occupations in Mechanical and Metallurgical Industries		12	4
1. Millers and perforators	11.58	12	4
2. General mechanics	11.15	12	4
3. Mechanical turners	10.82	12	4
4. Metal riveters	10.30	12	4
5. Grinders and sharpeners	10.10	12	4
6. Moulders and metal formers	9.95	12	4
7. Kettle makers	9.85	12	4
8. Metal tinsmiths	9.71	12	4
9. Lantern and vehicle makers	9.67	12	4
10. Explosion motor mechanics	9.44	12	4
11. Welders	9.10	12	4
12. Galvanizers and nickel-platters	9.09	12	4
13. Rollers and wiredrawers	8.96	12	4
14. Mechanical stampers	8.65	12	4
15. Metal founders	8.64	12	4
16. Smiths and locksmiths	8.11	12	4
17. Blacksmiths	7.54	12	4
Other Skilled and Semi-Skilled Occupations in the Industrial Sector		13	4
1. Radio technicians	12.99	13	4
2. Electricians	11.43	13	4
3. Typographers	11.25	13	4
4. Artificers without specification	10.63	13	4
5. Printers	10.62	13	4
6. Goldsmiths and watch-makers	10.58	13	4

Occupations listed in SILVA's Classification*	Social Scores*	Occupational Categories*	Occupational Groups**
7. Other occupations in graphics industry	10.30	13	4
8. Ship repair workers	9.74	13	4
9. Other occupations in transformation industry	9.56	13	4
10. Upholsterers	9.17	13	4
11. Gunned-painters	8.97	13	4
12. Stone-cutters	8.88	13	4
13. Polishers and emeried-polishers	8.55	13	4
14. Marble cutters	8.43	13	4
15. Textile stampers	8.05	13	4
16. Glassmakers and light bulb makers (ampoleiros)	7.94	13	4
17. Bookbinders	7.84	13	4
Occupations in Transportation and Communications		14	4
1. Boat stokers	11.94	14	4
2. Machinists	11.84	14	4
3. Section linemen	11.59	14	4
4. Crane operators	11.35	14	4
5. Postmen	10.90	14	4
6. Drivers	10.83	14	4
7. Train stokers	10.46	14	4
8. Cabin boys	10.45	14	4
9. Boat masters	10.27	14	4
10. Maneuverers, signal-men	10.20	14	4
11. Brake-men	10.14	14	4
12. Telephone operators	10.03	14	4
13. Commercial sailors	9.45	14	4
14. Stowers	8.77	14	4
15. Railway maintenance workers	7.78	14	4
Civil Construction Workers		15	4
1. Brick and parketry makers/layers	8.94	15	4
2. Plumbers	8.87	15	4
3. Operators of civil construction machinery	8.65	15	4
4. Calkers	8.38	15	4

Occupations listed in SILVA's Classification*	Social Scores*	Occupational Categories*	Occupational Groups**
5. Plasterers (stuccoers)	8.37	15	4
6. Glaziers	8.27	15	4
7. Mounters of reforced concrete structures	7.83	15	4
8. Painters and white washers	7.78	15	4
9. Masons	6.94	15	4
10. Pavers and asphalters	6.48	15	4
Workers of the Wood and Furniture Industry		16	4
1. Upholsterers and, makers of motorcar bonnets, tops or cowling (capoteiros)	8.65	16	4
2. Coopers	8.56	16	4
3. Cabinet-makers	8.44	16	4
4. Wood polishers	7.41	16	4
5. Carpenters	7.39	16	4
6. Mattress makers	6.18	16	4
Other Non-industrial Skilled and Semi-skilled Occupations		17	4
1. Prison directors and wardens	12.08	17	4
2. Non-licensed nurses	11.01	17	4
3. Captains	10.75	17	4
4. Civil guards and transit inspectors	10.42	17	4
5. Midwives	9.90	17	4
6. Sanitary guards	9.76	17	4
7. Machine operators	9.12	17	4
8. Barbers and hair dressers	9.00	17	4
9. Elevator operators	8.79	17	4
10. Cinematography operators	8.77	17	4
Workers of the Textile Leather and Garment Industry		18	5
1. Bleachers and dryers	7.73	18	5
2. Tailors and seamsters	7.19	18	5

