SOCIOECONOMIC AND DEMOGRAPHIC DETERMINANTS OF MIGRATION IN BRAZILIAN MUNICIPALITIES: 2000-2010[1]

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Brazilian economic transformations are responsible for the dynamics of the population of its territory. There are many studies that attribute a substantial part of migration decisions to the labor market, without, however, considering other possible determinants. In this sense, this paper aims to analyze the determinants of the Brazilian migratory dynamics, considering multiple dimensions of analysis. Literature is reviewed and empirical treatment is given by the construction of the Migration Effectiveness Index (MEI) and the use of fixed effects panel data models, with municipalities as units of analysis. The results show that labor market variables, such as occupation, work in industry, commerce and services, explain to a greater extent the participation of migrants in the municipalities of the country. Regarding emigration, it is the negative effects of these variables that motivate people to leave their municipality. In this sense, it is, therefore, the labor market that shows the greatest relation with the migratory dynamics in Brazil.

Keywords: migration dynamics; infrastructure; human capital; job market.

DETERMINANTES SOCIOECONÔMICOS E DEMOGRÁFICOS DAS MIGRAÇÕES NOS MUNICÍPIOS BRASILEIROS: 2000-2010

As transformações econômicas brasileiras são responsáveis pela dinâmica da população ao largo de seu território. Muitos são os estudos que atribuem ao mercado de trabalho parte substancial das decisões de migração, sem, contudo, considerar outros possíveis determinantes. Nesse sentido, este artigo tem como objetivo analisar os condicionantes da dinâmica migratória brasileira, considerando-se múltiplas dimensões de análises. Revisa-se a literatura e o tratamento empírico é dado a partir da construção do Índice de Eficácia Migratória (IEM) e do uso de modelos de dados em painel de efeitos fixos, tendo os municípios como unidades de análise. Os resultados mostram que as variáveis de mercado de trabalho, tais como: ocupação, trabalho no setor da indústria, comércio e serviços, explica em maior proporção a participação de migrantes nos municípios do país. Já em relação à emigração, são os efeitos negativos dessas variáveis que motivam a saída de pessoas de seu município. Nesse sentido, é, pois, o mercado de trabalho que apesenta a maior relação com a dinâmica migratória no Brasil.

Palavras-chave: dinâmica migratória; infraestrutura; capital humano; mercado de trabalho.

JEL: J0; J15; J61.

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1 INITIAL CONSIDERATIONS

This paper aims to study the issues that impact the migratory dynamics, comparing the variables that affect immigration (entry of people) and emigration (exit of people) in Brazilian municipalities. The basic assumption taken for the analysis is that the socioeconomic development and the population dynamics of the Brazilian population were marked by sharp differences in their consolidation. Regional economic concentration; indicators of disparate housing conditions; inequality in the labor market; disparities in national human capital; unemployment rates with substantial differences between regions; different activity conditions among the economically active national population; substantially higher income differentials among those employed in different regions of the country, among other issues, marked the population movement in search of better socioeconomic conditions in economically more dynamic regions (Sjaastad, 1980; Lee, 1980; Martine, 1990; Camarano and Abramovay, 1998; Pacheco, 1998; Guimarães Neto, 1997; Diniz, 2001; Araújo, 2000; Brito, 2006).

The socioeconomic context of the country was an inducer of migratory dynamics, especially in years of low economic growth and with a high incidence of climatic volatility in regions of agrarian economies, which caused the need to migrate as a strategy to overcome the challenges imposed by local conditions. Regional differences and the search for job opportunities, faced with a low economic growth and low labor availability in some regions, motivated a migratory movement in search of occupational insertion, in a context of limited employment possibilities in the regions source (Sjaastad, 1980; Lee, 1980; Martine, 1990).

The regional socioeconomic dynamics was the first characteristic observed as a factor of attraction of migrants in the classic studies of Sjaastad (1980), Lee (1980) and Martine (1987). The expected income in the region of destination substantially higher than the income earned in the region of origin is a significant factor in the process of expulsion and attraction of labor. Even knowing that factors that are implicit in the decision to migrate have strong impacts, the personal desire to improve socioeconomic conditions is decisive in the final decision (whether or not to migrate).

In this sense, the spatial mobility of the population is intrinsically related to social mobility. Leaving the origin for another destination is the search for better working conditions, with which it is expected that there will be greater possibilities of social mobility. Considering studies by Maia and Quadros (2009) and Maia (2013) it is possible to observe that social mobility through work has become an important condition for social improvement in the Brazilian economy in the 2000s. In addition, recent studies converge to the logic that has been set especially in the

theoretical models on migration for many years, affirming that the social mobility of the migrant happens through work (Lima and Vale, 2001; Santos Junior, 2002).

The historical-structural approach proposes that the decision to migrate comes from the desire for better remuneration and work conditions offered at the place of destination in relation to the place of origin. Todaro (1980) considered that the decision to migrate is a decision based on factors of an economic nature and is directly influenced by the possibilities of better socioeconomic insertion conditions of individuals. Based on this principle, the observable individual characteristics (race/color, sex, schooling, among others) and unobservable (determination, motivation, entrepreneurship, among others) analyzed in the migration decision are only highlighted in more recent empirical studies. But the possibility of social ascension of the individual is what most explains the decision of the migration.

