University of Oxford Centre for Brazilian Studies

Working Paper Series

Working Paper CBS-04-99(E)

Recent and Prospective Regional Changes in the Brazilian Economy

By

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ABSTRACT

This paper examines the recent and prospective course of regional economic development in the Brazilian economy. Over the past two decades, a number of factors including infrastructural investments, the development of Mercosul and the increasingly active role of sub-national governments have resulted in a relative geographical deconcentration of industry. This has been characterised by an increasing trend towards the establishment of production facilities away from the traditional industrial heartland of the metropolitan São Paulo region, although industrial and economic activities have remained highly concentrated in the South and South East of the country. While this trend has strong roots, this paper argues that, for a number of reasons, it is unlikely to continue indefinitely.

This paper was prepared during the author's stay as a Visiting Research Associate at the Centre for Brazilian Studies, during Trinity Term 1998 and was originally presented at a conference on "Industrial Competitiveness in Brazil", held at St. Antony's College, Oxford on 11th June 1998. The author wishes to thank the Fundação de Desenvolvimento da Pesquisa de Minas Gerais (Fapemig) for its assistance in supporting the basic research which underlies this paper.

RESUMO

O texto analisa o desenvolvimento regional econômico num contexto de transformação da produção regional, de modo a permitir uma reavaliação e reestruturação da política governamental para o desenvolvimento regional. O texto divide-se em sete partes. A primeira examina a produção regional a partir dos anos 70. O autor descreve a evolução de duas tendências principais nos anos 90, que se

desenvolvem no contexto da criação do Mercado Comum do Sul (Mercosul), do papel cada vez mais ativo das autoridades infranacionais na promoção de políticas de desenvolvimento econômico, bem como no desenvolvimento infraestrutural.

A primeira tendência é a concentração da atividade econômica e produtiva nas regiões de São Paulo e Rio de Janeiro. A segunda, aparentemente contraditória, é o processo de desconcentração da produção para o sul, o centro-oeste, o norte e o nordeste, principalmente como resultado da expansão da fronteira agrícola. Este processo tem sido caracterizado por uma tendência para estabelecer centros produtivos além do tradicional centro industrial da região metropolitana de São Paulo, embora as atividades industriais e econômicas tenham permanecido altamente concentradas no sul e no sudeste do país. Este processo tem fomentado, por sua vez, a desconcentração do rendimento, dado que os fluxos migratórios têm acompanhado as transformações na estrutura produtiva, bem como uma convergência no rendimento per capita.

O autor demonstra que a desconcentração não tem sido linear. Embora tenha havido uma tendência geral de desconcentração inicial, verifica-se posteriormente uma reconcentração nas regiões mais desenvolvidas do país devido á transformação tecnológica, a reestruturação da produção e a criação do Mercosul. Este processo de reconcentração tem-se manifestado de duas maneira predominantes: primeiro, o rendimento tem vindo a descer nas áreas metropolitanas de São Paulo, do Rio de Janeiro e do Recife, mas se verifica uma reaglomeração nas cidades de tamanho médio. Segundo, o processo de desconcentração parou, não permitindo ao norte e ao nordeste desenvolver um crescimento econômico próprio apesar do crescimento registado nas regiões do Ceará e da Bahia.

Nas restantes seis partes do texto, o autor analisa outras áreas e a sua evolução e impacto sobre o processo de desconcentração. Analisam-se a agricultura e o setor mineiro, ambos agentes da desconcentração regional pelo seu enorme peso econômico. O autor analisa igualmente o impacto do desenvolvimento infraestrutural que, na sua perspetiva, tem permitido o desenvolvimento da fronteira agrícola, da especialização e, ao aumentar a rede de transportes, deverá promover a relocalização produtiva para além das áreas de maior concentração. Os incentivos fiscais e a política de desenvolvimento regional são também analisadas. Os seus efeitos globais têm sido pouco significativos e devem ser repensados face ao aumento da corrupção e da crescente guerra fiscal entre os estados. O autor também examina o impacto do Mercosul que, na sua perspectiva, tem vindo a reforçar o processo de reconcentração nas regiões circundantes de São Paulo, embora também fomente o alargamento da fronteira agrícola na medida em que a liberalização comercial aumenta as exportações agrícolas. Finalmente, é analisado o impacto da mudança tecnológica. Nos países industrializados, este processo tem vindo a reconfigurar a produção industrial e no Brasil, na medida em que o faça, provavelmente favorecerá o corredor entre São Paulo e Porto Alegre devido ao alto nível de desenvolvimento tecnológico que já se verifica nessa região.
Por último, o eixo Belo Horizonte-Porto Alegre será reforçado pelos efeitos da aglomeração das economias, duma maior internacionalização do mercado nacional, do livre comércio, do Mercosul, das diferenças nos investimentos regionais na pesquisa, e dos diferentes níveis de concentração de rendimentos e de desenvolvimento do mercado profissional entre as regiões.

Resumindo, a desconcentração para além da região de São Paulo tem sido compatível com um processo de reconcentração nas áreas circundantes. O processo de desconcentração, no entanto, será enfraquecido por uma série de fatores, entre eles o congelamento do processo durante a crise dos anos 80, a transformação tecnológica e estrutural que favorece a reconcentração, níveis menores de investimento

governamental nas regiões mais pobres, a tendência do Mercosul e do setor privado para favorecer o sudeste, bem como da distribuição dos rendimentos para favorecer a reconcentração. Por outro lado, a expansão da fronteira agrícola dará continuidade à desconcentração. No entanto, tal como argumenta o autor, embora a desconcentração tenha fortes raízes, a continuação e o reforço dessa tendência requer a aplicação de políticas governamentais deliberadas.

O texto foi preparado durante a estadia do autor como Visiting Research Associate no Centro de Estudos Brasilieros, durante um trimestre do ano letivo de 1998, sendo apresentado originalmente numa conferência sobre Competitividade Industrial no Brasil que teve lugar no St. Antony's College, em Oxford, no dia 11 de Junho de 1998. O autor deseja agradecer a *Fundação de Desenvolvimento da Pesquisa de Minas Gerais* (FAPEMIG) pelo apoio concedido para a realização da pesquisa básica para a preparação do texto.

CONTENTS

1. REGIONAL DISTRIBUTION OF GEOGRAPHIC AREA, INCOME, AND POPULATION

Economic development in Brazil until 1970 led to strong geographic concentration of production in a few states and regions and thus a concentration of income. This process has been widely studied and thoroughly analysed [Cano (1977)]. By 1970, the final phase of concentration, the two states of São Paulo and Rio de Janeiro accounted for over 55% of national income: São Paulo, with 2.9% of the geographic area of the country, represented 39% of national income, and Rio de Janeiro, with 0.5% of the area, represented 16% of income (see Table 1, Map 1).

Due to historic factors, a large population share was concentrated in regions of low economic growth, and a striking difference in regional income per capita resulted. This difference encouraged migratory flows mainly from the Northeast and Minas Gerais to Rio de Janeiro and São Paulo and later, in successive phases, to Paraná, Centre-West, and North. At the same time, a sharp decrease in the population growth rate occurred, from an average of 2.9% in the 1960s to 1.4% in the 1990s (see Table 2). These two factors changed the regional distribution of population.

With regard to production, in the 1940's, a geographic de-concentration of production began to occur. Initially, the agricultural frontier shifted towards southern Brazil, and more recently towards the Centre-West and North regions and the North-eastern *cerrados* (savannahs). Since the 1970's, an industrial de-concentration movement from the state of São Paulo has also occurred. The de-concentration of agriculture and industry stimulated trade and services in the new regions, encouraging the national de-concentration of these sectors also.

The result of the economic de-concentration has been the regional de-concentration of income in favour of previously underdeveloped regions. At the same time, population remained concentrated in the most developed regions (see Table 1), since there is a time lag between industrial de-concentration and its effects on population migration. The total effect has been a convergence of regional income per capita (see Table 3) (Ferreira & Diniz, 1994).

This process has introduced a new element to the analysis of regional prospects. Although social indicators still show large differences among regions (see Table 4), poverty is increasingly changing from a regional issue to an interpersonal distribution issue, as the poor become more evenly geographically distributed. It is also increasingly an urban issue, due to rapid urbanisation and population concentration in big cities and major metropolitan areas, although growth rates in these areas have slowed in recent years (see Table 5). In addition to the nine official metropolitan regions, four other cities or urban agglomerations had 1 million or more inhabitants in 1996 (Brasília, 1.8, Campinas 1.3, Manaus 1.2 and Goiânia 1.0) and nine cities had between 500 thousand and 1 million inhabitants.

TABLE 1

Brazil - Regional Distribution of Geographic Area, GDP , and Population, 1970-1996