Occupations listed in SILVA's Classification*	Social Scores*	Occupational Categories*	Occupational Groups**
3. Warpers and remetedores	6.78	18	5
4. Shoemakers	6.69	18	5
5. Weavers	6.65	18	5
6. Cloth finishers	6.49	18	5
7. Cutters and combers	6.41	18	5
8. Tanners	6.37	18	5
9. Hatters (excl. straw hats)	6.19	18	5
10. Belt makers and saddlers	6.18	18	5
11. Purse and band makers	6.11	18	5
12. Rover operators	5.83	18	5
13. Spinners	5.83	18	5
14. Ropemakers	4.40	18	5
Workers of the Food Industry		19	5
1. Sweet meat makers and confectioners	7.32	19	5
2. Sausage makers and pork-butchers	7.28	19	5
3. Occupations in distilleries	6.75	19	5
4. Macaroni manufacturers and pastry men	6.57	19	5
5. Occupations in coffee grinding and torrefaction	6.55	19	5
6. Butchers	6.50	19	5
7. Bakers	6.36	19	5
8. Manufacturers of jerked beef	6.13	19	5
9. Buttermakers and cheesemakers	6.10	19	5
10. Slaughterers	5.98	19	5
11. Occupations in manufactories and mills	5.80	19	5
12. Flour dealers and millers	5.24	19	5
13. Occupations in fisheries industry	5.16	19	5

Occupations listed in SILVA's Classification*	Social Scores*	Occupational Categories*	Occupational Groups**
Unskilled Workers of the Industry and Workmanship		20	5
1. Stokers (vessel and train excl.)	7.65	20	5
2. Lubricators	7.61	20	5
3. Vulcanizers and recapers	7.60	20	5
4. Packers and shippers	6.38	20	5
5. Ceramic painters	5.96	20	5
6. Ceramists and chinaware makers	5.68	20	5
7. Broommakers	4.90	20	5
8. Cigar and cigarette makers	4.77	20	5
9. Makers of fireworks	4.61	20	5
10. Potters	4.50	20	5
11. Embroidery makers and fine-drawers	4.41	20	5
12. Apprentices	3.31	20	5
13. Basketmakers and matmakers	3.17	20	5
14. Net knitters	2.88	20	5
15. Lacemakers	2.49	20	5
16. Straw-hat makers	1.81	20	5
Various Manual Workers		21	5
1. Boat men and canoemen	6.10	21	5
2. Road maintenance workers	5.83	21	5
3. Sawyers	5.82	21	5
4. Garbage collectors	5.56	21	5
5. Manual workers without specification	5.30	21	5
Housekeeping Services		22	5
1. Laundresses and ironers	3.68	22	5
2. Domestics	3.33	22	5
Other Services		23	5
1. Manicures and pedicures	7.47	23	5
2. Waiters	7.31	23	5

Occupations listed in SILVA's Classification*	Social Scores*	Occupational Categories*	Occupational Groups**
3. Doormen, watchmen and servants	7.13	23	5
4. Exchangers	6.42	23	5
5. Cooks	6.32	23	5
6. Shoeshiners	3.76	23	5
Hawkers		24	5
1. Hawkers	7.39	24	5
Other Commercial Occupations		25	5
1. Newspapers and magazine vendors	8.84	25	5
2. Shop assistants and deliverers	7.39	25	5
Assistant Masons		26	5
1. Assistant masons	4.82	26	5
Primary Sector Workers		27	6
1. Miners	6.48	27	6
2. Tractor drivers	6.11	27	6
3. Gardeners	5.55	27	6
4. Cattle-raising workers	5.45	27	6
5. Stone-cutters and saline workers	5.38	27	6
6. Small farmers	5.04	27	6
7. Diamond and gold seekers	4.90	27	6
8. Hunters	4.84	27	6
9. Mate growers	4.61	27	6
10. Wood workers and lumbermen	4.40	27	6
11. Coalmen	4.28	27	6
12. Rubber latex tappers	4.21	27	6
13. Fishermen	4.20	27	6
14. Ploughmen	3.92	27	6
15. Hoe workers	3.49	27	6
16. Harvesters, pickers, gatherers and huskers	2.50	27	6
Others		28	7
1. Army forces	13.60	28	7

