A SOCIOECONOMIC REGIONALIZATION OF BRAZIL*

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BRAZIL is of special concern to geographers and planners for several reasons and may soon become "the first Southern Hemisphere state in the world system," to quote Ronald M. Schneider's apt phrase.[1] The country has an area of some 8.5 million square kilometers, a range of climate, abundant, but only partially utilized natural resources, uneven settlement patterns, an expanding economy, and extremes of wealth and poverty.

Considerable research has been invested in attempts to identify the macroregions of Brazil.[2] There are at least three and perhaps as many as a half-dozen large, identifiable areas in the country. Although researchers differ on the exact delineation of the regions, there is agreement on their general location. The Northeast includes the seven states of Ceará, Rio Grande do Norte, Paraíba, Pernambuco, Sergipe, Alagoas, and Bahia. Amazônia includes the states of Amazonas, Pará, and others. The South is often divided in the Far South, including Rio Grande do Sul through Paraná, and the Center-South, including at least São Paulo and Rio de Janeiro. Other states and territories may be fitted around these regions. They are not merely directional terms for Brazilians, but connote distinct socioeconomic and demographic characteristics. The Northeast means antiquated agriculture and widespread poverty. Amazônia means vast reaches of uninhabited tropical forest, the "Inferno Verde" or "Green Hell" that may contain untold natural wealth. The Center-South means the modern sector with huge urban centers of manufacturing; the Far South means rich farming and productive pasture lands. The South means a large and relatively prosperous population.

Since 1941 the Brazilian government, mostly through its statistical service, the Instituto Brasileiro de Geografia e Estatística (IBGE), has carried out serious efforts at regionalization. Initially these efforts emphasized the natural features:

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* This article was prepared as part of a project on Brazilian social stratification and development, which is supported by the National Science Foundation (Grant SES 78–07414), the University of Wisconsin College of Agricultural and Life Sciences, the Institute of Advanced Studies of the Australian National University, and the University of São Paulo, with the assistance of the Brazilian Institute of Geography and Statistics. I express my gratitude to the individuals at these institutions who have contributed to this project. The maps were prepared at the Cartographic Laboratory, University of Wisconsin–Madison.

[1] Ronald M. Schneider, Brazil: Foreign Policy of a Future World Power (Boulder, Colo.: Westview Press, 1976), p. 3.

[2] Werner Baer, The Brazilian Growth and Development Experience, *in* Brazil in the Seventies (edited by Riordan Roett; Washington, D. C.: American Enterprise Institute, 1976), pp. 41–62; Speridião Faissol, Espaço, Geografia e Ciências Sociais, *Revista Brasileira de Geografia*, Vol. 37, No. 4, 1975, pp. 3–22; Janet D. Henshall and R. P. Momsen, A Geography of Brazilian Development (London: Bell and Sons, 1974), pp. 59–61; Thomas W. Merrick and Douglas H. Graham, Population and Economic Growth in Brazil, 1800 to the Present (Baltimore: Johns Hopkins University Press, 1979), pp. 17–24; Olinda Vianna Mesquita, Rivaldo Pinto Gusmão, and Solange Tietzmann Silva, Modernização da Agricultura Brasileira, *Revista Brasileira de Geografia*, Vol. 39, No. 4, 1977, pp. 3–65; and Stephan Robock, Brazil: A Study in Development Progress (Lexington, Mass.: D. C. Heath, 1975).

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climate, topography, and the biosphere. In the last twenty-five years, economic and demographic criteria have played a prominent role. For the last decade geographers who study Brazil have employed formal statistical models, especially factor analysis, to form indexes of broad, abstract constructs that presumably are underlying specific observations on regional subdivisions of the country. The scores of these indexes are then used to group contiguous sets of the subdivisions, usually states and territories, in large units. Regional constructs, especially the five official *Grandes Regiões*, are regularly used in federal planning. These five regions as currently defined by the IBGE are: the Southeast with the states of Minas Gerais, Espírito Santo, Rio de Janeiro, and São Paulo; the South with the states of Paraná, Santa Catarina, and Rio Grande do Sul; the Central-West with Goiás, the Federal District including Brasília, Mato Grosso, and Mato Grosso do Sul; the Northeast with Maranhão, Piauí, Ceará, Rio Grande do Norte, Paraíba, Pernambuco, Sergipe, Alagoas, and Bahia; and the North with Amapá, Roraima, Pará, Amazonas, Acre, and Rondônia.

The regionalization process poses two basic research questions: the relative sizes or types of small areas to be aggregated in large units must be determined; and the variables must be established to identify any given areal aggregation of small units and to distinguish among each of the large units. To date, researchers have used states and territories as the smallest units. This practice is a mistake, although in the hands of IBGE's able geographers the resulting macroregions have considerable merit and are used with slight variations to identify the jurisdictions of the various regional development-planning agencies. This system has the dual advantage of recognizing economic and historical differences among regions and of identifying the states that are politically powerful in the Brazilian federation. Some states such as São Paulo, Rio Grande do Sul, Minas Gerais, and Pernambuco are especially influential.

Brazilian states are too few and too large to fit neatly in the existing regional molds. In the late 1970s, Mato Grosso was divided in two, and in 1981 Rondônia became a state. With these changes, and the previous merger of Guanabara with Rio de Janeiro, continental Brazil consists of twenty-six federal units—two territories, the Federal District, and twenty-three states. The states vary greatly in socioeconomic composition and area. It is not surprising that the pronounced regional variations in Brazil do not always correspond to state boundaries. In a regionalization study, many small units prove more useful than a few large units. It is advisable to begin the regionalization process with smaller units than states and to reaggregate these units in large regions that might bear no relation to state boundaries. It is then a straightforward procedure to reattribute whole states to the macroregions so delineated.