Over the years, the migratory movement has been extremely high, with the most diverse destinations among the regions of the country, but with specific foci in regions where economic development was potentially high. For many decades, the Brazilian Southeast has been, in both absolute and relative terms, the most attractive region of intraregional and interregional migrants. In contrast, the Northeast showed significant expulsion in the last fifty years of the 20th century (Netto Júnior, Porto Junior and Figueiredo, 2008), but with marked changes in recent years (Oliveira and Jannuzzi, 2005).

The low economic dynamism of some regions is shown to be a high factor to explain the migratory processes (Singer, 1980; Taylor, 1999; Borjas, 1996; Pacheco and Patarra, 1997). The dynamics of the population is driven by economic dynamics, which is the main attraction factor for migrants in Brazil and in the world (except for the few countries where migrations are motivated by wars, climatic catastrophes, religious persecutions, among others), including that the decision is individual (Singer, 1980; Sawyer, 1984; Cançado, 1999; Santos and Moreira, 2006; Mata et al., 2007; Cambota and Pontes, 2012; Freguglia and Menezes-Filho, 2012).

The migratory dynamics in Brazil is a result of the socioeconomic characterization of its regions. Regional productive concentration; low level of human capital; substantially high socioeconomic disparities are major determinants of national migration dynamics. Before the Brazilian economic situation and the above mentioned factors, studying the Brazilian migratory dynamics is substantially relevant from the point of view of the dynamics of human capital in search of opportunities for occupational insertion. Besides, the Brazilian migratory flows are high.

In recent years, short-distance migration has predominated. Improvement in national economic indicators, such as: economic growth; regional productive decentralization; reduction of regional and economic inequalities of the population; greater formalization in the labor market, generally across the country, have ended

up impacting on the reduction of long-distance flows and accentuating short-distance migration in the national territory. Municipalities of economic growth became important recipients of internal migrants. In order to study the Brazilian migratory dynamics, considering inter-municipality migration is important to consider the short-term flows in the national migratory dynamics in a temporal cut (Demographic Censuses of 2000 and 2010) where the short-distance flows in the national migratory dynamics stand out.

Based on the context presented, this paper aims to analyze the Brazilian socioeconomic dynamics and the socioeconomic development factors involved in the attraction and repulsion of in-migration and out-migration, respectively, in the municipalities of the country. The specificity of this research lies in the joint analysis of the inter-municipality[4] and individual socioeconomic factors that impact the migration decision. From this perspective, the development of the work is based both on a historical-structuralist approach and on the maximization of individual well-being.

Thus, the intention is to observe the socioeconomic differences and the profile of the migrants, as well as their socioeconomic insertion in the Brazilian municipalities, since the economic divergence of the country is extremely high. However, the analysis intends to answer some questions related to population displacement, which are: what are the relations between the municipality socioeconomic conditions and the migratory dynamics? How do migrants enter socioeconomically in places of destination?

Considering the decision to migrate as being influenced by socioeconomic and individual factors as diverse as possible, the magnitude of the economic variables influences the population dynamics (infrastructure, labor market, unemployment rate, wages, among others). In addition, it is worth pointing out that it is possible to measure the influence that each of the individual characteristics (socioeconomic and demographic) used can exert on decision-making and migratory processes. Besides, it should be noted that the socioeconomic insertion of migrants in the municipalities of the country, based on the last two Demographic Censuses, allows us to observe both the migratory dynamics and the economic and social context resulting from the socioeconomic transformations experienced in Brazil. From this perspective, the purposes of this study are established.

The paper is divided into five sections, besides these initial considerations, the second section presents the methodological procedures used; in the third section, there is empirical evidence of migration off the national territory; soon after, in

4. Intermunicipality migration is one in which a person changes from one municipality to another. It is an intermunicipality migrant that person who migrates from a municipality belonging to a state to another municipality belonging to another state, that is, interstate; or one that migrates from a municipality from one state to another municipality in the same state, that is, intra-state. Thus, intermunicipality migration happens from one municipality to another, whether of the same or another state.

the fourth section, the results of the Migration Effectiveness Index (MEI) are presented; in the fifth section, the results obtained from the panel data model; in the sixth section, the final considerations are made.

2 METHODOLOGICAL PROCEDURES

This paper analyzes the impacts of socioeconomic variables on migratory dynamics: attraction and repulsion in Brazilian municipalities, based on microdata from the Demographic Census of Brazil in the years 2000 and 2010. In addition, information is used here about heads of households in the two years under analysis. The fixed date migration was the one used here. In Brazil it is considered the one in which the migrants are less than five years old in the current municipalities at the moment the Census goes to the field. That is, if the person answered that resided in another municipality on 7/31/1995 and 7/31/2005, in the 2000 and 2010 census,[5] respectively, this person is a fixed date migrant. Likewise, a fixed-date migration was used in order to verify the effect of short-distance migration in the last Demographic Census, as well as to capture the effects of Brazilian socioeconomic transformations and their impacts on migration dynamics in recent years, excluding the other types of migration.

The variables used throughout the paper are named in the following.

1) Households in the destination with responsible in-migration.
2) Households at the origin with those who emigrated.
3) Households with a water supply service through a general network.
4) Households with sewage system by general sewage or rainwater network, septic tank and rudimentary septic tank.
5) Households with garbage collection by cleaning service or placed in a cleaning service bucket.
6) Households with electricity supply by distributing company or other sources.
7) Households in which the responsible person claimed to be literate.
8) Households in which the responsible person claimed to have completed high school.
9) Households in which the responsible person has complete higher education.
10) Households in which the reference person answered to be occupied in the reference week of the survey.