Occupations listed in SILVA's Classification*	Social Scores*	Occupational Categories*	Occupational Groups**
2. Professional athletes	12.22	28	7
3. Other undefined or misdefined occupations	10.64	28	7
4. Firemen	7.38	28	7
5. Undeclared occupations[1]	--		
6. First-time-job seekers[1]	--	28	7

[1]In Silva's classification, 'Undeclared occupations' and 'First-time job seekers' have no social score. In this study, for purposes of case selection, a social score value of 99.99 and an occupational group value of 9, which both signify 'missing value', were assigned to 'undeclared occupations' and whenever information on occupations was missing. 'First-time job seekers' and other non-working job seekers were assigned a 00.00 social score value and an occupational group value of 7.

APPENDIX B

LETTER OF INTRODUCTION AND SURVEY INTERVIEW SCHEDULE

SERVIÇO PÚBLICO FEDERAL
UNIVERSIDADE FEDERAL DO PARÁ
NÚCLEO DE ALTOS ESTUDOS AMAZÔNICOS

Belém, 22 de agosto de 1978

Prezados Senhores:

Apresentamos o geógrafo Luc J. A. Mougeot, pesquisador e professor, que, neste Núcleo de Altos Estudos Amazônicos (NAEA), está realizando estudos sobre o crescimento populacional de Conceição do Araguaia (períodos 1960-70 e 1970-78).

Na etapa de documentação, o professor Mougeot se dirigirá a V.Sas., para solicitar dados, relatórios, mapas e planos publicados ou não, os quais servirão para fundamentar e facilitar o trabalho de campo e as análises posteriores.

Antecipadamente, vimos agradecer toda a atenção que dispensarem ao técnico que ora lhes apresento.

Sendo o que se nos oferece, aproveitamos o ensejo para apresentar-lhes,

cordiais saudações.

José Marcelino Monteiro da Costa
Coordenador do NAEA

1. HISTORIA MIGRATÓRIA DO ENTREVISTADO								
Nº de paradas	Lugares de nasc. e resid. Estado	Município	Cidade	Int'	Ano de chegada	Pessoas com você na chegada: /1 sozinho /2 pai /3 mae /4 esposo(a) /5 irmãos /6 filhos /7 outros	Trabalho principal	Outros trabalhos
				S N		/1/2/3/4/5 /6 /7		
				S N		/1/2/3/4/5 /6 /7		
				S N		/1/2/3/4/5 /6 /7		
				S N		/1/2/3/4/5 /6 /7		
				S N		/1/2/3/4/5 /6 /7		

Nº de paradas	Trabalhava em uma roça na área	Tamanho em alqueires: /1 mineiro /2 paulista /3 paraense /4 goiano	Regime de propriedade: /1 dono com tit. defin. /2 dono com tit. prov. /3 dono sem tit. /4 arrendatário /5 parceiro /6 posseiro /7 outro	Ainda trabalha em essa(s) roça(s): /1 têm /2 vendeu /3 alugueu /4 cediu /5 doou /6 outro
	S N	/1/2/3/4___	/1 /2 /3 /4 /5 /6 /7	/1 /2 /3 /4 /5 /6
	S N	/1/2/3/4___	/1 /2 /3 /4 /5 /6 /7	/1 /2 /3 /4 /5 /6
	S N	/1/2/3/4___	/1 /2 /3 /4 /5 /6 /7	/1 /2 /3 /4 /5 /6
	S N	/1/2/3/4___	/1 /2 /3 /4 /5 /6 /7	/1 /2 /3 /4 /5 /6
	S N	/1/2/3/4___	/1 /2 /3 /4 /5 /6 /7	/1 /2 /3 /4 /5 /6

