



**THE TERTIARY SECTOR
AND REGIONAL
INEQUALITY IN BRAZIL**

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Abstract - *This paper analyses the role of tertiary activities in regional inequality in Brazil, considering both concentration and per capita income inequality. The estimated indicators reveal that for the most sophisticated sub-sectors, the richer regions are not only above average in terms of competitiveness, but are widening the gap to poor regions over time. The analysis indicates that spatial concentration and growth are not associated, in general. Regressions were estimated between per capita income growth and initial income levels, indicating that only a sub-set of activities presented regional income convergence. By correlating convergence with concentration and concentration changes, only very weak associations were found.*

Key-words - TERTIARY SECTOR, REGIONAL COMPETITIVENESS, REGIONAL INEQUALITY, CONVERGENCE IN TERTIARY ACTIVITIES.

JEL Classification: R100, R110, R120.

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1. INTRODUCTION

The economic evolution of the world determined an increasing importance for tertiary activities. This was particularly important in the last decades, in which globalization, economic restructuring and many other processes have accelerated the rhythm of urbanization and tertiarization of economic activities. For less developed countries, this process is even more intense, given their late entrance into the globalization process and the lower level of tertiarization they started with. In the case of Brazil, tertiary activities accounted for less than 50% of GDP in the early 80s, and 57% in the first years of the XXI Century¹. Considering employment, the growing importance of tertiary activities is even more impressive: from 51% of total employment in Brazil in 1980 to an impressive 65% in 2001. Similar situations were observed in Spain (Yserte, 2002), Italy (Evangelista and Sirilli, 1998), Germany (Ellger, 1997; Kaiser, 2002), USA (Hammond and Thompson, 2001) and UK (Marshall et al., 1987).

It seems, thus, that an important structural modification is taking place at a rapid pace, especially in less developed countries, and certainly in the Brazilian case. Such changes might have implications in terms of regional concentration and regional economic inequality within countries. In this paper, we deal with tertiary activities in Brazil considering regional concentration and convergence. In the first section, we present some theoretical considerations about the role of tertiary activities. Then, we present some regional concentration and competitiveness indicators in commerce and services for different Brazilian macro regions, and analyze their evolution over time. We then move to a more detailed sectoral disaggregation and consider the evolution of these activities across Brazilian states over the last two decades. We finish by estimating convergence regressions, and analyzing the association of convergence to growth, spatial concentration levels and variations in spatial concentration.

2. TERTIARY ACTIVITIES AND REGIONAL CONCENTRATION: THEORETICAL CONSIDERATIONS

The growing importance of tertiary activities called the attention of many scholars since long ago, although the sector as a whole received comparatively less importance than manufacturing, for example. One line of reasoning identifies tertiary activities as superior goods, that is, goods with high income-elasticity. As income increases, demand for such activities tends to grow faster than income, thus increasing their share in GDP. Kravis et al. (1983) and Gutierrez (1993) found no evidence in favor of this interpretation. A second possible explanation is the so-

¹ Source: IBGE www.ibge.gov.br, Contas Nacionais.

called "cost disease" (Baumol, 1967), according to which tertiary activities present lower-than-average productivity growth, given the technological specificities involved. This leads to cost increases, which have to be borne by customers, for such activities find no substitutes in consumption, leading to an increasing share in GDP. Thus, the increasing share is not a result of a greater preference of society for such activities, as in the previous explanation, but rather an inefficiency problem. Baumol et al. (1986) found evidence supporting the "cost disease" hypothesis for different countries; Mello et al. (1998) found inconclusive evidence for Brazil, suggesting that for less developed countries the hypothesis would be unrealistic. A third explanation points to the increasing importance of intermediate services, partially related to structural changes in manufacturing activities, which determined increases in demand for some specialized services. Gershuny (1987), Momigliano and Siniscalco (1986) and Gutierrez (1993) have discussed the different roles of services to firms and to households in this process; Flores and Santos (1995) indicate that intermediate services grew above average in Brazil in the 70s.

The above explanations refer to the importance of tertiary activities in the economy as a whole. Given the regional focus of this study, it is important to explore the spatial aspects involved. Within the tertiary sector, important technological and organizational changes have taken place. Even in traditional activities within the sector, such as restaurants, drugstores, supermarkets, etc., a more capital-intensive technology and a better-qualified labor force is required. This brings an interesting spatial bias, for poor regions within countries tend to lack this kind of newly demanded factors. In fact, Silveira-Neto and Azzoni (2000, 2001), for the Brazilian case, and Yserte (2002), for the Spanish case, indicated that tertiary activities have important influence on regional divergence.

