

Regional economic disparities in Colombia

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ABSTRACT: This paper advances the analysis of regional income convergence in Colombia, through the use of the income data recently estimated for the departments, the main subnational political units. The results show a polarization process between Bogotá and the rest of the departments. The preponderance of Bogotá during the period analyzed is also discussed: its *per capita* income is more than double that of the national average, and more than eight times the per capita income of the poorest department, Chocó. Persistence in the departmental per capita income ranking is observed: Bogotá is always ahead, while the departments in the periphery are in the last places. The findings lead to the conclusion that it is necessary to design policies to correct the significant disparities in per capita income between Colombian regions.

JEL classification: O18, O47, O54, R11, R12.

Key words: Convergence, polarization, disparities, income, region, Colombia.

Disparidades económicas regionales en Colombia

RESUMEN: Este trabajo avanza en el estudio de la convergencia en el ingreso regional en Colombia a través del análisis de las cifras de ingreso calculadas recientemente para los departamentos, la principal unidad política subnacional. Los resultados muestran un proceso de polarización entre Bogotá y el resto de departamentos. La supremacía de Bogotá durante los años de estudio también es discutida: su ingreso per cápita es más del doble de la media nacional y más de ocho veces el observado para el Chocó, el departamento con menor ingreso. Esta situación persistió a lo largo de todo el período: Bogotá se consolidó a la cabeza de los ingresos regionales per cápita, mientras que los departamentos de la periferia se mantuvieron en los últimos lugares. Estos hallazgos obligan a pensar en la necesidad de establecer una política de

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Estado orientada a corregir las enormes disparidades observadas en el ingreso per cápita entre las regiones colombianas.

Clasificación JEL: O18, O47, O54, R11, R12.

Palabras clave: Convergencia, polarización, disparidades, ingreso, región, Colombia.

1. Introduction

Colombia has been seen as a country composed of relatively distinct regions. The geographical and topographical conditions have been mentioned as the main cause for the low integration. As a result, transportation costs are high and accessibility is low, compared to European or North American standards.

The evolution of the disparities in regional *per capita* income in Colombia has been a subject of analysis since the 1990's. Basing themselves on the neo-classical methodology for examining the convergence of incomes¹ (Barro and Sala-i-Martin, 1992), a great number of studies in this field have been carried out in the country in recent years². In general, the findings of most of these studies indicate that Colombia has gone through a process of polarization of regional incomes.

In contrast, Mauricio Cárdenas has insisted on the existence of a process of convergence in departmental *per capita* income, even though his results have some contradictions³. For example, in a recent publication, Cárdenas (2005) argues that the disparities in income levels of the departments have fallen since 1970, since the ratio between per inhabitant gross domestic product of Bogotá (the richest territorial entity) and that of Chocó (with the lowest income), fell from 6.7 in 1970 to 3.6 in 2000. However, he also shows that the coefficient of variation in *per capita* GDP increased between 1970 and 2002.

One of the limitations of this debate is that there did not exist, until recently, a direct measurement of departmental *per capita* income. As a result, previous analyses used the departmental gross domestic product estimated by the DANE (National Administrative Statistical Department) as a proxy for income. Thus, previous discussions about the process of convergence in departmental *per capita* income had serious limitations, especially because the data on GDP do not reflect well the level of prosperity of the regions. For example, the coefficient of the correlation between the index of the quality of life –IQL– for 1993 and the *per capita* GDP for 2002 is barely 0.18⁴.

This situation changed in 2006, when the Center for Livestock and Agricultural Studies, CEGA from its Spanish initials, presented a new study in which it constructs,

¹ A pioneer work using this approach is Barro and Sala-i-Martin (1992).

² Some of these studies are Meisel (1993), Mora and Salazar (1994), Birchenall and Murcia (1996), Rocha and Vivas (1998), Bonet and Meisel (1999), Acevedo (2003), Ardila (2004), and Aguirre (2005).

³ See Cárdenas (1993), Cárdenas and Pontón (1993) and Cárdenas, Pontón and Trujillo (1993).

⁴ This correlation coefficient is statistically equal to zero.

for the first time in Colombia, series of income, consumption and savings for what are known as the old departments and Bogotá⁵. The estimates of CEGA represent an important advance in the studies of regional growth in Colombia, because they allow the researcher to directly analyze the income variable⁶. The measurement of gross departmental income has a high association with the indicators for the quality of life. In fact, the coefficient of correlation between real gross *per capita* departmental income in 2000 and the IQL for 1993 is 0.7, which is significantly higher than what was observed between the IQL and the departmental GDP⁷.

Two main theoretical approaches can be identified to explain regional income disparities. The neoclassical theory considers that the disparities in the *per capita* income tend to fall in the long run. Since this model assumes perfect factors mobility and decreasing marginal returns, capital and labor move to where there are higher returns and, as a result of this process, convergence in regional incomes takes place. On the other hand, the new economic geography states that there is a process of cumulative causation in regional growth, which results in agglomeration economies in some locations. Since growth is accumulative, prosperous regions will grow faster than lagging regions, and disparities in regional incomes would be perpetuated.

What has been argued about economies of agglomeration is that technological and pecuniary externalities, often working together, create economic agglomerations. Fujita and Hu (2001) argue that the major roles in the agglomeration forces are played by transportation, face-to-face communications, and differentiation of products and inputs. Locations with geographical and historical advantages become the initial places of agglomerations. Later on, the self-agglomeration, caused by increasing returns to scale and positive feedback mechanisms, helps those locations to maintain their leadership. The agglomeration of production can directly cause income disparities when there are barriers to the inter-regional labor migration or when, as is observed in developing countries, there exists a labor surplus in the economy.

The aim of this article is to present new evidence for the debate about the convergence of departmental incomes in Colombia. Our approach is more descriptive than analytical. We introduce the new data on departmental income in Colombia to test the convergence hypothesis. The document is made up of five sections. After analyzing the spatial distribution of gross departmental income in the first section, the following one focuses on the study of the disparities in gross *per capita* income. The fourth one examines convergence on the basis of the use of some traditional measures, as well as a number of techniques proposed by Quah (1996). Finally, the last section presents our conclusions.

