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Regional Development in Brazil: Research Trends in the Seventies

In the decade of the seventies Brazil vibrated with a feeling of growth and development. The economic "miracle," beginning in the sixties, carried Brazil into the seventies on a wave of euphoria and expectation. The spontaneous growth experienced in the private sector was quickly accompanied by public sector programs to identify national and regional development goals and to offer stimulus toward their achievement.

Two key elements in the government's efforts to stimulate economic development were the abundant financing of national and regional development research projects and the improvement of development-related human resources by creating and generously supporting graduate level programs, providing liberal scholarships for graduate study and training abroad, and inviting foreign specialists in development fields to serve as university professors, consultants, or conference guests. This set of conditions formed the active background of research activities in geography and other disciplines in Brazil in the seventies and, quite understandably, influenced greatly the topics selected and the objectives pursued.

Although the effects of this set of conditions were experienced more directly and strongly by Brazilian geographers, foreign geographers in tune with Brazilian development issues were also stimulated by what was occurring there. The publishing of geographical research on a wide variety of development issues, especially by Brazilian geographers, was prolific in the decade. As a consequence of government development incentive programs, the existence of strong regional differences in Brazil, and the perspective of a certain set of energetic Brazilian geographers, research on regional development stood out as a major theme in the geographical literature on Brazil.

The purpose of this paper is to provide a review of the geographical literature of the seventies on Brazilian regional development issues. The primary information sources are the English language and Brazilian professional geographical journals. As might be expected, articles in Brazilian Portuguese are much more numerous. The objectives are to describe the major foci of the studies within the broader topic and to identify any trends or obvious gaps existent in the literature.

Suggestions for future research directions on regional development in Brazil are also offered.

The foci are classified and discussed under three subheadings. The first is concerned with conceptual and thematic frameworks espoused by the researchers. This is followed by a discussion of the topics and regions studied. Finally, a review of the data analysis techniques employed in the research is presented. With this classification there is some overlapping because the works of some authors are relevant to more than one group. A chronological order is attempted within each of the subheadings but is not strictly adhered to in favor of treating related topics together.

Concepts and Themes

The basic concepts and themes underlying the research have been identified in three ways. One is through the analysis of publications in which the authors focus on a conceptual or thematic aspect of regional development as the central topic. This is combined with an examination of conceptual or theoretical expositions followed, in the same study, by a practical application or a test of validity. In this case it must be assumed that the author accepts as valid the framework under which he works unless he provides contradictory evidence. A third indicator, in the case of Portuguese language publications, is the types of foreign language articles selected by editorial boards for translation and publication.

The principal framework for regional analysis and development in Brazil, as espoused by geographers in the seventies, was built upon core-periphery and central place theory concepts. In early 1970, Geiger pointed out the need to define the spatial structure of the country in terms of a hierarchical system of nested functional regions. In addition to detailed regional studies, he called for research on the delimitation of such a structure at the national level and for its use as the official system of data gathering units (Geiger, 1970, 169-170). Even though not wholly the result of his call, a great number of works were published throughout the seventies that continued within the same conceptual context or focused on more specific elements within the theme.

A leading figure in promoting core-periphery concepts in regional development research in Brazil was Speridião Faissol, who served for a number of years as the highest ranking geographer at the Instituto Brasileiro de Geografia e Estatística (IBGE). Especially in the early part of the decade, when the concept was still

young in Brazil, Faissol published several works concerned with specific aspects of core-periphery or central place theory concepts and introduced several quantitative analytical techniques designed for related regional development analysis.

In 1972, he focused upon identifying the polarization capacities of the larger Brazilian urban centers and, subsequently, on defining city types and their positions in the urban hierarchy (Faissol, 1972a; 1972b). In a third article in 1972, he, along with Oliveira and Pedrosa, centered on identifying the boundaries of functional regions in Brazil (Faissol, Oliveira, and Pedrosa, 1972). In yet another study, he concerned himself with two fundamental aspects of a region's economic structure, production, and distribution, within the context of a functional region (Faissol, 1973b).