The recent changes in tertiary activities might lead to increasing interregional inequality. On the other hand, these are high income-elasticity sectors, and their growth is expected to happen in rich regions first and in poorer regions later. This is exemplified in Rubalcaba and Cago (2003), who tested different explanatory hypotheses for service sectors performance. The authors show that the influence of locational factors varies in great deal across types of sector, region and country, but that factors such as income, density and labor qualification are always important. Interestingly enough, the tertiary sector receives very little attention from regional scientists, as compared to agriculture and manufacturing². This might be due to its heterogeneity and to the lack of data sources.

3. REGIONAL CONCENTRATION IN BRAZIL

Brazil is a country with a large territory, spreading in the North-South direction from a small tip in the Northern hemisphere, going along the interval

² In the case of Brazil, Mello et al. (1998), Kon (1999, 2004 and 2005) and Menezes and Carrera-Fernandes (1998) are exceptions.

between the Equator Line and the Tropic of Capricorn line, and reaching large subtropical areas in the South; in the East-West direction, distances are also large. It is thus expected that it presents regional disparities, of which Table 1 presents some indicators. Considering population, the largest regions are the Northeast and the Southeast. These are the places where most of the regional problem in Brazil is located. In terms of the share in national GDP, the Northeast region accounts for only 13.1% and hosts 28.1% of population; the richer Southeast region accounts for 57.1% of GDP and 42.6% of population. In terms of per capita income, an average inhabitant of the Northeastern region gets only 0.47 of the national average; a citizen of the Southeast, 1.34 times. For the two extreme states, the poorest Piauí and the richest São Paulo, the distances are even larger: 0.28 of the national per capita income in the first, and 1.5 times in the latter. The comparison between 1939 – the first year for which data is available – and 2001 – the most recent available information – indicates that differences grew in time. The poorest region lost 3.8 points of percentage in its participation in national GDP, and saw its distance to the national per capita average decrease slightly; in the case of the poorest state Piauí, the decrease was impressive, from 0.43 to 0.28 of the national average. It is true that the rich Southeast also lost participation, but still kept a very large share.

The concentration varies across sectors. In manufacturing, for example, the state of São Paulo alone hosted 42% of sectoral GDP in 2001; for tertiary activities, the state of São Paulo accounted for 29% of commercial establishments in the year 2000, and for 30% of national employment, 38% of total wage payments and 33% of total net revenue. The remaining of the Southeast region, to which São Paulo state belongs, accounted for 22% of establishments, 23% of employment and 22% of the wage bill and net revenue. For services, concentration is even higher for all variables.

Table n° 1: Population and income in Brazilian regions

Region	Share of National Territory (%)	Share of National Population (%)		Share of National Income %		Per capita income in relation to national average	
		1940	2000	1939	2001	1939	2001
North	45.3	3.5	7.6	20.7	4.7	0.75	0.62
Northeast	18.3	35.0	28.1	16.9	13.1	0.48	0.47
<i>Piauí State</i>	2.9	2.0	1.7	00.9	0.5	0.43	0.28
Southeast	10.9	44.5	42.6	63.0	57.1	1.41	1.34
<i>São Paulo State</i>	2.9	17.5	21.8	31.3	33.4	1.80	1.53
South	6.8	13.9	14.8	15.3	17.8	1.11	1.21
Center-West	18.9	3.1	6.8	20.1	7.2	0.70	1.04*

* Influenced by the creation of Brasília, the nation's capital, in the early 60's.

3.1. Regional competitiveness indicators in tertiary activities

The spatial concentration described above is the result of private³ investment decisions made in the past. Concentration will only diminish if decision makers prefer to locate in areas with smaller shares, which will only happen if profitability in such areas is higher than in the traditional areas of concentration. In other words, concentration will diminish if areas with smaller shares in GDP become more competitive. In this section, some competitiveness indicators are calculated, in order to assess how different parts of Brazilian territory are positioned. In order to provide information on levels and on trends, two moments in time are considered. We take census data for 1975 and 1980 (Commerce and Services censuses, IBGE) and comprehensive surveys covering the years 1998-2000 (Pesquisa Anual do Comércio and Pesquisa Anual de Serviços, IBGE). These two moments were chosen mainly by data availability, but they are very interesting for the analysis, because they cover a period starting before globalization and all the structural modifications that took place in the world's economy recently, in Brazil especially. We use averages of these years, in order to avoid unwanted oscillations due to sample sizes⁴. For the sake of simplicity, we call them "Late 70s" and "Late 90s". Three rough indicators of competitiveness are calculated: a) revenue/wage bill; b) revenue/employee, and c) revenue/establishment. Each one of these indicators is limited, and all three should be used jointly in the analysis. The ratio revenue/wage bill indicates profitability; the other two are straightforward. The idea is to compare these indicators across space, setting the national average equal to one and considering deviations from the average.

