Brazilian migration patterns between 1980 and 2010: towards a transitory period?

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Abstract
The reciprocal relationship between development and population dynamics affects migration patterns. The level of regional development is affected by migration process, and the subsequent migration flows are affected by the growth rates of the localities in a process of circular and cumulative causation. The aim of this paper is to identify the main characteristics of the Brazilian migration patterns between the 1980's and the 2010's. To achieve this goal, we analyze data from demographic census for the period, provided by IBGE. The migration criterion adopted considers migrant the individual who lives in a region for less than 05 years, regardless of his place of birth. Data analysis shows that migration patterns in Brazil are extremely related with the levels of regional development. Moreover, migration flows are associated with the advantages of urban centers, especially if they are located in medium sized cities. New trends begin to emerge and are related to the economic expansion of new destiny regions, with the decline of job opportunities in the most developed region of the country, and with return migration. Despite the changes observed, the expansion rate of the migration transition in Brazil is still low due to the inertial component of its dominant migration pattern.

Keywords: internal migration; dominant trajectories; secondary trajectories.

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1. Introduction

The process of economic development and migration flows are closely related phenomena (DE HAAS, 2008). The interactions between these processes should be incorporated into the analysis of population dynamics to avoid misinterpretations about this subject. More specifically, De Haas (2008) emphasizes that is important to understand how migration flows are perpetuated, their dynamics, and their effects on the development of the societies of origin and/or destiny of migrants. In this perspective, the authors intend to analyze Brazilian migration flows and their relationship with the levels of development of its regions.

Migration flows are an important component of a broad process of socioeconomic development. These flows are regular and have structural characteristics because of their importance to the spatial dynamics of the economy (BRITO, 2002). These specific migration flows are equivalent to population trajectories designed according to the national socioeconomic needs. Brito (2002) emphasizes that these migration trajectories have been fundamental to the development of the Brazilian markets since the 1950's. These migration trajectories behave as a mechanism of demographic transfer from stagnant regions to dynamic regions, where the urban-industrial economy is more developed or the agricultural frontier has expanded. The way how migration trajectories articulate themselves with historical contexts to attend economic, social, political, and demographic demands of the country, composes a migration pattern. This migration pattern is dynamic: it influences and is influenced by regional aspects. In this context, migration patterns may contribute to perpetuate the unequal characteristic of growth process.

Brito (2002) analyzes Brazilian migration patterns between 1870 and 1996, classifying them in three cycles: (i) 1870-1930 - incipient internal migration; (ii) 1940-1980 - the full expansion of internal migration; and (iii) 1980-1996 - the transition to a new migration pattern. In the first cycle, internal migration was incipient due to the low Brazilian population and because of the importance of international migration. In the second cycle, dominant migration trajectories occurred from the less dynamic regions of the country - the Northeast region and the state of Minas Gerais - to its most dynamic states - São Paulo and Rio de Janeiro. The high rates of industrial growth and employment in these two states functioned as factors of population

attraction (pull factors). The secondary trajectories during this cycle, which represent stages of dominant migration trajectories, occurred between neighboring states, for example, Espírito Santo and Rio de Janeiro, São Paulo and Paraná, Minas Gerais and states of Northeast region (regional migration patterns). Migration flows occurred mainly from rural to urban areas. Moreover, these migration patterns were influenced by government policies in areas of destiny (attraction policies) and/or origin (retention policies) of potential migrants. In general, public investments reinforced the dominant migration trajectories, and, consequently, the spatial pattern of Brazilian development and its regional disparities. Finally, Brito (2002) identifies that socioeconomic transformations occurred in Brazil from the 1980's decreased the dominant migration flows in favor of secondary flows, including return migration. These changes seem to delineate a transition to a new migration pattern.

The aim of this paper is to identify recent trends of internal migration in Brazil. More specifically, it seeks to determine if a new migration pattern is emerging due to socioeconomic changes occurred in Brazil between 1980 and 2010. To achieve this goal, we analyze data from demographic census for the period, provided by IBGE (Brazilian Institute of Geography and Statistics). Besides this introduction, the paper has four more sections. The main characteristics of database and methodology applied are described in the second section. In the following section, the authors discuss about Brazilian regional dynamics between 1980 and 2010. In the fourth section, the authors analyze the main tendencies of population displacements of short and long distance in Brazil in this period. Then, the conclusions are highlighted.

2. Methodology and sample characteristics

In order to analyze the interactions between migration and development, two empirical exercises are performed. Firstly, Brazilian migration patterns will be characterized using migration matrices for the period 1980-2010. This analysis is required to assess the extent to which migration flows are associated with Brazilian regional contexts. Brito (2002) emphasizes that migration patterns correspond to forms of articulation between population displacements and socioeconomic dynamics of the areas of origin and/or destination of migrants. These migration patterns have two main characteristics: (i) they are flexible, and (ii) they have an inertial component, stimulated by their cultural and social dimensions, that contributes to their

maintenance even in unfavorable contexts. In Brazilian case, recent studies indicate that is emerging a migration transition: the relative importance of dominant flows is decreasing and return migration is becoming more expressive (BRITO, 2002; BRITO e CARVALHO, 2006; BAENINGER, 2008). The analysis of the main characteristics of Brazilian migrations flows (inter and intrastate) between 1980 and 2010 will identify the consistence of these changes. Furthermore, this exercise will indicate the main regions of origin and destination of internal migrants in Brazil.

Secondly, to complement the analysis, econometric models will be estimated to identify the determinants of individual migration. Logistic regressions will be applied to identify the importance of individual characteristics (productive and non-productive) and regional characteristics to the implementation of displacement. This strategy aims to identify the contribution of Brazilian regional dynamic to the establishment of its migration flows.

2.1 Database

To achieve the proposed objectives, the authors analyze data from demographic census provided by Brazilian Institute of Geography and Statistics (IBGE) for the period 1980-2010. Population censuses are the best source of information to analyze migration: they provide information about productive (education, income, employment, etc.) and non-productive (sex, race, family structure, household condition, etc.) characteristics of individuals as well as their respective regions of origin and destiny.

In the period analyzed, new municipalities were created in Brazil and the criteria for obtaining census variables were changed. To avoid misinterpretation, some methodological adjustments were made to match census data. Firstly, the authors performed a spatial compatibility of database using the concept of minimum comparable areas (MCA), elaborated by Reis *et al* (2011). To enable comparisons between censuses, Reis et al (2011) aggregate municipalities in broader areas, which correspond to the union of the areas of the municipalities changed[4]. For example, in the case of municipalities that originates from more than one municipality the re-composition of the area involves aggregate the areas of all the municipalities of origin. In this paper, the first step to the spatial compatibility was the aggregation of

[4] Number of municipalities in Brazil in 1980, 1991, 2000, and 2010, respectively: 3,991; 4,491; 5,507; and 5,565.

municipalities in MCA for each census. This criterion defined 3,659 MCA. Then these MCA were aggregated according to their micro-geographical regions of origin[5]. This spatial compatibility generated 413 regional comparable areas (RCA) to Brazil between 1980 and 2010. The RCA is the spatial unit applied in this paper. The choice of this spatial unit is justified since this is the most important scale for individual displacements (the most expressive migration flows do not occur between small distances).

Secondly, the variables that provide information about income, employment and education of individuals were compatibilized. Income has been updated to 2010 values using census deflators calculated by Corseuil and Foguel (2002) and the National Consumer Price Index. The variables of employment were aggregated in 10 categories to enable sectoral analysis by activity[6]. Similarly, 04 categories were created to characterize the occupational structure of labor markets in Brazil (by the skill level of occupations)[7]. Furthermore, educational variables were created to indicate the number of years of formal education of individuals, classifying them into 05 groups of education[8].

Finally, the most important adjustments were made in migration variables. There are two criteria to define the condition of migration using Brazilian Demographic Censuses: "last stage" and "fixed date" (RIGOTTI, 1999; CARVALHO et al, 2000). The first criterion is obtained by combining census questions about "duration of current residence" and "place of last residence". This criterion identifies the previous place of residence of individuals who live less than 10 years in the place (area) of census. The second criterion indicates, for individuals with 05 years or more, the place of residence in a predetermined date, in general, 05 years before census date. These two criteria are not perfect substitutes because in some cases the place of origin at fixed date may not be the place of residence preceding the last stage of migration (RIGOTTI, 1999). Furthermore, census questions about these criteria were implemented in different census years. To overcome this limitation, it was constructed a proxy to the criterion "fixed date" to 1980, compatible with "fixed date" criterion of later census years. This proxy variable indicates the

[5] In 1980 Brazil had, according IBGE, 360 micro-regions. This amount increased to 558 in 1991 and has remain constant until 2010.