The analysis of the evolution of gross incomes per department enables us to establish several characteristics of the spatial distribution of the country's development.

⁵ Colombia is politically divided into departments, districts and municipalities. Before the Constitution of 1991, there were also intendencias and comisarias. The intendencias and comisarias are the new departments, and the departments that existed before 1991 are known as the old departments.

⁶ CEGA (2006), *Ingreso, consumo y ahorro en los departamentos de Colombia, 1975-2000*, vol. 2, Sistema Simplificado de Cuentas Departamentales, Bogotá.

⁷ This correlation coefficient is statistically different from zero.

In the first place, we find a clear hegemony of Bogotá, with an increasing share of gross national income, which rose from 30% in 1975 to 36% in the year 2000. Second, the importance of Bogotá becomes much clearer in the 1990's, when one can see a bimodal distribution in which Bogotá is found very far up one end of the scale and the rest of the country is on the other end, with a process of downward convergence. In fact, departments which formerly had *per capita* incomes above the national average, like Antioquia, Atlántico, and Valle, now approach it, while the other group of departments stays below it, with a tendency towards convergence. What is more, the *per capita* gross income of the capital was, on average, more than double the national mean. A third factor which is worth singling out is the persistence of these disparities throughout the 25 years covered by the study: Bogotá stays at the top of *per capita* incomes, while the departments on the periphery remain in the last places: Caquetá, Cauca, Cesar, Córdoba, Chocó, Nariño, Norte de Santander, Magdalena, and Sucre.

2. Spatial distribution of departamental gross income

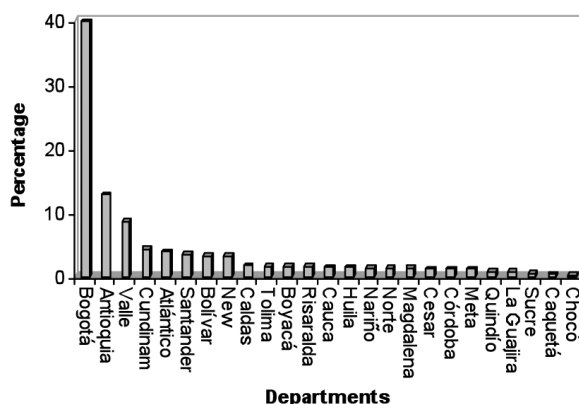
Gross National Income (GNI) shows a high spatial concentration during the period covered by the study (1975-2000). Three territorial entities —Bogotá, Antioquia, and Valle— accounted for approximately two thirds of the total income of the country. These territories began with 56% of total income in 1975 and finished with 60% in 2000. However, the supremacy of Bogotá over Antioquia and Valle should be pointed out, because it increased in the course of the years under study. In 1975, the national capital's share of GNI was twice that of Antioquia, and three times that of Valle. By 2000, these differences widened to three times with respect to Antioquia and four times with respect to Valle.

A review of the distribution of the increase in gross national income (GNI) by department shows that Bogotá is the big winner. As may be seen in Graph 1, 40% of the increase in the GNI during the period 1975-2000 was concentrated in the capital of the country; it was followed by Antioquia (12.9%), Valle (8.6%), Cundinamarca (4.3%), Atlántico (3.9%), Santander (3.5%), Bolívar (3.2%), and the New Departments (3.2%). Each of the remaining 17 departments had less than 2% share of the total increase in GNI⁸.

In accordance with their share in gross national income, the departments may be grouped into four categories. In the first one stands Bogotá, which generated more than a third of the total gross income. The second group is made up of Antioquia and Valle, which registered shares that oscillate between 10 and 15%, but had a descending tendency during the period. The third group is composed of departments which maintained their shares at a level close to 5%: Atlántico, Cundinamarca and Santander. Finally, the rest of the departments registered shares of less than 3%, with a num-

⁸ The seven departments of the continental Caribbean region, which have 21% of the population, were only responsible for 12.3% of the increase in gross income during the period 1975-2000.

Graph 1. Percentage share of the absolute increase in gross national income by departments, 1975-2000



Note: The sum of the increases equals 100% and corresponds to the total increase of the GNI in the period from 1975-2000.

Source: Estimates of the authors based on CEGA (2006).

ber of extreme cases like Caquetá, Chocó, La Guajira, and Sucre, which registered shares of less than 1%. With the exception of Bogotá and the New Departments, the territorial entities showed decreasing or relatively stable trends. The entity which wound up with the biggest slice of the cake of national income was Bogotá (see Map 1).

3. Differences in departmental gross per capita income

The classification of departmental gross *per capita* income (GDIpc) is included in Table 1. It shows the relative position of each department in 1975 and 2000, as well as the rankings in that period. It also includes the absolute change in the GDIpc of each department, and the change in relation to the average variation in the *per capita* GNI.

In absolute terms, Bogotá stayed at the top, with the highest GDIpc and the biggest increase. The nation's capital was the only territory which showed an absolute increase higher than the national average. At the same time, Chocó remained the department with the lowest *per capita* income. Whereas the absolute change in the GDIpc of Bogotá corresponded to 243% of the change in the gross national *per capita* income (GNIpc), the change for Chocó was only 32% of the national average. The two biggest winners in GDIpc were Caldas and La Guajira, which rose seven places in the classification. However, the relative changes of those departments were less than that registered in the GNIpc: the growth of Caldas was 86% and that of La Guajira 94% of the average national increase. Other departments which improved their rankings were Antioquia, Santander, Cundinamarca, Risaralda, Cauca, and Magdalena.

Map 1. Departmental share of GNI, 2000



Source: Authors' estimations based on CEGA (2006).