Results are presented in Table 2. Given the importance of the Southeast region and São Paulo state in terms of GDP share and per capita income levels, they are taken as reference for the analysis. For wholesale commerce, it can be seen that these areas present lower-than-average, and declining revenue/wage ratios. Although they present above-average indicators of revenue/employee and revenue/establishment, the more recent indicators clearly indicate a decline over time. The same holds for retail commerce. However, in this case the revenue/wage ratio for the Southeast region increases marginally, although it is still below average in late 90s. Thus, it is clear that the most important centers of Brazilian economy are either below average in terms of competitiveness or losing competitiveness over time as the commerce sector is concerned. The same does not hold for services in general. As for the ratio revenue/wage, these regions were below average in late 70s and moved to above average in late 90s, as the other regions moved counter wise, with the exception of the North region, where a free

³ Decisions from the public sector also have an influence. Since most indicators in this study refer to private business, the discussion will concentrate on the private sector.

⁴ There is no other information source after 1985 covering establishment data. The available information precludes the calculation of more sophisticated indicators.

import zone was established in the early 70s, leading to a boom in commerce activities. As for the other indicators, São Paulo state and the Southeast region present above average figures, with declining values for revenue/establishment and revenue/employee in the case of the Northeast region. São Paulo state presented growth in this latter indicator.

Table n° 2: Regional competitiveness indicators for tertiary activities

	Commerce				Services													
	Wholesale		Retail		All services		Hotels and restaurants		Real state		Transportation		Services to firms		Others		Computing	
	Late 70s	Late 90s	Late 70s	Late 90s	Late 70s	Late 90s	Late 70s	Late 90s	Late 70s	Late 90s	Late 70s	Late 90s	Late 70s	Late 90s	Late 70s	Late 90s	Late 90s	
Revenue/Wage Bill																		
North	1,03	1,36	1,20	1,27	1,04	1,09	1,16	0,91	0,85	1,06	0,80	1,34	1,11	0,94	2,26	0,78	0,65	
Northeast	1,13	1,27	1,39	1,16	1,19	0,94	1,49	0,99	1,01	0,96	0,93	0,98	1,64	0,95	1,48	0,84	0,70	
Southeast	0,99	0,89	0,92	0,93	0,97	1,01	0,93	1,02	1,01	1,02	0,99	0,98	0,84	1,03	0,94	1,09	1,04	
South	1,01	1,09	0,99	1,05	0,92	0,98	0,97	0,92	1,11	0,98	0,82	1,02	1,54	0,96	0,89	0,84	0,97	
Mid-West	0,85	1,37	1,15	1,19	1,24	0,98	1,16	1,04	0,83	1,07	1,34	1,19	1,34	0,83	1,27	0,85	1,06	
SPaulo st	0,95	0,83	0,94	0,88	0,86	1,02	0,92	0,94	0,99	0,84	0,83	0,96	0,93	1,08	0,84	1,21	1,18	
Revenue/Worker																		
North	0,70	1,30	0,67	1,31	0,75	0,96	0,93	0,88	0,31	0,82	0,75	1,18	1,07	0,72	0,97	0,73	0,71	
Northeast	0,65	0,89	0,57	0,88	0,57	0,68	0,61	0,83	0,86	0,70	0,69	0,75	0,67	0,63	0,63	0,63	0,44	
Southeast	1,16	1,03	1,21	1,03	1,18	1,13	1,21	1,11	1,08	1,09	1,11	1,08	1,07	1,14	1,18	1,25	1,20	
South	0,89	0,94	1,13	0,99	0,73	0,83	0,86	0,82	0,89	0,94	0,59	0,90	1,11	0,86	0,96	0,66	0,69	
Mid-West	0,74	1,09	0,99	1,01	1,10	0,83	0,84	0,96	0,87	0,89	1,26	0,90	1,02	0,73	0,87	0,88	1,04	
SPaulo st	1,16	1,06	1,36	1,14	1,15	1,27	1,31	1,15	1,10	0,95	0,97	1,18	1,18	1,31	1,21	1,65	1,51	
Revenue/Establishment																		
North	0,55	1,56	0,53	2,24	0,75	1,80	1,16	1,76	1,06	1,07	1,05	2,24	1,11	1,38	1,01	0,87	3,86	
Northeast	0,36	0,96	0,38	0,78	0,39	0,92	1,49	1,20	1,32	0,76	0,57	1,09	0,55	0,88	0,51	0,80	0,75	
Southeast	1,44	1,07	1,56	1,06	1,37	1,17	0,93	1,06	1,00	1,15	1,26	1,29	1,20	1,16	1,27	1,32	1,05	
South	0,96	0,80	1,35	0,93	0,71	0,59	0,97	0,68	0,85	0,75	0,42	0,50	0,97	0,60	1,02	0,50	0,56	
Mid-West	0,75	1,31	1,00	1,18	1,12	0,93	1,16	1,21	1,17	0,91	1,40	0,80	0,97	0,73	0,85	0,76	11,39	
SPaulo st	1,44	1,12	1,84	1,10	1,38	1,27	0,92	1,02	0,94	1,05	1,12	1,27	1,24	1,29	1,33	1,78	1,14	
Brazil	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	