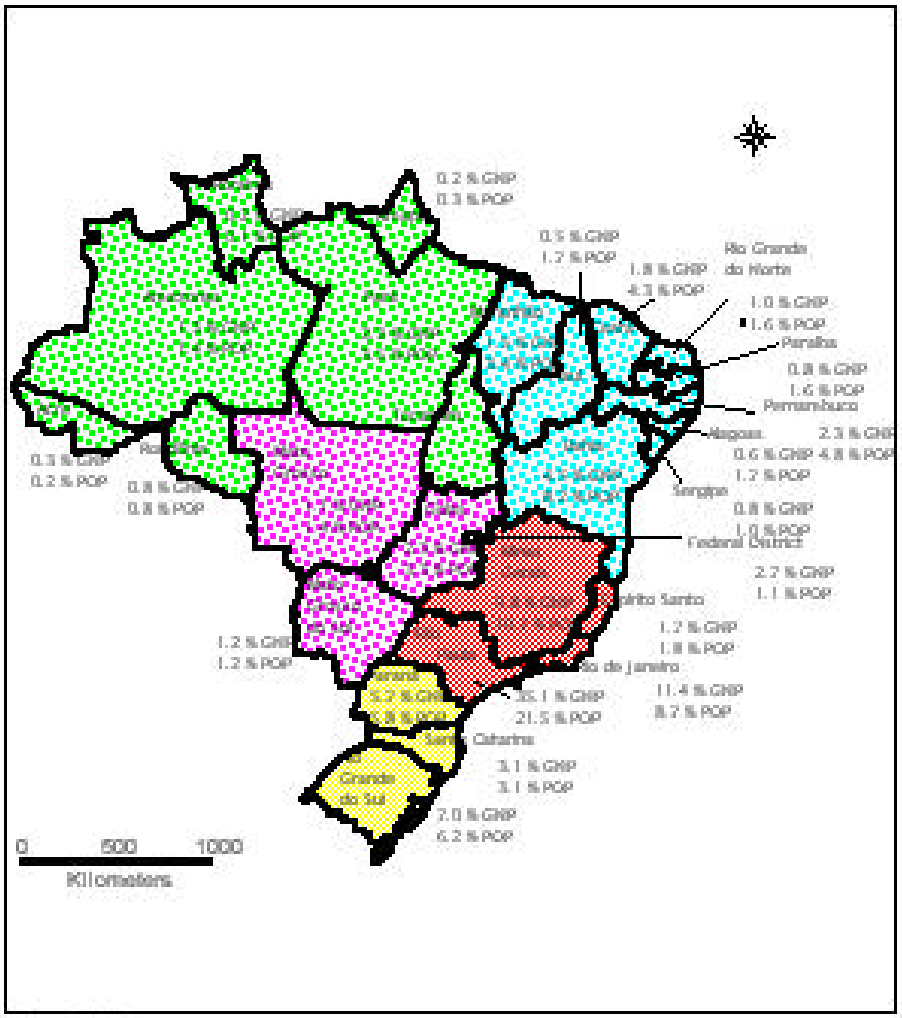
Brazil/Regions/States	Area*	GDP		Population**
		1970	1996	
Rondonia	2,8	0,1	0,8	0,8
Acre	1,8	0,1	0,3	0,2
Amazonas	18,4	0,7	1,3	1,4
Roraima	2,7	-	0,2	0,1
Pará	14,5	1,2	2,3	3,5
Amapá	1,6	0,1	0,2	0,3
North	**41,8**	**2,2**	**5,1**	**6,3**
Maranhão	3,8	0,9	1,5	3,4
Piaui	3,0	0,4	0,5	1,7
Ceará	1,8	1,5	1,8	4,3
Rio Grande do Norte	0,6	0,6	1,0	1,6
Paraíba	0,7	0,7	0,8	2,2
Pernambuco	1,2	3,0	2,3	4,8
Alagoas	0,3	0,7	0,6	1,7
Sergipe	0,5	0,5	0,8	1,0
Bahia	6,6	3,8	4,5	8,2
Northeast	**18,5**	**12,1**	**13,5**	**28,9**
Minas Gerais	6,9	8,3	9,8	10,7
Espírito Santo	0,5	1,2	1,7	1,8
Rio de Janeiro	0,5	16,1	11,4	8,7
São Paulo	2,9	39,4	35,1	21,5
Southeast	**10,8**	**65,0**	**58,0**	**42,7**
Paraná	2,4	5,5	5,7	5,8
Santa Catarina	1,1	2,8	3,1	3,1
Rio Grande do Sul	3,2	8,7	7,0	6,2
South	**6,7**	**17,0**	**15,8**	**15,1**
Mato Grosso do Sul	4,2	-	1,2	1,2
Mato Grosso	10,4	-	1,1	1,4
Goiás	7,6	-	2,3	3,3
Federal District	-	1,0	2,7	1,1
Center-West	**22,2**	**3,7**	**7,3**	**7,0**
Brazil	**100**	**100**	**100**	**100**

Source: FIBGE

* - Total area = 8,547,403 km2

** - Total population = 157,079,573 inhabitants

MAP 1
Brazil: macroregions and states –
% of GNP and Population, 1996



Source : IBGE

TABLE 2

Brazil: Annual Average Rate of Growth of Resident Population,

Percentage

Brazil/Regions/States	Period			
	1960-1970	1970-1980	1980-1991	1991-1996
Rondônia	4,8	16,0	7,9	1,7
Acre	3,1	3,4	3,0	3,0
Amazonas	3,0	4,1	3,6	2,6
Roraima	3,8	6,8	9,6	2,6
Pará	3,6	4,6	3,9	2,2
Amapá	5,4	4,4	4,6	5,6
North	**3,4**	**5,0**	**4,3**	**2,4**
Maranhão	1,9	2,9	0,8	1,2
Piaui	3,1	2,4	1,7	0,7
Ceará	2,8	2,0	1,7	1,4
Rio Grande do Norte	3,1	2,1	2,2	1,2
Paraíba	1,8	1,5	1,3	0,7
Pernambuco	2,3	1,8	1,4	0,8
Alagoas	2,4	2,2	2,2	1,0
Sergipe	1,8	2,4	2,5	1,7
Bahia	2,4	2,4	2,1	1,2
Northeast	**2,5**	**2,2**	**1,7**	**1,1**
Minas Gerais	1,5	1,5	1,5	1,2
Espírito Santo	2,1	2,4	2,3	1,5
Rio de Janeiro	3,1	2,3	1,1	0,9
São Paulo	3,3	3,5	2,1	1,6
Southeast	**2,6**	**2,6**	**1,8**	**1,4**
Paraná	5,0	1,0	0,9	1,3
Santa Catarina	3,2	2,3	2,1	1,5
Rio Grande do Sul	2,2	1,6	1,5	1,1
South	**3,4**	**1,4**	**1,4**	**1,2**
Mato Grosso do Sul	5,6	3,2	-	1,6
Mato Grosso	6,1	6,6	3,9	2,0
Goiás	4,4	2,8	2,3	2,4
Federal District	14,4	8,2	2,8	2,7
Center-West	**5,6**	**4,1**	**2,9**	**2,2**
Brazil	**2,9**	**2,5**	**1,9**	**1,4**

Source: FIBGE

TABLE 3
Relation between Relative Participations in Population and GDP by States. 1970 - 1995

States	Years		
	1970	1980	1995
Rodônia	1,15	1,44	1,30
Acre	1,72	2,08	1,28
Amazonas	1,43	1,05	1,17
Roraima	1,29	1,54	1,29
Pará	2,05	1,76	1,55
Amapá	1,05	1,70	1,29
Northeast			
Maranhão	3,72	3,84	3,07
Piaui	4,73	4,68	3,67
Ceará	3,13	2,91	2,35
Rio Grande do Norte	2,98	2,48	1,75
Paraíba	3,46	3,48	2,79
Pernambuco	1,86	2,02	1,89
Alagoas	2,41	2,48	2,16
Sergipe	2,16	2,43	1,45
Bahia	2,09	1,80	1,77
Southeast			
Minas Gerais	1,48	1,17	1,14
Espírito Santo	1,40	1,13	1,10
Rio de Janeiro	0,60	0,71	0,82
São Paulo	0,48	0,56	0,61
South			
Paraná	3,34	1,09	0,86
Santa Catarina	1,12	0,89	0,92
Rio Grande do Sul	0,82	0,82	0,84
Center-West			
Mato Grosso1	1,54	1,21	1,13
Goiás2	2,01	1,70	1,43
Federal District	0,56	0,64	0,50

Source: FIBGE

TABLE 4
Brazil: Indicators of Economic and Social Development by State and Region, 1970 e 1996

State/Region	GDP per capita (US$)		Life Expectation at Birth (Years)		Literacy Rate *	
	1970	1996	1970	1996	1970	1996
Rondônia	1302	6448	54	67	65	86
Acre	2025	5741	53	67	47	70
Amazonas	1302	5718	54	68	63	79
Roraima	1591	6231	52	66	66	86
Pará	1736	4268	54	68	68	79
Amapá	1157	5370	55	68	66	85
Tocantins	-	1575	-	67	-	78
North	**1302**	**4705**	**54**	**67**	**63**	**79**
Maranhão	579	2158	49	63	41	67
Piauí	434	2004	49	64	40	66
Ceará	723	2667	43	65	45	69
R.G.Norte	723	4083	39	65	46	72
Paraíba	723	2438	39	63	45	69
Pernambuco	1157	3213	41	62	50	74
Alagoas	868	2496	41	62	39	64
Sergipe	1013	5122	45	66	47	75
Bahia	1013	3677	49	66	49	76
Northeast	**869**	**3085**	**44**	**64**	**46**	**72**
Minas Gerais	1591	5968	54	69	66	87
Espírito Santo	1591	6251	58	69	67	86
Rio Janeiro	3761	8653	57	67	83	94
São Paulo	4629	10536	58	69	81	93
Southeast	**3472**	**8843**	**57**	**69**	**77**	**91**
Paraná	1736	6485	58	69	69	88
Santa Catarina	2025	6519	61	71	81	93
R.G.Sul	2749	7395	65	71	82	93
South	**2170**	**6865**	**60**	**70**	**77**	**91**
M.G.Sul	-	6410	-	69	-	88
Mato Grosso	1447	5003	58	68	64	88
Goiás	1157	5238	55	69	64	87
Distrito Federal	4051	14854	54	68	83	94
Center-West	**1591**	**7073**	**56**	**69**	**68**	**88**
Brazil	**2315**	**6491**	**53**	**68**	**67**	**85**

Source: IPEA/PNUD/FJJP/IBGE - Desenvolvimento Humano e Condições de Vida: Indicadores Brasileiros
* - People of 15 years of age and over who can read and write.

TABLE 5
Population and Growth Rates of Population in Metropoliatan Regions - 1970-1996

Metropolitan Regions	Yearly growth rate (%)			Pop (1,000 inh.)
	1970s	1980s	1990s	1996
Belém	4,3	2,7	-1,7	1.486
Fortaleza	4,3	3,5	2,1	2.582
Recife	2,7	1,9	0,7	3.088
Salvador	4,4	3,2	1,3	2.709
Belo Horizonte	4,6	2,5	0,7	3.803
Rio de Janeiro	2,4	1,0	0,3	10.192
São Paulo	4,5	1,9	0,4	16.583
Curitiba	5,8	3,6	2,3	2.425
Porto Alegre	3,8	2,2	0,4	3.016

Source: FIBGE

The changes discussed above make necessary a reevaluation of the regional nature of production, and its determinants and major trends, so as to establish guidelines for national planning and appropriate instruments for regional economic policy. This is especially important in light of the fact that structural changes in the economy, the increasing integration of the internal market, and the opening to international trade will reinforce regional competition.

