Population size, poverty and migration: the experience of Brazil[1]

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Abstract

Developing countries have faced a sharp urbanization in recent decades, which has been led by intense rural-urban migration flows. But why do people have preferred crowded urban locations rather than been more evenly spread across the territory? And what are the prospects for those left-behind populations that were trapped in the poorest and sparsely populated areas? We analyze the case of Brazil, highlighting the non-linear relationships between population size, poverty and internal migration. We use nationally representative data from the Demographic Census and gravitational models of migration, analyzing how migration flows are affected by push and pull forces in origin and destination. We highlight the existence of a U-shaped relationship between population size in origin and out-migration, which implies that migration rates tend to be substantially higher in the least populous locations. We also highlight that poverty is one the main push factors of out-migration in origin, but its impacts are not unidirectional. While the share of poor in origin tends to increase out-migration, the intensity of poverty, a measure of how poor people are, tends to restrain out-migration. The first main implication of our results is that there may be a minimum population size threshold, below which migration rates may sharply increase, probably due to the lack of prospects of socioeconomic growth. The second main implication is to reinforce the existence of poverty traps of migration, i.e., locations where extreme poverty may limit the accumulation of assets that are needed to finance mobility.

Keywords: internal migration, rural out-migration, poverty, gravity model of migration, zero-inflated models

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Extended abstract

Introduction

Starting towards the end of the 20th century, most developing countries observed a sharp transition from a rural to an urban society. Internal migration rates slowed in some countries, but rural-urban migration continues to be the main driver of urbanization (Lall, Selod and Shalizi, 2006). According to the traditional models of migration, rural-urban migration is mainly driven by economic push and pull factors; for example, income inequalities and the probability of finding a better job in urban areas (Lee, 1966; Todaro, 1969). Labor-saving technologies in agriculture and scale economies in service and manufacturing have contributed to urbanization, fueling large-scale rural-urban migration and the emergence of large and medium-sized urban cities (Irwin *et al.*, 2010).

We analyze the relationships between population growth, poverty and internal migration in Brazil. We test two main hypotheses. The first is the existence of a population size threshold, below which migration flows may intensify because of the lack of economies of scale that are needed to boost socioeconomic development. The second hypothesis is the existence of poverty traps in the territory, where the limited accumulation of assets that are needed to finance mobility restrains rural out-migration.

Brazil provides a singular case to analyze the relationship between population dynamics, poverty and migration. Despite recent improvements, the levels of poverty and inequality continue extremely high in Brazil. Rural-urban inequalities are particularly high, with rural poverty rates doubling those of urban areas (Gori Maia and Buainain, 2015). This uneven development has led to large-scale rural-urban migration. The rural population reduced from 55% in the 1960s to 15% in the 2010s. Nowadays, the country presents one of the highest rates of internal migration in the developing world, with two-fifths of the population living outside of their place of birth (United Nations, 2013).

Material and methods

The primary data source of this study is the sample of the Demographic Census 2010. The Demographic Census allows us to analyze origin-destination models between the minimum administrative division with autonomous local government in Brazil: 5,507 municipalities. We define as migrants those who did not live in the same municipality of residence 5 years ago. We also restricted the sample of migrants to those adults between 16 and 54 years old. Children under 16 usually do not take the decision to migrate on their own. Adults 55 years of age or older are less likely to migrate in the country.

Our analyses are based on gravity models of migration, which assume that the spatial distribution of migrants is determined by gravity forces conditional on the size and characteristics of the economy and population in origin and destination (Greenwood, 1997). The dependent variable represents the migration flows with origin in each one of the 5,507 municipalities and destination in any remaining (5,507−1) municipalities in Brazil. In this respect, our gravity model considered a total of 30,321,542 cross sectional units (pairs of origins and destinations). Since migratory flows are zero for an overwhelming number of localities, the frequency of migration was modelled by zero-inflated negative binomial (ZINB) processes. The ZINB models assume that

the population is formed by two different groups (Cameron and Trivedi, 1998): a group of localities with no migratory flows, and a group of localities with randomly distributed migratory flows, which might also contain zeros. The ZINB model also considers that the count variable has an incidence of zeros greater than expected for the underlying probability distribution of count values.

The explanatory variables of interest represent the push forces exerted by population and poverty in origin: (log) population size; square of (log) population size, which captures the non-linear relationship between population and migration; the share of population with per capita income below R$ 255 (US$ 142), which is the official poverty line in Brazil; and the intensity of poverty (or poverty gap), which is a measure of how poor this people are.