Considering service activities, in general, hotels and restaurants and real state present a similar behavior as commerce, except for revenue/establishment, for which rich areas show increasing competitiveness. For transportation, São Paulo state presented improvements in revenue/worker and in revenue/establishment, as did the Southeast region in this latter case. The really interesting modifications occurred in services to firms and miscellaneous, in which the rich areas moved from below to above average in revenue/wages, and increased their advantage in the other two indicators, with one exception only in the Southeast region. These are more sophisticated sectors, for services to firms are related to outsourcing, consulting, etc., and miscellaneous tends to include new innovative activities not included in the previous classifications.

Finally, computing activities were only present in the surveys after the 1980 census, with only data for the late 90s available. The results indicate high

competitiveness in all indicators for the richer areas, especially for the state of São Paulo. In the case of the center-west region, results are biased by the presence of the federal government in Brasília, concentrating all data processing for federal activities in Brazil. It seems clear, thus, that in the most sophisticated sub-sectors within services, the rich regions are not only above average, but are increasing their competitiveness over time.

3.2. Spatial concentration: a finer analysis

Given the above results, it seems important to explore the available information in greater detail. This is not possible with the Commerce and Services censuses and the more recent surveys; different data sets are needed. Thus, the analysis at a sub-sector level is based on yearly household surveys developed by IBGE, the Brazilian official statistics agency⁵. The surveys cover households and therefore the information refers to the sector of activity declared by the respondents. It is not strictly comparable to the censuses or the annual surveys, in which the unit of investigation is the establishment. Nevertheless, it is a very good data source and the sample sizes are large enough to allow for a comparison across states and over time.

Data for each of the 27 Brazilian states are available for the period 1981-2001, allowing for a disaggregation of tertiary activities into 24 sub-sectors⁶. Employment growth was calculated as the average of the last 3 years in relation to the average of the first 3 years of the series⁷. On average, employment grew 1.85 times in the period, almost doubling. Hotels and restaurants, social clubs, associations and churches, and commerce modern are the sub-sectors with the largest growth. A spatial concentration index (SCI), based on Devereux *et. al.* (2004), was calculated for each year:

$$SCI = \sum_{j=1}^K \left[s_j - \frac{1}{K} \right]^2 \quad (1)$$

where s_j is the share of a state in the employment of sector j and K is the number of states (26). In case employment is evenly spread across states, $s_j = 1/K$ and $SCI = 0$. The larger the value of SCI, the greater is spatial concentration.

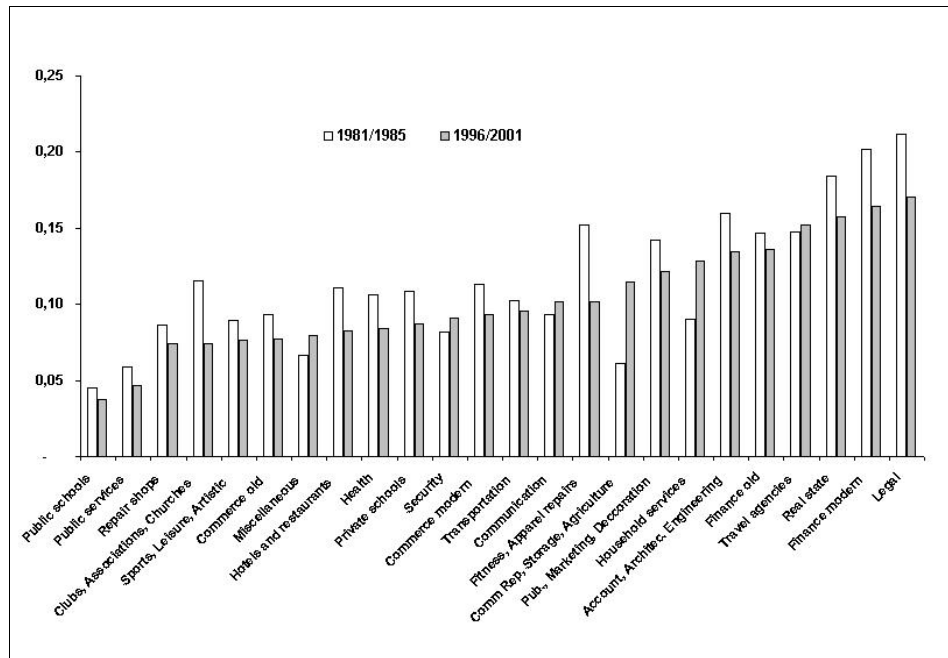
⁵ PNAD – Pesquisa Nacional por Amostra de Domicílios (national survey on a sample of households) <http://www.ibge.gov.br/home/estatistica/populacao/trabalhoerendimento/>