Tabla 1. Classification of the departments according to their departmental *per capita* gross income, 1975 and 2000

Rank 1975	Rank 2000	Change in Ranking	Department	Change in GDIpc (\$ 1994)	Change in GDIpc as a percentage of the change in GNIpc	Share of each department in the national income change (%)
1	1	0	Bogotá	1.575.397	243	15
4	2	2	Antioquia	686.619	106	7
3	3	0	Valle	489.456	75	5
2	4	-2	Atlántico	257.258	40	2
7	5	2	Santander	506.921	78	5
5	6	-1	New Departments	486.467	75	5
10	7	3	Cundinamarca	609.458	94	6
15	8	7	Caldas	560.390	86	5
11	9	2	Risaralda	436.253	67	4
6	10	-4	Meta	269.749	42	3
8	11	-3	Boyacá	366.545	56	3
12	12	0	Huila	381.001	59	4
9	13	-4	Bolívar	363.392	56	3
13	14	-1	Tolima	432.034	67	4
14	15	-1	Quindío	422.778	65	4
16	16	0	Cesar	293.058	45	3
24	17	7	La Guajira	612.370	94	6
20	18	2	Cauca	362.239	56	3
17	19	-2	Norte de Santander	243.859	38	2
22	20	2	Magdalena	268.360	41	3
18	21	-3	Córdoba	208.211	32	2
19	22	-3	Caquetá	168.157	26	2
21	23	-2	Sucre	94.862	15	1
23	24	-1	Nariño	234.229	36	2
25	25	0	Chocó	205.922	32	2

Source: Estimates of the authors based on CEGA (2006).

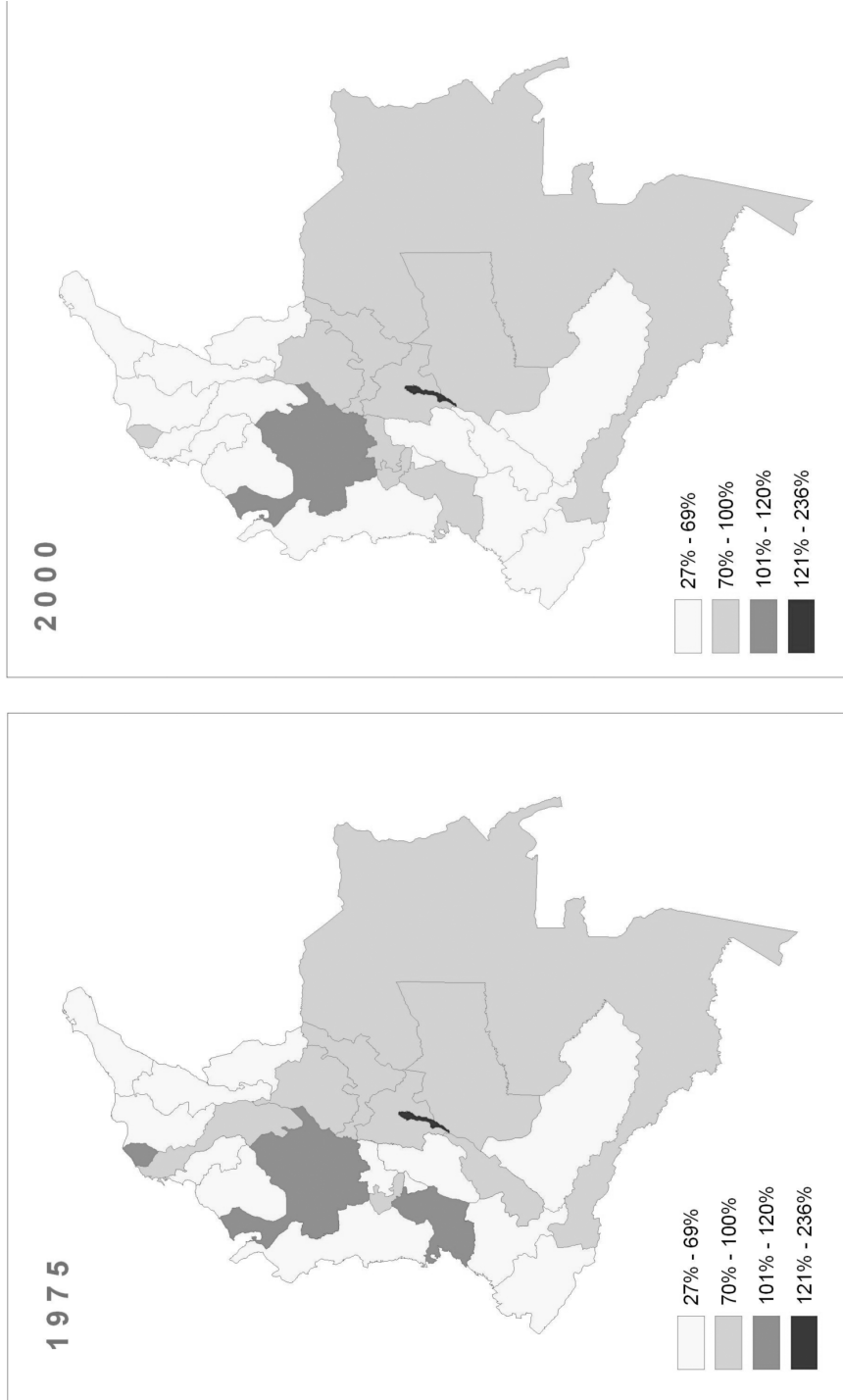
The biggest losers in the GDIpc were Bolívar and Meta, which fell four places in the rankings. They were followed by Boyacá, Córdoba, and Caquetá, which cut down three places, while Atlántico, Norte, and Sucre, fell by two. Within this group, the smallest relative changes were in Córdoba, Caquetá, and Sucre, whose increases represented, respectively, 32, 26 and 15%, of the total increase shown in the GNIpc.