What variables are to be used to array the small units? In theory the regions of a country may be delineated by a large number of variables or indexes of hypothetical dimensions that presumably underlie a multiplicity of specific variables. Any aggregation of small units in large regions will depend on the choice of variables. In other words, the regions that emerge from a statistical regionalization procedure are products of the variables on which the units are arrayed. To be most useful the original choice of variables must be dictated by a clear conception, if not explicit theory, of the structure of the factor or factors to be measured.

Delineation of Brazilian Macroregions

In this article I present a delineation of Brazilian macroregions based on socioeconomic and demographic variables measured in each of the 360 official continental microregions in the country.[3] The system is simple, comprehensive, rigorous, and flexible. For the most part, it is consistent with the IBGE regionalization and allows insights to the socioeconomic and demographic structure of Brazil, even when the new system is inconsistent with the IBGE scheme. The variables have been refined for a half century through intensive theoretical and empirical research by sociologists and demographers. Many small areal units are used as the most disaggregated level of analysis rather than a small number of large units. Rigorous separation of socioeconomic and demographic variables enhances this system. Microregions may be easily reclassified according to their scores on the socioeconomic criteria.

The current regionalization uses two basic variables: a unifactorial multivariate index of microregional socioeconomic development level (SED) with a score for each of the 360 continental microregions of Brazil, and a dichotomous variable identifying microregions that have four or more residents per square kilometer.

The IBGE provides geographical data on economic, social, political, agricultural, and other aspects of the country for approximately 2,000 variables, aggregated at the levels of *municípios*, microregions, states and territories, and grand regions. The município, the smallest effective unit in the Brazilian political system, consists of a central city and its immediate hinterland. New municípios develop as divisions of previously existing ones and are generated when new cities rise to prominence. Microregions (MRs) are agglomerations of contiguous municípios, so arrayed by IBGE that they are homogeneous in terms of ecology, demography, agriculture, manufacturing, and transportation. Most MRs are several thousand square kilometers in area, although some are barely larger than 1,000 square kilometers. In the vast Amazonian backlands, some MRs are as large as 300,000 square kilometers. Their populations vary from a few thousand people in those backlands to millions in the highly urbanized areas. In this study, I used only the 360 continental MRs and excluded Fernando de Noronha, the small group of islands that lies 345 kilometers offshore.

The microregion is the basic unit of analysis for this study, although the IBGE formed each MR from the smaller municípios. The statistical data on each MR were compiled from the censuses of population, agriculture, commerce, and manufacturing as well as from other public records; in other words, the most basic data on each microregion were taken from firms, farms, households, and individuals. Units smaller than a microregion thus indirectly enter the analysis. IBGE's mezzoregions and grand regions were not used in the analysis. States and territories also were not used, but for some purposes macroregions drawn along state and territorial boundaries are presented.

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[3] Divisão do Brasil em Microregiões Homogêneas (Rio de Janeiro: Instituto Brasileiro de Geografia e Estatística, 1970).

Measurement of Socioeconomic Development

This regionalization of Brazil is an important part of a project that analyzes variations in stratification among macroregions according to their levels of development. Variables measuring development were sought at the microregional level to provide a regionalization of the country that is as precise as possible. Two such variables are gross national product per capita ($GNP/_k$) and electrical energy per capita ($EE/_k$). The first does not exist at the microregional level, and there is no Brazilian analogue at that level. The second is often used as a measure of developmental differences among countries. At that level this variable can be useful, although in the productive sphere it may bias the ordering of countries toward manufacturing and away from agriculture and commerce: factories tend to use large amounts of electricity; farms and vendors do not. However, there is less room for doubt regarding the consumption of electricity by people. The greater the availability of electrical power to individuals, the easier it is to perform household tasks and to maintain contact with a wider world through the electronic media. Because $EE/_k$ could not be obtained for this analysis, measures dependent on electricity were used.

Manufacturing is an important aspect of development. One tacit hypothesis in the literature on development is that the degree of industrialization is synonymous with the degree of manufacturing and that the average socioeconomic status of a population is a simple function of the level of manufacturing. It is assumed that industry is manufacturing and nothing more and that the well-being of a people directly corresponds to the productive capacity of their factories. Such thinking also assumes that $EE/_k$ is an excellent measure of development. The proportion employed in agriculture is another variable often used as a measure of development on the assumption that the higher the percentage employed in agriculture, the lower is the level of development. This reasoning implies that manufacturing and industrialization are synonymous and that industrialization is the true engine of development. The use of such single-variable indicators assumes that they are interchangeable and, by implication, are so highly correlated that the scores for any one of them may be reproduced by a simple linear transformation of any other. In the real world, correlations among these variables are surely positive; whether they are uniformly high remains to be demonstrated.

The current research requires one or more measures of microregional development, each defensible on theoretical and empirical grounds. Substantial efforts were undertaken to obtain valid and reliable quantitative data at the level of the microregion: $EE/_k$, individual socioeconomic status per capita ($SES/_k$), manufacturing emphasis per capita ($M/_k$), and agricultural employment per capita ($A/_k$), the last indicating underdevelopment rather than development. To these, the total value of commercial sales per capita ($S/_k$) was added on the hypothesis that commercial activity is another useful indicator of development. All except one of these variables ($EE/_k$, which was not available) are theoretically appropriate but partially fallible measures of the same underlying dimension, which I term socioeconomic development (SED).

