

## **Migration and Democratization in Brazil: The Case of Electoral Participation and Competition**

Alexandre Gori Maia (Gori Maia, Alexandre) – Corresponding Author  
University of Campinas – São Paulo – Brazil  
Rua Pitagoras, 353 – Campinas/SP – Brazil – CEP 13083-857  
Telephone Number +55 (19) 3521 5716  
Email: gori@unicamp.br

Yao Lu (Lu, Yao)  
Columbia University - New York - United States  
Telephone Number +1 (212) 854 5442  
Email: yao.lu@columbia.edu

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### **Abstract**

Deepening democratization in Brazil has coincided with sustained flows of domestic migration. This raises an important question of whether migration deepens or depresses democratic development in migrant-sending regions. Whereas earlier perspectives view migration as a political "brain drain," we contend that out-migration can generate resources that promote democratic processes back home. We investigate the role of migration in two aspects of democratization: electoral participation and competition. The analyses are based on spatial panel data models of mayoral election results across all municipalities between 1996 and 2012. The results show that migration increases electoral participation and competition in migrant-sending localities in Brazil. This study also identifies the sociopolitical context that conditions the impact of migration: the effect is most often present in the context of rural-urban migration and is more pronounced in sending localities with less democratic political structures than those with more democratic structures. Moreover, using spatial network models, we find evidence for the transmission of political remittances from migration destination municipalities to origin municipalities. The present study extends the research on the "migration-development nexus" to the political arena, thus demonstrating the value of integrating demographic processes into explanations of political change.

### **Keywords**

migration, democratization, voting, spatial panel data model, spatial network model

## Introduction

The past few decades have witnessed deepening democratization in Brazil. This has coincided with sustained flows of domestic migration in the country, especially from rural to urban areas. The country now has 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). This raises an interesting question about the relationship between the two phenomena: Does out-migration deepen or depress the democratization process? The present study examines how out-migration affects electoral outcomes in migrant-sending localities. In doing so, it moves beyond the conventional focus of demography from how political factors shape demographic outcomes to the reverse question: how demographic forces shape political processes, a question key to the growing field of "political demography" (Goldstone et al. 2012).

Charting new directions and investigating new questions can advance the field of demography and make it even more relevant to ongoing political debates. Demography is a general science and engages in important questions related to both the causes and consequences of population change. In this respect, the study of the consequences (economic, social, as well as political) of demographic change is at the core of the discipline. While the economic and social impacts of demographic processes (e.g., migration) have received ample attention, research aiming to uncover the political impacts of migration has lagged far behind. Fortunately, the emergent field of political demography has conceptualized a bi-directional relationship between population and political processes although empirical studies have only recently begun to follow suit. Our research is one of the first efforts to examine the impact of migration on electoral politics (and, to the best of our knowledge, the first in Brazil to do so).

Earlier perspectives have viewed migration as a source of a political "brain drain," in that out-migration can deplete the political vitality of sending areas and delay the democratization process (Hirschman et al. 1999; Kurtz 2004). However, with the advent of modern communication and transportation technologies, today's migrants are more circular and better positioned to maintain social and economic links with families and communities from their places of origin (Itzigsohn and Giourguli 2002; Kapur 2010; Levitt 2001). This linkage facilitates cross-space democratic diffusion and financial transfers, which can nurture democratic behaviors and reshape local patronage systems in sending societies (Lu 2019; Pfütze 2014). The possibility for migration to influencing politics back home is relevant for internal migrants, who are better positioned to conduct timely interactions with remaining families and make frequent return visits. In this paper, we jointly consider these multiple pathways that underlie the overall political impact of migration.

Brazil provides a useful setting for investigating the political consequences of migration because over the past several decades, the country has experienced substantial migration while simultaneously undergoing a democratic transition. After a 21-year military regime, the transition to democracy began in 1985 and was consolidated in 1988 with a new Constitution and unrestricted direct elections at the national and subnational levels (Cajado et al. 2014). In 1989, the proportion of eligible voters surpassed half of the total population for the first time in the republican history of Brazil (Moisés 1993). Despite the progress, corruption and clientelism have endured as features of Brazilian politics (Ferraz and Finan 2005; Frey 2019; Gay 1998; Samuels 2001). The development of well-functioning democratic institutions is a process that is still underway.