Finally, we use the Spearman rank correlation coefficient to test the correlation between the ranks⁹. The null hypothesis in this test considers no association between the rank pairs. Using the Colombian GDIpc rank in 1975 and 2000, the Spearman correlation was 0.91. Comparing to the critical values of this test, this correlation coefficient allows us to reject the null hypothesis and, therefore, it can be stated that there is an association between the rank pairs. In other words, we can argue that there is stability in the rank position of each territorial entity during the period.

An additional indicator which helps us to study the relative evolution of departmental incomes is the GDIpc as a percentage of the GNIpc. Several aspects of the performance of this indicator during the period 1975-2000 should be emphasized. In

⁹ For more information in the Spearman rank correlation coefficient see Wackerly, Mendenhall and Scheaffer (1996), *Mathematical Statistics with Applications*, Fifth Edition, Duxbury Press.

Map 2. *Per capita* gross departmental income as a percentage of *per capita* gross national income, 1975 and 2000



Source: Estimates of the authors based on CEGA (2006).

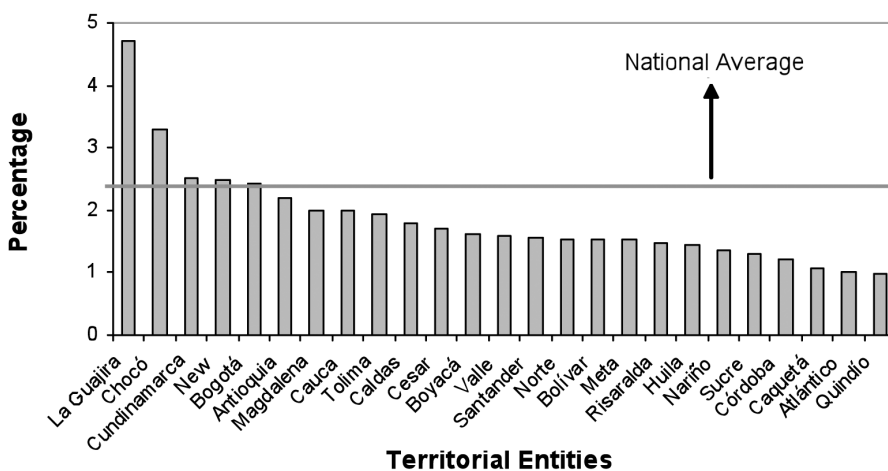
the first place, Bogotá strengthens its hegemony, maintaining a GDIpc that is more than twice the average income of the country (see Map 2).

Second, two departments which began with incomes above the national mean in 1975 fell down in 2000 a position well below the initial one. Such is the case of Atlántico, which fell from an income equivalent to 116% of the national mean in 1975, to 87% in 2000, thus becoming the department which suffered the largest reduction in the period. Another department with a poor performance is Valle. Its GDIpc fell from the equivalent of 113% of the national average in 1975 to 98% in 2000. Other departments which suffered important losses were Caquetá, Meta, and Sucre. Santander, the new Departments, Risaralda, Boyacá, Huila, Bolívar, Cesar, Norte, Magdalena, and Córdoba showed smaller declines.

A third element in the analysis of relative incomes is the important increase observed in La Guajira. In fact, the GDIpc of La Guajira rose from 32% of the GNIpc in 1975 to 56% in 2000. Other territories which strengthened themselves were Cundinamarca and Caldas, which increased their income from 76 to 83% of the GNIpc, in the case of the first, and from 65 to 73%, in that of the second. A third group of beneficiaries is made up of Bogotá, Cauca, and Chocó, which registered relatively modest increases.

The growth rates of the GDIpc included in Graph 2 indicate that La Guajira, Chocó, Cundinamarca, the New Departments, and Bogotá, in that order, registered the best performance. The most outstanding performance was that of La Guajira, with a growth rate that was double the national average, which enabled it, as mentioned above, to improve its relative position. The same did not occur with Chocó, which despite having a growth rate that was 1.4 times the national average and improving its relative income, stayed in last place among all the departments.

Graph 2. Average annual growth rates of real departmental gross per capita income, 1975-2000



Source: Estimates of the authors based on CEGA (2006).

4. Analysis of convergence

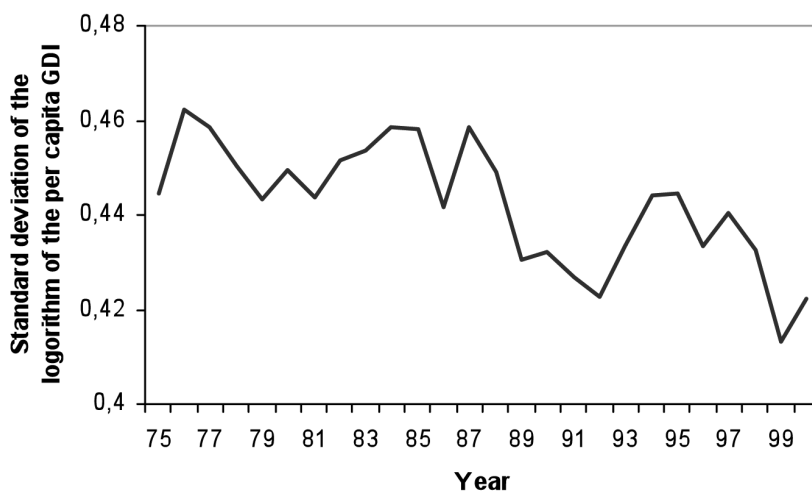
An initial approach to regional convergence is obtained from the indicators included in Table 2. As is observed, the relation between the department with the highest GDIpc —Bogotá— and the lowest —Chocó— was maintained over time. The same occurred with the relation between Bogotá and the departments in the next four positions. In addition, the relation between both the maximum and minimum —Bogotá and Chocó— and the national mean also remained the same throughout the period; thus consolidating, in that way, a persistence of the regional disparities.

Table 2. Some relationships between the GCIpc

Indicator	1975	2000
Maximum in relation to the minimum	8,7	8,3
Maximum in relation to second place	2,0	2,2
Maximum in relation to third place	2,1	2,4
Maximum in relation to fourth place	2,2	2,7
Maximum in relation to fifth place	2,7	2,8
Maximum in relation to the mean	2,4	2,4
Minimum in relation to the mean	0,3	0,3

Source: Estimates of the authors based on CEGA (2006).