To judge from the literature on development, especially in Brazil, a valid

indicator of $M/_k$ might be an adequate measure of SED.[4] If tests seemed advisable for $M/_k$ and its indicators, they would be essential for the remainder of the variables. The case for face-validity of $SES/_k$ is promising in that its component variables would be microregional isomorphs of the kinds of variables that have long been known to be valid and sensitive measures of socioeconomic status at the household level. This line of research has has been pursued for at least fifty years, the variable sometimes being called SES, sometimes social status or level of living, and occasionally standard of living.[5] The approach worked well in at least one poor and isolated rural area of Brazil.[6] However, the data available at the microregional level might differ slightly from those proved to work at the household level, and correlations among variables might differ at the microregional level. These variables would require testing at the microregional level, as would $S/_k$ and $A/_k$, neither of which has been well established as an indicator of development at the countrywide, much less at the microregional, level.

It is thus essential, though not sufficient, to test each variable of the level of development by correlating it with the others. Several logical outcomes are possible. All variables might be highly intercorrelated ($r = +.98$ or higher), in which case each one of them could be taken to be a valid indicator of the variable that it is thought to measure. They could all have low correlations ($r = +.30$ or lower), an implication that without other evidence none of them could be shown to be a valid indicator. They might be a mixture of high and low correlations (+.95 to +.10), meaning either that certain variables were poorly chosen or that the concept was not unifactorial. Or the correlations might all be moderately high (+.40 to +.90), in which case factor analysis might show them all to be rather good, but individually imperfect measures of the socioeconomic development level of the microregions. In the fourth case (and perhaps the second and third) a factor-weighted index employing all variables would be a better measure than any one of them alone.

Data on each microregion were obtained with the cooperation of IBGE and were used to construct the following variables.

Variable 1. $M/_k$: microregional involvement in manufacturing. *Measure A.* $MEmp/_w$: manufacturing employment per worker—the proportion of each MR's economically active population that was employed in manufacturing on December 31, 1970. This is the main measure of the variable. *Measure B.* $MEng/_k$: manufacturing energy potential per capita—the total potential energy output in horsepower of all manufactural machinery in the MR (1970). This checks the validity of Measure A.

Variable 2. $S/_k$: microregional involvement in commerce—total value of all commercial sales per capita in the MR (1970) in thousands of cruzeiros.

Variable 3. $A/_k$: microregional involvement in agriculture—total number of

[4] Werner Baer, Evaluating the Impact of Brazilian Industrialization, *Luso-Brazilian Review*, Vol. 15, 1978, pp. 178–179; and Robock, footnote 2 above, pp. 40–74.

[5] William H. Sewell, The Construction and Standardization of a Scale to Measure the Socioeconomic Status of Oklahoma Farm Families (Stillwater: Oklahoma State University Agricultural Experiment Station, 1940).

[6] Archibald O. Haller and Helcio Ulhoa Saraiva, Status Measurement and the Variable Discrimination Hypothesis in an Isolated Brazilian Region, *Rural Sociology*, Vol. 37, 1972, pp. 325–351.

persons in the MR who were employed in agriculture per capita, either permanently or temporarily (1970).

Variable 4. Radios/$_k$: proportion of the MR's population residing in households where a radio receiver was available (1970).

Variable 5. Refrigerators/$_k$: proportion of the MR's population residing in households where a refrigerator was available (1970).

Variable 6. Televisions/$_k$: proportion of the MR's population residing in households where a television receiver was available (1970).

Variable 7. Automobiles/$_k$: proportion of the MR's population residing in households where an automobile was available (1970).

Variable 8. Literacy/$_k$: proportion of the MR's population that was literate (1970).

Because of the unique potential importance of manufacturing as an index of development, the two indexes of that variable, MEmp/$_w$ and MEng/$_k$, were correlated with each other in the 360 continental microregions to determine whether they would array the microregions in the same order—the result that would occur if both were highly valid indexes of the same measurable variable. Note that the two indexes are taken from counts of very different empirical phenomena: MEmp/$_w$ counts humans, and MEng/$_k$ counts units of energy, that is, horsepower. A high positive correlation coefficient measured on indexes so different at the operational level of manifested content would constitute powerful evidence that they measure the same underlying conceptual variable. Because this was the case ($r = +.999$), it may be concluded that either one of these measures provides a valid index of the degree to which each microregion is developed as indicated by the involvement of the population in manufacturing. The two measures are interchangeable for the purpose of indexing the population's involvement in manufacturing.

Still unanswered is the question of whether M/$_k$ or its indicators can measure the even more fundamentally conceptual variable, socioeconomic development, or whether a procedure of multivariate measurement is needed. It would be theoretically and technically efficient if the M/$_k$ measures were also valid measures of SED: theoretically because it could be concluded that manufacturing is the key to understanding the socioeconomic developmental differences among populations of various Brazilian microregions; and technically because the M/$_k$ indicators are easily understood and measured. However, evidence does not support such a conclusion, and I will discuss the implications of this situation later in this article. For the purpose of ordering the microregions by M/$_k$, the two measures, MEmp/$_w$ and MEng/$_k$, are interchangeable. Because they provide the available evidence regarding M/$_k$, the correlations of either with other indicators of SED also apply to correlations of M/$_k$ with other SED variables. Taking MEmp/$_w$ as the measure of M/$_k$, it may be seen that development in the sense of manufacturing is only moderately correlated with other measures of SED that range from $r = +.445$ with literacy/$_k$ to $r = +.687$ with televisions/$_k$ (Table I).