⁶ Sample sizes vary from 85 950 in 1981 and 91 779 in 2001 (only people in tertiary activities). Sector x state x year sample sizes vary from 7 to 7 602. Therefore, we had to aggregate some sectors that would be otherwise interesting to analyze individually.

⁷ Although the list of sectors is very large, sample size considerations recommended working with fewer sectors. Also, since respondents are not the same in different years, we take averages to avoid spurious oscillations in the indicators.

Figure 1 displays the results for two periods, the average of 1981/85 and the average of 1996/2001⁸. In general, sectors highly concentrated presented lower growth rates, but there are some exceptions, such as publicity, marketing and decoration. Over time, only six sectors increased spatial concentration as measured by employment: miscellaneous; security; communication; commercial representation, storage and agriculture; household services and travel agencies. The sectors for which increased concentration was the highest were household services and commercial representation, storage and agriculture. No statistically significant relationship between the two variables was found, that is, employment growth and end-of-period concentration do not seem to be associated.

Figure n° 1: Evolution of sectoral spatial concentration



4. CONVERGENCE

4.1. Estimating convergence

The previous indicators reported information on concentration and absolute values: competitiveness indicators suggest that the present concentration levels are expected to continue in the future. However, they inform only one dimension of

⁸ Averages over periods were calculated to avoid oscillations due to sample sizes.

regional disparity, that is, concentration. We also explore inequality in per capita income levels obtained by people working in those sectors and how it is evolving over time. For that purpose, we have estimated convergence regressions, in which the growth in labor income per worker over a period is correlated to the initial level of labor income per worker. Several works have used the same approach in studying the problem in Brazil, such as Ferreira (1995), Diniz and Ferreira (1995), Ferreira and Ellery (1996), Zini (1998), Azzoni (2001) and Silveira-Neto and Azzoni (2001). The results obtained in these studies are not homogeneous, since they use different data sources and methodologies, and cover distinct periods. However, whenever convergence is present, the speed at which it is occurring is limited. Only Silveira-Neto and Azzoni (2001) dealt with convergence at the sectoral level, although at a very broad disaggregation level (agriculture, manufacturing and tertiary activities). It should be pointed out that this approach presents many drawbacks, as mentioned in Temple (1999), and Dall'erba and Le Gallo (2005). To avoid some of these, Mossi et al. (2003) used intradistribution dynamic tools based on Markov transition matrices and stochastic kernels, showing the existence of two income clusters in Brazil, and that states with relatively rich neighbors have a greater chance of being prosperous. Since that study considers only aggregate income, the time span could be enlarged, covering the period 1939-1998. Spatial dependence was also considered in Magalhães et al. (2005), also at the aggregate level, but covering a more limited period of time.

For our sectoral analysis, data availability precludes coverage of such a long period. We use hourly labor income in the main activity for people working over 20 hours per week. We chose this variable in order to avoid including income of people with eventual jobs, and also to control for the number of hours worked. We consider both formal employees (with a written labor contract) and informal employees. In order to avoid unwanted oscillations in the data, we have excluded any sector-state-year case with less than 2 000 observations (persons). This implied treating as missing a number of 2 057 cases, of a possible maximum number of 13 104 (24 sectors x 21 years x 26 states). We take as the initial income the 1981-1984 average, and as the final income, the 1998-2001 average, in order to avoid spurious oscillations.