5. The Demographic Census in Brazil is held every 10 years, from the year 1950 to the year 2010, the last year. In that period, only one Census was not decennial, that of 1991.

11) Households in which the person responsible for the household responded to be a contributor to an official social security institute in the main job or other job.

12) Households in which the person responsible responded to be engaged in sectors of economic activities of industry, commerce or services (ICS).

13) Households in which the person in charge claimed to be poor at work. That is, to have remuneration lower than ¼ minimum wage.

2.1 MEI

In order to analyze the Brazilian municipal migratory dynamics, an important index used by the international and national literature is the MEI. This was created and indicated by the United Nations (UN, 1970) and suggests a way of comparing the internal migratory dynamics of a country, without risks of fragility of the indicator over time. With this, one can make an internal analysis of the migrations in different time clippings, maintaining the robustness of the results. Thus, a dynamic analysis of the migrations in the territory is considered, considering the emigrations and immigration of each unit of analysis (municipalities, states or regions; exits and entrances). With the index, it is possible to observe the municipalities (unit of analysis of this paper) for their capacity of retention, evasion and migratory turnover. Therefore, it is necessary to build the Brazilian migratory matrix, presented here at municipality levels. The migratory matrix of this paper is made from the following mathematical denomination. Let A be any migratory matrix.

$$A = \begin{pmatrix} a_{11} & \cdots & a_{1j} \\ \vdots & \ddots & \vdots \\ a_{i1} & \cdots & a_{ij} \end{pmatrix}, \tag{1}$$

in which

- A_{ij} = exit of the migrants from the municipality i to the municipalities j in the period t under analysis;
- $\sum a1j$ = total number of people who emigrated from the municipality i to j municipalities in Brazil; and
- $\sum ai1$ = the total number of people who are in-migration in the municipality i and who left the j municipalities in Brazil.

From this definition, it is possible to build a flow analysis for the Brazilian migrants responsible for the households and then build the MEI. The values assumed by the index vary between - 1,00 and 1,00. The mathematical formula is given by the following expression.

$$MEI = \left[\left(\frac{I_i - E_i}{I_i + E_i}\right)\right], \tag{2}$$

in which I_i and E_i are, respectively, the in-migration residing in the municipality i and the out-migration of the municipality i in the two Censuses under analyzes.

With the elaboration of the index, it is worth mentioning that the national literature (Oliveira, 2011) and international literature (Menezes, 2003) interpret the values approximately as follows: - 1,00 < - 0,13 are considered areas of migratory loss; ≥ - 0,13 ≤ 0,12 are attributed as areas of migratory turnover; and > 0,12 ≤ 1,00 are classified as a migratory retention area.

The use of the index has the purpose of presenting, from maps, the Brazilian municipalities that present a high population loss (in the case of Brazil, the outflows occur mainly due to economic reasons. That is, low economic dynamics of the municipalities which induces the outflows movement in search of work); the areas which attract and create labor constantly, being, therefore high in entrance and exit. These municipalities are those of temporary economic dynamism, without, however, establishing a dynamic economy base capable of attracting and maintaining the work force, configuring, this way, as municipalities where there is migratory turnover; the retention areas, in the Brazilian case, can be classified as those which attract the work force for considerable periods of time. That is, they are municipalities located in areas of constant economic growth.

2.2 Panel data model

The second part of this paper makes use of the panel data model by the fixed effects approach. Municipalities are used as cross-sectional units. The municipalities in 2010 were reconciled to the year 2000, in such a way that the new dismembered municipalities were grouped to their municipalities of origin, as stated in the 2000 Demographic Census, so that the data matrix could be reconciled. Thus, the analysis panel had 5,507 municipalities in two periods, totaling 11,014 records.

The panel data model consists of associating time series and cross section data. This results in the joining of information from several units of monitored analysis over time. In this sense, the composition of the units is given from $i = 1,2,3 \ldots, N$ units at any time interval in which $t = 1,2,3 \ldots, T$ periods of time used in time series in i units of observation.

Thus, the units of analysis and time are crucial to the construction of the data panel to be used in studies of this nature. Hence, the mathematical representation takes the following form.

$$Y_{it} = \alpha_i + X_{it}\beta + \varepsilon_{it}, \quad (3)$$

in which α_i assumes the specific effects of the cross-sectional units, and these are considered constant over time under study; and, ε_{it} assumes the error term not specified in the model. The α_i factor can be controlled by the fixed or random effects

approach. The first, fixed effects, assumes that this factor can be correlated to the characteristics of the municipalities Xit. The second, random effects, assumes that this factor is not related to the characteristics of the municipalities. Fixed effects approach were opted in this paper, since the decision to migrate (attractiveness, for example), would also be associated to the socioeconomic characteristics of the municipalities.

Thus, the correlation between the characteristics of the units and the random variables used in the panel data model used in this study is sought. The participation of migrants in municipality i can be explained by circumstantial variables of basic household infrastructure, such as: energy service, water, sewage and garbage collection; variables of municipality human capital, such as: participation of literate people and participation of people with at least high school; participation of persons with complete higher education; and labor market variables, such as: occupancy rate (participation of persons employed in the Economically Active Population – EAP in the country), social security contribution and participation of employees in ICS by municipality.