OBSERVAÇÕES: _____

_____

_____

1. HISTORIA MIGRATÓRIA DO ENTREVISTADO

Nº de paradas	Lugares de nasc. e resid. Estado	Município	Cidade	Int'	Ano de chegada	Pessoas com você na chegada: /1 sozinho /2 pai /3 mae /4 esposo(a) /5 irmãos /6 filhos /7 outros	Trabalho principal	Outros trabalhos
				S N		/1/2/3/4/5 /6 /7		
				S N		/1/2/3/4/5 /6 /7		
				S N		/1/2/3/4/5 /6 /7		
				S N		/1/2/3/4/5 /6 /7		
				S N		/1/2/3/4/5 /6 /7		

Nº de paradas	Trabalhava em uma roça na área	Tamanho em alqueires: /1 mineiro /2 paulista /3 paraense /4 goiano	Regime de propriedade: /1 dono com tit. defin. /2 dono com tit. prov. /3 dono sem tit. /4 arrendatário /5 parceiro /6 posseiro /7 outro	Ainda trabalha em essa(s) roça(s): /1 têm /2 vendeu /3 alugueu /4 cedlu /5 doou /6 outro
	S N	/1/2/3/4___	/1 /2 /3 /4 /5 /6 /7	/1 /2 /3 /4 /5 /6
	S N	/1/2/3/4___	/1 /2 /3 /4 /5 /6 /7	/1 /2 /3 /4 /5 /6
	S N	/1/2/3/4___	/1 /2 /3 /4 /5 /6 /7	/1 /2 /3 /4 /5 /6
	S N	/1/2/3/4___	/1 /2 /3 /4 /5 /6 /7	/1 /2 /3 /4 /5 /6
	S N	/1/2/3/4___	/1 /2 /3 /4 /5 /6 /7	/1 /2 /3 /4 /5 /6

OBSERVAÇÕES: _____

1. HISTORIA MIGRATÓRIA DO ENTREVISTADO

Nº de paradas	Lugares de nasc. e resid. Estado	Município	Cidade	Int'	Ano de chegada	Pessoas com você na chegada: /1 sozinho /2 pai /3 mae /4 esposo(a) /5 irmãos /6 filhos /7 outros	Trabalho principal	Outros trabalhos
				S N		/1/2/3/4/5 /6 /7		
				S N		/1/2/3/4/5 /6 /7		
				S N		/1/2/3/4/5 /6 /7		
				S N		/1/2/3/4/5 /6 /7		
				S N		/1/2/3/4/5 /6 /7		

Nº de paradas	Trabalhava em uma roça na área		Tamanho em alqueires: /1 mineiro /2 paulista /3 paraense /4 goiano	Regime de propriedade: /1 dono com tit. defin. /2 dono com tit. prov. /3 dono sem tit. /4 arrendatário /5 parceiro /6 posseiro /7 outro	Ainda trabalha em essa(s) roça(s): /1 têm /2 vendeu /3 alugueu /4 cediu /5 doou /6 outro
	S	N	/1/2/3/4___	/1 /2 /3 /4 /5 /6 /7	/1 /2 /3 /4 /5 /6
	S	N	/1/2/3/4___	/1 /2 /3 /4 /5 /6 /7	/1 /2 /3 /4 /5 /6
	S	N	/1/2/3/4___	/1 /2 /3 /4 /5 /6 /7	/1 /2 /3 /4 /5 /6
	S	N	/1/2/3/4___	/1 /2 /3 /4 /5 /6 /7	/1 /2 /3 /4 /5 /6
	S	N	/1/2/3/4___	/1 /2 /3 /4 /5 /6 /7	/1 /2 /3 /4 /5 /6