[6] Sectors of economic activity: modern industry, traditional industry, building, distributive services, productive services, social services, personal services, government, agriculture, extractive and mineral activities.

[7] Higher-level occupations, mid-level occupations, manual occupations, and domestic occupations.

[8] Educational groups: 0-3 years of schooling, 4-7 years of schooling, 8-10 years of schooling, 11-14 years of schooling, and 15 years or more of schooling.

place of residence of individuals 05 years before census date[9]. Thus, it is possible to calculate, for the entire period, proxies of conventional migration measures, such as number of immigrants, emigrants, and net migration[10].

Additionally, some adjustments were performed in order to obtain a more homogeneous sample: individuals who resided at "fixed date" (or earlier date) in other countries and individuals who have declared to be yellow or indigenous people (ethnic minority) were excluded from the analysis. The sample includes only individuals aged 25 to 64 years to capture migratory movements of individuals in working age and who have completed the educational cycle[11]. Improvised or collective households, and households without a head individual were also excluded from sample.

The authors highlight that sample adjustments enable an analysis about migratory trends in Brazil of a specific group of individuals and their relationship with the levels of regional development. Despite this limitation, it will observed that this sample represents a significant percentage of Brazilian population. Therefore, the results obtained will be important to improve the analysis about regional and migratory dynamics in Brazil in the last 30 years.

Sample details are shown in table 01 below:

Table 01 – Sample distribution by year

Year	Frequency	Proportion (%)	Cumulative (%)	(%) of demographic census
1980	8,088,455	28.09	28.09	27.53
1991	5,582,196	19.39	47.48	32.75
2000	6,745,692	23.43	70.92	33.27
2010	8,373,332	29.08	100.00	40.58
Total	**28,789,675**	**100.0**	**-**	**32.97**

Source: elaborated by the authors from demographic censuses 1980 to 2010.

Individuals are classified into two groups:

- Non-migrants: individuals who were born and lived in the locality of census or individuals who lived at least 05 years in this locality.

[9] The authors combined three census questions to create this variable: place of birth (city and state), place of previous residence, and time of residence in the locality of census.

[10] The authors are aware that when using a proxy to "fixed date" criterion it is not possible to calculate "net migration" (RIGOTTI, 1999). However, to simplify the analysis, the difference between the number of immigrants and emigrants will be considered a proxy to this measure.

[11] This sample selection is suitable for the problem analyzed, since the goal of the paper is to identify migratory movements of individuals inserted in Brazilian labor markets. Furthermore, with this sample selection it is expected to withdraw from analysis population displacements that are not related to economic development (family migration).

- Migrants: individuals who live less than 05 years in the locality of census even if they were born in this locality.

Migrants are classified into two categories:

- Interstate migrants: individuals who have moved between Brazilian states.

- Intrastate migrants: individuals who have moved between regional comparable areas (RCA) of a specific state in Brazil.

It is important to emphasize that spatial unit adopted, the regional comparable area, will directly affect the number of short distance migrants compared to municipal analysis. The RCA consists of several municipalities, and for that reason the number of intrastate migrants by RCA will be lower than the number of intrastate migrants by municipality. This spatial aggregation does not compromise the analysis but it is important to understand the differences between these spatial scales to avoid misinterpretation.

Finally, using a criterion of place of birth, migrants of short and long distance are classified as return migrants[12]. Long distance migrants who were born in the state of census are classified as interstate return migrants. Short distance migrants who were born in the RCA of census are classified as intrastate return migrants.

Table 02 shows the sample composition by group:

Table 02 – Sample composition by group (Brazil, 1980-2010)

Year	Non-migrants	Interstate migrants	Intrastate migrants	Return migrants	
				Interstate	Intrastate
1980	7,343,269	335,435	409,751	64.800	24.610
1991	5,227,553	175,930	178,713	49.051	20.248
2000	6,333,793	200,082	211,817	56.270	21.225
2010	7,975,735	192,964	204,633	54.808	24.442
Total	**26,880,350**	**904,411**	**1,004,914**	**224,929**	**90,525**

Source: elaborated by the authors from demographic censuses 1980 to 2010.

2.2 Methodology

The analysis of the main tendencies of internal migration in Brazil will be held in two stages. Firstly, migration matrices of short (intrastate) and long (interstate) distance will be

[12] The adoption of this criterion does not allow the identification of return migration of individuals born in different localities of the census area. The study requires this qualification due to compatibility of demographic censuses between 1980 and 2010.

constructed for each census year. These migration matrices allow the identification of the regions of origin and destination of migrants and they facilitate the determination of the main migration trajectories in Brazil. In other words, the analysis of migration flows through these migration matrices allows to identify which areas are more and less attractive to Brazilian population in the last 30 years.

After the analysis of migration flows in Brazil, an econometric exercise will be conducted to evaluate the influence of regional development to individual migration condition. The aim is to identify the main determinants of individual migration condition and include into the analysis aspects related to socioeconomic development levels of regions of origin and destination of potential migrants. The idea is to demonstrate in what extend migration flows are influenced by regional contexts, represented by indicators of local levels of development and attractiveness. More specifically, it is intended to emphasize the importance of local urbanization and centrality to migration flows in Brazil between 1980 and 2010. This is a strategy to include factors of population attraction, retention, and/or repulsion in migration models.

The migration criterion adopted, as previously noted, is a proxy of "fixed date" criterion. It considers migrant the individual that resides in a particular locality for less than 05 years. The spatial unit of the exercise, the 413 regional comparable areas, emphasizes the main contribution of this paper to the analysis of interactions between migration and development in Brazil: in general, researches on this subject are limited to state or municipal scale. A more rigorous analysis of the determinants of population displacements requires a refinement of regional borders. When the analysis is performed among small areas (municipalities) or among large areas (states), the results obtained may limit the interpretation of migration flows.

Logistic models will be estimated to determine individual migration condition in Brazil between 1980 and 2010. These models are applied to estimate the probability of occurrence of a particular event, e.g. the execution of migration, under a series of conditions represented by a vector x of independent variables, e.g. individual and regional aspects (CAMERON and TRIVEDI, 2005). The functional form of these models is specified below:

$$\Pr(y_{ij} = 1 \mid x, z) = \beta_0 + \beta_1 Xij + \beta_2 Z_{ij} + \varepsilon_{ij} \qquad (1)$$

where y_{ij} is the dependent variable, X_{ij} is a vector of interest variables, Z_{ij} is a vector of control variables and ε_{ij} is the random error term.

The dependent variable, y_{ij}, represents individual migration condition in each census year. It assumes the following values:

$y_{ij} = 1$ when the individual is a migrant; and

$y_{ij} = 0$ when the individual is a non-migrant.

The interest variables refer to indexes of the levels of regional development and attractiveness of areas of destination and origin of potential migrants. The values of these variables are identical at origin and destiny areas for non-migrants. In other words, non-migrants have identical regional information at "fixed date" (origin RCA) and "census date" (destination RCA). This fact rules out the estimation of migration models that simultaneously incorporate variables of regions of origin and destination of potential migrants: the non-migrant observations would be self identified and probably the results obtained would lead to misinterpretation. For this reason, specific regressions are estimated to the RCA of individual residence at "fixed date" (origin area) and to the RCA of individual residence at "census date" (destination area).

Control variables are incorporated into the analysis to capture the effective contribution of regional aspects to migration decision. The purpose of their inclusion is to control the omission of non-observable variables, and problems of model specification. These variables refer to demographic controls, such as sex, race, age, years of formal education, etc.

According to Cameron and Trivedi (2005), the coefficients obtained from logistic estimation are difficult to interpret because they do not provide the relative changes of probabilities between the categories of analysis. To overcome this difficulty, the relative risk ratio (or odds ratio) is calculated between two particular observations. The odds ratio can be interpreted as the relative change in probabilities of the analyzed categories; the odds ratio calculates the probability of choosing a contrast category in relation to the reference category when a specific independent variable varies in one unit. Thus, the variable $\boldsymbol{x}$ increases (decreases) the probability of occurrence of the reference category if the odds ratio is larger (smaller) than 01. To calculate odds ratio is necessary to find the ratio between the relative chances of success of two events:

$$RRR = odds \quad ratio = \frac{odds_1}{odds_2} = \frac{\frac{p_1}{1-p_1}}{\frac{p_2}{1-p_2}} \qquad (2)$$

The non-linearity of probability functions of logistic regressions requires the adoption of estimation methods of Maximim Likelihood. These estimation methods are essential to logistic analysis: when considering the distribution of ***y*** given ***x***, the method automatically incorporates the existing heteroscedasticity in ***Var(y|x)***. This is sufficient to correct any problems of consistency of estimated parameters.