3 BRAZILIAN MIGRATORY DYNAMICS: SOCIOECONOMIC AND DEMOGRAPHIC ASPECTS

The limitations of geographic space, working conditions, concentrated income, among others, have provided crucial problems in Brazilian socioeconomic development. Political and economic issues were strongly influenced by the urban dynamics registered by the concentration of production and the fluidity with which the population dynamics intensified. The structure of the labor market always had a strong influence on the Brazilian migratory movement, especially at the boom of the industrialization process, as well as the advance of the national agricultural frontier (Todaro, 1980; Wood, 1982; Martine, 1990). On the one hand, substantial changes in the productive structures strongly affected the inclusion of labor, especially the one with low level of schooling and reduced professional experience in the great industrial development centers of the country. On the other hand, the search for work in the agricultural frontier regions absorbed for many years the population surplus not absorbed by the activities related to industry.

Studies of this nature confirm the hypothesis of the historical-structural model that determines migration (Singer, 1980). It is understood that the decision to migrate is due to the deficient capacity of the installed productive structures and negatively affect the economy of the regions that expel the population. Substantial changes in the regional productive dynamics reinforce a migratory movement in search of better conditions of existence in other regions.

According to Ramalho (2005), the regional economic disparities are in a country with a high population distributed in sharply disparate territory, as well as the concentration of monetary income, which determines the migratory movement. Changes in regional productive structures change the direction of migratory flows. In this case, it is the search for better working conditions, mainly with a higher remuneration than the one obtained at the origin, which determines the destination. In the intermunicipality migratory dynamics, issues related to household infrastructure and the possibility of access to human capital training services are also relevant in the decision to migrate.

These inequalities in regional productive structures have a marked impact on the regional distribution of the Brazilian population's monetary income. The more economically developed regions are the ones that absorb the most part of the work force, and with the best salaries practiced, which encourages interregional and intra-regional migration in these spaces (Freguglia, Menezes-Filho and Souza, 2007). Even in view of the better performance assumed in recent years in productive structures at regional scales in the country, Freguglia and Menezes-Filho (2012) verified the high effect of wage differentials on regional scales influencing the migratory movement motivated by higher labor income. However, a relatively small part of the migrant population is influenced by labor market dynamics in sectors of high technological intensity and substantial capacity to absorb skilled labor. The majority of the migrant population occupies jobs in more traditional sectors.

Thus, some studies in Brazil have sought to list determinants of migratory processes, with regional income disparities as conditioning factors, without, however, analyzing socioeconomic issues of a structural nature in the destination of migrants (Ferreira and Diniz, 1995; Menezes and Ferreira-Júnior, 2003; Netto Júnior, Porto Junior and Figueiredo, 2008). In this context, questions related to regional income inequality, through the spatial allocation of the work force by migratory processes, justify a series of empirical studies.

In addition, there is considerable production of migratory selectivity[6] in international studies (Borjas, 1987; 1998; Chiswick, 1978; 1999) and national (Ramalho, 2005; Silva, Silva-Filho and Cavalcanti, 2016) that attribute to migration the loss of qualified or entrepreneurial work force, since factors such as better remuneration have significant importance in the decision to migrate. Thus, the entrepreneurs, who are part of the migratory contingent, seek to live in urban areas of greater economic relevance and with greater possibilities of social ascension.

6. By this model, it is understood that the immigrants are part of the population with individual characteristics more aggressive, enthusiastic, enterprising and motivated to look for better opportunities. Therefore, they are a positively selected sample.

Freguglia, Menezes-Filho and Souza (2007) and Freguglia and Menezes-Filho (2012) showed that migrants from economically less developed regions seek better conditions for occupational insertion. For the authors, there are salary differentials between regions and this is one of the incentives to migration in the studies conducted. Given this, positive selection may not happen precisely because of the greater qualification or determination in the individual view, but because of the conditions offered by the labor market in the destination, contrary to some of the works that elect migratory selectivity as a phenomenon that accentuates the regional income disparity in regional scale.

In addition, Brazilian agribusiness cities have also become important poles of opportunity: these cities receive substantial participation of migrants over the years in search of work. They are important destinations for the workforce and meet the needs of unskilled labor, especially for direct activities in the countryside. Thus, it is not possible to overlook the important role of agribusiness in the Brazilian migratory dynamics, especially with the advancement of the national agricultural frontier and the consolidation of countryside activities in the attraction of agroindustries in the years following the advance of grain production in the country (Guimarães and Leme, 2002; Juttel, 2007).

The impacts of the expansion of the national agricultural frontier on population dynamics are still recorded in a few municipalities in the Brazilian Northeast. This dispersion of the national migratory dynamics is accentuated by the modernization and agricultural occupation in the less populated areas of the national territory (Todaro, 1980; Wood, 1982; Martine, 1990; Camarano and Abramovay, 1998; Guimarães and Leme, 2002; Juttel, 2007). According to Brito (2006) the Midwest still stands out in the migratory dynamics of the 2000s, as well as the North of the country that has experienced significant growth in migrations in recent years (Jakob and Jakob, 2015).

The Midwest, with the development of large-scale agribusiness, has become an important nucleus of attraction for migrants throughout the last decades of the twentieth century (Martine and Camargo, 1984; Camarano and Abramovay, 1998) and the beginning of the 2000s 2000 (Guimarães and Leme, 2002; Brito, 2006; Juttel, 2007). So, can structural issues impact the Brazilian migratory dynamics? Is there a correlation between the level of municipality socioeconomic development and the attraction of people across the national territory?