We first used OLS to estimate absolute and conditional convergence equations, in which income growth was regressed against the initial income level (in logarithms). The same two sets of regressions were used to estimate conditional convergence, in which case we include the level of education (number of years in school) and the degree of industrialization (share of manufacturing employment), also in logs, both in the beginning of the period. Schooling is a variable present all over the literature on convergence studies (Barro and Sala-I-Martin 1995). As in Azzoni et al. (2000), the manufacturing share is included to indicate specificities of the productive sector of the states; it is expected that the higher the share of manufacturing in a state, the more advanced its economy. These two variables provide grounds for differentiating steady-states across regions. They are also

averaged over the same four-year periods as income. We also estimated panel regressions, in which we organized 10 rolling 12-year periods. In each period, the initial income is the average of the first four years, and the final income is the average of the last four years (all logs). As discussed in Arellano and Bond (1991) and in Islam (1995), the use of panel data estimation avoids the omitted variable bias present in the OLS estimator.

A summary of the results is presented in Table 3⁹. Results for agriculture, manufacturing and the tertiary sector as a whole are presented for comparative purposes. Considering that the studied period presented very high oscillations in macroeconomic conditions, most series present a bell-shaped curve, with higher values in the mid-90's. Therefore, it is no surprise that results with rolling panels present better fits in general, especially considering that time dummy variables were included. Also, convergence is more common in this case than in the whole period estimation with OLS, as expected¹⁰. Considering OLS estimation first¹¹, there is no sign of absolute convergence in agriculture, but the same can not be said about manufacturing and the tertiary as a whole. The halfway convergence period is much larger in the later case, 87 years, confirming the results of Silveira-Neto and Azzoni (2001). Also, as expected, the absolute convergence periods are always longer than conditional convergence intervals, since in the latter case each state is not converging to a common steady-state, but to its own. Moving to panel estimation, all sectors present convergence, but the halfway periods for the tertiary are manifold the other periods, indicating that this sort of activity is more resistant to convergence, confirming previous results by Silveira-Neto and Azzoni (2001), who found no evidence of convergence for tertiary sector activities, at a more aggregated level.

Considering now sub-sectors within the tertiary sector, OLS estimation only presented absolute convergence for communication, household services, and public and private schools; all other sectors either presented non-significant initial income coefficients, or divergence. Conditional convergence is present only for repair shops, fitness centers, household services, and public and private schools, showing that within the tertiary sector, convergence occurs for some sub-sectors only, with the majority of sub-sectors not showing any sign of convergence. Panel data estimation¹² presented convergence everywhere. The signs of the coefficients on education are positive, as expected, in regressions in which only this variable is included. When the share of employment in manufacturing is also included, in

⁹ Complete results are available upon request from the authors.

¹⁰ See Temple (1999).

¹¹ For OLS estimation, we use only 20 states, for the six states in the North region (predominantly rural) presented few observations. As can be observed in Table 1, this region accounts for less than 8% of the population.

¹² All cases state-sector-year with less than 2 000 observations were considered missing.

some cases it becomes negative. This latter variable presents a positive sign in general.

Since we considered rolling periods and eliminated small cells in a different way as compared to OLS estimation, results are really not comparable between the two methods. As the number of observations in this latter case is always larger, and it better captures oscillations in economic conditions occurring in the country during the period, the following analysis concentrates on panel data results.

4.2. Associating concentration and convergence

Table n° 3: Estimated half-way convergence periods ()*

Number of years (*)	2001-1981			Panel		
	Absolute	Conditional		Absolute	Conditional	
Agriculture		35	35	6	7	8
Manufacturing	43	27	28	6	7	7
Tertiary	87	36	36	50	22	26
Commerce Old		29	41	8	8	8
Commerce Modern				6	6	8
Finance Old				7	8	5
Finance Modern				9	8	7
Real State Selling and Administration				7	6	7
Transportation				7	7	8
Communication	25			7	7	6
Hotels and Restaurants				7	8	9
Repair Shops		39	41	7	7	8
Fitness Centers, Apparel Repairs		35	35	14	10	9
Household Services	58	41	37	13	11	7
Security				8	6	8
Sports, Leisure, Artistic				6	6	7
Legal				7	7	8
Publicity, Marketing, Decoration				6	5	7
Accounting, Architecture, Engineering				7	6	9
Corn Representation, Storage, Serv to Agriculture			19	10	9	6
Travel Agencies				7	7	10
Social Clubs, Associations, Churches				6	7	9
Health				7	7	8
Public Schools	33	32	32	5	5	7
Private Schools	50	32	30	6	5	6
Public Services				5	4	6
Miscellaneous				7	7	7

(*) Blank cells indicate that the coefficient on initial income was not statistically significant

We now consider the possible associations between the indicators of regional concentration and regional inequality. This will be performed on an exploratory basis only, without any statistical test to back-up our comments. The purpose is more of raising some questions about the association of these dimensions of inequality than providing definitive answers. In figures 2 and 2a, we express the estimated coefficient on initial income in the horizontal axis, and the end-year spatial concentration index on the vertical axis. Absolute convergence,