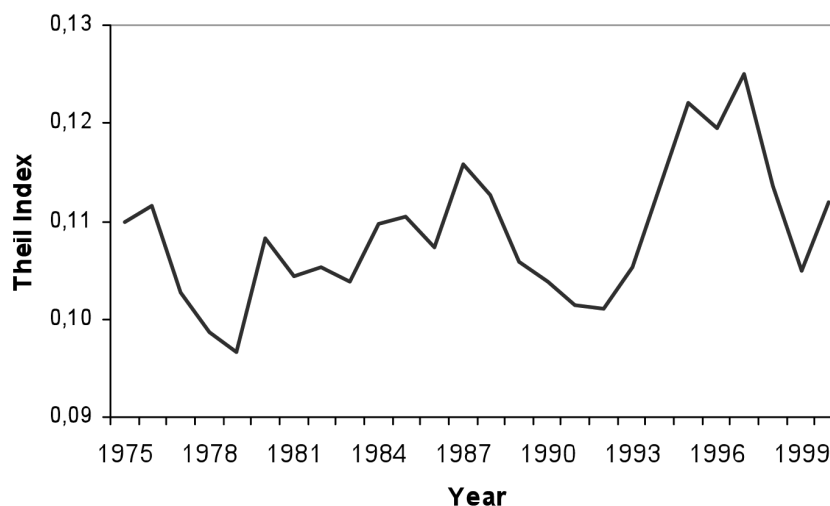
Graph 3. Sigma Convergence of departamental gross per capita income , 1975-2000



Source: Estimates of the authors based on CEGA (2006).

To analyze the evolution of the convergence, we estimate two indicators traditionally used in the literature on disparities in income: the sigma convergence and the Theil index¹⁰. The results included in Graphs 3 and 4 indicate that it is not possible to speak of a clear trend in convergence. While sigma convergence shows a small reduction falling from 0.44 in 1975 to 0.42 in 2000, the Theil index remained relatively stable over the whole period, although it showed a minimum of 0.09 in 1979 and a maximum of 0.12 in 1997. These contradictory results may be the result of the weighting which is given to the different territorial entities in the estimate of the Theil index, which is absent from the sigma convergence, where each territory is given an equal weighting. The above evidence thus allows us to conclude that the result of convergence is not robust for the type of measurement adopted.

Graph 4. Theil index of departmental gross *per capita* income, 1975-2000

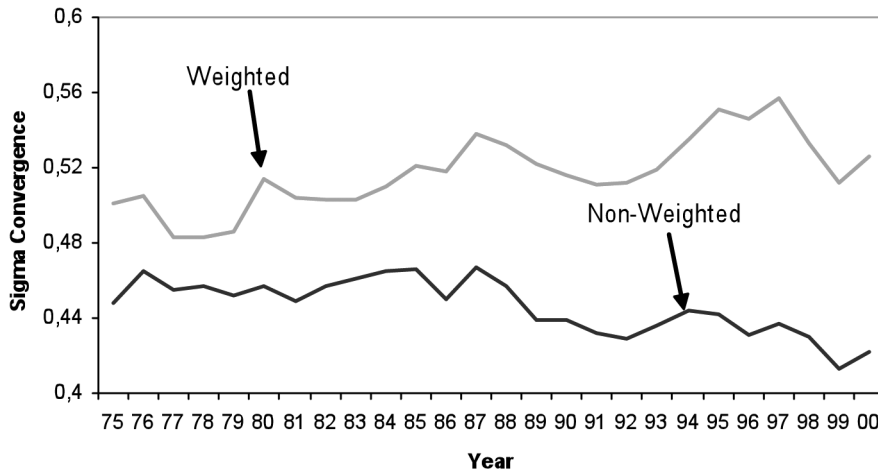


Source: Estimates of the authors based on CEGA (2006).

With the aim of incorporating an estimate of the sigma convergence which reflects the demographic weight of the territorial entities, we have made a new calculation for this indicator, weighting it according to the share which each territorial entity has in the total national population. The results included in Graph 5 show how the analysis of the sigma convergence changes as soon as the weighting is incorporated. It is worth mentioning two important aspects: in the first place, the absolute value of

¹⁰ The sigma convergence was estimated as the standard deviation of the logarithms of the gross departmental *per capita* income and the Theil index as $T = \sum_{i=1}^n s_i \log(ns_i)$, where n is the number of territorial entities and $s_i = f_i / \sum_{i=1}^n f_i$, where f_i is the level of gross departmental *per capita* income in the territory i .

Graph 5. Sigma convergence of departmental gross *per capita* income, weighted and non-weighted, 1975-2000



Source: Estimates of the authors based on CEGA (2006).

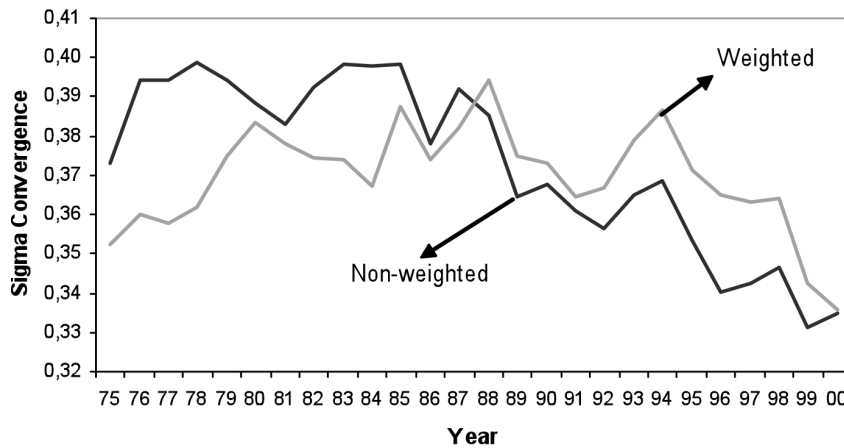
the disparity increases in every year that is studied, and, in second place, the convergent trend noted in the non-weighted sigma indicator is not seen in the weighted indicator. On the contrary, it shows a clear divergent trend throughout the period.