OBSERVAÇÕES: _____

1. HISTORIA MIGRATÓRIA DO ENTREVISTADO

Nº de paradas	Lugares de nasc. e resid. Estado	Município	Cidade	Int'	Ano de chegada	Pessoas com você na chegada: /1 sozinho /2 pai /3 mae /4 esposo(a) /5 irmãos /6 filhos /7 outros	Trabalho principal	Outros trabalhos
				S N		/1/2/3/4/5 /6 /7		
				S N		/1/2/3/4/5 /6 /7		
				S N		/1/2/3/4/5 /6 /7		
				S N		/1/2/3/4/5 /6 /7		
				S N		/1/2/3/4/5 /6 /7		

Nº de paradas	Trabalhava em uma roça na área	Tamanho em alqueires: /1 mineiro /2 paulista /3 paraense /4 goiano	Regime de propriedade: /1 dono com tit. defin. /2 dono com tit. prov. /3 dono sem tit. /4 arrendatário /5 parceiro /6 posseiro /7 outro	Ainda trabalha em essa(s) roça(s): /1 têm /2 vendeu /3 alugueu /4 cediu /5 doou /6 outro
	S N	/1/2/3/4___	/1 /2 /3 /4 /5 /6 /7	/1 /2 /3 /4 /5 /6
	S N	/1/2/3/4___	/1 /2 /3 /4 /5 /6 /7	/1 /2 /3 /4 /5 /6
	S N	/1/2/3/4___	/1 /2 /3 /4 /5 /6 /7	/1 /2 /3 /4 /5 /6
	S N	/1/2/3/4___	/1 /2 /3 /4 /5 /6 /7	/1 /2 /3 /4 /5 /6
	S N	/1/2/3/4___	/1 /2 /3 /4 /5 /6 /7	/1 /2 /3 /4 /5 /6

OBSERVAÇÕES: _____

2. EM QUE ESTAVA TRABALHANDO O/A SENHOR (A) A SEMANA PASSADA ?

1 TINHA TRABALHO:

Trabalho	Remunerado	Lugar de trabalho	Há quanto tempo?
	S N		
	S N		
	S N		

2 NÃO TINHA TRABALHO:

Qual foi o ultimo trabalho que você teve?	Remunerado	Lugar de trabalho	Há quanto tempo que v. deixou?	Por que é que deixou?
	S N			
	S N			
	S N			

3. O/A SENHOR(A) TRABALHA EM UMA(S) ROÇA(S) NA ÁREA ESTE ANO ?

1 SIM

2 NÃO

O/A SENHOR(A) TRABALHOU EM UMA(S) ROÇA(S) NA ÁREA OS ANOS PASSADOS ?

Nº de Roças	Tamanho em alqueires: /1 mineiro /2 paulista /3 paraense /4 goiano	Regime de propriedade: /1 DTD /2 DTP /3 DST /4 AR /5 PAR /6 POS /7 OUTRO	Como é que você se desloca para a roça: /1 PÉ /2 BIC /3 CAV /4 BUS /5 CAM /6 OUTRO	A quantas horas de aqui fica a roça ?	Vai pra lá quantas vezes por mês ?
	/1/2/3/4___	/1/2/3/4/5/6/7	/1/2/3/4/5/6		
	/1/2/3/4___	/1/2/3/4/5/6/7	/1/2/3/4/5/6		
	/1/2/3/4___	/1/2/3/4/5/6/7	/1/2/3/4/5/6		

1 SIM

2 NÃO

	/1/2/3/4___	/1/2/3/4/5/6/7	/1/2/3/4/5/6		
	/1/2/3/4___	/1/2/3/4/5/6/7	/1/2/3/4/5/6		