2. REGIONAL DISTRIBUTION OF INDUSTRIAL PRODUCTION AND ITS TRENDS

After a century of industrial concentration in the state of São Paulo and polarisation in the city of São Paulo's metropolitan area, the process was inverted in the last two decades, with industrial de-concentration towards several other regions of the country and reversal of polarisation[1]. As a result, between 1970 and 1997, the participation of the state of São Paulo in the industrial production of the country was reduced from 58% to 49%, and that of the metropolitan region of the city of São Paulo from 44% to 26%, in spite of the increasing relative participation of São Paulo state's hinterland in national industrial production (see Tables 6 and 7).

[1] On the concept of reversal of polarisation, see Richardson (1980). The analysis of São Paulo's experience can be found, among others, in Azzoni (1986), Storper (1991), although these authors did not conclude that such a phenomenon might be occurring.

TABLE 6
Brazil - Distribution of Industrial Production, According to Great Regions and Major States. 1970 - 1997

Selected Regions and States	1970	1980	1990	1997
Amazonas	0,4	1,6	2,0	2,4
Pará	0,4	0,7	0,9	1,4
Other states	0,0	0,1	0,2	0,2
North	**0,8**	**2,4**	**3,1**	**4,0**
Pernambuco	2,2	2,0	1,8	1,2
Bahia	1,5	3,5	4,0	3,7
Other States	2,0	2,6	2,6	2,8
Northeast	**5,7**	**8,1**	**8,4**	**7,7**
São Paulo	58,1	53,4	49,3	49,1
Rio de Janeiro	15,7	10,6	9,9	7,8
Minas Gerais	6,5	7,7	8,8	9,2
Espírito Santo	0,5	0,9	1,3	1,2
Southeast	**80,8**	**72,6**	**69,3**	**67,3**
Paraná	3,1	4,4	5,6	5,7
Santa Catarina	2,6	4,1	4,1	4,6
Rio Grande do Sul	6,3	7,3	7,7	8,2
South	**12,0**	**15,8**	**17,4**	**18,5**
Center-West	**0,8**	**1,1**	**1,8**	**2,5**
Brazil	**100**	**100**	**100**	**100**

Source: FIBGE and Pacheco 1998.

TABLE 7
Metropolitan Area of São Paulo: Participation in Industrial Production and Employment

	Years				
Breakdown	1950	1970	1980	1990	1997
MASP/State of São Paulo					
Production	72	75	63	53	50
Industrial Employment	65	70	64	60	55
MASP/Brazil					
Production	34	44	33	26	25
Industrial Employment	27	34	29	25	24

Source: FIBGE and Pacheco 1998.
For 1997 the author's estimation.

In its first phase, the reversal of polarisation was characterized by a spreading of activity to the interior of the state of São Paulo and to almost all of the other states of the country (see Table 6). Between 1970 and 1980 the participation of the Southeast region (where São Paulo is located) in Brazilian industrial production declined from 81% to 73%. With the economic crisis of the 1980s, this decrease was slowed, but the tendency is still the same (Table 6).

This process resulted from several factors, primarily: a) agglomeration diseconomies in the city of São Paulo's metropolitan area coincident with agglomeration economies in other urban centres and regions; b) government policies regarding direct investment, fiscal incentives, and infrastructure construction; c) exploration for natural resources, resulting in the movement of agricultural and mineral frontiers, and of various industrial activities; d) market unification, strengthened by the development of transport and communications infrastructure, affecting inter-industrial competition and location.

It is worth noting the role of investment of federal public companies in the first phase of industrial de-concentration. Mainly in the 1970s, due to the ambitious goals of the second national development plan (II PND), there occurred an avalanche of industrial investment by companies controlled by the federal government, called *estatais* (state-owned) - steel, petroleum, phosphate, potassium, paper, petrochemicals, coal, mining, titanium, copper, chloride-chemicals, among others.[2] In several cases, the location of these investments was based on political criteria. Whether for political or technical reasons, most investment occurred in states and regions other than São Paulo, contributing to the relative industrial de-concentration[3].

Taking the regions and states in geographic order, the North widened its participation in industrial production from 0.8% to 4.0% between 1970 and 1997. This growth was strengthened by the fiscal incentives given by the authority for the development of the Amazon (SUDAM) and the authority for the free-trade zone of Manaus (SUFRAMA) to the North and Manaus Free-Trade Zone, respectively, which encouraged the establishments of industries of electronic consumption goods (45% of the local industrial production) and other light goods (watches, eyeglasses, bicycles, motorcycles, fishing and leisure water materials)[4] in [Diniz e Santos, 1994). The extraction of natural resources (iron, aluminium, asbestos, gold, timber, among others), mainly in Pará, and urban growth in the cities of Manaus and Belem, which became local markets of considerable importance, also contributed to grow in the North.

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[2] Estimates of the 60's and 70's indicate that the federal government contributed 60% of the annual fixed capital investment in the Brazilian economy (Baer et. al. (1978)].

[3] The federal government enacted Resolution nº 24 of the Economic Development Council (CDE) in the mid-seventies, which regulated industrial de-concentration in the country.

[4] As a matter of fact, Manaus has become a free zone of imports, since all local production is based in imported inputs and parts, free of taxes and allotted for the domestic protected market. The decisions of opening up the international trade, the reduction of import tariffs and with the prevision of termination of the fiscal incentives by 2013, the industries of Manaus could face some severe problems.

The next region is the Northeast which comprises nine states and diverse economic conditions (Diniz, 1988). In the aggregate, this region increased its share of national industrial production from 5.7% to 8.4% between 1970 and 1990, but with a small reduction since 1990. The participation of all states except Pernambuco increased, but total gain is mainly explained by the state of Bahia which increased its share of production from 1.5% to 4%, corresponding to almost 50% of that of the Northeast in 1990. A major contributing factor in this growth was the construction of the petrochemical pole of *Camaçari* through bulk public investment by the petrochemical industries *Petroquisa* and *Norquisa*. The chemical industry represents 48% of the industrial production of the state[5]. Additionally, fiscal incentives by the authority for the development of the Northeast (SUDENE) have made possible several industrial projects in several Northeastern states oriented to local, national, and export markets [Guimarães (1986); Magalhães (1993); and Redwood III (1984)]. In the 1990s, the production of apparel goods and other "footloose" industries such as textiles has been moving to the Northeast region, especially to the State of Ceará, taking advantage of cheap labour and fiscal incentives.

The Centre-West region, in spite of low economic and population density, has expanded in the last decades, benefiting from the transference of the federal capital to Brasilia in the Centre-West State of Goiás, and the gradual expansion of the agricultural frontier. Industrial production in this region is still modest, but it is increasing with the expansion of the agricultural frontier and the increasing extraction of mineral resources, and fertilisers in the state of Goiás. Urban growth in Brasilia and in municipal centres of the agricultural frontier may also have affected industrial growth in the region. Its share of the Brazilian industrial production rose from 0.8% to 2.5% between 1970 and 1997.

In the Southeast region, the states of Rio de Janeiro, Minas Gerais, and Espírito Santo show different patterns. The state of Rio de Janeiro has been in a process of loss and decay throughout this century which could be called *relative de-industrialisation*. The states of Minas Gerais and Espírito Santo, on the contrary, have gained in relative position. Espírito Santo has only a small national share, in spite of growth in the 70's resulting from the production of intermediate goods linked to the export complex, regional incentives, and the diversification policy of the large iron ore company *Cia. Vale do Rio Doce* before it was privatised. Minas Gerais was one of the few states that kept its relative position in the industrial production of the country in the period of strong concentration in São Paulo, due to its base of mineral resources and proximity to the latter. It has acted as a complementary economy to the great industrial centre of the country, and also as a supplier of intermediate goods (steel, cement, etc.), food, mineral and cattle and agricultural raw materials. Between 1970 and 1997, its share of industrial product grow from 6.5% to 9.2%. Initially, the industry of intermediate goods expanded and more recently it has been strengthened by means of a large state government institutional apparatus which supports industrialisation through fiscal

[5] These companies have been recently privatised and there is no clear idea of what investment strategy to apply. If they decide to invest more in other regions, the petrochemical industry of Bahia will be affected.

incentives, political pressure on the federal government, and other mechanisms (Diniz, 1981). More recently, the growth of the automobile industry (Fiat) and the policy of stimulating the nearby location of suppliers (the so-called process of "mineirização") stimulated a very strong growth of metalwork and other car components in the region. Meanwhile, the geographic proximity with São Paulo has stimulated expansion in the contiguous Minas Gerais regions *Triângulo* and *Sul*, which offer an alternative to the agglomeration diseconomies of the metropolitan area of São Paulo. The industrial advancement towards the west of the state of São Paulo and its penetration into the *Triângulo* of Minas Gerais are coincident with the advance of the agricultural frontier towards the Centre-West.

The South region widened its share of national industrial production from 12% to 18.5% between 1970 and 1997. In the state of Rio Grande do Sul, three aspects explain the growth: first, an agricultural expansion with increasing production of grains, and a multiplier effect on agro-industries processing agricultural products as well as on those producing machines, equipment, and inputs [Fee (1976)]; second, the growth of capital and durable consumer goods in the area of Porto Alegre-Caxias do Sul (with an existing industrial tradition), external economies generated by industrial growth, and regional incentives [Almeida et al. (1986)]; and finally, the growth of leather and shoes industry which has benefited from the advantages of accumulated specialisation and export incentives [Lagemenn (1986)]. In the latter industry, there has been some movement in recent years toward the Northeast region, as mentioned before, but the recent decision of General Motors and Ford to locate new plants near Porto Alegre will have a favourable impact on the industrial growth of Rio Grande do Sul.

Also in the South, the state of Santa Catarina has benefited from its double industrial base: the western meat-packing industry, specialising in fowl and swine (the most developed in the country), strengthened by the growth in both the domestic market and in exports; and the traditional region of Blumenau-Joinville's diversified production of textiles, musical instruments, motors, foundry, and more recently electronic goods, which has shown significant growth. The industrial expansion of this state is mainly supported by local entrepreneurship. Santa Catarina is perhaps the Brazilian state with the largest share of industry oriented to national and international markets which is owned by national and regional capital.