Figure n° 2: Absolute convergence and end-of-period spatial concentration

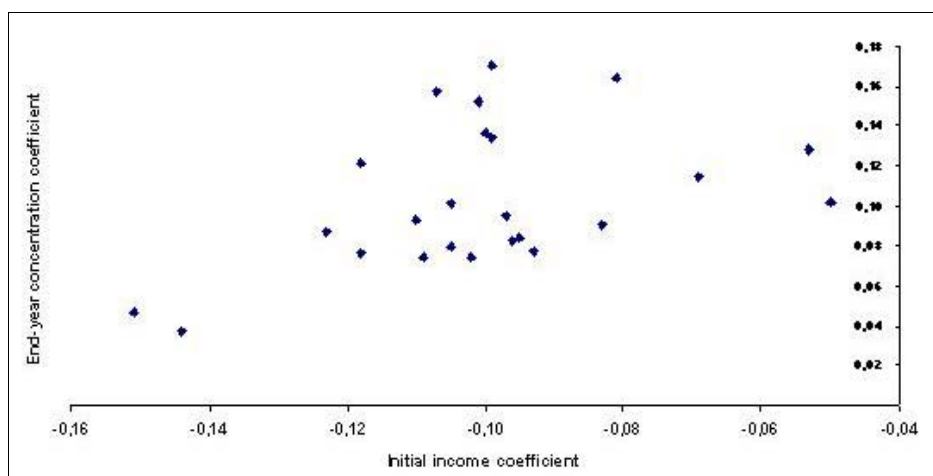
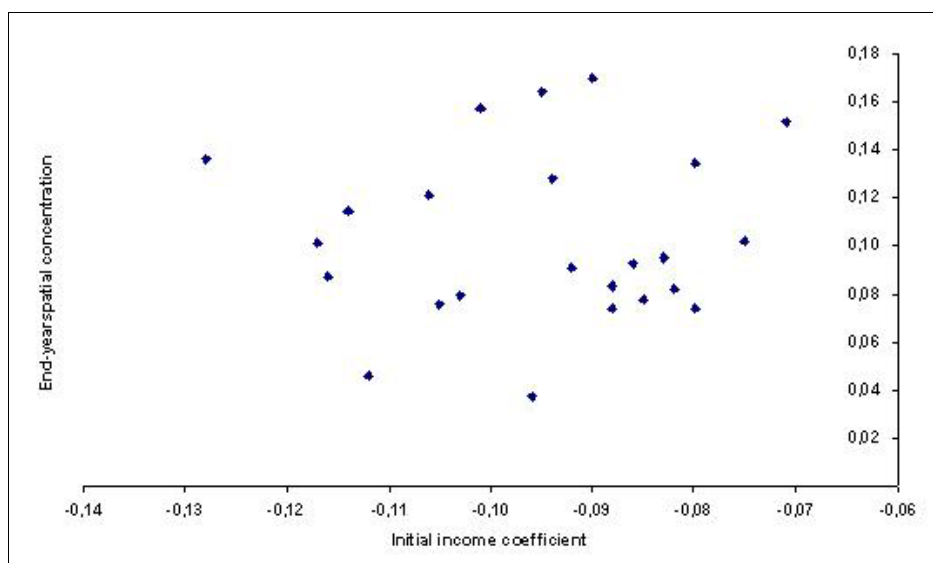


Figure n° 2a: Conditional convergence and end-of-period spatial concentration



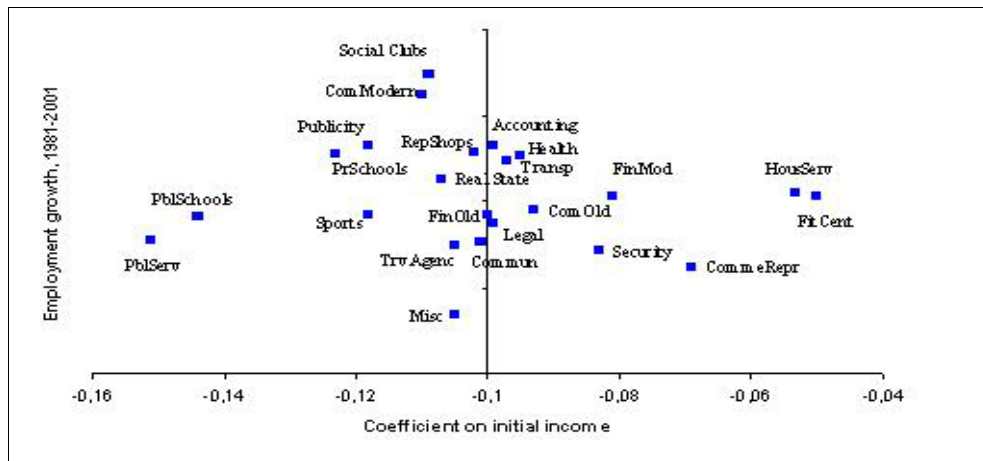
displayed in Figure 2, is slightly positively correlated to spatial concentration. In other words, the higher the concentration, the lower the speed of convergence would be. This indicates that sectors more spatially concentrated are not the ones for which regional per capita labor income is converging. That is, spatial