The matrix of correlations of the eight variables selected as partial measures of microregional socioeconomic development and their means and standard deviations shows a picture of widespread poverty (Table I). In comparison with countries of western Europe and North America, Brazilian manufacturing is

TABLE I—VARIABLES INDICATING MICROREGIONAL SOCIOECONOMIC DEVELOPMENT 1970

VARIABLES	CORRELATIONS							MEANS	STANDARD DEVIATIONS (N = 360)
	2	3	4	5	6	7	8		
Manufacturing MEmp/$_w$	.458	−.447	.511	.660	.687	.607	.445	.044	.051
Sales S/$_k$ (÷Cr$1000)		−.571	.663	.824	.779	.756	.635	.700	.864
Agriculture A/$_k$			−.570	−.702	−.691	−.616	−.546	.270	.132
Radios/$_k$				.814	.749	.894	.907	.482	.202
Refrigerators/$_k$					.946	.894	.771	.128	.123
Television sets/$_k$						.867	.696	.096	.126
Automobiles/$_k$							.837	.053	.046
Literacy/$_k$								.721	.119

Source: Calculated by author from 1970 IBGE public-use data-tape.

not highly developed, commerce is not lively, and large numbers of people engage in farming, often at subsistence levels. Approximately 50 percent of the 1970 Brazilian population had access to radios, but only 12.8 percent had access to refrigerators, 9.6 percent to television sets, and 5.3 percent to automobiles. The average literacy rate was not high, 72.1 percent. Several variables have low means and high standard deviations, a reflection of the degree to which the microregional distribution of most of the variables is skewed: most microregions are inhabited by the poor, but some microregions have relatively prosperous populations. After reversing the signs of the correlations with A/$_k$, so that high A/$_k$ means underdevelopment, as is proper, the signs imply that each variable varies directly with every other variable.

This evidence is not sufficient to permit inferences to be drawn about socioeconomic development, the hypothetical conceptual variable underlying this study. The factor-analytic structure is examined to determine whether these eight variables can be interpreted as empirical manifestations of SED. If three conditions are met, it may be concluded that the data are consistent with the hypothesis that a single dimension more fundamental than any of the eight variables explains their intercorrelations. The three conditions are: a single principal component that accounts for a large part of the common variance of the eight items; no other principal component that also accounts for a substantial proportion; and all items have a reasonably high loading on the first principal component.

All principal components necessary to account for 100 percent of the common variance were extracted. Eight were required. The first accounts for 74.5 percent of the common variance, and its eigenvalue is 5.956. The other seven eigenvalues are less than 1.00, the largest being 0.700. In accordance with standard practice only those with eigenvalues equal to or greater than 1.00 are used. In terms of the proportion of the common variance accounted for, the second-largest factor yields 8.7 percent, the third 6.6 percent, and so on.

One factor alone is sufficient to explain most of the common variance in the matrix, and that variable may be termed microregional socioeconomic development. The factor loadings express the relationship of each individual indicator to the parent dimension (Table II). The factor loadings of all variables are at least moderately high, and there is no pattern that singles out some variables from the others. Involvement in manufacturing at .691 has the lowest loading,

TABLE II—LOADINGS ON THE SOCIOECONOMIC DEVELOPMENT FACTOR FOR BRAZILIAN MICROREGIONS 1970

VARIABLES[a]	LOADINGS
Manufacturing $MEmp/_w$	.691
Sales $S/_k$ (÷Cr$1000)	.831
Agriculture $A/_k$	−.744
$Radios/_k$	.895
$Refrigerators/_k$	.965
$Televison\ sets/_k$	.935
$Automobiles/_k$	.947
$Literacy/_k$	.856

Source: Calculated from Table I.

[a] Eigenvalue: 5.956; common variance explained: 74.5 percent.

and per capita access to refrigerators at .965 has the highest. Variables 4 to 7, measuring household socioeconomic status, weigh slightly more heavily in the factor loading than do the others. The factor fulfills its intended purpose and reflects the average material well-being of families in the microregions. The negative sign for involvement in agriculture is to be expected because $+A/_k$ means underdevelopment. With $A/_k$ properly reversed, all the item-factor loadings are high and positive.

The foregoing analysis demonstrates that to measure socioeconomic development the Brazilian microregions of 1970 may be arrayed and scored from highest to lowest in terms of a unidimensional variable. Microregions may be scored by assigning to each a value that is a sum of its mean on each variable (standardized by dividing it by its standard deviation) multiplied by the loading the item has on the socioeconomic development factor.

The formula is $I = Fz$, where F is the matrix of factor loadings, and z is the vector of standardized values of the variables that have been factor analyzed. Specifically, let each of the variables in tables I and II be called $V_1, V_2, \ldots V_8$ and assign to each the meaning it has in the tables. Then let SED_m be the socioeconomic development-index score for the m^{th} microregion. Then

$$SED_m = \frac{.691V_{1m} - 0.44}{.051} + \frac{.831V_{2m} - .700}{.864} - \frac{.744V_{3m} - .270}{.132} + \frac{.895V_{4m} - .482}{.202} + \frac{.965V_{5m} - .128}{.123} + \frac{.935V_{6m} - .096}{.126} + \frac{.947V_{7m} - .053}{.046} + \frac{.856V_{8m} - .721}{.119}.$$

In actual practice the resulting distribution of the original SED scores was proportionately transformed so that the lowest possible score was zero and the highest was 100.[7]

SOCIOECONOMIC MACROREGIONS OF BRAZIL

The SED scores provide most of the data from which maps of the macroregions of Brazil were constructed. Population-density data were also used. A

[7] The scores for each microregion may be obtained from the author for a period of two years after the publication date of this article.