The state of Paraná, also in the South, which has traditionally had its industries linked to the timber complex (including paper), has experienced a great expansion in agro-industries processing agricultural inputs (due to the exceptional quality of its lands) and agricultural production. More recently, a diversified industrial process is under way, especially in the area of Curitiba which has recently seen the location of several foreign projects as the automobile industry (Volvo) and electronic components, attracted by local incentives, amenities, and urban support of Curitiba and by its relative proximity to the metropolitan area of São Paulo. A new group of projects will begin soon in the Curitiba area. Among these the most important is a new Renault plant, with a projected capacity of 500,000 cars per year.

The process of regional development has not occurred in a linear way. In its first phase, the de-concentration movement was generalised, as mentioned before. However, we are now seeing a trend to reconcentration in the more developed areas of the country. This

reconcentration is related to technological changes and production restructuring which alter local requirements, especially with regard to knowledge-intensive activities. Furthermore, ideological and political changes regarding the role of government, free-trade policy (specially that of MERCOSUL), and political democratisation will certainly have decisive effects on the regional industrial outline in Brazil, and suggest a possible re-concentration in the Centre-South region of the country. Evidence of this is a trend to a relative reconcentration in the polygon defined by Belo Horizonte-Uberlândia-Londrina/Maringá-Porto-Alegre-Florianópolis-São José dos Campos- Belo Horizonte.

Between 1970 and 1997, the participation in industrial production of the states of Minas Gerais, São Paulo (except for its metropolitan region), Paraná, Santa Catarina, and Rio Grande do Sul is estimated to have increased from 32% to 51% (Diniz, 1993). More recent evaluations (based on a selection of relevant industrial agglomerations, understood as homogeneous microregions, with more than ten thousand industrial jobs in 1980) indicate the existence of 76 of such areas in Brazil which corresponded to 84% of industrial employment and 89% of manufacturing in the country [Diniz e Crocco (1994)].

When these areas are stratified according to the growth rate of industrial employment between 1970 and 1985, it is seen that 27 of these areas have grown below the Brazilian average, indicating stagnation or small dynamism; 12 have grown between the Brazilian average and 25% above the average: 18, between 25% and 50% above the average; and 20, with a growth above 50% of the Brazilian average (see Table 8, Map 2).

Analysing the regional distribution of the areas in Table 8, two characteristics stand out: areas with low increase are concentrated in the metropolitan areas of São Paulo, Rio de Janeiro, and Recife; and the re-agglomeration of the areas with greater dynamism has occurred in capitals or medium-sized cities in the large strip of land that goes from the central part of Minas Gerais to the Northeast of Rio Grande do Sul, including the interior of the state of São Paulo, consistent with the polygonal re-agglomeration phenomenon analysed before [Diniz e Crocco (1994)]. One can also note the relevance of the urban network, not only because of its population size, but mainly because of its modern services endowments. Out of 180 municipalities with a hundred thousand people or more in 1991, 119 were located in the strip extending from Minas Gerais to Rio Grande do Sul.

Thus, the process of macro-spatial industrial de-concentration has been halted and a new regional industrial outline in Brazil has occurred. It combines the polarisation reversal of the metropolitan area of São Paulo with a relative agglomeration in the previously mentioned polygon area. This indicates that the regions of the Northeast and North that were the target of regional development policy have not been able to sustain a distinct growth that can be translated into relevant macro-spatial change, in spite of industrial growth in the states of Bahia and Ceara.

TABLE 8
Brazil: Relevant Industrial Agglomerations*
- Growth Rate of Occupied People, 1970 - 1985

Relevant Industrial Agglomerations	Industrial Employment in 1970	Industrial Employment in 1985	Annual Average Variation
Brazil	**2.699.969**	**5.608.704**	**5,0**
Below the Brazilian Average			
Vitória de Santo Antão	12.056	13.488	0,8
Lages	8.399	9.442	0,8
Campos	12.756	14.405	0,8
Petrópolis	25.077	32.094	1,7
Rio de Janeiro	224.465	320.820	2,4
Maceió	9.358	13.447	2,4
Médio Iguaçu	7.354	10.571	2,4
Barbacena	7.030	10.190	2,5
Guarapuava	6.164	9.009	2,6
Lindóia	9.347	13.729	2,6
Conselheiro Lafaiete/Ouro Branco	11.119	16.428	2,6
Niterói	56.564	88.558	3,0
Recife	52.354	86.406	3,4
São Paulo	906.907	565.873	3,7
Timbaúba	9.182	16.331	3,9
Ponta Grossa	10.430	18.708	4,0
Santos/Cubatão	21.154	38.288	4,0
Canela/Gramado	8.671	15.741	4,1
Juiz de Fora	16.016	29.647	4,2
Furnas	7.506	13.904	4,2
Presidente Prudente	6.424	12.430	4,5
Marília	7.833	15.294	4,6
Volta Redonda	20.891	41.776	4,7
Ipatinga/Monlevade	18.743	37.666	4,8
Jundiaí	29.693	60.140	4,8
Caruaru	7.202	14.852	4,9
Aracaju	6.294	12.981	4,9
Between 25% and 50% above the average			
Cascavel/Foz do Iguaçu	7.975	16.694	5,0
Belém	14.439	30.288	5,1
Porto Alegre	109.497	230.104	5,1
Mococa	5.697	12.076	5,1
Dourados	3.551	7.572	5,2
Piraçununga/Mogi Mirim	14.759	31.748	5,2
Bauru	8.871	20.169	5,6
São José dos Campos	46.844	110.210	5,9
Pelotas/Rio Grande	9.968	9.968	5,9
Goiânia	11.757	28.015	6,0

Source: FIBGE - Industrial Census, 1970 and 1985, from Diniz e Crocco (1994).
Note: * Homogeneous microregions renamed according to the most importantcity in terms of industrial employment

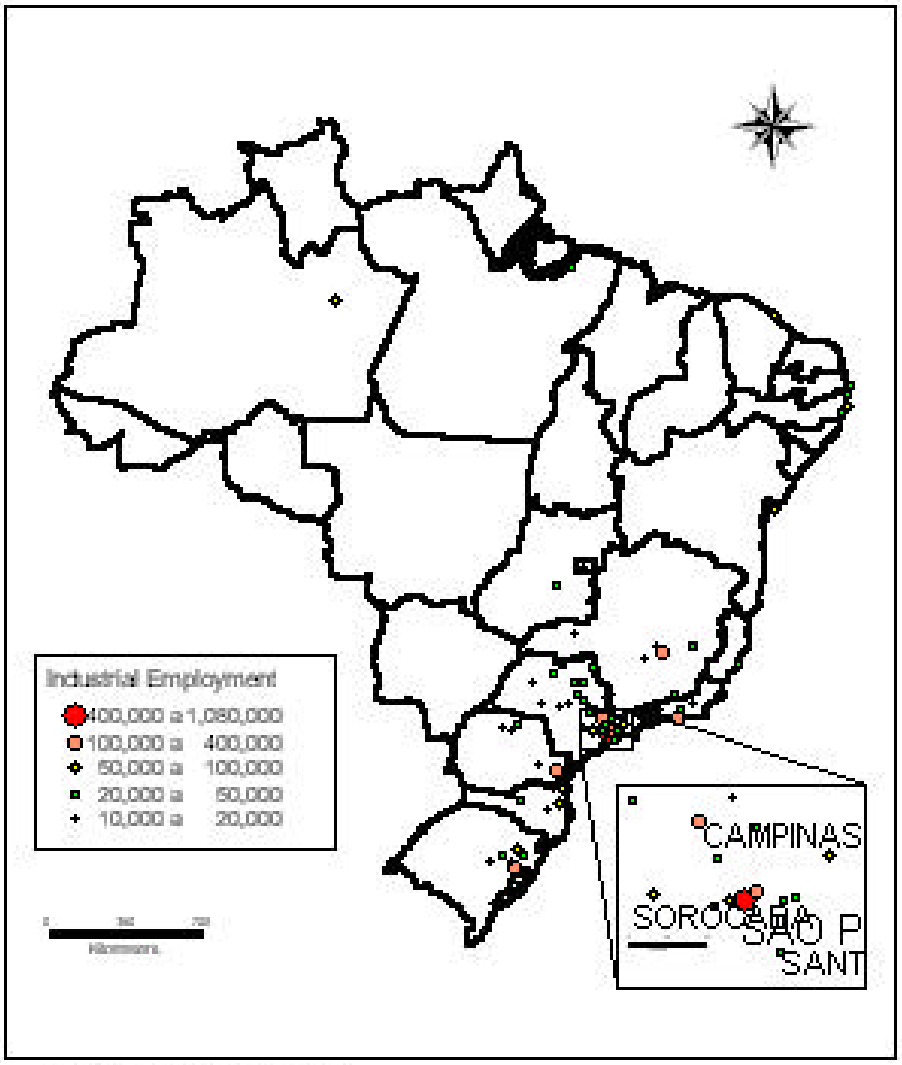
TABLE 8
Brazil: Relevant Industrial Agglomerations*
- Growth Rate of Occupied People, 1970 - 1985

(continued)

Relevant Industrial Agglomerations	Industrial Employment in 1970	Industrial Employment in 1985	Annual Average Variation
Bebedouro	5.586	13.706	6,2
Rio Claro	4.686	11.542	6,2
Between 25% and 50% above the average			
Blumenau	29.044	72.461	6,3
Piracicaba	18.684	46.619	6,3
João Pessoa	7.831	19.900	6,4
Sorocaba	34.951	89.115	6,4
Feira de Santana	3.837	9.802	6,5
Divinópolis	9.609	24.617	6,5
Campinas	71.201	183.211	6,5
Belo Horizonte	61.551	160.361	6,6
Salvador	27.560	71.929	6,6
Jaú	8.425	22.007	6,6
São Bento do Sul	10.807	28.610	6,7
Ribeirão Preto	13.728	36.690	6,8
São Jerônimo/Triunfo	4.899	13.105	6,8
Curitiba	37.888	101.434	6,8
Concórdia	9775	27162	7,1
Sete Lagoas	4955	14015	7,2
Londrina	9731	27561	7,2
Fortaleza	4900	72251	7,4
Above 50% of the average			
Araraquara	15377	45349	7,5
Santa Cruz do Sul	5287	15605	7,5
Chapecó	5740	17393	7,7
Joinville	21825	66685	7
Natal	7350	23203	7,9
Criciúma/Tubarão	11442	36457	8
Bragança Paulista	3849	12881	8,4
Uberlândia	5246	17710	8,4
Pouso Alegre	4569	15611	8,5
Lajeado	5208	17952	8,6
Caxias do Sul	23481	81564	8,7
Tatuí	3602	12927	8,9
Distrito Federal	4450	16548	9,2
Franca	9485	36277	9,4
São José do Rio Preto	11341	46332	9,8
Maringá	3499	15091	10,2
Vitória	8463	37814	10,5
Manaus	9908	60724	12,8

MAP 2

Brazil: industrial agglomerations with more than 10 thousands industrial employment, 1991



Source:RAIS-Ministry of Labor

3. TRENDS IN THE REGIONAL DISTRIBUTION OF AGRICULTURAL ACTIVITIES

The great increase of grain production since the 1970's, including that for export, shows a natural path through the South and Centre-West. The agricultural experience gained by various immigrant groups (Germans, Italians, Japanese) in these regions was a decisive base for the recent agricultural expansion. Technological change made possible the incorporation of the savannahs (flat and cheaper land) into productive activity, and the improvement of infrastructure (mainly transport) and greater physical productivity by area have made the Centre-West frontier more dynamic, transforming it into a great potential for productive expansion in the near future.