In addition, we have excluded Bogotá from the estimate of the value of the weighted and non-weighted sigma convergence to evaluate the impact of the capital district on the value of this indicator. As can be seen in Graph 6, the conclusions are completely different when we exclude the capital. From the end of the 1980's onwards, a strong convergent trend is observed in the *per capita* incomes of the rest of the departments. In a similar way, the polarizing role played by Bogotá in regional income in Colombia is evident. Its performance, especially during the 1990's, is the main cause of the polarizing phenomenon registered in regional income.

To make a wider analysis of convergence, following Quah's proposals (1996), we have included other indicators. Quah believes that the traditional analysis of convergence may not reflect the inner dynamics of the sampling, which is an important factor when it comes to define the kind of process it produces. It may happen that the backward regions are, in fact, growing more than the prosperous ones, but this does not necessarily guarantee a process of convergence in which the former catch up with the latter. According to Quah, what is really important for convergence is how a regional economy grows in relation to each of the others and not its growth in terms of its own history. In this sense, the crucial factor in determining whether the backward economies are really catching up with the most advanced ones is to understand the nature of the interactions between the different regions.

To examine the dynamic of the distribution of the GDIpc among the different territories of Colombia, we have estimated the Kernel density function for the years

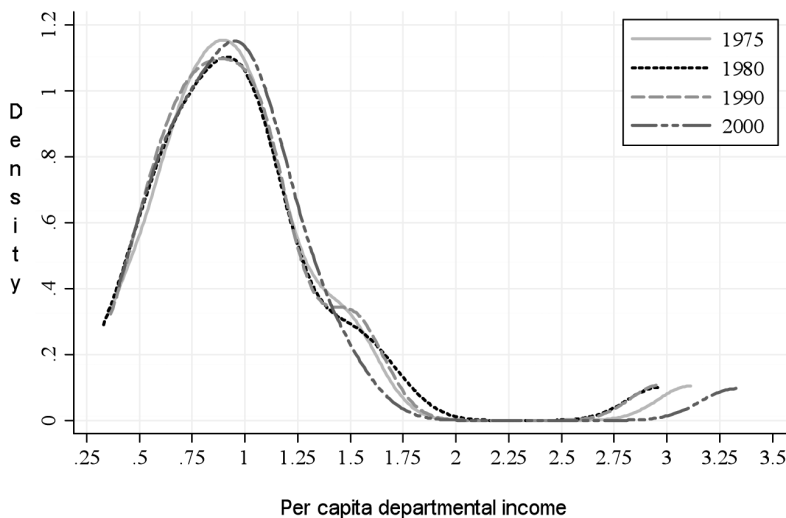
Graph 6. Sigma convergence of departmental gross *per capita* income, weighted and non-weighted, 1975-2000



Source: Estimates of the authors based on CEGA (2006).

1975, 1980, 1990, and 2000¹¹. According to Rey (2004), the morphology of the distribution helps one to understand the evolution of the disparities in regional income. Insofar as they can be seen in a dynamic context, changes in the form of these distributions may illustrate aspects of the process of regional growth.

Graph 7. Kernel of departmental gross *per capita* income in Colombia, 1975 -2000



Source: Estimates of the authors based on CEGA (2006).

¹¹ For the estimate of this indicator, each density was rounded out with a Gaussian kernel and the width of the band was chosen according to Silverman’s criterion. The calculations were made in Stata and the departmental average of the GDIpc was standardized to the unit.

The density functions included in Graph 7 reveal three important aspects. In the first place, one can see a polarization of the GDIpc with two groups whose differences widen over time. At one end, and high above the rest, we find Bogotá, which, with the passage of time, stands farther away from the national mean. At the other end are the rest of the departments, with some degree of convergence to the national mean. In second place, the group of entities apart from Bogotá initially showed two modes in their distribution. This is clearest in 1990. This reflected the fact that the departments of Antioquia, Atlántico, and Valle, registered a GDIpc above the mean. By 2000, the distribution within this group becomes unimodal, indicating a process of downward convergence for this group. The evidence supports the hypothesis of the hegemony of Bogotá in Colombian regional income, with two clear peaks in the distribution: Bogotá and the rest of the country. Finally, the persistence of this distribution throughout the whole period should be emphasized.

In addition, a Markov transition probabilities matrix was estimated to complement the analysis of the dynamic of the GDIpc. The elements of this matrix indicate the probability of a department's going through the transition from one level of income from one moment t to another $t + s$ ¹². The classes serve to discriminate the values of income by rendering them into fixed classes that stay constant through the period under analysis.

The results of Table 3 show that there is a high probability that a department would remain in the same income class where it was at the beginning of the period. In fact, the highest probabilities lie along the main diagonal of the matrix. In particular, the values of the classes at either end are higher: there is a strong probability that the richest and the poorest ones continue to be the same. In the case of the hegemony of Bogotá, there is a 93% probability that the capital remains at this high level of in-

Table 3. Markov transition probabilities matrix, 1975-2000

$t/t+1$	0,668	0,845	0,997	1,169	3,521
0,668	0,91	0,09	0,00	0,00	0,00
0,845	0,11	0,81	0,08	0,01	0,00
0,997	0,00	0,09	0,75	0,16	0,00
1,169	0,00	0,00	0,15	0,79	0,07
3,521	0,00	0,00	0,00	0,07	0,93

Source: Estimates of the authors based on CEGA (2006).

Note: To define the income bands, the national average income was normalized to one. The values above one imply that departments included in that band have a *per capita* income above the national mean. Those values below one have the opposite meaning. Each element in the matrix is the probability that one department has of moving from its band in period t to the other bands in period $t + s$.