The intragroup correlation of interest variables (regional variables) is controlled to minimize the implications of the hypothesis of independence between these observations. Each individual perceives the locations of origin and destination in a different way. The assignment of identical values to interest variables of all individuals that reside in a specific area may generate limitations to interpretation of the obtained results. In other words, unobservable factors, such as preferences, climate, proximity to family, etc., imply individual perceptions extremely specific and particular. For that reason, it is necessary to control correlation within these groups (regional comparable areas). Technically, it is assumed that observations are independent among the groups, but not necessarily within these groups. This strategy provides a more accurate measure of the contribution of regional characteristics to individual migration decision[13].

To achieve the proposed objectives, it is considered that individuals have two alternatives in relation to displacement: migrate or not migrate. These alternatives are represented by the variable described in chart 01 below[14]:

Chart 01 – Dependent variable

Variable	Name	Description
cond_mig	Individual migration condition	Categorical variable that takes value 01 to migrant and 0 otherwise.

Source: elaborated by the authors from demographic censuses 1980 a 2010.

Sociodemographic controls are included into the analysis using the variables described in chart 02. The authors highlight that occupational variables are not included in analysis due to the imprecision of effective date of individual achievement of these characteristics.

[13] The methodological adjustments performed to control intragroup correlation, and the stability of individual characteristics over time show that cross section techniques are appropriate to analyze the proposed objective (CAMERON and TRIVEDI, 2005). The contributions of panel data estimation would be relevant only if the unit of analysis was the regional comparable area: these regions have characteristics that change over time.

[14] Several tests were performed to define the specification of the models estimated. The exercises performed with multinomial variables to migration generated results very similar to the results obtained with binary models. For that reason, the authors opted to use binary models.

Chart 02 - Sociodemographic controls

Variable	Name	Description
sex	Sex	*Dummy* that takes value 1 to men and 0 to women.
white	Cor ou raça	*Dummy* that takes value 1 to white person and 0 to black and brown person.
marital_status	Marital status	*Dummy* that takes value 1 to individuals with stable relatioship and 0 otherwise.
aged_25to34	Aged group 25 to 34 years	*Dummy* that takes value 1 to individuals aged 25 to 34 years e 0 otherwise.
aged_35to44	Aged group 35 to 44 years	*Dummy* that takes value 1 to individuals aged 35 to 44 years e 0 otherwise.
aged_45to54	Aged group 45 to 54 years	*Dummy* that takes value 1 to individuals aged 45 to 54 years e 0 otherwise.
aged_55to64	Aged group 55 to 64 years	*Dummy* that takes value 1 to individuals aged 55 to 64 years e 0 otherwise.
educ_0to3	Educational group between 0 and 3 years of schooling	*Dummy* that takes value 1 to individuals with 0 to 3 years of schooling and 0 otherwise.
educ_4to7	Educational group between 4 and 7 years of schooling	*Dummy* that takes value 1 to individuals with 4 to 7 years of schooling and 0 otherwise.
educ_8to10	Educational group between 8 and 10 years of schooling	*Dummy* that takes value 1 to individuals with 8 to 10 years of schooling and 0 otherwise.
educ_11to14	Educational group between 11 and 14 years of schooling	*Dummy* that takes value 1 to individuals with 11 to 14 years of schooling and 0 otherwise.
educ_15	Educational group with 15 years of schooling or more	*Dummy* that takes value 1 to individuals with 15 years of schooling or more and 0 otherwise.

Source: elaborated by the authors from demographic censuses 1980 to 2010.

Two groups of regional variables will be used to identify the importance of localities to individual migration decision. The first group indicates the levels of local centrality according to a study conducted by IBGE (2008). In this study, using several information about socioeconomic dynamic and accessibility, IBGE (2008) has identified the structure of Brazilian urban network. This urban network has five hierarchical levels, respectively: metropolis, regional pole, subregional pole, center zone, and local center. The second group of variables indicates the levels of regional development and its industrial dynamics. These indexes were constructed using multivariate techniques described in next section. These variables provide important information about regional productive potential. The first index assumes higher values for regions with higher levels of development and it should be interpreted as local capacity to attract individuals. The second index shows that regional comparable areas that have higher levels of employment in

industrial sector tend to be more dynamic. The regional variables are described in chart 03 as follow:

Chart 03 – Regional variables

regic1*	REGIC centrality level 1 of the RCA	*Dummy* that takes value 01 if the RCA of residence is a metropolis and 0 otherwise.
regic2*	REGIC centrality level 2 of the RCA	*Dummy* that takes value 01 if the RCA of residence is a regional pole and 0 otherwise.
regic3*	REGIC centrality level 3 of the RCA	*Dummy* that takes value 01 if the RCA of residence is a subregional pole and 0 otherwise.
regic4*	REGIC centrality level 4 of the RCA	*Dummy* that takes value 01 if the RCA of residence is a center zone and 0 otherwise.
regic5*	REGIC centrality level 5 of the RCA	*Dummy* that takes value 01 if the RCA of residence is a local center and 0 otherwise.
c1**	Development and attractiveness index of the RCA	Indicator of the level of development and attractiveness of the RCA of individual residence.
c2**	Industrial index of the RCA	Indicator of the advantages and disadvantages of the industrial sector of the RCA of residence.

Source: elaborated by the authors from demographic censuses 1980 to 2010.
(*) These levels of centrality are defined by IBGE (2008).
(**) These indexes were constructed using multivariate techniques specified in next section.

These regional characteristics tend to be correlated. For that reason and to avoid misinterpretation, models will be estimated for each group of regional variables. These models will identify the main determinants of individual migration condition, including regional issues. It is expected to identify the main regional factors of population attraction, retention, and/or repulsion.

3. Brazilian regional dynamics

The socioeconomic conditions of a locality have significant impact to migration decision. According to Singer (1973), regional contexts are the most important aspects of this process: before to take individual characteristics in consideration, potential migrants analyze in details

regional socioeconomic contexts at origin and destination areas. The author highlights that the existence of regional disparities can be interpreted as the main determinant of migration trajectories stimulated by the process of capitalist development. Furthermore, migration can affect regional disparities in a reciprocal way, intensifying them. This fact highlights the importance of analyzing Brazilian regional dynamic in recent years to understand the complexity of its migration patterns.

Brazilian recent development (post-1950) is marked by expressive regional disparities (AFFONSO and SILVA, 1995). This process favored the central-south region of the country (especially the State of São Paulo) at the expense other regions/states. During the 1960's and the 1970's, several instruments of regional development were applied to minimize these disparities, however, their results were not expressive (GUIMARÃES NETO, 1995). The Brazilian crisis debt in the 1980's stimulated the decrease of public intervention, especially the implementation of regional policies. The absence of Federal policies stimulated the application of local policies over the country, especially in the 1990's (ARAUJO, 2000). In a context of intense trade liberalization, the main results of these policies were the dispersion of productive activities in center-south region (DINIZ, 1993) and in some isolated areas over the country, such as the economic poles that emerged in some states of Northeast (LIMA, 2004).

In this new context, medium sized cities have played a strategic role to economic development: they have the entire infrastructure needed to the growth of productive activities and they do not have high costs of congestion, observed in large urban centers (THOMPSON e SERRA, 2001). The urban intensification of medium sized cities has stimulated their development and dynamism.

To observe Brazilian regional dynamic between 1980 and 2010, some regional variables were constructed using data from demographic censuses. These variables are described in chart 04, and they demonstrate essential characteristics of local socioeconomic development: income, education, household infrastructure, health, industrial dynamics, modern services dynamics, level of formalization of labor markets, labor qualification, urban attractiveness, poverty, and inequality.

Chart 04 – Regional socioeconomic variables

Name	**Description**
Per capita household income	Average value of per capita household income of region.

Sewerage system rate	Proportion of households connected to sewerage system.
Average schooling	Average years of schooling in region.
Degree of industrialization	Proportion of urban workers in industrial sector.
Industrial scale*	Indicator of relevance of industrial sector to region.
Density of modern services**	Proportion of urban workers in modern services sector.
Skilled labor	Proportion of urban workers in technical and scientific activities.
Formality level of labor markets	Proportion of urban workers in formal activities.
Cultural supply	Proportion of urban workers in cultural activities.
Health services supply	Proportion of urban workers in health sector.
Occupancy rate	Proportion of workers.
Public goods supply	Urban workers in activities related to the provision of public goods.
Poverty index***	Poverty index.
Gini Coefficient	Inequality index.
Centrality level****	Urban hierarchy indicator.