concentration, by its sectoral characteristics, could contribute to keep convergence speed down. If a sector only finds attractiveness in some specific regions, per capita labor income will tend to grow in these attractive regions at a higher speed than in other places, thus contributing to a reduction in the speed of convergence. As for conditional convergence, displayed in Figure 2a, there is no visible association, that is, sectors are converging at different speeds to each state's steady state situation, regardless of concentration.

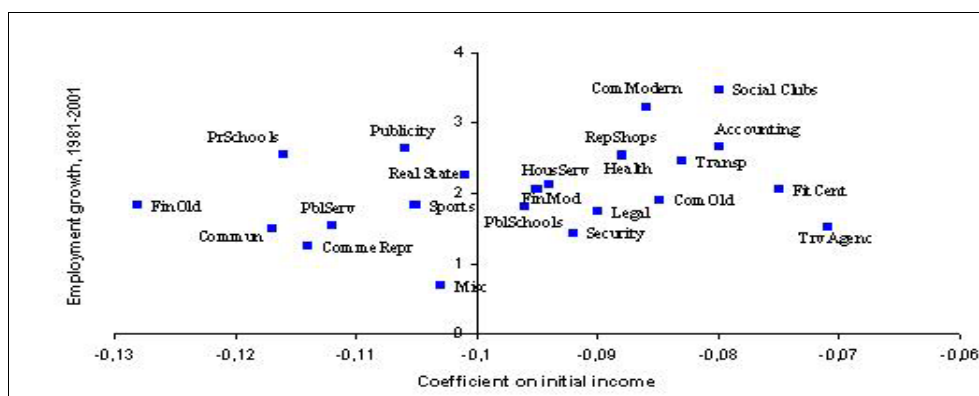
Another way to look at this phenomenon is to associate convergence with employment growth, as displayed in figures 3 and 3a. As for absolute convergence (Figure 3), there is no observable relationship. However, information on conditional convergence displayed in Figure 3a suggests that sectors with higher employment growth are the ones with lower convergence speeds, although the correlation is not a strong one¹³. This reinforces the previous observation on concentration levels. Finally, it does not seem to be any association between convergence and concentration change, for both absolute and conditional convergence.

Considering these convergence results, it seems clear that the association of the two forms of regional disparity, concentration and income inequality, is not straightforward. Whenever a correlation is present, it is not strong. Anyway, if any, the results suggest that concentration is not helping reducing per capita income inequality. In other words, both forms of regional disparity tend to go together in time.

Figure n° 3: Absolute convergence and sectoral growth



¹³ No statistical test was performed to test if the association is significant.

Figure n° 3a: Conditional convergence and sectoral growth

5. FINAL REMARKS

In this paper we developed a preliminary analysis of tertiary sector activities in Brazil. This is a very important sector to study, given its increasing importance in GDP and, especially, in employment. Previous studies had indicated that these activities could be contributing to the increase in spatial inequality in per capita incomes in the country. The results observed in this study confirm that idea.

We started with an analysis of competitiveness indicators for different areas in the country. The results indicate that the rich areas are losing competitiveness in commerce and in traditional services, but are becoming more competitive in the modern sub-sectors within the tertiary, such as in services to firms, computing, etc. The analysis of growth and concentration revealed a great variety across sub-sectors, indicating that it is important to develop detailed analysis to come to relevant conclusions. As for spatial concentration, the majority of sub-sectors presented decreasing concentration in the period, although six sub-sectors presented increasing concentration.

We then moved to labor income convergence, and we have observed that only a sub-set of sectors presented convergence. By correlating convergence with concentration and concentration changes, we found no or very weak association. Therefore, it seems that we should not make any association of the observed increasing share of tertiary activities in GDP and total employment, and spatial income inequality in the country.

This is a preliminary exploratory analysis. Better data sources and more sophisticated techniques should be applied in the future. The results achieved are interesting enough to suggest that additional efforts should be devoted to a better understanding of the spatial processes behind tertiary activities dynamics.

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ACTIVITÉS TERTIAIRES ET INÉGALITÉS RÉGIONALES AU BRÉSIL

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