Brazilian production of the five major grains (rice, beans, maize, soy beans, and wheat) increased from an annual average of 25 million tons in the triennial period of 1968/70 to 76 million in the triennial period of 1995/97. The participation of the Centre-West in the production of such grains increased from 11% to 24% of the nation's total. While Brazilian production increased 204% in the period, that of the Centre-West increased 577%, and Mato Grosso do Sul and Mato Grosso's production significantly increased. Such a differentiated growth confirms the geographic dynamics of agriculture production and the importance of the Centre-West region in this process (see Table 9).

Soy bean production in the savannah areas of in Minas Gerais, Bahia, Piaui and Maranhão, could be considered as part of the same production dynamics of the Centre-West since the entire area is geographically integrated and presents similar natural and productive characteristics. Soy bean has been the crop with the greatest increase and its expansion towards the Centre-West is significant. In 1968/70, for an annual average production of 1,082 thousand tons, the participation of the Centre-West was of only 11 thousand tons, i.e., 1% of total national production. This participation reached an annual average of 9,789 thousand tons in the triennial period of 1995/97, corresponding to 41% of national production (see Table 10). The genetic adaptation of the soy bean to the savannahs, combined with the climatic regularity of these areas in relation to the soy producing states in the South, permits a greater physical productivity per area in a sustained way, and suggests the growth potential of this area (see Table 11).

TABLE 9
BRAZIL: Grain Production according to the Great Regions and Units of the Federation

Brazil/Regions/	1968/70		1979/81		1989/91		1992/94		1995/97	
States	(1000 t)	(%)	(1000 t)	(%)	(1000 t)	(%)	(1000 t)	(%)	(1000 t)	(%)
Rondônia	23	0,1	273	0,6	489	0,8	594	0,9	733	1,0
Acre	13	0,1	48	0,1	110	0,2	119	0,2	108	0,1
Amazonas	5	0,0	18	0,0	10	0,0	12	0,0	13	0,0
Roraima	3	0,0	35	0,1	20	0,0	37	0,1	66	0,1
Pará	127	0,5	250	0,5	452	0,8	481	0,7	702	0,9
Amapá	1	0,0	2	0,0	1	0,0	-	-	-	-
Tocantins	-	-	-	-	558	0,9	449	0,6	506	0,7
North	**172**	**0,7**	**625**	**1,4**	**1.639**	**2,8**	**1.691**	**2,4**	**2.129**	**2,8**
Maranhão	959	3,8	1.276	2,8	1.175	2,0	1.005	1,4	1.556	2,0
Piauí	209	0,8	205	0,4	633	1,1	500	0,7	833	1,1
Ceará	524	2,1	193	0,4	523	0,9	555	0,8	937	1,2
R. G. do Norte	111	0,4	19	0,0	95	0,2	103	0,1	172	0,2
Paraíba	251	1,0	104	0,2	218	0,4	145	0,2	346	0,5
Pernambuco	348	1,4	186	0,4	255	0,4	211	0,3	461	0,6
Alagoas	106	0,4	76	0,2	96	0,2	121	0,2	167	0,2
Sergipe	63	0,2	54	0,1	93	0,2	99	0,1	160	0,2
Bahia	520	2,1	539	1,2	1.029	1,7	1.558	2,2	2.213	2,9
Northeast	**3.090**	**12,3**	**2.652**	**5,8**	**4.116**	**7,0**	**4.296**	**6,2**	**6.843**	**9,0**
Minas Gerais	3.531	14,1	4.150	9,0	5.122	8,7	6.184	8,9	6.258	8,2
Espírito Santo	367	1,5	307	0,7	427	0,7	426	0,6	274	0,4
Rio de Janeiro	200	0,8	151	0,3	129	0,2	135	0,2	84	0,1
São Paulo	3.562	14,2	4.292	9,3	5.526	9,3	5.523	8,0	5.451	7,2
Southeast	**7.660**	**30,6**	**8.901**	**19,3**	**11.204**	**18,9**	**12.268**	**17,7**	**12.067**	**15,8**
Paraná	4.432	17,7	12.075	26,2	12.162	20,6	14.115	20,3	16.746	22,0
Santa Catarina	1.390	5,5	3.787	8,2	3.705	6,3	4.952	7,1	5.098	6,7
R. G. do Sul	5.607	22,4	11.373	24,7	13.032	22,0	16.827	24,3	14.959	19,6
South	**11.429**	**45,6**	**27.235**	**59,1**	**28.899**	**48,9**	**35.894**	**51,7**	**36.803**	**48,3**
M. G. do Sul	-	-	1.929	4,2	3.552	6,0	3.497	5,0	4.153	5,5
Mato Grosso	722	2,9	1.334	2,9	4.521	7,6	5.945	8,6	7.572	9,9
Goiás	1.983	7,9	3.341	7,3	5.017	8,5	5.564	8,0	6.427	8,4
Distrito Federal	6	-	28	0,1	176	0,3	209	0,3	201	0,3
Centre-West	**2.710**	**10,8**	**6.631**	**14,4**	**13.265**	**22,4**	**15.214**	**21,9**	**18.353**	**24,1**
Brazil/	**25.060**	**100,0**	**46.044**	**100,0**	**59.122**	**100,0**	**69.364**	**100,0**	**76.195**	**100,0**

Source: FIBGE

TABLE 10
Brazil: Soya Bean Production by Great Regions and Federation Units - Triennial Average

Brazil/Regions/	1968/70		1974/76		1989/91		1992/94		1995/97	
States/	(1000 t)	(%)	(1000 t)	(%)	(1000 t)	(%)	(1000 t)	(%)	(1000 t)	(%)
Rondônia	-	-	-	-	6	0,0	9	0,0	9	0,0
Acre	-	-	-	-	-	-	-	-	-	-
Amazonas	-	-	-	-	-	-	-	-	-	-
Roraima	-	-	-	-	-	-	-	-	-	-
Pará	-	-	-	-	-	-	-	-	-	-
Amapá	-	-	-	-	-	-	-	-	-	-
Tocantins	-	-	-	-	50	0,3	29	0,1	21	0,1
North	**-**	**-**	**-**	**-**	**56**	**0,3**	**38**	**0,2**	**29**	**0,1**
Maranhão	-	-	-	-	17	0,1	85	0,4	207	0,9
Piauí	-	-	-	-	0	0,0	4	0,0	28	0,1
Ceará	-	-	-	-	-	-	-	-	-	-
R. G. do Norte	-	-	-	-	-	-	-	-	-	-
Paraíba	-	-	-	-	-	-	-	-	-	-
Pernambuco	-	-	-	-	-	-	-	-	-	-
Alagoas	-	-	-	-	0	0,0	-	0,0	-	-
Sergipe	-	-	-	-	0	0,0	-	0,0	-	-
Bahia	0	-	0	0,0	414	2,1	651	2,9	928	3,9
Northeast	**0**	**-**	**0**	**0,0**	**432**	**2,2**	**740**	**3,3**	**1.163**	**4,9**
Minas Gerais	1	0,1	84	0,9	965	4,9	1.132	5,0	1.135	4,7
Espírito Santo	-	-	0	0,0	-	-	-	-	-	-
Rio de Janeiro	-	-	-	-	-	-	-	-	-	-
São Paulo	65	6,0	655	6,8	1.090	5,6	1.109	4,9	1.245	5,2
Southeast	**66**	**6,1**	**739**	**7,6**	**2.055**	**10,5**	**2.241**	**10,0**	**2.380**	**9,9**
Paraná	266	24,6	3.571	36,9	4.404	22,4	4.488	19,9	6.114	25,5
Santa Catarina	34	3,1	436	4,5	483	2,5	505	2,2	511	2,1
R. G. do Sul	705	65,2	4.555	47,1	4.943	25,2	5.922	26,3	5.108	21,3
South	**1.004**	**92,9**	**8.563**	**88,6**	**9.830**	**50,1**	**10.915**	**48,5**	**11.733**	**49,0**
M. G. do Sul	-	-	-	-	2.302	11,7	2.199	9,8	2.209	9,2
Mato Grosso	6	0,6	290	3,0	3.200	16,3	4.218	18,7	5.283	22,0
Goiás	5	0,5	74	0,8	1.657	8,4	2.053	9,1	2.219	9,3
Distrito Federal	-	-	0	0,0	101	0,5	98	0,4	79	0,3
Centre-West	**11**	**1,0**	**364**	**3,8**	**7.260**	**37,0**	**8.568**	**38,1**	**9.790**	**40,9**

Brazil/	**1.082**	**100,0**	**9.665**	**100,0**	**19.632**	**100,0**	**22.503**	**100,0**	**23.960**	**100,0**

Source: FIBGE

TABLE 11
Brazil - Physical productivity of Soya Bean by Major Producing States
1974-1997

kg./ha.