(*) Indicator contructed from Diniz e Crocco (1996) with the following classification: 01 to irrelevant industrial areas (industrial labor<1.000); 02 to intermediate industrial areas (1.000<=industrial labor<10.000); and 03 relevant industrial areas (>=10.000).

(**) Telecommunication services, financial services and insurance, legal services, accounting and auditing, consulting, advertising, engineering, architecture, design and other technical services to enterprises, scientific and technological institutions.

(***) The poverty line is equivalent to ¼ of Brazilian minimum wage at reference date of the 2010 demographic census. This is the same criterion to individual inclusion in Brazilian social programs, such as Bolsa-Família.

(****) These levels of centrality were constructed from REGIC/IBGE to the years of 1991, 2000, and 2010. Population was used as a proxy to 1980. Regional comparable areas were classified according to the level of centrality of the municipality of higher GDP.

Techniques of multivariate analysis (Principal Component Analysis - PCA) are applied to reduce the number of regional variables and to identify the most dynamic regions of Brazil between 1980 and 2010. The aim of PCA is to build a set of statistically independent variables from a linear transformation of a given set of observed variables that are correlated (MINGOTI, 2005). The components generated are not correlated and they are calculated such that the first component shows the highest percentage of variation of observed data, the second component shows the second highest variation, and so on. Thus, it is possible to reduce the initial number of variables with minimal loss of information. Moreover, PCA is a nonparametric statistic method and because of that it is not necessary to assume hypothesis about the probability distribution of the original variables. Table 03 shows that the two first components explain approximately 70% of variation of original data for each census year:

Table 03 – Variance explained - Sample of 413 regional comparable areas (Brazil, 1980-2010)

	Variation							
Component	**1980**		**1991**		**2000**		**2010**	
	Individual	Accumulated	Individual	Accumulated	Individual	Accumulated	Individual	Accumulated
c1	54.50%	54.50%	51.80%	51.80%	52.10%	52.10%	46.90%	46.90%
c2	14.60%	69.10%	17.10%	68.90%	17.40%	69.50%	22.70%	69.60%
Other	30.90%	100.00%	31.10%	100.00%	30.50%	100.00%	30.40%	100.00%

Source: elaborated by the authors from demographic censuses 1980 to 2010.

The analysis and interpretation of the contributions of each variable to the first component and to the second one allows the identification of two indicators of Brazilian regional dynamic (table 04).

Table 04 – Principal components coefficients (Brazil, 1980-2010)

	1980		**1991**		**2000**		**2010**	
	c1	c2	c1	c2	c1	c2	c1	c2
pc_income	0,333	-0,124	0,334	-0,099	0,327	-0,131	0,350	-0,097
sewage_r	0,269	-0,127	0,253	-0,198	0,244	-0,162	0,276	-0,131
schooling	0,334	0,009	0,341	0,047	0,339	-0,037	0,347	-0,094
air	0,295	-0,099	0,303	0,070	0,293	-0,060	0,297	-0,044
ind_degree	0,118	-0,585	0,182	-0,457	0,054	-0,526	0,034	-0,446
mod_serv	0,276	0,188	0,312	0,143	0,340	0,046	0,360	0,045
qualif_l	0,273	0,276	0,296	0,262	0,322	0,113	0,168	0,345
occup_r	-0,178	-0,158	-0,205	-0,144	-0,201	-0,200	-0,018	-0,320
formal_r	0,320	-0,112	0,318	-0,137	0,288	-0,227	0,305	-0,231
culture	0,115	0,295	0,076	0,271	0,140	0,296	0,302	0,128
health	0,164	0,309	-0,064	0,374	0,219	0,341	0,142	0,323
poverty	-0,324	0,164	-0,312	0,183	-0,247	0,335	-0,253	0,339
gini_coef	0,037	0,506	-0,066	0,516	0,032	0,473	0,109	0,464
pub_goods	0,284	-0,037	0,259	0,179	0,260	0,074	0,225	0,063
centrality	0,304	0,039	0,278	0,248	0,303	0,154	0,321	0,178

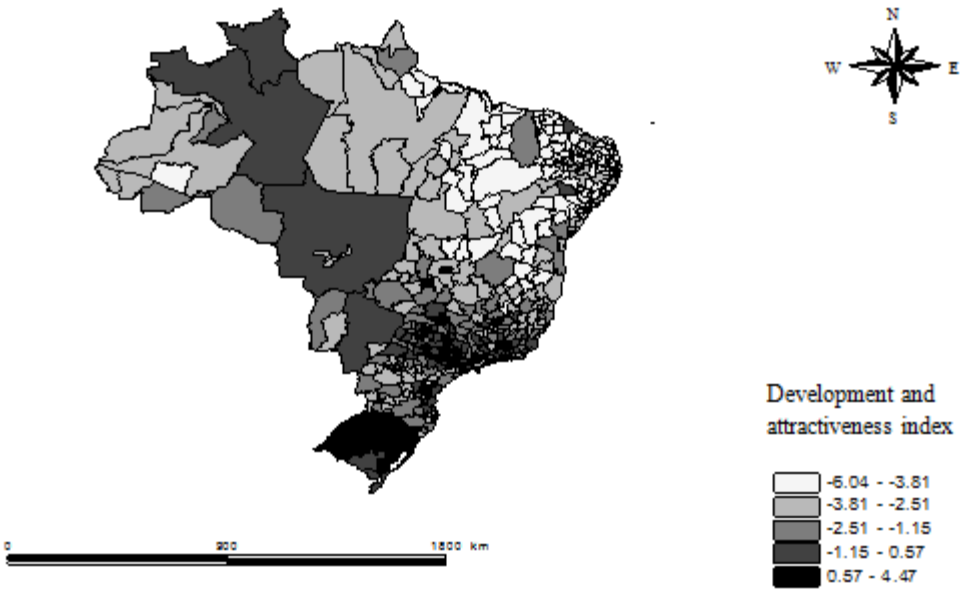
Source: elaborated by the authors from demographic censuses 1980 to 2010.

The first component is an index of local level of socioeconomic development. It compares variables that have a positive contribution to development (e.g. degree of industrialization and average schooling) with variables that have negative contribution to development (e.g. poverty index). This index has higher values to regional comparable areas that have more employment opportunities and income levels to individuals. It can also be interpreted as the level of local attractiveness. The second component is equivalent to an industrial relevance index. It compares the importance of this sector to locality with local levels of poverty and inequality. Furthermore,

this index analyze in what extent aspects that are not direct related to the dynamics of industrial sector (e.g. health services and cultural offer) can counteract the benefits generated by industry. This index has greater importance to medium sized regions.

Figure 01 shows spatial distribution of the development and attractiveness index in Brazil in 1980. In this year, regional comparable areas with higher values of this index were located in southeastern region of the country (especially in areas polarized by state capitals), while the Northeast region had the less developed and attractive areas. São Paulo, the main economic pole of Brazil, had the largest amount of dynamic regions and it was the more attractive region of the country. Other important dynamic regions in southeastern region were the RCAs of Rio de Janeiro, Belo Horizonte, Uberlândia, and Juiz de Fora. In South region, the most developed and attractive areas were the RCAs of Porto Alegre, Curitiba and Florianópolis (state capitals). The proximity of this macroregion to the main economic pole of Brazil (São Paulo) stimulated the attractiveness of intermediary RCAs, such as Londrina, Maringá, Joinville, and Blumenau. The expansion of agricultural frontier towards Midwest region generated local benefits, whose main results were reflected in the indexes of the RCAs of Goiânia, Campo Grande and Cuiabá. Finally, the indexes of North and Northeast regions evidenced the high heterogeneity of Brazilian economy: local levels of development and attractiveness were insignificant with few exceptions, such as the RCAs polarized by state capitals (e.g. Recife, Fortaleza, Salvador, Belém, and, Manaus).