Beginning at the same time and continuing across the decade were a series of articles authored by Bertha Becker, whose main focus was regional analysis and planning within the context of the center-periphery model. In a national scale study in 1972, Becker affirmed that economic growth was, indeed, diffusing across the country in keeping with the center to periphery diffusion process postulated in the model. At the same time, she states that the social aspects of development did not accompany the economic sector and that great contingents of the population remain at the margin of the development process. In order to attain overall development she calls attention to the need for social integration measures directed toward the rural and the marginal urban sectors (Becker, 1972, 114-115).

In subsequent research Becker focused upon specific regions and developmental changes within a core-periphery context. In a study of the state of Espirito Santo, Becker observed that increased competition from the centers of São Paulo and Rio de Janeiro to the southwest and from Salvador to the north is reducing Espirito Santo to periphery status. The transformation currently in progress is marked by a contradiction between the economic advantages brought to the country as a whole and social and economic disadvantages caused to the region's inhabitants (Becker, 1973a; 1973b, 111).

In two articles published on the development of the Amazon region, Becker again draws upon center-periphery concepts as a framework for her analysis. Reviewing a series of government attempts to develop and integrate the Amazon, Becker concludes that the attempts have not been carried out in such a way as to favor

self-sustained growth in the region. She asserts that the process, which was initiated and directed from outside the region, did not place value on the local needs and even nullified the regional forces (Becker, 1974, 33). In a follow-up to the above study, Becker entered into greater detail on the problems of development of the Amazon. In this work she drew to a great extent upon the concepts that Friedmann earlier enumerated concerning the periphery's means to counteract polarization forces (Becker, 1976, 138; see also Friedmann, 1972).

Over time, the works of Becker illustrate her growing concern with the limitations of transferring the center-periphery model as a regional development tool without stronger empirical support. Among geographers, her works, concerned with center-periphery concepts, appear to be those most directly oriented toward regional analysis for development planning and, at the same time, she appears to be among the most critical of the model. In a recent article she and Bernardes gave considerable thought to location and development theories for developing countries. They maintain the validity of the center-periphery concept, but conclude that some practical perspectives need to be modified when considering underdeveloped countries. First, in developing countries the problems of social inequalities and differences in the quality of life are more grave than that of economic disequilibrium. Second, the periphery is undervalued as an innovator and its potential as an upward diffusing development agent merits more attention (Becker and Bernardes, 1979, 147). They also conclude by calling for additional empirical studies to reformulate the model to render it more applicable to developing countries.

Core-periphery relationships formed the conceptual bases for a series of additional studies throughout the decade. Carvalho Ferreira identified growth poles and their associated regions in the state of Minas Gerais (Carvalho Ferreira, 1971). Semple, Gauthier, and Youngman illustrated the use of a trend surface technique to identify two types of growth poles in the state of São Paulo (Semple, Gauthier, and Youngman, 1972, 597). Mold discussed the theoretical relationship between planned development of urban centers and the development of their surrounding regions using, as an example, the state of Rio Grande do Sul (Mold, 1973). Geiger and Davidovich discussed the spatial structure of Brazil within the context of historical development, tendencies toward polarization, and public sector attempts to diffuse economic activities to the interior (Geiger and Davidovich, 1974). Koenig, Lentnek, and Mitchell's work on the relationship between growth in regional income and the development of a regional urban

hierarchy, although presented more in the context of central place theory, also parallels core-periphery postulates related to the growth of poles (Koenig, Lentnek, and Mitchell, 1974). Finally, two studies on the identification and explanation of industrial location tendencies in Brazil by Enders and Enders and Bardini were couched in the core-periphery concepts of cumulative causation and trickling down effects (Enders, 1977; Enders and Bardini, 1977).