4. O/A SENHOR(A) TRABALHA AS VEZES EM FAZENDAS DE PARTICULARES ?

1 SIM

2 NÃO

A ULTIMA VEZ QUE VOCÊ FOI:

4.1 QUANTAS PESSOAS DA CASA FORAM COM VOCÊ ? _____

4.2 COMO É QUE VOCÊ SE DESLOCOU PARA A FAZENDA ? _____

4.3 A QUANTAS HORAS DE AQUI FICA A FAZENDA ? _____

4.4 QUANTO TEMPO É QUE VOCÊ FICOU TRABALHANDO NESTA FAZENDA ? _____

5. O/A SENHOR(A) ESTA PENSANDO IR EMBORA DESTA CIDADE ESTE ANO ?

1 SIM — QUANTAS PESSOAS PENSA LEVAR COM VOCÊ ? _____

2 NÃO

3 NÃO SABE

5.1 O ANO PRÓXIMO ?

1 SIM — QUANTAS PESSOAS PENSA LEVAR COM VOCÊ ? _____

2 NÃO

3 NÃO SABE

6. PARA ONDE ?

ESTADO	MUNICIPIO	CIDADE	S N INTERIOR

7. POR QUE É QUE O SENHOR QUER IR PARA LÁ EM VEZ DE OUTRO LUGAR ?

_____

_____

Relação	Sexo	Lugar de nascimento Estado	Município	Cidade	Int'	Data nascimento	Anos de estudo	Lugar de Residencia atual Estado	Município	Cidade	Int'	Ano de chegada ao lugar de res. at.
	H M				S N						S N	
	H M				S N						S N	
	H M				S N						S N	
	H M				S N						S N	
	H M				S N						S N	
	H M				S N						S N	
	H M				S N						S N	
	H M				S N						S N	

Trabalho principal	Trabalha em uma roça na área	Morou nesta cidade	Ano de chegada a esta cidade	Chegou com você	Trabalho principal	Trabalho em uma roça na área	Ano de saída desta cidade
	S N	S N		S N		S N	
	S N	S N		S N		S N	
	S N	S N		S N		S N	
	S N	S N		S N		S N	
	S N	S N		S N		S N	
	S N	S N		S N		S N	
	S N	S N		S N		S N	
	S N	S N		S N		S N	

OBSERVAÇÕES: FILHOS (AS) VIVOS (AS):

OUTROS FAMILIARES VIVOS; ESPOSA(O): PAIS: IRMAOS(AES):

Relação	Sexo	Lugar de nascimento Estado	Município	Cidade	Int'	Data nascimento	Anos de estudo	Lugar de Residencia atual Estado	Município	Cidade	Int'	Ano de chegada ao lugar de res. at.
	H M				S N						S N	
	H M				S N						S N	
	H M				S N						S N	
	H M				S N						S N	
	H M				S N						S N	
	H M				S N						S N	
	H M				S N						S N	
	H M				S N						S N	

Trabalho principal	Trabalha em uma roça na área	Morou nesta cidade	Ano de chegada a esta cidade	Chegou com você	Trabalho principal	Trabalho em uma roça na área	Ano de saída desta cidade
	S N	S N		S N		S N	
	S N	S N		S N		S N	
	S N	S N		S N		S N	
	S N	S N		S N		S N	
	S N	S N		S N		S N	
	S N	S N		S N		S N	
	S N	S N		S N		S N	
	S N	S N		S N		S N	

OBSERVAÇÕES: FILHOS (AS) VIVOS (AS):

OUTROS FAMILIARES VIVOS: ESPOSA(O): PAIS: IRMAOS(AES):