Brazil/States	Years					
	1974/76	1979/81	1984/86	1989/91	1992/94	1995/97
Maranhão	-	1.632	1.474	1.243	1.851	2.063
Bahia	-	990	1.304	1.406	1.685	2.038
Minas Gerais	1.226	1.640	1.819	1.797	2.143	2.067
São Paulo	1.744	1.814	1.886	1.967	2.110	2.193
Paraná	2.104	2.049	1.797	1.982	2.262	2.647
Santa Catarina	1.227	1.205	1.340	1.312	1.873	2.237
Rio Grande do Sul	1.484	1.311	1.355	1.408	1.927	1.743
Mato Grosso do Sul	-	1.599	1.761	1.904	2.093	2.377
Mato Grosso	1.560	1.640	2.046	2.195	2.447	2.520
Goiás	1.233	1.674	1.705	1.811	2.130	2.217
Brazil	1.077	1.577	1.634	1.753	2.120	2.232

Source: FIBGE

However, the great distance of the soybean area from major national markets and exporting seaports, implies greater costs of transport and the expansion of production in the most distant areas may be hampered. For that the Centre-West soybean to be competitive with that produced in the South, requires a lower production cost, either through higher physical productivity or lower cost per area. Since input prices are also high in more distant regions, a significantly higher physical production per area is a major requirement to assure feasibility of the frontier agriculture. Thus, transport improvement might leverage production expansion, making the area a regional alternative for production growth attracting agro-industries and contributing to change in the Brazilian macro-spatial pattern.

The role of cattle raising in the geographic de-concentration of Brazilian production and income is also worth noting. The greatest growth rate in cattle raising is seen in the Centre-West and North regions of the country. In 1960, those two regions had 12 million heads of cattle, corresponding to 21% of Brazilian bovine livestock. In 1994, the cattle of those two regions numbered 71 million heads, equivalent to 45% of the national total (see Table 12).

TABLE 12

Brazil - Cattle by Great Regions and Federation Units, 1960 - 1994

In 1,000 heads

Brazil/	Years					
Regions/States	1960	(%)	1980	(%)	1994	(%)
Rondônia	3	0,0	251	0,2	3.470	2,2
Acre	33	0,1	292	0,2	465	0,3
Amazonas	139	0,2	356	0,3	747	0,5
Roraima	166	0,3	314	0,3	286	0,2
Pará	842	1,5	2.730	2,3	7.540	4,8
Amapá	46	0,1	46	0,0	86	0,1
Tocantins	-	-	-	-	5.374	3,4
North	**1.229**	**2,2**	**3.989**	**3,4**	**17.966**	**11,4**
Maranhão	1.361	2,4	2.804	2,4	4.102	2,6
Piauí	1.126	2,0	1.556	1,3	2.054	1,3
Ceará	1.343	2,4	2.354	2,0	2.186	1,4
Rio Grande do Norte	491	0,9	896	0,8	646	0,4
Paraíba	760	1,4	1.296	1,1	975	0,6
Pernambuco	940	1,7	1.832	1,6	1.349	0,9
Alagoas	402	0,7	829	0,7	822	0,5
Sergipe	494	0,9	996	0,8	815	0,5
Bahia	4.570	8,2	8.943	7,6	9.877	6,2
Northeast	**11.489**	**20,6**	**21.506**	**18,2**	**22.825**	**14,4**
Minas Gerais	11.881	21,3	19.560	16,6	20.707	13,1
Espírito Santo	648	1,2	1.844	1,6	1.919	1,2
Rio de Janeiro	1.074	1,9	1.745	1,5	2.004	1,3
Guanabara	17	0,0	-	-	-	-
São Paulo	7.155	12,8	11.685	9,9	12.974	8,2
Southeast	**20.775**	**37,3**	**34.835**	**29,5**	**37.604**	**23,8**
Paraná	1.630	2,9	7.893	6,7	8.912	5,6
Santa Catarina	1.196	2,1	2.616	2,2	2.960	1,9
Rio Grande do Sul	8.683	15,6	13.986	11,8	14.556	9,2
South	**11.509**	**20,7**	**24.495**	**20,7**	**26.429**	**16,7**
Mato Grosso	5.631	10,1	5.243	4,4	22.244	14,1
Mato Grosso do Sul	-	-	11.863	10,0	12.654	8,0
Goiás	4.848	8,7	16.090	13,6	18.397	11,6
Distrito Federal	16	0,0	66	0,1	124	0,1
Centre-West	**10.496**	**18,8**	**33.261**	**28,2**	**53.420**	**33,8**
Brazil	**55.693**	**100,0**	**118.086**	**100,0**	**158.243**	**100,0**

Source: FIBGE

4. MINERAL FRONTIER

Significant regional changes have also occurred in mineral production. Limited at first, mining was widened and diversified after the 1950's in response to the growth of domestic demand due the expansion and diversification of the Brazilian industrial park, the production increase by heavy industry, and the increase of iron ore and manganese exports. In this period, the state of Minas Gerais increased its relative participation (although it did not produce coal, salt, and petroleum, and lost importance as a manganese producer, with the beginning of production in Amapá). However, since the 1970's, the traditional leadership of Minas Gerais as mineral extractive producer became threatened by the establishment of new mineral frontiers in the North, Centre-West, and even Northeast and other areas of the country.

The distribution of recent investments in mining suggests potential changes in the regional distribution of production. Although a direct relation can not be established between participation in investment and production because of differences in the capital-output relation among the several minerals and characteristics of mineral deposits, regional participation in investment is an indicator of the future geographic trend of production.

The state of Pará is estimated to have absorbed more than 50% of investment in the mineral sector in the 1980's. It will be competing with Minas Gerais as the major mining state in the country in the medium and long run, due to its iron, manganese, copper, tin, bauxite, and gold in the region of Carajás, and bauxite, kaolin, and gold in other regions of that state. Other competitors are the states of Goiás (due to its reserves of asbestos, tin, phosphate, and niobium) and Bahia (with a diversified list of minerals).

De-concentration of investment in mining will undoubtedly reinforce the trend of regional economic de-concentration. There is no guarantee, however, that it will produce the desired effects in terms of industrial location. Unlike Minas Gerais, which due to its privileged location managed to develop reasonably strong and dynamic inter-sectoral relationships over time (mainly in the steel-metallurgy-mechanics complex and transport material), recent mining centres show a risk of becoming mere exporting enclaves with no positive effects on either industrial location or growth of regional income. Nevertheless, mineral production has a great de-concentrating potential, as has been shown in the case of Minas Gerais where it offset economic exhaustion at time when industrial expansion and resulting concentration were accelerating in São Paulo.

Agriculture and mining are inducing the establishment of activities related to the processing of agricultural and mining inputs, and the supply of industrial inputs and capital goods, which tend to locate near the source of raw material or potential market. This has amplified the impact of activities based on natural resources in regional de-concentration. Despite structural changes in the economy, resource-oriented industries (metallurgy, cement, fertilisers, agro-industries, etc.) still have significant weight. A great share of the industrial

growth of the country during the *economic miracles* of the 1950's and 1970's, was based in these industries. They are estimated to still account for more than one third of the industrial production in the country. Although these industries tend to lose relative importance as the productive structure changes and technological change allows productivity increase [intensifying the use of lands closer to the Southeast, decreasing the demand for mineral inputs and reducing the movement of frontier incorporation as pointed by Sawyer (1984) and Haddad (1988)], the natural resource frontier is still relevant in the Brazilian economy. This potential should continue to be explored, especially with regard to current economic and social development. It can also contribute to expanding Brazilian exports, due to potential competitiveness in this area.

5. THE ROLE OF INFRASTRUCTURE IN REGIONAL DEVELOPMENT

In recent decades, an extraordinary effort has been made in terms of improvements \in infrastructure, with the aim of encouraging economic growth in lagging or empty regions and integrating them to the national economy. The capacity of electric power generation increased from 11 million to 37 million kW between 1970 and 1980 and to approximately 60 million kW in 1995, almost all from state-owned companies that recently have been privatised. The paved road network (federal and state) increased from 2,000 km in 1955 to 50,000 km in 1970 and 150,000 km in 1996. The telecommunication system , which was privately owned and operated in poor condition until the end of the 1950's, was nationalised, amplified, and modernised, permitting the integration of almost all Brazilian cities, including those in the Amazon region[6]. In 1998 the entire telecommunication system was divided into regional systems and privatised. The number of installed lines and mobile phones increased from 1,42 million in 1972 to 5,09 million in 1980 and 14.9 million in 1995 [Villela (1992), FIBGE, 1997].

From the regional point of view, it is the transport system which stands out for its importance in expanding economic markets, facilitating the incorporation of the frontier, and determining the direction of flows of goods and services and of regional development. Thus, economic and political decisions regarding expansion and modernisation of the road and rail systems will be decisive in regional terms in Brazil.

In global terms, the issue of transport must be viewed from three principal dimensions: interregional integration, linking the traffic of merchandise and people within a country; great bulk transports between agricultural and mineral frontiers; and seaports and a seaport system.

[6] The geopolitical concern of the military rule has definitely contributed to the infrastructure expansion of the Amazon region [Silva (1978)].

A) TRANSPORT AND INTERREGIONAL INTEGRATION

The road system has greatly contributed to interregional flows. Brazilian market unification developed throughout this century, but it was consolidated only in recent decades with the construction and enlargement of the road network[7] from the 1950's with the increase in number and improvement of vehicles[8] and development and modernisation of communications. After a severe economic recession in the first half of the sixties, economic growth resumed in 1967, as Brazil entered a period known as "the economic miracle." At this time, inter-company competition became a factor at the regional level. Supported by a minimum level of public infrastructure, a certain market potential, and regional and sectoral incentives, several companies sought new natural resources, new markets, and the removal of barriers to entry. Guimarães (1986) describes the passage from commercial integration to productive integration by showing the growth of great national companies in almost all regions of the country and the increase of inter-industry trade [Redwood III (1984); Oliveira (1977); Cano (1977); and Diniz (1987)][9].

With market unification, the possibility that Brazilian regions or states could construct an integrated industrial structure as was done in São Paulo seems now out of question. São Paulo was industrialised first and alone, when the economy of Rio de Janeiro was in decay and the other regions were lagging [Cano (1977; Leopoldi (1984)]. The new regions will have to compete with each other for the national market, and success will be related to their relative advantages. Increased competition has led to a relative specialisation in each region in products in which the region (or state) has a competitive advantage. Changes in productive structure resulting from changes in technology and in the composition of demand can be expected to alter the relative positions of the regions, according to their specific conditions and the location requirements of different sectors.