In the present paper, we operationalize democratization using measures of electoral participation and competition (Przeworski et al. 2000; Vanhanen 2003). Because voting remains an essential political activity in democratic societies, the degree of participation and competition is a crucial indicator of the health and functioning of a democracy (Franklin 1999). We compiled panel data on municipal-level migration, socioeconomic indicators, and mayoral election results between 1996 and 2012. We focus on mayoral elections because clientelistic arrangements in

Brazil are largely operated by local political machines (Ames 1994). Since the passing of the new constitution of 1988, municipal governments have been responsible for implementing public policies and control a large share of public resources that can be allocated for clientelistic use (Ferraz and Finan 2005; Rocha and Kerbauy 2014). Also, mayors play a major role in the Brazilian political structure as they act as brokers for party leaders at higher levels of government (Stokes et al. 2013). For these reasons, recent studies on clientelism in Brazil have focused on mayoral governments (Avis et al. 2018; Frey 2019).

### **Internal Migration in Brazil**

Brazil is characterized by massive regional inequalities and internal migration. Inequality between rural and urban localities is especially pronounced, with rural poverty rates doubling those of urban areas (Gori Maia and Buainain 2011). This uneven development has led to large-scale migration from rural areas, resulting in the share of rural population plummeting from 55% in 1960 to 32% in 1980 to 15% in 2010 (IBGE 2018). Internal migration had traditionally flowed to large metropolitan areas, notably in the states of São Paulo and Rio de Janeiro. Overtime, it has increasingly been directed to new areas of agricultural development in the North and Central-West (Camarano and Abramovay 1999; Perz 2000).

Despite somewhat of a recent decline, the volume of internal migrants in Brazil has remained significant: nearly 12 million people migrated between 2004-2009 (Dota and Queiroz 2019). Migration continues to be dominated by rural-urban migration (Gori Maia and Buainain 2015) although the traditional northeast-southeast flow (from the poorest to the richest regions) has been superseded by new, more complex migration flows (Baeninger 2012). In addition, the deconcentration of production and urbanization in intermediary cities has mitigated the polarization of employment distribution in recent decades (de Carvalho and Charles-Edwards 2019). New employment opportunities in small and medium-sized cities, coupled with the high costs of living in large metropolitan areas, have increased intraregional migration and shortened the average distance travelled (Baeninger 2012). Migrants nowadays are more likely than before to stay within the state and less likely to stay permanently in destination localities (Baptista and Rigotti 2017).

In the midst of this transition, migrants often maintain continuous connections with relatives and peers in their places of origin (Fazito 2010). We can see evidence of this from the growing rate of return migration, which accounts for almost one quarter of all internal migration (IBGE 2010). But the sociopolitical impact of internal migration and its recent trends are not well understood. To the best of our knowledge, no study has empirically investigated the impact of internal migration on political development in Brazil. Most existing studies have emphasized how migration is linked to regional economic cycles, the spatial distribution of employment, and socioeconomic development (Cunha 2015; Genicot et al. 2017; Lima and Braga 2016; Pais et al. 2018). Our study seeks to fill this gap and examine how migration flows may shape democratic processes back home.

### **Mechanisms Linking Migration and Democratization**

Migration can influence democratic processes in sending communities through several main channels. The first is political remittances: migrants learn the political values and behavior of their host localities, which often have more democratic political environments than their places of origin, and transmit them back to their communities of origin through long-distance communication and return visits (Kapur 2014; Pfütze 2012). Migrants' transmission of democratic norms and practices promotes political consciousness and ultimately contributes to democratic behaviors in sending areas (Lu et al. 2017; Pérez-Armendáriz and Crow 2010). This transmission of political remittances can occur through both close social networks and community-wide diffusion (Pérez-Armendáriz 2014). In the former scenario, nonmigrants are

influenced by their interpersonal interactions with current or returned migrant family members or friends. In the latter case, political remittances produce an aggregated effect through community-wide diffusion in a way that transcends individuals who have direct ties to migrants.

In Brazil, regional distinctions in political institutions serve as a basis for political remittances. For instance, the term *Coronelismo* (literally “rule by the coronel”) exemplifies the highly oligarchic and personalized political structures that have traditionally dominated politics in rural areas and the poorest North and Northeast regions (Goldsmith and Wilson 1991; Roninger 1987). The *coronels*<sup>1</sup> have traditionally controlled strategic resources such as land, communication networks, and public resources. In rural and poor areas, the *coronelismo* has largely persisted and has even evolved into rampant clientelism, subsequently impairing democratic institutions and norms (de Carvalho 1997; Frey 2019). In the most developed urban areas, which are largely concentrated in the South and Southeastern regions, European immigrants brought new liberal ideologies from the time of the late nineteenth century. By the end of the twentieth century, industrialization had fueled the development of more liberal and democratic institutions and undermined the ability of local politicians to monopolize strategic resources and votes (Baiardi 1995; Gay 1998).