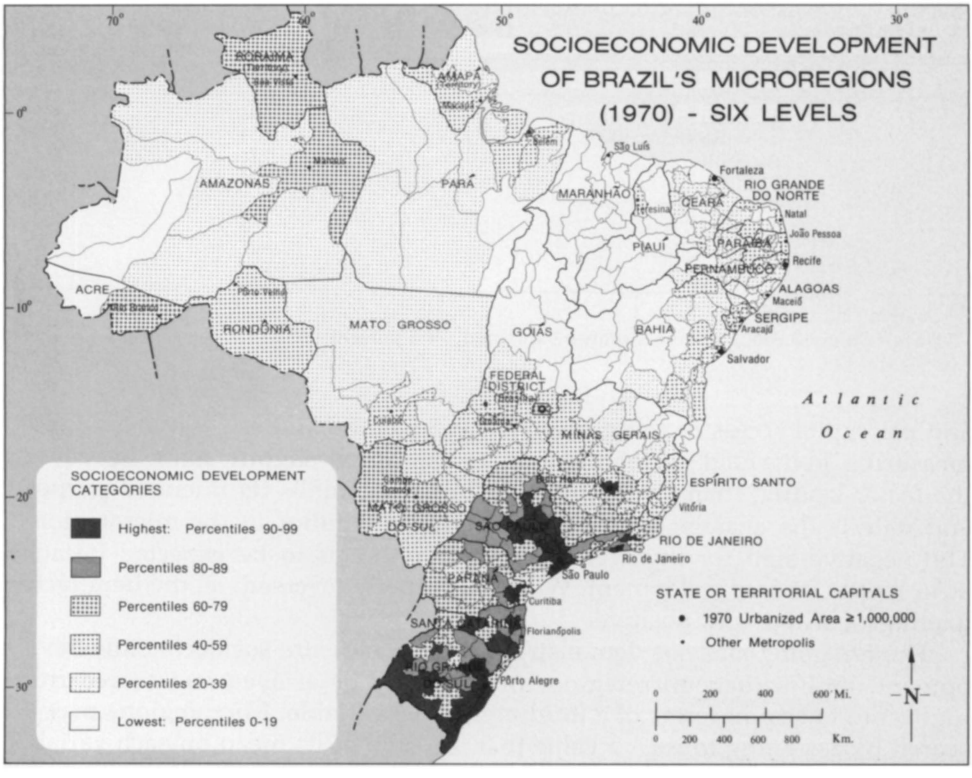

FIG. 1

map showing the geographical distribution of socioeconomic development was constructed by grouping the 360 continental microregions in quintiles, 72 to a quintile, and by dividing the highest or fifth quintile in its two deciles (the tenth or highest and the ninth or second highest), each containing thirty-six microregions (Fig. 1). On Figure 1, each microregion is assigned to its quintile or decile class according to its SED score. Macroregions were identified by isolating large sets of contiguous microregions that were classed almost without exception in the same quintile or an adjacent one, and then by marking the remaining sets of contiguous microregions (whether or not the set was composed of microregions of the same SED class). This procedure will become clearer as I discuss the resultant distribution of the microregions according to their SED scores.

Five macroregions were identified and assigned names indicating both their location and their SED characteristics (Fig. 2). Region I is the Developed South. The median SED score of its microregions is 78. Region II is the South's Developing Periphery with a median SED score of 54. This region swings across the top of the Developed South and then northwestward along the border. Region III is the Unevenly Developed Old Northeast with a median SED score of 31. Region IV is the Developing Amazonian Frontier with a median SED score of 32.5. Region V is the Underdeveloped New Northeast with a median

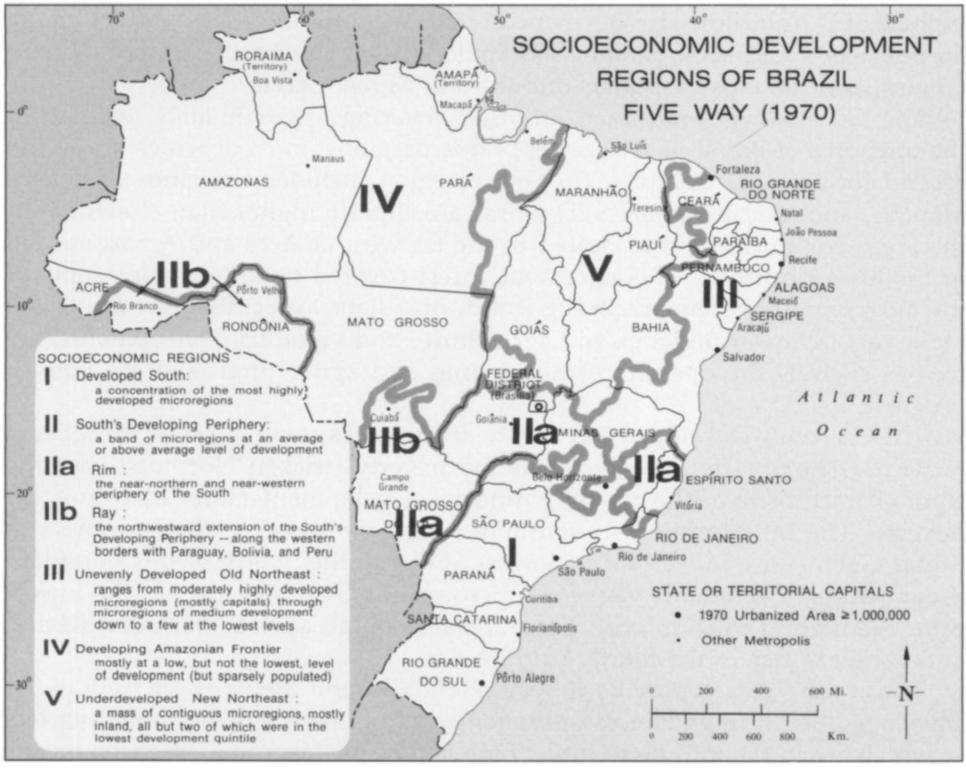

FIG. 2

SED score of 13. My discussion of these regions begins with the most readily identified macroregion and proceeds in order of the ease with which each region can be discerned.