In recent decades, further improvement of the road system has focused on the development of the existing network and an ambitious plan to double several of the major trunk roads, which will have a decisive effect on the integration of Brazilian regions. In the latter project are worth mentioning the doubling of the following roadways: BR-381, a federal road linking São Paulo to Belo Horizonte; BR - 116, in the southern section, linking São Paulo to Curitiba and Porto Alegre; BR - 376, through the interior of the country and northward, in the section of

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[7] The Brazilian railway system never performed this role. In addition to its short extension (38,000 km at the utmost), it was not integrated and basically linked each exporting region to its respective seaport, using distinct railway gauges. River navigation has not been developed and the main rivers are not located in the major economic regions.

[8] The Brazilian automobile industry started its production in 1960 (until then there were only car assembling companies). The great production expansion, however, occurred from the end of that decade with the recovery of Brazilian economic growth. Between 1967 and 1973, production grew from 200,000 vehicles per year to 1.0 million, stabilising during the late 1970s and 1980s and recovering expansion since. In 1997, car production in Brazil reached almost 2 million. Because of the many new projected car plants in construction, it is expected that the car industry will reach 4 million by the year 2004. The total number of vehicles increased from 400,000 units in 1955 to approximately 25 million in 1995.

[9] Such a process could be compared with the international movement of capitals or the very creation and occupation of the American market in the second half of the nineteenth century.

Volta Redonda - Além Paraíba - Salvador; BR - 101, in the section of Curitiba-Florianópolis; BR - 262 and BR - 381 linking Belo Horizonte to Ipatinga; and BR - 040 and BR - 050 in the direction of Brasília - the delta of the Triângulo region down to the São Paulo border.

The doubling of these roadways, some of them already in process, will have a signicant effect on the restructuring of industrial space in Brazil, encouraging the polarisation reversal of the metropolitan area of São Paulo and the industrial de-concentration within the great macroregion extending from the central region of Minas Gerais up to the Northeast of Rio Grande do Sul, including the coastal strip of Paraná and Santa Catarina. Furthermore, given the existence of great road trunks linking the coast and the metropolitan area of São Paulo with the Northeast and west of that state, going towards northern Paraná, Mato Grosso do Sul and the Triângulo region in Minas Gerais, the largest and most developed macroregion of the country would be completed, opening the possibility of industrial expansion based on efficiency, compatibility, and competitiveness. At the same time, this will allow a better distribution of the urban-industrial network, avoiding economic and population concentration in a few places and thus reduce the economic and social costs of concentration.

B) GREAT EXPORTING TRUNKS; RAILWAY AND SEAPORTS

In addition to the flow of merchandise coming from the Centre-South region of Brazil, the dynamics of the agricultural frontier of the Brazilian Centre-West, the potential of grain production, and the demand of both the domestic and export markets require improvement in the long distance transport system. Given the expected cargo volume and distances, the railway system is the best alternative. Thus, decisions on priority rail routes will decisively affect flow directions and the expected regional impact. Since the South has largely exhausted its extensive frontiers and does not have an expansion capacity comparable to that of the Centre-West, and it already has a functioning transport network and port system, the most important decisions will be related to alternative means of linking the Centre-West to exporting seaports. A study prepared by the engineering firm *RP Engenheiros Associados* presents three principal options for channelling flows to/from the harbours of Santos-São Sebastião, Tubarão, and Itaqui [RP (n/d)], with the possibility of combining iron ore export and petroleum import. The first alternative is a railway system linking Mato Grosso to the state of São Paulo through the project called *Ferronorte*. The second would link Mato Grosso to Tubarão, through Minas Gerais and Espírito Santo, as part of the project called *Corredor Centro-Leste* (Centre-East Corridor). The third, called *Corredor Norte* (North Corridor) would link Mato Grosso to the seaport of Itaqui through Carajás and from there to São Luiz.

The improvement of the transport system would enable the expansion of the agricultural frontier and increase competitiveness of Brazilian output by reducing land transport and harbour costs.

6. EXPLICIT REGIONAL POLICY AND THE SYSTEM OF FISCAL INCENTIVES

Brazil has promoted a series of regional development policies. The central element of such policies has been the use of a set of fiscal incentives, aiming at a cheaper capital stock, reduced tax burden, or even easier imports.

Fiscal incentives have existed since the beginning of this century, but they have been expanded and generalised since the late sixties. The most famous examples are those of SUDENE for the Brazilian Northeast and those of SUDAM and SUFRAMA for the Amazon region and Manaus. There are also special incentives and subsidies for reforesting, tourism, exports, agricultural credits, minimum prices, fuels, among others. Such an avalanche of subsidies and incentives has cheapened capital stock, and reinforced the frontier expansion[10].

When the four main incentives for the North and Northeast regions are considered, their weight and relevance can be observed (see Table 13), although their rationale may be questionable.

Besides these incentives, it is also worth noting the mechanism of resource transfers from the federal government, called the *Fundo de Participação de Estatos e Municípios e de Transferências Negociadas* (Fund for the Participation of States and Municipalities and Negotiated Transfers) which represents approximately 4% of annual GDP. The North and Northeast regions alone receive approximately 50% of these transfers, or 2% of the national GDP in the 1980s [Diniz e Oliveira (1992)].

A system of incentives for the Manaus free-trade zone (ZFM), based on tax waivers, made possible the building of the industrial pole of Manaus. This region specialises in consumption electronics valued at US$ 9 billion in 1990; the associated tax waiver was estimated to be US$ 2.4 billion. The opening of the Brazilian economy provoked a deep crisis in the Manaus ZFM, decreasing sales by approximately 50% between 1990 and 1992, but a recovery has subsequently occurred. The cost of maintaining the ZFM, and its artificiality, casts doubt on the feasibility of its continuance. The opening to international trade and the end of fiscal incentives by the year 2013 will provoke a deep crisis in the industrial district of Manaus.

[10] There are several evaluations of the meaning, cost, and results of such incentives from the viewpoint of their regional effects and criticism on their effects predominate [Oliveira (1977); Cavalcanti et al. (1981); Diniz (1981)].

TABLE 13

Brazil - Major Fiscal Incentives for the North and Northeast Regions

1962 - 1992

(in thousands US$ 1992)

Year	34/18 Finor*	Law 4126, Law 5174 and Finan**	Pin***	Proterra****	Constitutional Fund
1962	121	13			
1963	91	21			
1965	228	50			
1966	718	126			
1967	882	211			
1968	893	269			
1969	1068	340			
1970	1092	403			
1971	799	280			
1972	688	208			
1973	799	216			
1974	712	239	731	488	
1975	767	209	760	507	
1976	491	156	697	465	
1977	515	183	769	531	
1978	455	201	796	531	
1979	314	175	628		
1980	236	146	504	336	
1981	268	169	621	414	
1982	201	206	640	427	
1983	351	111	368	245	
1984	295	81	289	193	
1985	310	79	288	192	
1986	526	229	558	372	
1987	488				
1988	311				
1989	276				465
1990	370				935
1991	221				624
1992	325				550
Total	**14811**	**4321**	**7649**	**4701**	**2574**

Source: * - BNB - Demec (Bank for the Brazilian Northeast).

** - Mahar (1978), from 1963 to 1974; Anuario Economico Fiscal (Economic and Fiscal Yearbook).

*** - Economic and Fiscal Yearbook.

**** - Boletim Mensal do Banco Central (Monthly Bulletin of the Central Bank).

Note: Deflated by the wholesale price index of the USA.

Finally, the Federal Constitution of 1988 created a special fund called the *Fundo Constitucional para o Desenvolvimento das Regiões Norte, Nordeste e Centro-Oeste* (Constitutional Fund for the Development of the North, Northeast, and Centre-West Regions), corresponding to 3% of the revenues from the income and industrialised products taxes whose values began to be calculated in 1989 (see Table 13). And there are other funds benefiting specific sectors through the *Fiset*, as well as incentives to exports and subsidised credit scattered all over the country.

Although the volume of regional incentives is considerable, their effects have been shown to be small and of negligible importance.

Complimenting the system of federal fiscal incentives, state incentives have also been used since the end of the sixties (especially the exemption of ICM tax, a sales and services tax, similar to value-added tax; donation of lots of land; and even financial contribution via share holding) in several states that were also benefiting from federal incentives designed for the North and Northeast. In recent years, most states have increased fiscal incentives in an attempt to attract new investment. This has become known as the "Fiscal War", due to the aggressiveness of the states and the amount of resources involved.

As mentioned previously, Brazil's constitutional structure, its territorial dimensions, and the economic and social inequalities between regions require governmental action on regional issues. However, it is necessary to establish clear and explicit guidelines, criteria, and priorities in allocating resources. Trafficking of administrative privilege and corruption, as for example has occurred in the *industria da seca* (drought industry), require stern action from several governmental agencies.

7. THE IMPACT OF FREE-TRADE POLICY AND MERCOSUL

Recent changes in economic policy, occurring in accordance with globalisation of the world economy and as a result of the free-trade policy recently adopted in the Brazilian economy, will have a differentiated regional effect.

First, given the dimensions of its territory, population, and productive capacity, the country will not reach levels of free-trade and trade integration similar to those countries of smaller dimensions, such as the European countries or the small and recently industrialised Asian countries. Brazil's structural conditions mean that its economic growth primarily depend on its domestic market.

Secondly, changes in external trade policy will reinforce the relative concentration of industrial production in the most industrialised area of the country. This area has the best conditions to improve efficiency and competitiveness in the international market since more than 80% of the Brazilian exports come from the Centre-South region (Table 14). The

opening to external markets and domestic market integration have contributed to the reinforcement of regional specialisation (*e.g.*: shoes in Rio Grande do Sul; meat-packing products in Santa Catarina; machinery and equipment, orange juice and cars in Sao Paulo; cars and metalwork in Minas Gerais). On the other hand, the process of industrial de-concentration of the Sao Paulo metropolitan region, and improvement of location conditions in the large macroregion rangeing from the centre of Minais Gerais to the Northeast of Rio Grande do Sul, the opening to external markets should reinforce the latter's development. (This macroregion saw its participation in the international trade fall from 11.5% to 9.3% between 1980 and 1995, since it did not find new production alternatives with which to compete in international trade.)