The second mechanism of the migration effect operates through economic remittances. Economic remittances can ease a household’s capital constraints; they can also have important multiplier effects on the local economy by increasing consumption and creating job opportunities (Durand et al. 1996). Importantly, the flow of these resources may undermine local clientelistic relations by strengthening the power of ordinary citizens relative to political actors. Clientelism entails the distribution of material rewards and benefits by political actors to constituents in exchange for electoral support (Greene 2007; Stokes et al. 2013). Economic remittances effectively reduce citizens’ dependence on clientelistic transfers. To remain appealing, clientelistic transfers would have to increase in magnitude, which may become prohibitively expensive (Pfutze 2014). As a result, citizens with alternative income from remittances may be emboldened to “make ideological investments in democratization” (Magaloni and Kricheli 2010) by voting in accordance with their true partisan preferences. This alters the distribution of votes. Instead of being limited to established power brokers (e.g., incumbent parties), votes are increasingly cast for a multitude of political actors (i.e., opposition parties), thereby increasing electoral competition.

The potential of migration and remittances to weaken local clientelism is relevant in Brazil, where clientelistic transactions have remained entrenched despite increasingly competitive elections. Between 1964 and 1985, the military regime imposed a two-party system in Brazil, composed of a pro-government party (ARENA) and an opposition party (MDB). After this period, a multiplicity of parties emerged and political fragmentation in local elections erupted in the 2000s when traditional parties, such as PMDB, PFL and PP lost ground to younger and smaller parties such as PT, PR, PPS, PSB and PSD (Lavareda and Telles 2016).

Notwithstanding these changes, clientelism has continued to permeate Brazilian elections. Common clientelistic transactions include benefits such as cash, material goods (bricks, food, small appliances), and services such as health care or public-sector employment in exchange for political support (Sugiyama and Hunter 2013). About one third of voters declare that they know of some sort of vote buying (TSE 2015). Clientelism also extends to anti-poverty social policies, such as cash transfer programs, which account for over 25% of income for the rural poor (IICA 2012). Local incumbents may mislead voters by claiming that they will extend these programs and the opposition parties will end them. Politicians may also manipulate

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<sup>1</sup> *Coronel* (colonel in English) refers to a locally dominant politician who provided favors in return for political loyalty and who was sometimes given a military title.

conditionalities of these programs in their favor such as by misreporting school attendance; this leads the penalized beneficiaries to blame and punish local incumbents (Brollo et al. 2017).

The third channel is through the absence of migrants, which is likely to have an adverse effect on democratic outcomes. Emigration may produce a "political brain drain," whereby the absence of community members depletes human capital (e.g., the electorate) available for political participation (Docquier and Rapoport 2011). The loss is exacerbated if migrants are disproportionately selected among those who are most likely to engage in politics (Hirschman et al. 1999). The absence of migrants, especially those of high socioeconomic statuses, can also affect the supply of potential leaders for political changes in their places of origin (Kapur 2014). This may serve to relieve political tensions and maintain a hegemonic party structure in the places of origin.

This is the case of internal migration in Brazil. Rural-urban migration is disproportionately drawn from the young and more educated residents (Gori Maia and Buainain 2015). These groups are more likely to hold democratic values, to vote, and to engage in other political activities (Brooks 2014; Moisés 1993). These patterns suggest a potential detrimental impact of migration on electoral outcomes in sending communities.