The Underdeveloped New Northeast is the most obvious homogeneous macroregion (Fig. 1). This vast region, lying just west of the traditional Northeast, stretches approximately 1,000 kilometers from east to west and 1,600 kilometers from north to south and encompasses the states of Maranhão and Piauí, the northern half of Goiás, the western half of Bahia and sections of Pará, Ceará, Pernambuco, and Minas Gerais. The uniformity of the SED pattern for the New Northeast, generally in the lowest quintile, is broken only by the slightly higher SED scores for the microregion of the city of Teresina. Characterized by widespread poverty, the New Northeast is the most underdeveloped macroregion in Brazil. The boundaries of this large region have been vaguely suggested in previous regionalizations but were inferred from state-level data, which are too imprecise to determine the true extent and boundaries of the macroregion.

The second-most obvious macroregion, the Developed South, can be described as a collage of developed microregions dotted with a few small less-developed microregions. Almost all of the most highly developed microregions in Brazil are concentrated in this area, and most of these fall in the two

highest SED quintiles. The Developed South includes the states of Rio Grande do Sul, Santa Catarina, Paraná, São Paulo, all but the northern tip of Rio de Janeiro, and the most populous one-third of Minas Gerais.

The Developing Amazonian Frontier, covering approximately one-half of the total area of Brazil, is a large set of microregions, most of which are in the second lowest SED quintile. This macroregion includes the cities of Belém, Manaus, and Macapá where SED scores are slightly higher than elsewhere in the area. The microregions located in the far west of Acre and Amazonas fall in the lowest quintile. This enormous forest-covered region contains some of the most remote settlements in the world. Brazilians expect that one day it will yield vast riches in minerals and agriculture, and vigorous developmental activities such as the opening of new mines and agricultural land are now in progress.

The Unevenly Developed Old Northeast stretches along the coast from Ceará to Bahia. The area is stereotyped as the poverty-stricken Northeast, but the chief characteristic of the region is uneven development rather than uniform poverty. The MRs forming its southern boundary—some in Bahia, others in Minas Gerais—are indeed in the lowest SED quintile. North of this boundary the macroregion contains very few microregions that fall either in the lowest or in the highest SED quintile. Several state capitals such as Salvador, Recife, and Fortaleza rise to the fourth quintile.

The South's Developing Periphery extends around the northern limit of the Developed South in an almost unbroken band of microregions, three-quarters of which are in the middle quintile. One end of the macroregion encompasses all of Espírito Santo, a small part of the state of Rio de Janeiro, and eastern Minas Gerais. A second and larger section of this macroregion swings northwestward from south-central Minas Gerais, across southern Goiás and the Federal District to include the state of Mato Grosso do Sul and the southern section of Mato Grosso. The extreme eastern part of this section wedges between the Developed South and the Unevenly Developed Old Northeast; the central part separates the South from the Underdeveloped New Northeast; and the western part separates the South from the Developing Amazonian Frontier. Two large border microregions, the new state of Rondônia and the eastern half of Acre, form a discontiguous portion of this macroregion. On Figure 2, this macroregion is divided in two parts, called the rim and the ray. The rim is the band that extends around the northern boundary of the South, and the ray contains the border projections. The region as a whole is distinct from the Developed South because the SED scores of almost all the component microregions are lower than those of the Developed South. Higher SED scores for microregions distinguish the South's Developing Periphery from the Developing Amazonian Frontier where the two abut. This pattern exists along the border with the Underdeveloped New Northeast. The microregions of the adjoining inland fringes of the Unevenly Developed Old Northeast have lower SED scores, usually in the second to lowest quintile.

Figure 3 presents the geographical distribution of microregions with dense population, that is, four or more inhabitants per square kilometer, and those with sparse population, that is, less than four inhabitants per square kilome-