The national economic situation in the years 2000, with regional productive decentralization, although small; reduction of socioeconomic inequalities across Brazilian territory; emergence of poles of economic growth in the medium cities of the country, becomes an important reason to study the intermunicipality migration dynamics. In the last Demographic Census, long-distance migration has been

giving way to a short-distance migratory movement in the country (Vasconcellos and Rigotti, 2005). In these aspects, the following section seeks to contemplate the purpose of the paper to present the determinants of migration in a context of socioeconomic performance of the municipalities of Brazil.

3.1 Determinants of migration in Brazilian municipalities

Brazilian migratory dynamics is defined by the intensity and volume of migratory flows. The patterns of classification and the determinants of people's mobility in the country assume the most diverse motives over the years. Issues related to the economic development of some Brazilian regions and factors of climatic nature took on a substantial dimension in the analysis of the migratory dynamics in the second half of the twentieth century (Martine and Camargo, 1984; Camarano and Abramovay, 1998; Aydos, 2010). According to Myrdal (1956), the main determinants of demographic dynamics are related to their inequalities in internal economic geography. In this interpretation, economic issues are one of the main determinants of population mobility.

It is possible to emphasize that from the 1940s to the 1980s, the Brazilian migratory dynamics was mainly based on issues related to climatic factors (Camarano and Abramovay, 1998) – exits from the Northeast – and related to the socioeconomic development of the country (Martine and Camargo, 1984). The construction of access roads and the labor market in industrial sectors that emerged in the regions of greater economic importance were crucial to the promotion of the internal population movement.

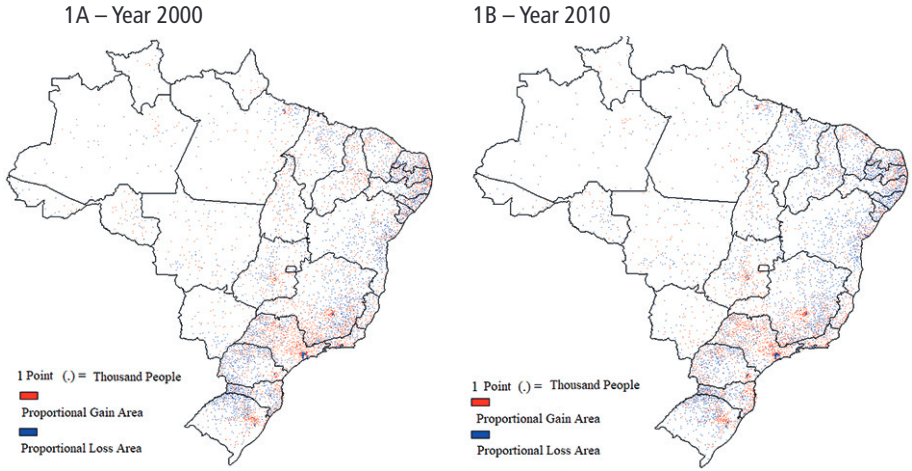
In recent years, especially after the policies of productive deconcentration and the reduction of Brazilian regional inequalities, new migratory flows and new directions have been recorded (Vasconcellos and Rigotti, 2005; Lima and Braga, 2013; Gama and Machado, 2014). The new areas of potential economic development in the Midwest and North of the country (Jakob and Jakob, 2015), in addition to the movements registered to the Northeast, especially return migration, recent phenomena marked the new phase of Brazilian internal migratory processes (Guimarães and Leme, 2002; Juttel, 2007; Justo et al., 2010; Silva, Silva-Filho and Cavalcanti, 2016).

Figure 1 shows the balance of migrants in Brazilian municipalities, considering the fixed date migration and the clipping by heads of household in the years 2000 and 2010. From the results, it is possible to perceive that the great majority of municipalities, especially in the North and in the Northeast had net loss of people, considering only the movement of entry and exit, without considering here the vegetative growth.[7]

7. Difference between birth rate and mortality in municipalities.

National socioeconomic transformations, besides reducing the intensity of migratory flows, also reduce the relative participation of migrants. As recorded by Vasconcellos and Rigotti (2005), the strong concentration of migrants in the 2000 census occurred among those who were in the range of up to 250 kilometers away from the municipality of origin. That is, migration happens with reduced distance for most of the recorded flows. This may result from the various needs in the mobility of the population: work, study, or other subjective issues of the migrants.

FIGURE 1
Net migration (fixed time migration) of heads of households in Brazilian municipalities (2000 and 2010)

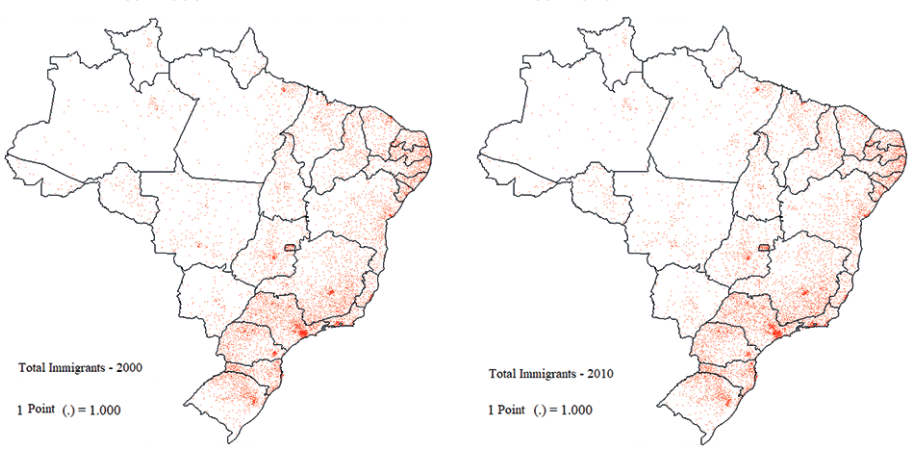


Source: Demographic Census data from Brazil (2000 and 2010).
Authors' elaboration.
Obs.: Figure whose layout and texts could not be formatted due to the technical characteristics of the original files (Publisher's note).