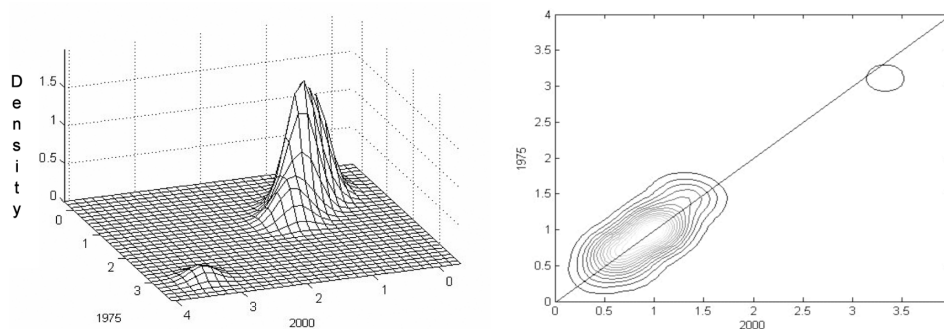
¹² The estimates of the transition probabilities matrix for the interval s were obtained by accumulating the empirical transitions over each interval s within the total period of the study and standardizing by the number of regions that exist at the beginning of the period within each kind of income (Rey, 2004).

come. Once again, the evidence supports the idea of a polarization, with the supremacy of Bogotá over the rest of the country.

The Markov transition probabilities matrix has been subject to a number of criticisms, because its results are sensitive to the definition of the income groups. The solution which has been proposed for that limitation is the construction of stochastic kernels, where the groups are allowed to tend to infinity. According to Quah (1997), the stochastic kernel is a probability density function which describes the transitions of a given value of income during the period under analysis. If the graph is concentrated along the 45 degree line, it is said that the elements in the distribution remain where they began. If, on the contrary, the elements turn 90 degrees from the 45 degree line and in a counter-clockwise direction, it is argued that substantial changes have occurred in the sampling: the rich become the poor or *vice versa*.

The stochastic kernel included in Graph 8 enables us to confirm a high persistence in Colombian departmental gross *per capita* income, since most of the observations are concentrated along the 45 degree line. That is, departmental incomes stay where they began. Once again, the hegemonic pattern of Bogotá is repeated, with a much higher income, and the rest of the country tends to converge towards a much lower level of income.

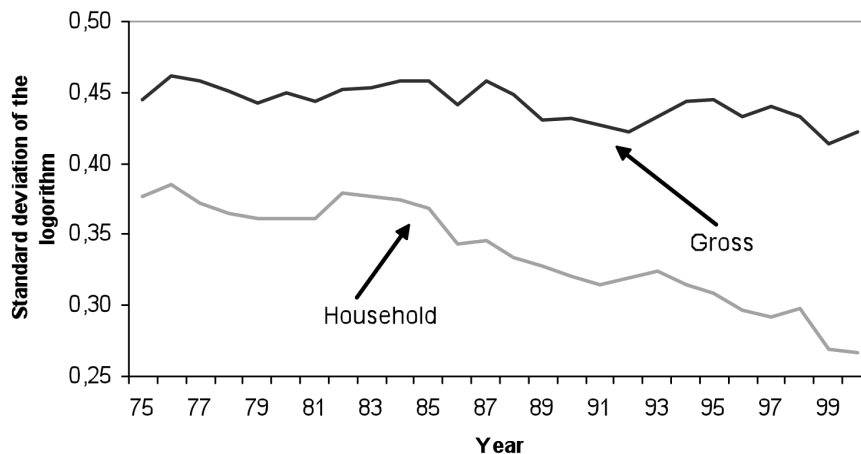
Graph 8. Stochastic kernel of departmental gross *per capita* income in Colombia, 1975-2000



Source: Estimates of the authors based on CEGA (2006).

Finally, we think it is important to single out the differences in the convergence process between departmental gross *per capita* income (GDIpc) and departmental *per capita* household income (GDHIpc). As can be seen in Graph 9, one may speak of a process of convergence in the GDHIpc, but not in the GDIpc. Even though their share has fallen during the period, households continue to be the main departmental income-generating sector. However, the convergent trend in this segment is not reflected in departmental gross income. The above is evidence of a high polarization among the other three components: government, non-financial corporations (NFC), and financial corporations (FC).

Graph 9. Sigma convergence in departmental gross *per capita* income and departmental *per capita* home income, 1975-2000



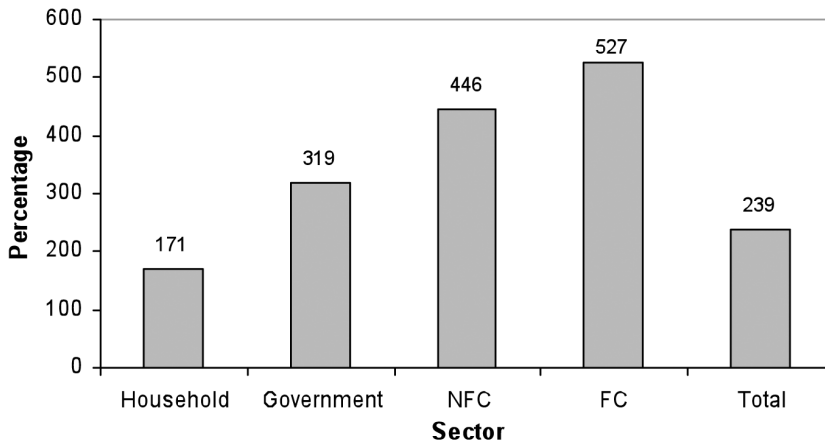
Source: Estimates of the authors based on CEGA (2006).

With regard to the role played by the decentralization process of the 1990's in the convergence seen in the GDHIpc, Graph 9 shows how that trend is registered since the beginning of the 1980's. That is, the convergence in the GDHIpc is a long-term phenomenon and no break in this situation is shown during the 1990's. There is no evidence to support the argument that the decentralization process which took place has accentuated the convergent process.