The seeds of another theme concerned with ecology and regional development in Brazil were planted in the early seventies but never really grew to fruition as a major focus of research among geographers. Ludwig's statement in 1972 that "Brazil cannot depollute and develop simultaneously" was a strong, as yet unanswered, challenge for geographers and other development planners (Ludwig, 1972, 43). Likewise, Denevan's concern with the demise of the Amazon rainforest and his call for "more attention to the negative and long-term aspects of wide-open tropical colonization" have not generated, at least in the published literature, a satisfactory response in terms of continuous research throughout the seventies (Denevan, 1973, 133). Becker returned to this theme in 1976 when she described the current process of natural resources exploitation in the Amazon region and called for a search for ways to utilize the land that would minimize the negative effects associated with disrupting the ecosystem (Becker, 1976, 138139). Each of these studies ends on a rather pessimistic note and constitutes an appeal for positive research contributions.

Around the middle of the decade a number of translated articles on regional development appeared within the geographic literature in Brazil. In 1973 and 1974, the *Boletim Geográfico* published a series of articles focusing directly on the explanation and discussion of growth pole concepts (Boudeville, 1973; Lasuen, 1974; Gilbert, 1974). The same series also included articles by Keeble and Wrobel, which provided additional options for analyzing regional development (Keeble, 1973; Wrobel, 1974).

In 1975, Faissol edited a volume of translated articles on urbanization and regionalization and their relationships to development (Faissol, 1975). The volume included articles on growth pole concepts by Hansen, Lasuen, and Perroux (Hansen, 1975; Lasuen, 1975; Perroux, 1975). It also included two works on methods of nodal region identification and delimitation by Brown and Holmes and Nystuen and Dacey (Brown and Holmes, 1975; Nystuen and Dacey, 1975).

Chronologically, the translated articles appear after a great number of other

articles employing the same concepts had already been published in Portuguese. Quite assuredly some Brazilian authors benefitted from the contents of the translated articles while still in their original language. The relatively late publication of the translations is due in great part to the lags involved in securing copyright releases, translating, and the technical aspects of publishing. The major contribution of the translations is the diffusion of concepts from the more dynamic center of geographical research in Brazil to the rest of the country.

Topics and Regions

Some publications in the seventies focused on topical issues of regional development without concentrating on a specific region. Most of the research, however, centered on specific issues in specific regional settings. Some of these were also concerned with introducing or applying a new analytical technique for the solution of specific problems. This latter aspect will be discussed in more detail in the next section.

All the translated articles cited in the previous section are topical in nature with no specific reference to Brazil. They focused on three related topics: theoretical clarification of growth pole theory, the concept and identification of regions, and alternative models in economic development (Boudeville, 1973; Grigg, 1973; Gilbert, 1974; Keeble, 1974; Lasuen, 1974; Wrobel, 1974; Brown and Holmes, 1975; Hansen, 1975; Lasuen, 1975, Nystuen and Dacey, 1975, Perroux, 1975). In this same vein Geiger presented a conceptual basis for dividing the nation into different types of regions for analytical, planning, and development purposes (Geiger, 1970). Subsequently, a working group from the IBGE elaborated a detailed methodological report on how to divide Brazil into urban functional regions (Instituto Brasileiro de Geografia e Estatística, 1976a).

Several publications focused upon reviewing and/or evaluating regional development policies (Kleinpenning, 1971a; Momsen, 1972; Cunningham, 1976; Henshall and Momsen, 1976, 246-265; Maimon, Baer, and Geiger, 1977). The Northeast region has received the greatest attention in this respect. On a related issue, Mandell concentrated on the diminishing participation of geographers in development planning, especially in the agricultural sector, in Brazil in the sixties (Mandell, 1972). In the seventies Brazilian geographers appear to have been more active in this type of work.

Prominent in the research of the seventies were the related topics of growth pole

identification, functional region delimitation, and analysis of center-periphery relationships. In 1972, Faissol published articles on growth poles and on urban structure in Brazil at the national level (Faissol, 1972a; 1972b). In a more spatially restricted study, Semple, Gauthier, and Youngman identified the growth poles in the state of São Paulo (Semple, Gauthier, and Youngman, 1972). In still other studies authors combined pole identification with region delimitation in the same piece of work.