The control variables represent gravitational push and pull forces of migration in origin and destination: average wage; employment-to-population ratio; the share of agricultural workers; the share of women; the share of the labor force with secondary degree or more; the share of people aged 16-24 years; and the distance between municipalities of origin and destination. We use the 5-years lagged value of all socioeconomic variables to avoid simultaneous causality between migration flows and socioeconomic characteristics. The lagged values are computed by averaging the values of the Demographic Censuses in 2000 and 2010. We control for unobservable regional heterogeneities using fixed effects for the 27 federal units of the localities of origin and destination. We also control for potential endogeneity bias due to omitted variables by using the lag of migration flows, which is the migration flow between 1995 and 2000.

Results

Between 2005 and 2010, more than 10 million people (nearly 5% of the population) migrated from their municipalities of origin to other municipalities in Brazil. On average, nearly 2 million residents migrated per year in the 2000s. Nearly 18% (1.9 million) of them left small rural municipalities to live in more populous urban or metropolitan cities. Other 12% (1.2 million) left urban municipalities to leave in the largest metropolitan areas of the country.

Socioeconomic inequalities undoubtedly play an important role on internal migration. Despite some recent improvements, differences between the less developed rural and the most developed urban localities are still noticeable. In 2010, the average wage was 29% higher in urban than in rural areas, and the poverty rate was 7 percentage points lower. The poverty gap, which measures the extent to which individuals fall below the poverty line, was 5 percentage points lower in urban areas. The share of working age population with secondary or tertiary education was 7 percentage points higher urban areas.

The estimates of our gravity models provide strong evidences that, holding constant traditional push and pull factors in origin and destination, the relationship between population size and migration is not linear: migration is higher than expected in the least populous areas. As a result, migration rates tend to be substantially higher in small-sized municipalities, which may probably be related to the lack economies of scale that are need to sustain economic growth in these localities.

Poverty has also shown to be one the main push factors determining out-migration in Brazil, but its impacts are not unidirectional. The share of poor in origin increases out-migration. In turn, the intensity of poverty, a measure of how poor people are, may limit the accumulation of assets that are needed to finance mobility and, thus, restrains out-migration. These results allow us to

elaborate a map of poverty traps in the territory, where the negative impacts of the intensity of poverty surpass the positive impacts of poverty rate on out-migration.

Other push and pull factors have also shown important roles on internal migration. For example, one of the most important pull factors in destination is the employment rate, which measures the ability of the economies to provide job opportunities. In turn, one key factor to reduce out-migration in origin is the creation of non-agricultural occupations.

Conclusion

We provide both theoretical and methodological contributions to the literature on internal migration. The main theoretical contribution is to better understand the process of internal migration in Brazil. Despite slight decreases in recent decades, the number of out-migrants in the country is still startling (nearly 2 million people migrated per year in the 2000s). The main destinations of migrants continue to be the large and medium-sized cities, notably the main metropolitan areas. Extreme inequalities and endemic poverty in the least developed regions have historically been pointed as key factors to understand the dynamics of internal migration in Brazil. But the causal relations between socioeconomic development and migration flows in Brazil was not yet clearly understood. In this respect, our estimates for the gravity models of migration provide additional and useful elements to investigate the push and pull factors of migration flows in the country.

Our main methodological contribution is to extend the traditional models of internal migration to capture broader aspects related to the regional and spatial economics. In particular, we highlight that the impacts of population size and poverty on out-migration are not linear. Migration flows tend to increase with population size, but the flows are substantially higher than expected in small cities. The lack of economies of scale that are need to sustain growth in the long run may affect expectations and migration flows. In turn, the opposite impacts of the extend of poverty (positive) and intensity of poverty (negative) on out-migration are consistent with the presence of territorial poverty traps. People leaving in the poorest regions may want to leave, but can not afford mobility.

Finally, we discuss potential implications of our results to policies of rural development. Municipalities with larger populations might enjoy long-run economic advantages and exert a strong attraction over migrants from the smallest cities. In turn, a main channel through which rural-urban migration may be attenuated is providing better jobs opportunities in rural areas, and the development of a non-farm economy seems to be particularly attractive alternative (Sakamoto, Nascimento and Maia, 2016).

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