Finally, the external opening and the export growth of grains, minerals and their derivatives should contribute to the expansion of the agricultural and mineral frontiers, improving the process of de-concentration of these activities to Centre-West and North regions. In this regard, it is possible to forecast some effects of Mercosul on the regional development of Brazil. The four countries that form the Mercosul are currently increasing their trade and investment activities. Considering the geographical position of the three Brazilian partners, this intensification should have a differentiated effect on the Brazil economy, from the regional point of view. The trade between Brazil and the other three countries increased by a multiple of 5 between 1990 and 1997, rising from US$ 3.6 billion to US$ 18.7 billion (Table 15).

In the current trade structure, agricultural products, textiles, leather and oil represent the bulk of Brazilian imports, whereas industrial goods and basic inputs predominate in Brazilian exports. Thus, the improvement of trade between Brazil and Mercosul could be expected to have two effects on the Brazilian economy. First, it will facilitate the exporting of industrialised goods, with positive effects on the exports of Sao Paulo, Minas Gerais, Parana, Santa Catarina and Rio Grande do Sul. Secondly, it will harm agricultural and agro-industrial production, particularly for grains and fruits, with negative effects on the Southern states and even on Minas Gerais for dairy products.

On the other hand, Mercosul integration opens cross-investment and joint investment opportunities. In Brazil, new enterprises have been established in the states of Sao Paulo, Parana, Santa Catarina and Rio Grande do Sul, reinforcing industrial growth and productive integration in this region.

TABLE 14
Exports per regions and states and growth
1980 - 1995

mil. US$ 1995

Regions and States	1980	1980 %	1995	1995 %	Yearly growth rate
NORTH	**1.101**	**3,0**	**2.427**	**5,3**	**5,4**
RONDONIA	16	0,0	38	0,1	5,7
ACRE	0	0,0	n.a.	-	n.a.
AMAZONAS	142	0,4	138	0,3	-0,2
RORAIMA	7	0,0	4	0,0	-3,3
PARA	803	2,2	2.181	4,8	6,9
AMAPA	133	0,4	66	0,1	-4,6
TOCANTINS	-	-	0	0,0	-
NORTHEAST	**4.291**	**11,5**	**4.238**	**9,3**	**-0,1**
MARANHAO	22	0,1	671	1,5	25,7
PIAUI	33	0,1	67	0,1	4,8
CEARA	289	0,8	352	0,8	1,3
RG NORTE	102	0,3	79	0,2	-1,6
PARAIBA	88	0,2	86	0,2	-0,2
PERNAMBUCO	887	2,4	574	1,3	-2,9
ALAGOAS	790	2,1	468	1,0	-3,4
SERGIPE	20	0,1	22	0,0	0,6
BAHIA	2.060	5,5	1.919	4,2	-0,5
SOUTHEAST	**22.511**	**60,6**	**26.616**	**58,3**	**1,1**
MINAS GERAIS	3.848	10,4	5.861	12,8	2,8
ESPIRITO SANTO	1.666	4,5	2.749	6,0	3,4
RIO DE JANEIRO	2.273	6,1	2.058	4,5	-0,7
SÃO PAULO	14.724	39,6	15.948	34,9	0,5
SOUTH	**9.143**	**24,6**	**11.381**	**24,9**	**1,5**
PARANA	3.690	9,9	3.547	7,8	-0,2
SANTA CATARINA	1.587	4,3	2.652	5,8	3,5
RG SUL	3.866	10,4	5.182	11,4	2,0
CENTRE-WEST	**117**	**0,3**	**987**	**2,2**	**15,3**
MT SUL	19	0,1	305	0,7	20,5
MATO GROSSO	51	0,1	426	0,9	15,3
GOIAS	46	0,1	249	0,5	11,9
DISTRITO FEDERAL	1	0,0	7	0,0	16,5
BRAZIL (*)	**37.163**	**100,0**	**45.649**	**100,0**	**1,4**

Source: Ministry of Commerce and Industry
(*) Data deflated by the US CPI, source: Conjunctura Economics, Septembre 1996.

TABLE 15
Mercosul - Trade between Brazil and Argentina, Paraguay, and Uruguay in 1980, 1990 and 1997

in mil. US$

Country	Years					
	1980		1990		1997	
	Exp.	Imp.	Exp.	Imp.	Exp.	Imp.
Argentina	1.092	757	645	1.400	6.767	8.216
Paraguay	409	92	380	333	1.406	532
Uruguay	311	193	295	587	870	981
Total	**1.811**	**1.041**	**1.320**	**2.319**	**9.043**	**9.729**

Source: Secex

8. TECHNOLOGICAL CHANGES AND TRENDS TOWARDS INDUSTRIAL REAGGLOMERATION

Brazil's industrial growth and relative de-concentration during the 1970's occurred within the existing industrial pattern, *i.e*. with a great expansion of basic industries that were based on natural resources and consumer durable goods.

Nowadays, the opposite occurs in the industrialised countries. Technological changes induce the expansion of sectors strongly sustained by science and technology, with a reduced or minor demand for natural resources. The location decisions of these sectors are linked to the presence of the following resources: institutions of higher education and research centres; a professional labour market; geographically articulated industrial relations; ease of access; educational and cultural base; business environment; concentration of research resources, among others [Markusen et al. (1986)]. Although these resources may be found in scattered locations, they tend to be found in regions with great urban agglomerations. The few locations with pre-existing advantages tend to widen them even more, since the increase of high technology activities acts as a powerful agglomerative force [Scott e Storper (1986)].

In this sense, the relevance of technological parks for industrial development in general and for regional growth in industrialised countries has been emphasised in recent literature. [De Mattos (1990); NIT (1988); Seminário (1987); Masser (1990)].

Most of the recent analysis starts by acknowledging the restructuring of the international productive system with the emergence of new sectors. These new sectors are identified as industries with high technology, characterising a new industrial revolution and a new expansive cycle of long duration in the analytical tradition of Kontratief and Schumpeter.

To what extent would this concept fit the Brazilian case? In spite of the relative delay of Brazilian technology in relation to the industrialised countries, several planned actions and anticipated circumstances have come to pass. There are fifteen cites with some experience with technological poles, although only a few may be considered successful or with a development potential [NIT (1988); Medeiros (1992)]. Among these are the following: Campinas, São Carlos and São José dos Campos, in the state of São Paulo; Santa Rita do Sapucaí in the state of Minas Gerais; Florianópolis, in Santa Catarina; and Porto Alegre in Rio Grande do Sul. Campina Grande, in the state of Paraíba, has potential, but the results do not yet permit a conclusive evaluation due to the city's economic isolation and the lack of professional and scientific integration with more industrialised regions of the country. The case of central Minas Gerais is a special situation. Although it possess an important and traditional university and research base in the areas of mineralogy and metallurgy, the state government demobilised several research and planning agencies exposing the region's technological future to risk [Diniz (1988)].

For Brazil as a whole, the previous industrial concentration and inequality in research resources and research potential hamper industrial de-concentration towards poorer or empty regions. Thus, without doubt, the best conditions for locating high technology activities continue to be found predominantly in the state of São Paulo and secondarily in the corridor going from Belo Horizonte to Porto Alegre[11].Thus, any attempt to recover poor and lagging regions, and to stimulate development in empty ones, will require the mounting of a specific research and development base for these regions as one of the basic instruments.

9. CONCLUSIONS

The combined result of agglomeration economies, increasing integration of the national market, free-trade policies and the effects of Mercosul, regional inequality in research expenditure, concentration of professional labour markets and income tend to reinforce industrial growth in the region going from Belo Horizonte to Porto Alegre. This region, comprising the states of Minas Gerais, Paraná, Santa Catarina, Rio Grande do Sul, and the state of São Paulo minus its metropolitan area, has enhanced its participation in the industrial production of the country from 33% to 51% between 1970 and 1995. This shows that polarisation reversal in the metropolitan area of São Paulo, which has surely occurred, has been compatible with agglomeration in this very region.

Although a relative industrial de-concentration occurred in the last twenty years, several factors suggest a weakening in this trend , at least in its speed and direction. First, in the 1980's and in the beginning of the 1990's, the Brazilian economy underwent a serious crisis.

[11] The city of Rio de Janeiro is a special case for analysis. Although it possesses traditional centres for higher education and research in addition to being the site of important corporations, specially state-owned ones, the local economy is decaying and does not encourage industrial location among other reasons of political and social nature.

From an average annual growth of 9% in the 1970's, overall industrial growth did not total 10% for the entire following decade. In the Brazilian economy, regional changes in industry are fundamentally due to new investment and not to relocation of existing plants, so the crisis broke or froze regional changes in production. Secondly, ongoing technological and structural changes seem to hamper macro-spatial de-concentration, by re-concentrating modern activities in the most developed area of the country.

Third, the current general crisis of the Brazilian economy has led to a reduction of direct government investment in infrastructure construction, which surely will harm industrial de-concentration. Furthermore, economic policy guidelines, including free-trade policy, privatisation, and the emergence of Mercosul, will tend to benefit the most developed region.

Fourth, the most important structural aspect for analysis in the Brazilian regional issue is the distribution of regional and personal income. Although the population of the country was 157 million people in 1996, the size of the domestic market is still small compared to those of industrialised countries because of the extremely low average income and the high concentration of wealth. In these terms, the Brazilian domestic market is yet to be constructed. Thus, the regional and personal distribution of income is a major obstacle to an effective regional de-concentration of industry in Brazil. In addition to structural distribution difficulties that stem from the need for changes in the productive structure, there is also a recurring political and ideological battle over the accomplishment of such an important policy, which would imply policy changes regarding public expenditures, the distribution of the tax burden, and the property legal system.

In spite of all of this, the potential of the agricultural and mineral frontiers suggests that they may be successful in stimulating development in the Centre-West and North regions, a possible macro-spatial alternative for de-concentration of a set of activities.

At last, some Brazilian regions, especially the Northeast, are still relatively behind, in spite of differentiated growth occurring in states within these regions, as is the case of Bahia and Ceara. The economic expansion of these backward regions in an integrated and increasingly competitive market will only be successful if it is linked to projects compatible with the logic of the overall economic growth of the country, emphasising the relevance of pro-active policies.

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