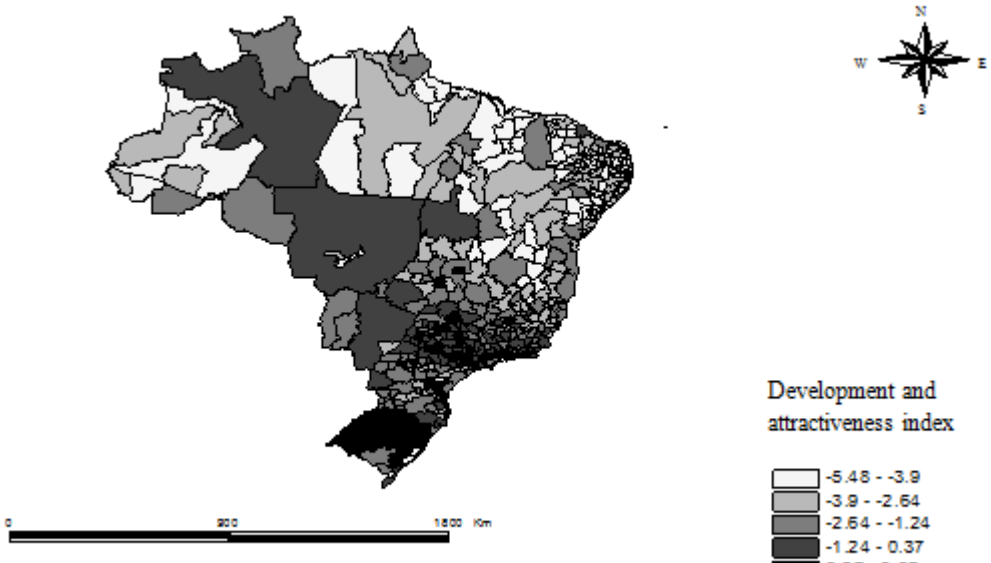
Figure 01 – Development and attractiveness index by regional comparable area (Brazil, 1980)



Source: elaborated by the authors from demographic census of 1980.

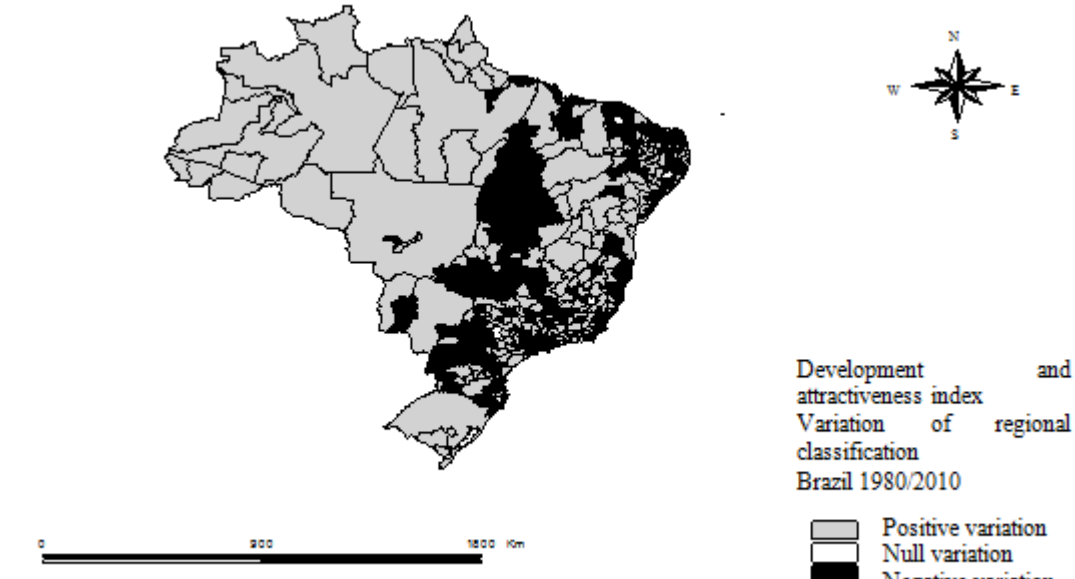
The analysis of development and attractiveness index to the following years (1991, 2000, and 2010) shows that despite the improvements observed in the period, Brazilian regional disparities persist and can be noted at different spatial levels (ARAÚJO, 2007). These changes can be observed in figures 02 and 03. The first shows the spatial distribution of development and attractiveness index in 2010. The second illustrates the variation of regional position according to a ranking constructed using the values of the development and attractiveness index between 1980 and 2010.

Figure 02 – Development and attractiveness index by regional comparable area (Brazil, 2010)



Source: elaborated by the authors from demographic census of 2010.

Figure 03 – Regional classification (variation) by regional comparable area (Brazil 1980/2010)



Source: elaborated by the authors from demographic censuses (1980 and 2010).

In 2010, the most dynamic areas of Brazilian economy are still concentrated in southeast region, but it is clear their expansion to regional comparable areas of south region and to Midwest. The most probable reason for this result is the decentralization of productive activity to the hinterland of the Metropolitan Region of São Paulo, more specifically to medium sized cities, as demonstrated by Diniz and Crocco (1996). Data from the Institute of Applied Economic Research (IPEA) show that these cities have growth rates of population and GDP more expressive than the major Brazilian cities (metropolis). It is also possible to observe that north and northeast indexes have improved, as a result of the growth of some regional poles (e.g. RCA of Petrolina, Mossoró-Vale do Açu, Campina Grande, Imperatriz, etc.).

However, the number of regional comparable areas with low values of development index is still very expressive in Brazil, especially in North and Northeast regions. In several cases there was a decrease in the level of attractiveness. Regional disparities are more expressive at macroregional scale, but the analysis indicates the existence of disparities within Brazilian macroregions, including in the more developed areas. In other words, Brazilian regional problem transcends the dichotomy Southeast versus Northeast (ARAÚJO, 2007). There are disparities of income, employment opportunities, productive structure, etc., in all spatial units in Brazil.

The analysis shows that regional comparable areas that had the most positive changes during the period are located in Southeast and Northeast regions. The questions are: does this increase in regional ranking (interpreted as an elevation of development level) was sufficient to stimulate displacements to these regions? Or to retain population? The answers to these questions will be obtained through the analysis of Brazilian migration patterns between 1980 and 2010.

4. Internal migration in Brazil between 1980 an 2010

Internal migration has an expressive importance to socioeconomic dynamic in Brazil. All stages of Brazilian growth have been accompanied by expressive migration flows (BRITO, 2002). Despite to be less expressive than migration flows observed in previous period (1950-1980), the absolute number of internal migrants in Brazil increased between 1980 and 2010 as shown in table 05. However, table 06 shows that the proportion of migrants decreased in this period (from 9.2% to 4.6%).

Table 05 – Number of migrants and non-migrants (Brazil, 1980-2010)*

Year	Non-migrants	Interstate migrants	Intrastate migrants	Return migrants	
				Interstate	Intrastate
1980	29,242,601	1,341,285	1,620,534	256,994	97,093
1991	43,109,440	1,473,236	1,463,262	401,489	158,768
2000	51,770,570	1,656,806	1,699,200	440,739	159,194
2010	71,354,008	1,750,569	1,655,122	446,049	193,687
Total	**195,476,619**	**6,221,896**	**6,438,118**	**1,545,271**	**608,742**

Source: elaborated by the authors from demographic censuses 1980 to 2010.
(*) Sample expanded by population using weights provided by IBGE.

Table 06 – Proportion of migrants (Brazil, 1980-2010)

year	Interstate migrants (a)	Intrastate migrants (b)	Migrants (a+b)	Return migrants	
				Interstate	Intrastate
1980	4.2%	5.0%	9.2%	0.8%	0.3%
1991	3.2%	3.2%	6.4%	0.9%	0.3%
2000	3.0%	3.1%	6.1%	0.8%	0.3%
2010	2.3%	2.2%	4.6%	0.6%	0.3%

Source: elaborated by the authors from demographic censuses 1980 to 2010.

Return migration represents a small portion of sample, despite the absolute increase of these flows in recent years. It is important to emphasize that return flows have gained importance within migration groups. Interstate return migrants correspond to 19.2% of long-distance migrants in 1980; in 2010 this percentual increased to 25.5%. In the case of intrastate return migrants, this increase was approximately from 6% to 12%. These data indicates, as shown by Brito (2002) and Baeninger (2000, 2008), the emergence of a new migration pattern in Brazil, in which return flows assume a more expressive importance.

Table 07 describes migration proportion by type of displacement (short or long distance). There are two tendencies: (i) an increase of interstate migration flows, probably stimulated by the reduction of transports costs; and (ii) an increase of return migration, probably stimulated by socioeconomic improvements in regions of origin of migrants or by decreases in employment and income opportunities in regions of destination.

Table 07 – Proportion of migrants by type of displacement (Brazil, 1980-2010)

year	Interstate migrants (a)	Intrastate migrants (b)	Migrants (a+b)	Return migrants	
				Interstate	Intrastate
1980	45.3%	54.7%	100.0%	8.7%	3.3%
1991	50.2%	49.8%	100.0%	13.7%	5.4%
2000	49.4%	50.6%	100.0%	13.1%	4.7%
2010	51.4%	48.6%	100.0%	13.1%	5.7%

Source: elaborated by the authors from demographic censuses 1980 to 2010.