In both 2000 and 2010, most of the Brazilian municipalities that had positive balances are close to municipalities with net loss of migrants. That is, considering the distance of the flows, this can reflect the intermunicipality migration, in the majority, within the same state or to near states, since the distance of the flows reduces over the years. The results reflect only the balance, without a deeper analysis of the flows (not the central objective of this article). This may be due to the fact that household heads change more often because of the need to work or to provide better opportunities for families, such as the possibility of study for their children.

Figure 2 shows the concentration of migrants in the metropolitan areas of the country in the two years studied. The coastal areas of the Northeast and the capitals of the Southeast and South of Brazil have the highest absolute concentration of migrants in both years.

FIGURE 2
Total Brazilian migrants with a fixed date (2000 and 2010)



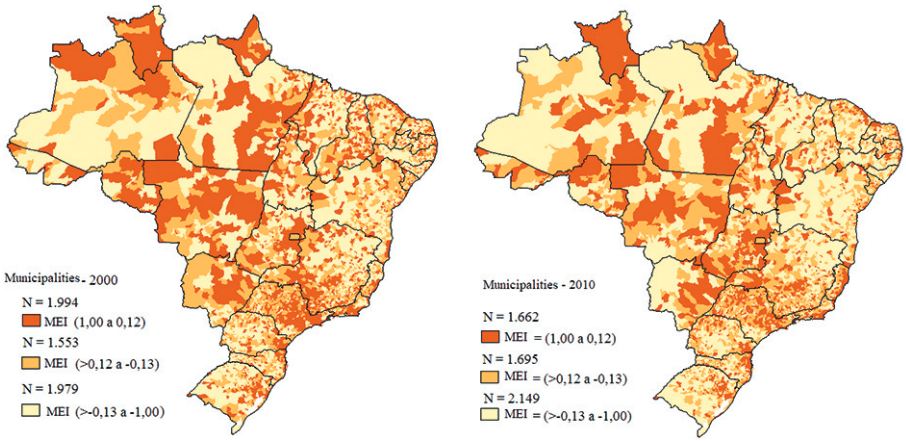
Source: Demographic Census data from Brazil (2000 and 2010).
Authors' elaboration.
Obs.: 1. Each [.] map point equals 1,000 people.
2. Figure whose layout and texts could not be formatted due to the technical characteristics of the original files (Publisher's note).

From the MEI, it is possible to classify areas such as retention, evasion and turnover in the macro-regional context. The migration efficacy indexes that can be spatially observed in figure 3 show that in the year 2000, many municipalities, mainly in the Brazilian Northeast, were characterized as areas of population evasion, despite a high return recorded in the migratory dynamics of the region (Oliveira and Jannuzzi, 2005; Queiroz and Santos, 2011; Justo et al., 2010; Queiroz and Baeninger, 2013). These results can find empirical support for the fact that regional economic development, even with productive deconcentration and reduction of regional disparities, is still a concentrated development in areas of greater capacity to absorb economic activities, given, in particular, its potential level of infrastructure (Silva Filho, Silva and Queiroz, 2015).

Thus, metropolitan municipalities and regions with high potential for development present the best results in the MEI. As can be seen, in the metropolitan municipalities and in the medium-sized cities of the Northeast, the value of the indicator accuses them as areas of population retention, with less developed areas such as high migratory turnover or evasion areas in the year 2000. Furthermore, the Southeast region, especially the state of São Paulo, Espírito Santo and southern of Minas Gerais, present indexes related to retention and/or migratory turnover, with few municipalities classified as areas of population evasion. On the other hand, the north of Minas Gerais and the whole backwoods of Bahia stand out in areas of municipalities with evasive populations.

In the year 2000, the concentration of municipalities in the Midwest and the North as a migratory retention area is extremely high. In the North, as highlighted by Jakob and Jakob (2015), five of the region's capitals had population growth above 3%, and only one capital outside this region obtained these results. Besides, the high process of regional agro-industrialization has empirical support in the literature to justify the intense migratory movement to the Midwest region (Guimarães and Leme, 2002; Juttel, 2007), as well as the permanence of the family migrants in the states. Goiás and Mato Grosso stand out in the regional migratory retention (Juttel, 2007). The expansion of the agricultural frontier coupled with the region's development programs, based on the development of agribusiness, has an important impact on population attraction and retention.

FIGURE 3
MEI in Brazilian municipalities (2000 and 2010)
3A – Year 2000 3B – Year 2010



Source: Demographic Census data from Brazil (2000 and 2010).
Authors' elaboration.
Obs.: Figure whose layout and texts could not be formatted due to the technical characteristics of the original files (Publisher's note).