We believe that the change in the trend of the convergence of home incomes and gross incomes is related to the greater concentration of income of the other sectors in Bogotá. This city concentrates 26% of home income, 49% of government income, 68% of the income of the NFC sector, and 80% of the income of the FC sector. As a result, while the *per capita* income of Bogotá's households is 171% of the mean of that sector, its *per capita* incomes for government, non-financial companies, and financial companies were 319%, 446%, and 527% of the national mean for each sector, respectively (see Graph 10).

A possible explanation of the regional income polarization in Colombia is the increasing concentration of economic activity in Bogotá. One of the salient features of regional economic development in Colombia in the last four decades has been the increasing importance of Bogotá in the urban network of the country. What had been singular in Colombia up to the 1960's was that urban growth was more or less equilibrated among the four main cities (Gouëset, 1998). Beginning in the 1960's urban growth in Colombia has become more like the typical Latin American pattern of one dominant city. While in 1960 Bogotá contributed with 14% of national GNP *per capita*, by 2006 it had increased to 25%. If we include the neighbor department of Cundinamarca, this share increases to 30%.

Graph 10. *Per capita income of Bogotá as a percentage of the national mean according to institutional sectors and total, 2000*



Source: Estimates of the authors based on CEGA (2006).

Note: FC = Financial corporations and NFC = Non-financial corporations.

The process which dominates the changes in Colombian income is the agglomeration economies which have consolidated themselves around Bogotá. The economic structure of the national capital has important forward and backward linkages, which allow it to exploit significant economies of scale. The regions near the capital enjoy the benefits of their proximity to the main national market.

This phenomenon is not exclusive to Colombia. Krugman and Livas (1996) point out that the main reason for the concentration of industry in the metropolitan areas of Latin America is the forward and backward linkages which those places offer. The advantages deriving from those linkages outweigh the disadvantages of such agglomerations, such as high salaries and rents, congestion, and pollution. In an application of the model of Krugman and Livas to Colombia, Fernández (1998) found that the linkages between sectors did, in fact, lead to an agglomeration around Bogotá, which also had a big influence on internal transport costs.

Another element which has contributed to the rapid growth of Bogotá in recent decades has been the enormous growth of the Colombian state. While total government expenditures as a percent of GNP were 8.8% in 1950, by 1997 they had increased to 37.2% (García and Jayasurita, 1997). Since Bogotá is the capital of the country, it received a large share of the increase in bureaucracy and public investment.

Although there was a decentralization of public spending during the nineties, which increased the transfers from the central government to the local ones, Bogotá continues being the main economic center in the country. In fact, some studies have shown that transferences perpetuate the inequalities in the spatial distribution of resources. Bonet (2006) considers that this behavior seems to be explained by a set of factors: the allocation of a major portion of the new local resources to current spending (e.g. wages and salaries) instead of capital or infrastructure investments, the lack

of a redistributive component in the national transfers, the absence of adequate incentives from the national to the subnational levels in order to promote an efficient use of them, and the lack of institutional capacity of the subnational governments.

Wiesner (2003) argues that the critical policy link to enhance fiscal decentralization gains can be identified in the fiscal and institutional governance structures connecting decentralized tax revenues and decentralized public expenditures. However, this author recognizes that self-financing for local governments in Colombia would be difficult to achieve under the actual tax legislation and the economic conditions in some localities, particularly in the poor ones.

Wiesner (2003) points out that education and health, the key sectors in the Colombian decentralization process, continue to be highly centralized either because national funds are the main source of financing or because national labor unions actually determine resource uses and policy priority. Although there have been some improvements in the municipalities' tax collection, transfers are still the main source of revenue. The ratio between revenue to expenditure at the local level indicates that departments and municipalities are strongly dependent on national transfers. This relation decreased, between 1984 and 2000, from 0.97 to 0.45 for departments, and from 0.76 to 0.44 for municipalities.

5. Conclusions

This article advances the study of convergence in regional income in Colombia, through the analysis of new data for departmental incomes calculated by the CEGA. It contributes in several aspects of the debate on the convergence in the departmental *per capita* incomes in this country. In the first place, it is evident that there is an economic polarization between Bogotá and the rest of the nation. The above is particularly strong in the case of the income generated by the government, non-financial corporations, and financial corporations, where Bogotá concentrates, respectively, 49, 68 and 80 percent of national income. The supremacy of the capital district becomes evident throughout the period under analysis, and particularly during the 1990's.

Second, no clear trend in the convergence of departmental gross income is detected. Once the indicator of the sigma convergence is weighted for population, the convergent pattern observed in this indicator disappears. While a process of convergence in the income available to household is observed, it is not longer observable when the incomes of the other components (governments, financial corporations, and non-financial corporations) are added. The above indicates that the level of polarization in those three components is large enough to change the trend observed with households. We believe that Bogotá plays a fundamental role, given the way in which the income of these three components is concentrated in the capital of the country.

Finally, another characteristic that becomes clear from an examination of the evolution of departmental income is the persistence of the disparities throughout the 25 years covered by the study. Bogotá stays at the head of the list of *per capita* incomes, while the departments on the periphery remain in the last places: Caquetá, Cauca, Cesar, Córdoba, Chocó, Nariño, Norte de Santander, Magdalena, and Sucre. In addition,

Bogotá maintained a *per capita* income which was, on average, more than twice that of the average income of the country and up to eight times that of the poorest department, Chocó.

From the point of view of economic policy, it might be argued that the latest reforms adopted in Colombia have tended to strengthen the agglomerative pull of Bogotá. On the other hand, the policies which were expected to have an impact on regional development, like decentralization, do not seem to have had a positive impact on the long-term trends in regional inequalities. Contrarily, during the period in which decentralization has been strengthened, the concentration of the income of the government, non-financial corporations, and financial corporations in Bogotá has increased. These findings support the need to establish a State policy aimed at reducing the enormous regional differences in *per capita* incomes prevailing in Colombia.

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