In 2010, regional comparable areas (RCA) localized in Brazilian southeast are the main destination places of internal migrants (44%), followed by RCAs localized in Northeast (22%), South (15%), Midwest (12%), and North (7%). The proportion of migrants in Southeast region declined, especially in São Paulo (from 31% in 1980 to 25% in 2010). Data analysis shows that the most expressive migration flows continue to occur between RCAs localized at Brazilian Northeast and Southeast. Return migration is more significant in Brazilian Northeast (37.5% of return migrants in 2010), followed by Southeast (32%) and South (17.3%). This type of displacement increased between 1980 and 2010 in all Brazilian macroregions except in Southeast. The increase of return migration to RCAs with lower levels of income may be related to pull factors at origin (e.g. high GDP growth rates) and/or push factors at destination (e.g. high urban costs). Finally, it is possible to observe that Midwest region has the most expressive proportion of migrants in relation to its population (although this proportion has decreased from 17% in 1980 to 7% in 2010) followed by North (12% to 5%), Southeast (10% to 5%), South (8% to 4%), and Northeast (7% to 4%).

Preliminary analysis of data indicates that the main population displacements in Brazil still flow towards its most dynamic regions. However, the analysis also indicates that RCAs that traditionally expelled migrants have increased their capacity to attract population in recent years.

Data from demographic census of 1980 reflect migration flows stimulated by socioeconomic transformations occurred in Brazil during the 1970's. The first half of this decade is characterized by high GDP growth rates while the second half is marked by a decreased in GDP due to unfavorable external conditions (CARNEIRO, 2002). Economic policies implemented in this period aimed to stimulate national growth and productive structure, but this developmental strategy increased Brazilian external vulnerability, especially after the second oil shock in 1979 and the rising of international interest rates. In summary, these structural adjustments failed to stimulate a new pattern of regional growth in Brazil, despite some localized

regional improvements (CARNEIRO, 2002). The most dynamic areas of national growth remained concentrated in southeast states, especially in São Paulo and Rio de Janeiro. Population displacements in this period reflect this regional dynamic and they demonstrate the relationship between migration and development: dominant migration flows were influenced by expressive levels of regional disparities and these migration flows conditioned Brazilian regional development. In other words, data from demographic census of 1980 demonstrate the migration pattern established during Brazilian industrial expansion, which main pole was the state of São Paulo. Migration flows towards this state continued to be expressive and, according to Martine (1989), these flows weren't more expressive due to regional policies to control displacements, especially in Northeast. The main RCAs that provided labor to São Paulo were located in Northeast and Minas Gerais. This dominant migration pattern (Northeast-Southeast) was accompanied by secondary trajectories, which tend to be limited to regional contexts. Flows of return migration represented a small proportion of displacements in this decade, but it is interesting to point out that the higher amount of return migrants in 1980 were located in Minas Gerais, Pernambuco, Ceará, and Bahia – states that traditionally expelled population. This information may be an indication of changes in Brazilian migration patterns in the following years.

To analyze internal migration in Brazil between 1980 and 1991 it is necessary to understand the main transformations occurred in economy in this decade. According Carneiro (2002), Brazilian economy experienced in this period several oscillations in inflation and GDP growth rates, credit restrictions, reduction of public spending (including investments), and a process of political re-democratization. In this context, the main objective of economic policies was the control of inflation rates. After four decades of developmental strategies, Brazilian government changed its focus to the implementation of macroeconomic stability policies. These changes in public intervention, the failures of monetary stabilization plans, and the intensification of globalization process are essential to explain internal migration dynamics in this period. The analysis of migration matrices demonstrates the increase of relative importance of regional (secondary) trajectories to migration patterns in Brazil and the increase of return displacements. The most probable explanations to these changes refers to three factors: (i) the consequences of productive investments implemented in the less developed regions of Brazil in previous period; (ii) the high impacts of economic recession to economic poles located in Southeast region,

especially in São Paulo and Rio de Janeiro; and (iii) the intensification of local development policies. The results obtained are consistent with the analysis performed by Baeninger (2000) and Brito (2000): RCAs of São Paulo and Rio de Janeiro continued to attract a high number of migrants in the 1980's (maintenance of dominant patterns); RCAs of Northeast and Minas Gerais remained as traditional areas of emigration, despite the reduction of their population losses; RCAs of Midwest and North emerged as new spaces of population attraction (expansion of agricultural frontier); and new poles of population attraction emerged around the metropolitan area of São Paulo.

These migration trends were intensified during the 1990's. The first half of this decade is characterized by several economic instabilities, such as low national income growth, high inflation rates, and external constraints (CARNEIRO, 2002). This conjuncture highlighted the need of economic reforms to re-establish GDP growth and Brazilian government adopted several measures suggested by IMF and World Bank, such as financial liberalization, trade liberalization and economic deregulation. The reorientation of economic policies was essential to the implementation of a plan of monetary stabilization – Real Plan –, whose results were very positive (GIAMBIAGI, 2011). The second half of the decade is characterized by the intensification of macroeconomic policies of monetary stabilization at the expense of regional development policies, employment and growth. There have been some improvements in social indexes, but regional disparities of income and employment opportunities remain very expressive (GUIMARÃES NETO, 1995, p. 37). These characteristics had several implications to migration flows, because the competition for investments among regional comparable areas increased in this period, especially between medium sized cities. Data from demographic census of 2000 indicate that Brazilian dominant migration pattern between 1991 and 2000 had the same characteristics as the previous period: the most significant displacements occurred from RCAs located in Northeast and Minas Gerais to RCAs located in Southeast (São Paulo). This pattern has an inertial component stimulated by the expressive Brazilian regional disparities and by migration networks between migrants and non-migrants at origin and destination regions. Despite of this inertial component, there is in recent years a continuous reduction of the magnitude of these dominant flows in favor of secondary trajectories within Brazilian macroregions. Several RCAs localized in Minas Gerais and in Northeast region reduced their migratory losses or had positive net migration between 1991 and 2000. The analysis indicates a probable migration

transition in Brazil stimulated by return migration and by the dynamics of medium sized cities as pointed out by BRITO e CARVALHO, (2006), BRITO (2006) e BAENINGER (2008).

In the early years of XXI century, the main characteristics of Brazilian economy were high unemployment rates, low GDP growth rates, macroeconomic stability, and absence of regional policies (IPEA, 2010b). The second half of this decade is characterized by monetary stability, reduction of public debt, generalization of social policies to reduce inequality and poverty, and by the increase of public investments in logistic infrastructure. It is important to point out that less developed regions have grown at more expressive rates than the national average rate, stimulated by public investments. However, these regions continue to have socioeconomic indicators lower than national average, which illustrates the relative stability of Brazilian regional dynamics (ARAÚJO, 2007). In this context, medium sizes cities consolidate their strategic position to development. Brazilian economic trends in last decade have generated several impacts to migration flows: the high growth rates of the less developed regions can act as a factor of population retention and can stimulate migration counterflows. Simultaneously, economic recovery in the most developed regions of the country (south-central) can stimulate the attraction of individuals and, consequently, the intensification of dominant migration pattern. These changes in Brazilian migration flows point out to a period of migration transition, which gradually seeks to decrease the relative importance of the displacements from Northeast to Southeast. However, the rate of expansion of this migration transitions is slow. The interactions between migration and development and the persistence of high regional disparities in Brazil tend to reinforce the inertial characteristic of its dominant migration pattern. Consequently, these factors attenuate changes in secondary flows.

More specifically, data from Brazilian demographic census of 2010 show that changes in secondary migration flows tend to occur mainly between RCAs with less expressive levels of regional disparities. The adequacy of migration patterns to new economic contexts benefits the most dynamic regions polarized by medium sized cities. The analysis shows that migrants tend to be concentrated in specific areas of origin and destination such as productive activities. Dominant and secondary migration patterns are defined by these specific flows.

In summary, the analysis of internal migration in Brazil between 1980 and 2010 shows that regional disparities of income and employment opportunities are so expressive that restrict broader changes in population displacements: the desire to migrate to Southeast to obtain

economic improvements persists, especially in Northeast. Changes in secondary migration trajectories delineate a new displacement ideology, however, the limited spatial dispersion of economic activities restrict the expansion of these flows.