In 2010, as can be seen from the map, although the Midwest region holds the highest values assumed by the MEI, other municipalities in other regions of the country have assumed values classified as units of population retentions. The results may be associated with the improvement in socioeconomic development indicators of Brazilian municipalities. By the map, from the right of the figure, it is possible to see that evasion areas expand in 2010. In the Northeast, evasion municipalities are higher in 2010, when compared to the year 2000. Besides this region, the number of municipalities in the South considered as areas of population loss also expands.

The number of municipalities classified with at least some migratory turnover rises throughout the national territory. The intensity and reduction of migration flows, as well as the length of stay in cities, given the labor market turnover, may explain the pattern of recent migration. Thus, a high turnover in the labor market such as that presented by Brazil can accentuate the spatial movement of the population.

4 DESCRIPTIVE STATISTICS AND THE PANEL DATA MODEL

In this section, the approach will be made from the descriptive statistics of the variables used in this study, as well as the results of the panel data models, by the fixed effects approach with transformation *within* (Wooldridge, 2006, p. 300). Here, it is sought to explain the participation of in-migration and out-migration in Brazilian municipalities. Based on the assumption that there are many socioeconomic and demographic determinants of the migratory dynamics in the country, variables are used in multiple dimensions. The objective is to establish a cause and effect relationship between socioeconomic factors (cause) and migration (effect) in Brazilian municipalities.

4.1 Descriptive statistics of variables

From the descriptive statistics, it is possible to confirm that the household infrastructure variables (households with electricity supply, water supply, sewage and garbage collection) show that there was a substantial improvement between the first and last year under analysis. In 2010, electricity supply approached universalization and 97% of Brazilian households responded to electricity, according to the 2010 Census. In addition, water supply, garbage collection and sanitary sewage had a higher coverage rate in 2010, compared to the year 2000, although there are still substantial possibilities for improvement in the supply of such basic services (table 1).

TABLE 1
Description of variables and municipality average values in Brazil (2000 and 2010)

Variables	Year		Description of the variables – participation by municipality
	2000	2010	2000 and 2010
p_imigrante	0.11	0.08	Percentage of households in the destination headed by in-migration.
p_emigrante	0.10	0.08	Percentage of households at the origin with responsible out-migration.
p_agua	0.58	0.69	Percentage of households with water supply service by general network.
p_esgoto	0.75	0.86	Percentage of households with sewage system by general sewage or rainwater network; septic tank and rudimentary tank.
p_lixo	0.53	0.70	Percentage of households with garbage collection per cleaning service or placed in a cleaning service bucket.
p_energia	0.86	0.97	Percentage of households with electricity supply by distribution company or other sources.
p_alfabetizado	0.72	0.79	Percentage of households in which the responsible person claimed to be literate.
p_segrau	0.08	0.15	Percentage of households in which the responsible person responded to have completed high school.
p_superior	0.02	0.05	Percentage of households in which the responsible person has completed higher education.
p_ocupado	0.79	0.74	Percentage of households in which the reference person responded that was working in the reference week of the survey.
p_previdencia	0.11	0.12	Percentage of households in which the head of household responded to pay social security contributions in the main job or in another job.
p_ICS	0.30	0.32	Percentage of households in which the person responsible responded to be occupied in sectors of economic activities of ICS.
p_pobretrab	0.68	0.57	Percentage of households in which the responsible declared to be poor at work. That is, to have remuneration lower than 1/2 of minimum wage.

Source: Demographic Census data from Brazil (2000 and 2010).
Authors' elaboration.

With regard to human capital (formal education of heads of households), the participation of literate people with high school and complete secondary education also improves in the period between the censuses. However, the participation of heads of Brazilian households with complete higher education is still low, being 2% in 2000 and 5% in 2010.

In the labor market (occupancy rate, social security coverage of the employed, engaged in activities of commerce, industry and services and labor poverty), the relative participation of employed persons is reduced from the first to the last year, rising from 79% to 74% of the workforce. However, poverty at work is reduced from 68% to 57%, from the first to the last year, which can result from higher income through conditional income transfer programs. In addition, there is a slight increase in the participation of employed persons in ICS, to the detriment of other

activities, as well as the participation of employed persons insured by official social security institutes (table 1).

4.2 Results and discussions: the panel data model

By analyzing the panel data model, the results indicate that if the participation of high school household heads increases by one percentage point (p.p.) in relation to those with first degree, a reduction of 0.117 p.p. in immigration in the municipality. Moreover, if the percentage of heads of households with higher education is varied by one p.p., a reduction of 0.04 p.p. in the participation of in-migration in the municipality is expected. The variation of one p.p. in the *p_alfabetizado* participation implies a variation of 0.066 p.p. in the participation of in-migration in the municipalities. The level of literacy in the municipality is directly related to the participation of in-migration at municipality levels. The results suggest that immigration is associated with locations where there is a greater participation of people enrolled.[8] But in those places with high qualification rates, the share of immigration is lower. Probably because migrants would have a more difficult insertion in the labor market. The coefficient of the *p_superior* variable is less expressive, but signals in the same direction as the high school.

With regard to the immigrant, it is worth mentioning that all variables of household infrastructure, except *p_esgoto*, were statistically significant at levels of 0.001, 0.01 and 0.05. In home infrastructure variables, *p_agua* and *p_lixo* showed positive signs and *p_energia* negative sign to explain the participation of in-migration by municipality of the country. In other words, the municipalities with the highest coverage of basic services are also those that tend to attract in-migration.