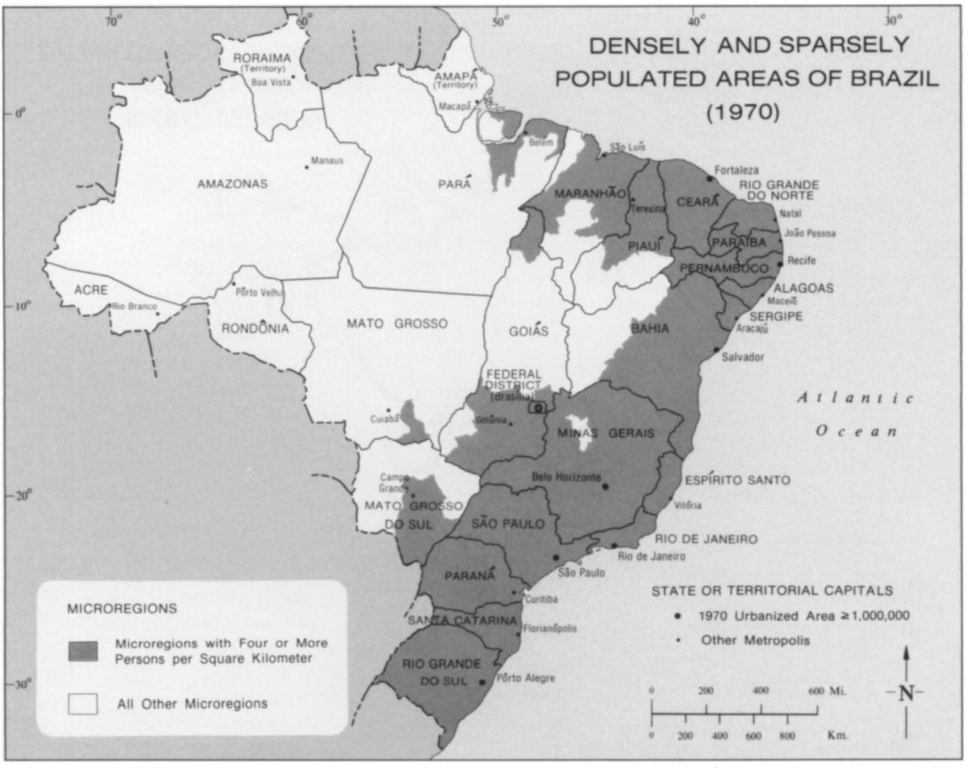

FIG. 3

ter.[8] The pattern is one that researchers have long noted: relatively few Brazilians have moved to the interior of the country. In other words, regionalization of the country in terms of population distribution yields two regions—a densely populated near-coastal region and a sparsely populated interior.

The distribution pattern of the six socioeconomic-development levels of the 360 continental microregions of Brazil identifies five macroregions (Figs. 1 and 2). The regionalization of Figure 2 is both refined and unidimensional: refined in the sense that its demarcation lines are drawn along microregion boundaries rather than along boundaries of states and territories; unidimensional in that it is based upon a single, factor-analytically pure dimension that measures the socioeconomic development levels of the microregions. However, the refinement of this regionalization scheme does not detract from its usefulness at the state and territorial level; nor does its unidimensionality prevent its use in combination with other variables such as population density.

For some purposes macroregions bounded by state and territorial lines are more useful than refined macroregional lines that dissect states or territories. States and territories are powerful political realities in Brazil. Macroregions

[8] Michael L. Yoder and Glenn V. Fuguitt, Urbanization, Frontier Growth and Population Redistribution, *Luso-Brazilian Review*, Vol. 16, 1979, pp. 67–90.

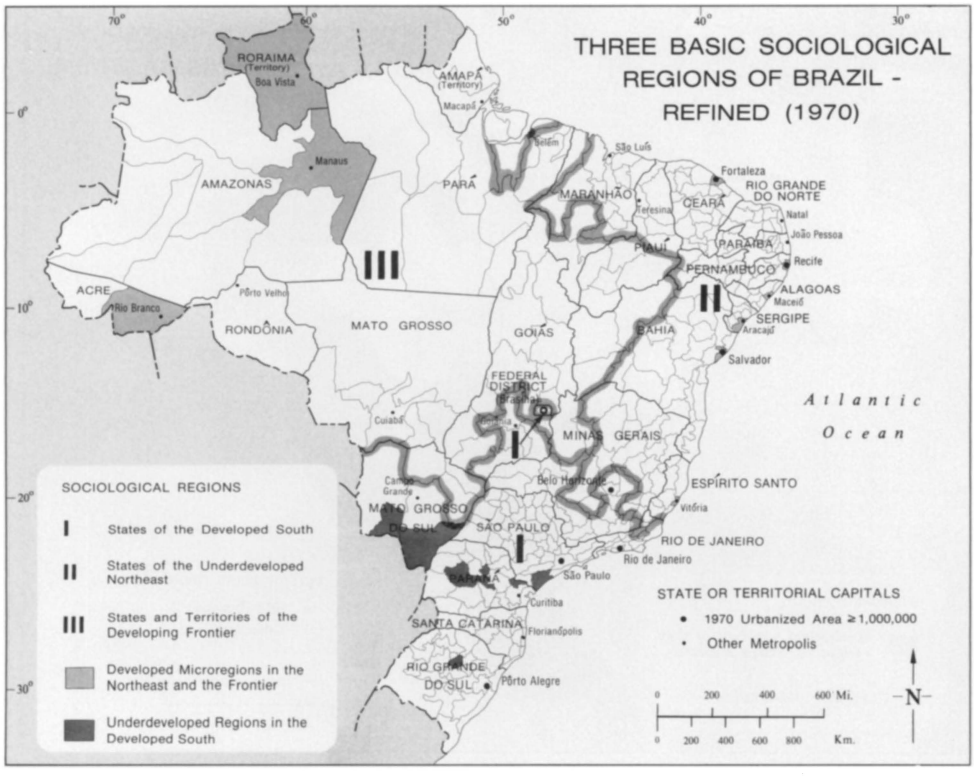

FIG. 4

based on microregional boundaries provide appropriate data by which to determine multistate macroregions. Indeed, many Brazilian states and territories are already wholly encompassed in one of the five macroregions. Allocating the divided states or territories to an appropriate macroregion may be accomplished by assigning the whole state or territory to the macroregion containing most of its population. The resulting multistate macroregions are as follows: the Developed South contains Rio Grande do Sul, Santa Catarina, Paraná, São Paulo, Minas Gerais, and Rio de Janeiro; the South's Developing Periphery contains Espírito Santo, the Federal District, Goiás, Mato Grosso do Sul, Rondônia, and Acre; the Unevenly Developed Old Northeast contains Ceará, Rio Grande do Norte, Paraíba, Pernambuco, Alagoas, Sergipe, and Bahia; the Developing Amazonian Frontier contains Mato Grosso, Amazonas, Roraima, Amapá, and Pará; and the Underdeveloped New Northeast includes Maranhão and Piauí.