At the national level, Faissol, Oliveira, and Pedrosa employed Markov chain analysis on migration flows and airline passages to identify two sets of functional regions (Faissol, Oliveira, and Pedrosa, 1972). Carvalho Ferreira and Rocha identified poles and associated functional regions for the states of Minas Gerais and São Paulo, respectively (Carvalho Ferreira, 1971; Rocha, 1974). Finally, the working group at the IBGE tested their methodology for the delimitation of functional regions on three large macroregions in the northeast, the southeast, and the south (Instituto Brasileiro de Geografia e Estatística, 1976b).

Faissol published two national level studies on urban types and growth, respectively, and their relationship with regional development (Faissol, 1971; 1976). At the state level the IBGE studied these relationships in Paraná and Mold focused on the same topic in the state of Rio Grande do Sul (Instituto Brasileiro de Geografia e Estatística, 1970; Mold, 1973). Studies of the functional relationship between specific centers and their respective functional regions were also published for the cities of Aracajú, Fortaleza, Rio de Janeiro, and São Luis (Duarte, 1971; Davidovich, 1971; Bernardes, 1971; Rodrigues, 1971).

The identification of homogeneous agricultural regions was the topic of three articles. Berry and Pyle identified macroregions at the national level in 1970 (Berry and Pyle, 1970). At the same time Mesquita and Silva identified uniform agricultural regions in the state of Paraná (Mesquita and Silva, 1970). In 1974, Gusmao identified agricultural subregions in the macro-region Sul, which is composed of the three states of Paraná, Santa Catarina, and Rio Grande do Sul (Gusmao, 1974).

Several regional case studies, not concentrating specifically on core-periphery relationships, also appeared in the literature. Three articles were published on the Amazon region (Pandolfo, 1971; Becker, 1974; 1976). A two part case study of the state of Espírito Santo was published in 1973 (Becker, 1973a; 1973b). Also, Geiger and Faissol presented discussions of the Centro-Sul, as the most

developed region, and the Northeast, as a retarded region (Geiger, 1972; Faissol, 1973a).

Regional disequilibrium was the concern of yet another group of authors. Three studies focused on regional differences in the locational tendencies of economic activities (Enders, 1977; Enders and Bardini, 1977; Pedrosa and Moreira 1978). An article by Maimon, Baer, and Geiger shows how sectoral development plans have increased regional inequalities by favoring the already more advanced region in the South (Maimon, Baer, and Geiger, 1977, 52). Regional differences in per capita income between the North and South was another topic treated. Over a twenty-year period, from 1947 to 1966, it was demonstrated that inequalities between the regions tended first to increase and then to decrease (Semple and Gauthier, 1972, 179).

Three regional case studies that do not fit well into any of the above groups also merit citation. They are Kleinpenning's article on road building and colonization in the Amazon, Brooks' work on drought in the Northeast, and Denevan's study on the demise of the Amazon rainforest (Kleinpenning, 1971b; Brooks, 1973; Denevan, 1973). These are three important topics of regional development in Brazil that have received very little attention from geographers in the past decade.

Analytical Techniques

There was a substantial infusion of quantitative techniques into the geographic literature on Brazil in the seventies. This section reports on the types of quantitative analytical techniques employed in the research on regional development throughout the decade. Most of the studies did not utilize sophisticated mathematical analysis and, therefore, are not discussed.

Factor analysis was the most important technique in the literature and was used in several different types of studies. In three cases factor scores were obtained as a first step and then used as input into a grouping routine to identify multivariate homogeneous regions. In this way Berry and Pyle identified homogeneous agricultural macroregions on the national level (Berry and Pyle, 1970). Gusmao subsequently applied the same methodology to identify more detailed agricultural regions in the three southernmost states of Parana, Santa Catarina, and Rio Grande do Sul (Gusmao, 1974). Henshall and Momsen applied the same procedure using thirty-seven socioeconomic variables to identify economic development macroregions at the national level (Henshall and Momsen, 1976, 61-

68).