Furthermore, the variation of a percentage point in the participation *p_ocupado* implies in the variation of 0.06 p.p. in the participation of in-migration in the Brazilian municipalities. It can be interpreted that the occupation rate at the municipality levels is directly related to the participation of in-migration. Thus, the local labor market is important indicator of the migratory dynamics of the municipality. As the occupation rate increases by one p.p., there is a tendency to register a positive variation in the participation of in-migration at the municipality level.

The economic activity sector also presented a positive signal for the coefficient. This means that the variation of one percentage point in occupied *p_ICS* implies a variation of 0.06 p.p. in the participation of intermunicipality in-migration in Brazil. That is, there is a cause and effect relationship between the employed

8. It is necessary to note that there may be an endogenous effect on the variable education and immigration. Since it is not possible, from the fixed-date migration, to work with this lagged variable, it is used here as a way of inferring by a cause-effect relationship that may be questionable.

in these sectors of activities (cause) and the participation of in-migration (effect) that are directly related. Otherwise, the variation of one point in the poverty in the work *p_pobretrab* implies in the reduction of the participation of in-migration in the municipalities in 0.02 p.p. That is, there is a positive correlation between labor market indicators and in-migrant participation, as well as a negative correlation between labor poverty and intermunicipality in-migration in the country.

TABLE 2
Panel data model for participation of migrants and in-migration in Brazilian municipalities (2000 and 2010)

Variables	2000 and 2010		2000 and 2010	
	In-migrants		Out-migrants	
	Estimate	$Pr > \|t\|$	Estimate	$Pr > \|t\|$
Intercept	-0.015	0.600	0.035	0.267
p_agua	0.019	0.001***	0.014	0.007**
p_esgoto	-0.006	0,264	0.020	0.002**
p_lixo	0.009	0.064*	-0.003	0.646
p_energia	-0.015	0.011*	0.048	0.000***
p_alfabetizado	0.066	0.000***	-0.014	0.344
p_segrau	-0.117	0.000***	0.031	0.105
p_superior	-0.037	0.315	-0.116	0.004**
p_ocupado	0.060	0.000***	-0.008	0.358
p_previdencia	-0.012	0.083	0.005	0.483
p_ICS	0.055	0.000***	-0.034	0.000***
p_pobretrab	-0.022	0.008**	0.058	0.000***

Source: Demographic Census data from Brazil (2000 and 2010).
Authors' elaboration.
Obs.: Significance – 0 '***' 0.001 '**' 0.01 '*' 0.05 ',' 0.1 ' ' 1.

Regarding the participation of out-migration, the data show that, of the 11 variables used, 5 did not present statistical significance. However, they were not removed from the model so as not to cause specification bias. That is, the difficulty of predicting the factors of people evasion in the municipalities of the country is greater. Besides, the other variables presented significance at 0.001% and 0.01%.

The variable *p_pobretrab* showed positive sign. That is, the variation of a percentage point in the poverty in the work can imply in the variation of 0.06 p.p. in the participation of out-migration. With this, the coefficients indicate that the greater the municipality poverty, the greater the records of people who

emigrated from that municipality. In this way, it is possible to suppose that there is a direct relation between poverty and people evasion in the Brazilian municipalities. In addition, the variables: complete higher education; employed, or working in the commerce or services industry, had negative signals, signaling that negative variations of a point in these variables imply negative variations, in percentage points, of the participation of out-migration in the municipalities of the country. That is, the exit of people from the municipalities may be related to the low participation of the employed or workers in the sectors of ICS, as well as people with higher level of schooling.

5 FINAL CONSIDERATIONS

The objective of this paper was to make a study about the socioeconomic factors that impact on the Brazilian intermunicipality migratory dynamics. The Brazilian Demographic Census of the years 2000 and 2010 show changes in the socioeconomic and migratory dynamics in the country, which is the motivation for an analysis of the intermunicipality migratory dynamics and the use of fixed date migration and heads of households as the chosen form for analysis.

By the MEI it is possible to notice that there is a substantial change in relation to the evasive areas between 2000 and 2010, as well as between the areas of migratory turnover. The economically less dynamic regions are responsible for the higher incidence of population evasion, and the labor market has support in the areas of migratory turnover. As regards areas of population retention, they are concentrated in economically developed and economically important regions, both in 2000 and 2010.

It is possible to perceive that there is population concentration coming from the migrations in the Brazilian metropolitan regions, as well as in the capitals of the states and in the Federal District. They are, therefore, areas of population attraction, given the best indexes of job opportunity, arising from the more accentuated economic dynamics of these municipalities.

The results of the panel data model showed that the percentage of in-migration' participation is positively affected by the occupation and work in the industry, services and commerce, being these variables with higher coefficients and with greater explanation powers in the model. That is, it is possible to affirm that there is a direct relationship between labor market performance, particularly in the more dynamic activities related to the ICS sectors, with the participation of in-migration in the municipalities that present the best indicators. The percentage of out-migration' participation in the municipalities can be explained mainly by the negative variation in the total occupation and by sector.

The results found, point to several determinant fronts of the Brazilian intermunicipality migratory dynamics. It was not possible to verify the isolated effect of the variables on the migratory dynamics of the heads of households. This is related to issues of opportunity for migrants and the selection is made by criteria differentiated between them. As next steps for future research, it is recommended to decompose the factors that influence the intermunicipality immigration dynamics of heads of households.

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