4.1 Regional aspects and the individual decision to migrate

To identify the main determinants of individual migration condition and recent trends in Brazilian migration patterns two logistic models will be estimated to the regions of origin and destination of potential migrants. These models incorporated, as explained in section 2, individual and regional variables. The first group indicates individual characteristics such as sex, race, schooling level, etc. The second group indicates the local level of development, and the position of the locality in Brazilian urban hierarchy. The aim of these empirical exercises is to prove the hypothesis of loss of attractiveness of metropolitan areas to migration decision, and the importance of local contexts to Brazilian migration patterns. The results obtained are shown in tables 08 and 09 below.

In relation to individuals characteristics, estimation models show that between 1980 and 2010, the probability of be a migrant is positively related to sex: men have, on average, a migration probability 10% higher than women. In 1980, white individuals had a probability of migration 9% higher than black (and brown) individuals, but this percentage decreased until 2010 to approximately zero. Individuals who have a stable marital relationship have higher probability to migrate, probably because they need to diversify their income and employment opportunities. The results indicate that families tend to migrate together, but this probability has decreased from 48% in 1980 to 24% in 2010. In other words, single individuals who have less significant emotional bonds at origin area tend to migrate more in 2010 than in 1980. The selectivity of migration in relation to age is easily identified by analyzing the results obtained. Individuals aged between 25 and 34 years have a probability of migration significantly higher than older individuals. It is important to point out that the results confirm the hypothesis of greater ability of young people to adapt to new social contexts and their low levels of risk aversion. Migration is also very selective in relation to the level of formal education. Individuals with higher education (11 years of schooling or more) have a higher probability to migrate during all the period analyzed when compared with other groups. High levels of education tend to facilitate individual

insertion in labor markets, thus, individuals with this characteristic have lower risks levels related with displacement. In summary, the models show that young and white men, who have high levels of formal education and a stable marital relationship, are the most likely individuals to migrate in Brazil between 1980 and 2010. There are indications that women's probability to migrate and black individuals' probability to migrate have grown, however, the selective nature of migration process remains.

In relation to regional issues at origin location, the results obtained show that RCAs with higher levels of urban hierarchy had higher capacity to retain population until the first half of the 1990's. Individuals that resided at fixed date (origin area) in metropolis had lower probability to migrate than individuals that resided in RCAs with lower levels of urban hierarchy. The high urban hierarchy was a factor of population retention in RCAs of origin of potential migrants (advantages related to the standard of living of Brazilian metropolises). From the second half of the 1990's, the expansion of medium sized cities stimulated their attractiveness, and these cities emerged as the new migration poles in detriment of Brazilian metropolises. In other words, from 1995, an individual that resides at fixed date in a RCA at the top of Brazilian urban hierarchy has a probability to migrate higher than the individuals that resides in RCA polarized by medium sized cities.

These results indicate that migration flows in recent year can't be explained by conventional migration theories (e.g. push-pull models, neoclassic models, etc.). These theories consider that migration and development are inversely related, and, because of that, migration should decrease with income convergence among regions. Migration patterns that emerge in recent years are complex and their interpretation requires a simultaneously analysis about regional development, the individual aspects of migration decision, and the relationship between these factors (DE HAAS, 2010). More specifically, it is important to understand how individual migration capacity is influenced by individual aspirations, and the impacts of regional development over these individual characteristics. In dynamic regions, individuals have higher access to information about income and employment opportunities in other locations, and higher levels of education and qualification, which reduce the risks related to their displacements (DE HAAS, 2010). This regional context facilitates displacements and individuals can migrate more because of their aspirations than by their capability to migrate. According De Haas (2010), migration capability varies in the same direction as development, but migration aspirations

increase only until a critical point of regional development. In this perspective, immigration varies in the same direction of development and emigration tends to increase in the early stages of development process. Emigration reaches a maximum level, and after that it varies in the opposite direction of development. These arguments are sufficient to explain migration flows that have emerged in recent years.

In relation to destiny regions of potential migrants, the results obtained show that there was no significant changes between 1980 and 2010: individuals that reside at census date in a RCA polarized by a metropolis have lower migration probability than individuals that reside in other RCAs. These results are equivalent to a loss of the capacity to retain population of Brazilian metropolises. The most probable reasons to these tendencies are related to the high congestion costs of urban centers and the expansion of medium sized cities.

RCAs polarized by subregional capitals (intermediate level of urban hierarchy), such as Paulo Afonso, Alfenas, Poços de Caldas, Ubá, Macaé, Viçosa, and Bragrança Paulista, have a grater capability of retain and attract population. These RCAs have an expressive economic dynamism in the last two decades with significant consequences to their levels of employment and income. These factors have stimulated the permanence of their respective populations, as well as the attraction of immigrants from different regions of the country. The residence at fixed date in RCAs with intermediate levels of centrality reduces individual probability to migrate when compared with individuals that reside in RCAs with high levels of centrality. However, it is important to point out that between 2000 and 2010 there was a reduction of the attractiveness of destiny regions with intermediate levels of urban hierarchy.

Finally, the results show that RCAs with lower levels of urban hierarchy have the smallest capacities to retain and attract population. The limited opportunities of employment and income have transformed these regions in traditional areas of population repulsion.

The results of the urban hierarchy models are confirmed by the models that incorporate the indexes of local development and attractiveness (table 09). RCAs more developed tend to expel population in recent years due to their inability to provide economic opportunities in the necessary amount to their high population levels. Simultaneously, RCAs with high levels of industrial development have a high ability to attract and to retain population.

The analysis demonstrates the importance of urbanization and development to new migration patterns that emerged in the last two decades in Brazil. The main flows occur among

urban regions, especially from the less developed regions to the most developed regions. Despite this fact, it is possible to observe an increase of the importance of secondary flows: from metropolises to localities with intermediate levels of centrality. The importance of medium sized cities to these migration flows is very expressive.

Table 08 – Odds ratio of logistic models to individual migration condition by centrality level (Brazil, 1980-2010)

	Origin (fixed date)				Destination (census date)			
	1980	**1991**	**2000**	**2010**	**1980**	**1991**	**2000**	**2010**
sex	1.103***	1.098***	1.083***	1.123***	1.104***	1.096***	1.082***	1.130***
	(0.005)	(0.005)	(0.005)	(0.006)	(0.012)	(0.005)	(0.008)	(0.006)
white	1.120***	1.025	0.973	0.988	1.128*	1.046	0.984	1.027
	(0.049)	(0.064)	(0.038)	(0.053)	(0.073)	(0.046)	(0.048)	(0.038)
sitconj_uniao	1.453***	1.350***	1.253***	1.263***	1.443***	1.327***	1.221***	1.216***
	(0.043)	(0.014)	(0.012)	(0.017)	(0.037)	(0.015)	(0.015)	(0.012)
aged_45to54	1.256***	1.253***	1.265***	1.138***	1.258***	1.245***	1.262***	1.119***
	(0.029)	(0.019)	(0.038)	(0.039)	(0.014)	(0.019)	(0.019)	(0.017)
aged_35to44	1.711***	1.768***	1.678***	1.649***	1.709***	1.743***	1.652***	1.594***
	(0.026)	(0.018)	(0.073)	(0.067)	(0.026)	(0.038)	(0.047)	(0.040)
aged_25to34	2.546***	2.436***	2.302***	2.283***	2.555***	2.374***	2.246***	2.150***
	(0.050)	(0.044)	(0.140)	(0.142)	(0.115)	(0.106)	(0.116)	(0.079)
educ_0to3	0.797***	0.895	0.950*	0.805***	0.852	0.831**	0.852***	0.696***
	(0.061)	(0.061)	(0.029)	(0.020)	(0.110)	(0.064)	(0.048)	(0.027)
educ_4to7	0.818***	0.901*	0.932**	0.934***	0.833***	0.876***	0.880***	0.845***
	(0.038)	(0.050)	(0.028)	(0.024)	(0.045)	(0.036)	(0.028)	(0.018)
educ_11to14	1.210***	1.118***	1.094**	1.020	1.191***	1.113***	1.100***	1.052***
	(0.050)	(0.039)	(0.041)	(0.023)	(0.041)	(0.020)	(0.021)	(0.016)
educ_15	2.151***	1.472***	1.487***	1.517***	2.092***	1.517***	1.619***	1.677***
	(0.291)	(0.156)	(0.167)	(0.115)	(0.196)	(0.054)	(0.055)	(0.046)
regic1	0.501**	0.664*	1.468***	2.718***	0.444***	0.397***	0.391***	0.404***
	(0.173)	(0.212)	(0.046)	(0.071)	(0.131)	(0.085)	(0.017)	(0.014)
regic2	0.325***	0.744***	0.654*	1.450	0.595*	0.984	0.354***	0.372***
	(0.071)	(0.079)	(0.182)	(0.441)	(0.237)	(0.110)	(0.126)	(0.129)
regic3	0.679***	0.943	0.494***	0.903	1.164	1169*	0.452***	0.370***
	(0.081)	(0.079)	(0.104)	(0.259)	(0.185)	(0.117)	(0.127)	(0.103)
regic4	0.867*	0.803***	0.876***	1071*	1.363**	0.804*	0.885**	0.862***
	(0.115)	(0.065)	(0.035)	(0.049)	(0.171)	(0.114)	(0.048)	(0.045)
_cons	0.056***	0.033***	0.035***	0.022***	0.045***	0.037***	0.043***	0.032***
	(0.005)	(0.003)	(0.002)	(0.001)	(0.005)	(0.003)	(0.004)	(0.002)
Pseudo-R2	0.037	0.019	0.024	0.027	0.036	0.033	0.029	0.031
Nº obs	8.088.455	5.582.196	6.745.692	8.373.332	8.088.455	5.582.196	6.745.692	8.373.332