The realignment of macroregional boundaries in this way will be particularly useful to policy makers who must treat states and territories as unified entities. There are two major disadvantages to this system. Firstly, approximately half of Bahia and Goiás and parts of other states are taken from the Underdeveloped New Northeast, so that it retains only Maranhão and Piauí, less than one-half its original territory. Secondly, Minas Gerais is regionally complex, dissected by four of the refined SED macroregions. This complex

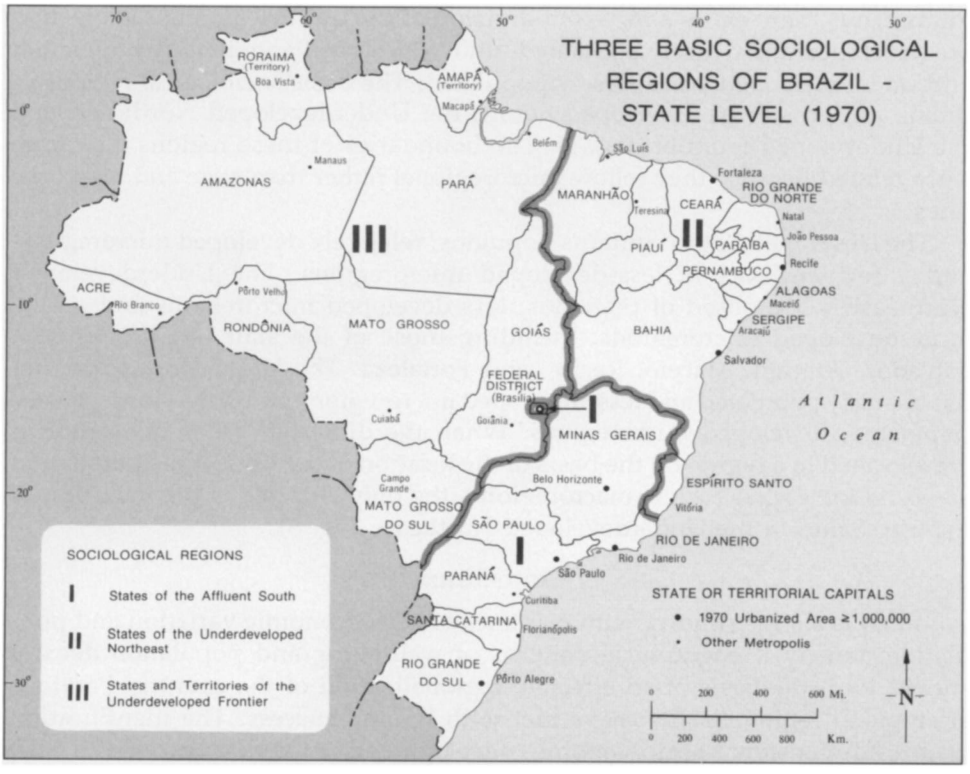

FIG. 5

regional development pattern is obscured when the whole state is allocated to the Developed South.

A simple, conceptually clear regionalization of the country is useful for some purposes. One of the most promising approaches to this end is the combination of the 360 continental Brazilian microregions in terms of population density and socioeconomic development. I have already noted the population division of the country between the near-coastal and interior regions. A reasonable SED dichotomy of Brazil distinguishes a developed region and an underdeveloped region. Almost all microregions in the South are in the two highest SED quintiles, the 60th through the 99th percentiles, while most microregions outside the South are in the bottom three quintiles (Fig. 1). The 60th percentile can be considered the dividing line between developed and underdeveloped microregions. By use of this dividing line, the Developed South forms a block of contiguous microregions mostly in the two highest SED quintiles. It includes Rio Grande do Sul, Santa Catarina, Paraná, São Paulo, most of Rio de Janeiro, and the southern half of Minas Gerais. The rest of the country is classified as underdeveloped.

A combination of the two elements yields four categories: developed and densely populated; developed and sparsely populated; underdeveloped and densely populated; and underdeveloped and sparsely populated. However, there is no contiguous region of developed and sparsely populated microre-

gions. Thus there exists a threefold division of the country among regions that are developed and densely populated, underdeveloped and densely populated, and underdeveloped and sparsely populated. The basic sociological regions of Brazil are termed the Developed South, the Underdeveloped Northeast, and the Undeveloped Frontier (Fig. 4). The boundaries of these regions on Figure 4 are refined because they follow microregional rather than state and territorial lines.

The Developed South contains populous, relatively developed microregions and a few enclaves of less-developed microregions. The Underdeveloped Northeast is composed of populous, less-developed microregions and a few, more-developed microregions, including those of the state capitals Vitória, Salvador, Aracaju, Maceió, Recife, and Fortaleza. The Undeveloped Frontier has sparsely populated and less-developed microregions and only a few sparsely populated, developed microregions. When the dissected states or territories are allocated to a region on the basis of the location of the bulk of the population as was done earlier for the macroregions, the only surprise is the inclusion of Espírito Santo in the Underdeveloped Northeast (Fig. 5).

Conclusion

Brazil is a large country with extremes of socioeconomic variation and population density. Geographical patterns of well-being and population density should form the basis of an effective regionalization of the country. Previous attempts at regionalization have met with limited success. The identification of a unidimensional socioeconomic development factor that provides a SED score for each microregion offers a method to determine the geographical distribution of levels of development. Contiguous sets of microregions with similar SED characteristics form patterns of identifiable macroregions. Maps of the patterns of population density provide a better understanding of the geographical distribution of socioeconomic differences among the people of Brazil. Perhaps the methods illustrated here will also prove useful in mapping the geography of socioeconomic development in other large, unevenly developed countries.