Faissol factor analyzed the major urban centers of Brazil to measure their functional size. He subsequently used the factor scores and a grouping technique to identify the positions of the cities among the various levels of the urban hierarchy (Faissol, 1972b). In another study he employed factor analysis to measure functional size and identify the functional structures of the major urban centers and related them to regional development (Faissol, 1976).

In separate works, graph theory, trend surface analysis, and optimal origin point analysis were employed to identify growth poles. Carvalho Ferreira and Rocha used graph techniques in their studies of growth poles in Minas Gerais and São Paulo, respectively (Carvalho Ferreira, 1971; Rocha, 1974). Earlier, Semple, Gauthier and Youngman had applied trend surface analysis to identify the growth poles in São Paulo state and Faissol had introduced the optimal origin point technique as a means to identify growth poles at a national level (Semple, Gauthier, and Youngman, 1972; Faissol, 1972a).

Two studies employed entropy measures as their principal analytical technique. Semple and Gauthier used it to measure regional income inequality tendencies over time and Enders applied it toward the analysis of industrial location tendencies (Semple and Gauthier, 1972; Enders, 1977). Finally, Faissol, Oliveira, and Pedrosa demonstrated the use of Markov chain analysis to identify the limits of functional regions (Faissol, Oliveira, and Pedrosa, 1972).

Research Trends and Needs

The major theme of the geographical research in the seventies on regional development in Brazil focused on growth pole theory concepts. Empirical studies were largely concerned with identifying growth poles, delimiting functional regions, and analyzing center-periphery relationships. Several quantitative techniques, new to the Brazilian literature, were introduced for these purposes.

Other studies concentrated on evaluating development programs, ecological problems, descriptive regional case studies, uniform region identification, and specific aspects of subnational regional disequilibrium. However, in none of these secondary themes does the number of publications rival that of the major thrust.

From the beginning to the end of the decade some trends in the research

emerged. Perhaps the most positive has been the shift toward a search for a truly relevant framework for regional planning in a developing country context, where economic growth may be of less immediate importance than quality of life and social improvements. This represents a move away from transplanting concepts, untested from other different regions, a phase that often accompanies a surge of new ideas.

A second positive trend, although not clearly established, appears to be a tendency in the later part of the decade to work toward the goal of diminishing regional inequalities. The studies on this theme have focused on regional disequilibrium in specific sectors and also on evaluating the impact of public sector development programs.

Some less positive trends can also be identified. In the first half of the decade geographers were much more productive in publishing research on regional development in Brazil. Seventy percent of the works reviewed here were published before 1975. Likewise, the great surge of methodological techniques introduced into Brazil by Faissol in the early half of the decade was not carried through, either by ongoing experimentation and application or by the continuous introduction of new techniques, in the second half.

Future research directions can build upon the favorable trends coming out of the seventies. The results of the previous theoretical and empirical research should not be ignored. Mechanisms for the diffusion of social progress and improvements in the quality of life are badly needed. A good start in this direction would be to give more attention to topics such as education, community health, family income, and social equality, with an eye toward development policies.

Some specific research initiatives in the seventies still appeal for additional attention in the eighties. The problems related to drought in the Northeast and the economic and ecological questions involved with exploitation of Amazon resources are timely major development issues and bold challenges to development planners. Geographers are among the professionals best prepared to offer solutions.

Mathematical models and innovative analytical techniques should not be ignored, but rather encouraged. At the same time, it should be remembered that the indiscriminate use of quantitative techniques has already been challenged in Brazil and the potential researcher should, therefore, apply his tools with prudence.

As a final comment, Brazil is a large, diversified country with great potential. The research suggestions offered here carry within them a challenge to know the country. It is directed as much toward Brazilian geographers as toward their foreign colleagues. For the most part the problems of regional development will not be understood and relevant solutions will not be forthcoming without first hand knowledge of the situation. There is no better way to arrive at this point than to complement a first class formal education with some fieldwork experience.

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