Source: elaborated by the authors from demographic censuses 1980 to 2010.
(***) Significant at 1%.
(**) Significant at 5%.
(*) Significant at 10%.

Table 09 – Odds ratio of logistic models to individual migration condition by development and attractiveness index (Brazil, 1980-2010)

	Origin (fixed date)				Destination (census date)			
	1980	**1991**	**2000**	**2010**	**1980**	**1991**	**2000**	**2010**
sex	1.111***	1.100***	1.087***	1.122***	1.108***	1.094***	1.081***	1.125***
	(0.005)	(0.004)	(0.005)	(0.006)	(0.012)	(0.005)	(0.008)	(0.006)
white	1.239***	1.044	1.049	0.978	1.106	0.953	0.949	0.903
	(0.103)	(0.103)	(0.061)	(0.068)	(0.093)	(0.070)	(0.061)	(0.063)
sitconj_uniao	1.444***	1.354***	1.259***	1.270***	1.460***	1.337***	1.226***	1.214***
	(0.040)	(0.014)	(0.014)	(0.019)	(0.039)	(0.017)	(0.014)	(0.015)
aged_45to54	1.266***	1.255***	1.271***	1.144***	1.258***	1.253***	1.265***	1.126***
	(0.031)	(0.018)	(0.036)	(0.038)	(0.015)	(0.019)	(0.020)	(0.018)
aged_35to44	1.713***	1.774***	1.692***	1.672***	1.722***	1.759***	1.666***	1.627***
	(0.026)	(0.019)	(0.066)	(0.065)	(0.028)	(0.036)	(0.050)	(0.044)
aged_25to34	2.538***	2.449***	2.321***	2.330***	2.586***	2.417***	2.274***	2.221***
	(0.049)	(0.038)	(0.123)	(0.138)	(0.100)	(0.099)	(0.121)	(0.083)
educ_0to3	0.747***	0.905	0.957	0.854***	0.932	0.879**	0.891**	0.767***
	(0.072)	(0.094)	(0.054)	(0.019)	(0.102)	(0.057)	(0.049)	(0.026)
educ_4to7	0.818***	0.909	0.937*	0.957	0.857***	0.879***	0.889***	0.870***
	(0.037)	(0.054)	(0.035)	(0.030)	(0.045)	(0.037)	(0.030)	(0.020)
educ_11to14	1.195***	1.113***	1.077*	1.008	1.210***	1.144***	1.109***	1.064***
	(0.053)	(0.036)	(0.042)	(0.026)	(0.047)	(0.028)	(0.022)	(0.022)
educ_15	2.106***	1.453***	1.477***	1.513***	2.020***	1.516***	1.597***	1.708***
	(0.262)	(0.150)	(0.169)	(0.123)	(0.197)	(0.067)	(0.056)	(0.073)
c1	0.876***	0.958	0.983	1.092***	0.958*	0.947**	0.926***	0.926***
	(0.039)	(0.048)	(0.046)	(0.035)	(0.031)	(0.023)	(0.018)	(0.023)
c2	1.038	0.977	1039*	1.039*	0.940*	0.859***	0.923***	0.882***
	(0.056)	(0.030)	(0.025)	(0.023)	(0.046)	(0.031)	(0.022)	(0.011)
_cons	0.038***	0.027***	0.029***	0.025***	0.037***	0.029***	0.031***	0.024***
	(0.003)	(0.002)	(0.004)	(0.002)	(0.005)	(0.003)	(0.003)	(0.002)
Pseudo-R2	0.034	0.017	0.013	0.024	0.022	0.024	0.020	0.027
Nº obs	8.088.455	5.582.196	6.745.692	8.373.332	8.088.455	5.582.196	6.745.692	8.373.332

Source: elaborated by the authors from demographic censuses 1980 to 2010.
(***) Significant at 1%.
(**) Significant at 5%.
(*) Significant at 10%.

5. Conclusions

Regional Socioeconomic development is a process closely related to the dynamics of population displacements (DE HAAS, 2008). The analysis of regional growth involves the study of these displacements to avoid misinterpretation. In other words, interactions between migration and development should be analyzed to understand the complexity of these process. In this context, migration should be considered as an integrant part of development process and a phenomenon that has a specific internal dynamic.

In Brazilian case, according to Brito (2002), migration flows have been significantly affected by spatial pattern of economic development, and this pattern, in turn, has been affected by migration flows. The aim of this paper was to analyze the evolution of migration patterns in Brazil in recent years (1980-2010) to identify in what extent the interactions between migration

and development affect dominant and secondary population displacements. To achieve this goal migration matrices of short and long distance were built to identify the main tendencies of internal population displacements between 1980 and 2010. After this characterization of Brazilian migration patterns, logistic models were estimated to identify the determinants of individual migration condition.

Using data from Brazilian demographic censuses provided by IBGE and multivariate techniques, it was constructed two indexes to represent the levels of regional development and attractiveness. The analysis of these indexes between 1980 and 2010 demonstrates that there have been regional improvements in Brazil, but regional disparities still are very expressive and can be observed in several spatial scales. In this context, medium sized cities, specially located in south-central regions, emerged as important poles of development.

The analysis of migration matrices demonstrate changes in population displacements in Brazil between 1980 and 2010. These changes indicate that Brazil tends to a period of migration transition. The dominant migration pattern (from Northeast to Southeast) has been gradually replaced by secondary flows oriented specially to RCAs polarized by medium sized cities. However, this migration transition has a slow expansion rate due to the persistence of expressive regional disparities. The interactions between migration and development stimulate the inertial characteristics of dominant migration patterns and decrease the rate of expansion of secondary flows. More specifically, data show that changes in secondary flows tend to occur more consistently among RCAs with less expressive regional disparities localized in Brazilian south-central region. The results show that limited spatial deconcentration of development restrict the expansion rate of Brazilian migration transition.

To identify in what extend regional contexts affect migration flows logistic models were estimated. The estimates obtained indicate that individuals with higher probabilities to migrate in Brazil between 1980 and 2010 are young white men with high levels of schooling. There are indications of increase of migration probability of women and black (brown) individuals, however, migration is a process with expressive levels of selectivity.

The models to the regions of origin and destination of potential migrants indicate that urban scale and high levels of development were important factors of population retention and attraction until the first half of the 1990's. However, the intensification of urbanization process and the rising costs of large urban centers reversed this influence: the inability to provide income

and employment to high levels of population stimulated migration flows from the most developed RCAs to RCAs polarized by medium sized cities. These regions provide the infrastructure necessary to development new economic activities and have lower urban costs than metropolises. In this context, RCAs with high levels of centrality and development have reduced their capacity to attract people.

The analysis demonstrate an important aspect of the interactions between migration and development: the adjustment of migration patterns to new contexts is a consequence of individual analysis about the conditions at regions of origin and destination. These interactions can't be reduced to simplistic analysis, restrict to economic determinants of migration. Individual migration condition is influenced by both structural and individual aspects (DE HAAS, 2010). It is clear that migration patterns should be analyzed in a broader perspective. The results obtained emphasized the importance of conventional migration determinants, such as income level, to explain dominant migration pattern in Brazil (from less developed regions to more developed regions). At the same time, the analysis shows that these determinants are inappropriate to explain secondary flows that emerged after 1995. In recent years, there has been a intensification of secondary flows: new forms of population displacements have increased with a more reversible character in relation to the localities of origin and destination. Return migration has also increased.

6. References

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