Relação	Sexo	Lugar de nascimento Estado	Município	Cidade	Int'	Data nascimento	Anos de estudo	Lugar de Residencia atual Estado	Município	Cidade	Int'	Ano de chegada ao lugar de res. at.
	H M				S N						S N	
	H M				S N						S N	
	H M				S N						S N	
	H M				S N						S N	
	H M				S N						S N	
	H M				S N						S N	
	H M				S N						S N	
	H M				S N						S N	

Trabalho principal	Trabalha em uma roça na área	Morou nesta cidade	Ano de chegada a esta cidade	Chegou com você	Trabalho principal	Trabalho em uma roça na área	Ano de saída desta cidade
	S N	S N		S N		S N	
	S N	S N		S N		S N	
	S N	S N		S N		S N	
	S N	S N		S N		S N	
	S N	S N		S N		S N	
	S N	S N		S N		S N	
	S N	S N		S N		S N	
	S N	S N		S N		S N	

OBSERVAÇÕES: FILHOS (AS) VIVOS (AS):

OUTROS FAMILIARES VIVOS: ESPOSA(O): PAIS: IRMAOS(AES):

Relação	Sexo	Lugar de nascimento			Int'	Data nas-cimento	Anos de estudo	Lugar de Residencia atual				Ano de chegada ao lugar de res. at.
		Estado	Município	Cidade				Estado	Município	Cidade	Int'	
	H M				S N						S N	
	H M				S N						S N	
	H M				S N						S N	
	H M				S N						S N	
	H M				S N						S N	
	H M				S N						S N	
	H M				S N						S N	
	H M				S N						S N	

Trabalho principal	Trabalha em uma roça na área	Morou nesta cidade	Ano de chegada a esta cidade	Chegou com você	Trabalho principal	Trabalho em uma roça na área	Ano de saída desta cidade
	S N	S N		S N		S N	
	S N	S N		S N		S N	
	S N	S N		S N		S N	
	S N	S N		S N		S N	
	S N	S N		S N		S N	
	S N	S N		S N		S N	
	S N	S N		S N		S N	
	S N	S N		S N		S N	

OBSERVAÇÕES: FILHOS (AS) VIVOS (AS):

OUTROS FAMILIARES VIVOS: ESPOSA(O): PAIS: IRMAOS(AES):

10. O/A SENHOR(A) SABE LER ?

1 SIM

2 NÃO

11. QUANTOS ANOS ESTUDOU ?

ANOS: _____

12. O/A SENHOR(A) É:

1 SOLTEIRO(A) 4 SEPARADO(A)

2 CASADO(A) 5 AMIGADO(A)

3 VIUVO(A) 6 OUTRO(A): _____

13. QUANTO O/A SENHOR(A) ACHA QUE A SUA FAMILIA GASTA POR MÊS:

EM COMIDA: _____

EM TRANSPORTE: _____

EM ENERGIA-LUZ: _____

EM ALUGUEL: _____

14. QUANTAS PESSOAS, FORA O/A SENHOR(A), VIVEM NESTA CASA ?

PESSOAS: _____

PAREDES	PISO	COBERTURA
SAPÉ-VASILHAME	TERRA	SAPÉ-VASILHAME
TAIPA-ADOBE	MADEIRA	TAIPA-ADOBE
MADEIRA	CIMENTO	MADEIRA
PEDRA-CONCRETO	LADRILHO	PEDRA-CONCRETO
TIJOLO	MOSAICO	TELHA-ZINCO

ENTREVISTAS COM CHEFES DE FAMILIA

CIDADE: _____

MUNICÍPIO: _____

ESTADO: _____

LUC J.A. MOUGEOT
NÚCLEO DE ALTOS ESTUDOS AMAZÔNICOS
UNIVERSIDADE FEDERAL DO PARÁ (GUAMÁ)
66.000 BELÉM, PARÁ

INFORMAÇÃO BÁSICA

ENTREVISTADOR: _____

Nº DO SETOR: _____ DATA: ___/___/78___

Nº DA ENTREVISTA: _____ HORAS: _____

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BIBLIOGRAPHY

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