### **Working Hypotheses: How Does Migration Shape Electoral Outcomes in Brazil?**

#### **Electoral Participation**

The mechanisms linking migration and democratization outlined above may shape electoral outcomes in several respects. The first is electoral participation, commonly operationalized by the rate of voter turnout (Fornos et al. 2004). The impact of migration on voter turnout in Brazil is not clear-cut. On the one hand, out-migration would be expected to reduce overall turnout, simply because voters are legally obliged to vote in Brazil. Brazil has the world's largest electorate that is subject to compulsory voting (Birch 2008). Voting is mandatory for all literate citizens over 18 and under 70, and optional for citizens who are aged 16 and 17, older than 70, or illiterate (TSE 2018a). Despite these mandates, the abstention rates are not exactly low. For example, nearly 25 million voters (18% of the eligible voter population) did not vote in the municipal election of 2016 (TSE 2018b). Voters have to vote in the electoral section where they are officially registered (TSE 2018c). This means many migrants are unable to go to the polls where they are registered. Voters who are out of their electoral district must justify their abstentions at an official electoral office. An alternative for migrants is to transfer their registration to a new electoral district. But many migrants choose not to transfer their registration because of bureaucratic difficulties (TSE 2019). If voters abstain from voting for three consecutive elections, their registration is canceled. Citizens without a registration are unable to receive government services such as borrowing from government-owned financial institutions, obtaining a passport, and securing public employment.

On the other hand, migrants may have a positive impact on the political participation of those left behind through their political remittances and economic remittances (Pérez-Armendáriz and Crow 2010). This is particularly probable in Brazil for several reasons. For one thing, there is a high level of circular migration in the country (Baptista and Rigotti 2017). More than one quarter of internal migrants are considered short-term migrants, having stayed in the destination for less than 5 years (IBGE 2010). These migration patterns facilitate migrants' continuous interest in their communities of origin as well as close connections with the people left behind, thus boosting subsequent transfers of remittances. Also, as migrants may not be able to return home to vote but remain invested in their localities of origin, family members and friends who stay behind often act as their representatives in elections. Moreover, economic remittances can provide resources to help voters overcome physical constraints (e.g., distance, lack of public transportation) to go to the polls (Power and Roberts 1995).

*Hypothesis 1:* Migration increases political participation among those left behind in sending communities, even though it may reduce the overall turnout rate. The positive impact of migration on political participation would manifest itself most clearly on those who are not obliged to vote, namely young voters (16-17 years) and the elderly (70 years or older).

#### Electoral competition

The second aspect of electoral outcome critical to this study is electoral competition. Elections in Brazil are often plagued by clientelism, which limits electoral competition and undermines the efficacy of electoral institutions. Voters in poor communities, many of which are also migrant-sending communities, may be especially vulnerable to clientelistic practices (Epstein 2009). By contrast, migrants tend to move to more developed areas that have a more pluralistic party structure and greater democratic values. For example, in 2012, 72% of the 100 most densely populated municipalities (more developed and urban areas where the population exceeds 50,000 people) had four or more candidates running for mayor; in comparison, only 15% of other municipalities in Brazil had this many candidates running for mayor (TSE 2018b). Also, a survey by the *Corporación Latinobarómetro* shows that Brazilians living in state capitals are more likely to support democracy than those in other localities (Corporación Latinobarómetro 2018). Through political remittances, migrants' exposure to a new political environment and adoption of more democratic values may positively influence electoral competition in sending localities.

Furthermore, economic remittances from migrants increase the disposable income of the households that remain, which can subsequently erode clientelism and strengthen electoral competition. Economic remittances are an important source of income for many Brazilian households. About 3.4 million households received economic transfers from non-residents in 2008 (5.8% of all households). Among these households, the average annual value of transfers was R\$6,874 (\$2,941), equaling 19% of total national household income (IBGE 2018). These remittances may be particularly crucial in supplementing income in the poorest sending localities. In such areas, the income of those who receive money from non-residents (including remittances) is 9% higher than those who do not (IBGE 2018).

*Hypothesis 2:* Migration increases electoral competition in sending communities.

#### Variations by origin and destination environment

Socioeconomic differences as well as differences in democratic development between origin and destination localities may shape the impact of migration because they determine the level of migrants' political and economic remittances. We expect a larger impact when migrants move from less developed rural localities to more developed urban localities (and by extension, from less democratic environments to more democratic environments) than when migrants move between places with similar environments (between rural or between urban areas). Migrants in the former scenario tend to transmit a higher level of political and economic remittances than the latter. Also, people left behind in rural localities tend to be poorer and less educated, and are thus more likely to engage in clientelism. Both conditions mean that urban-bound migration has the greatest potential to promote participation and weaken clientelistic practices in rural localities.

*Hypothesis 3:* The impact of migration on electoral outcomes is especially strong in the context of rural-to-urban migration.

The impact of migration may also be stronger in localities with a lower level of democratic development. In this context, voters have been less exposed to democratic values and practices. They lack the basic political and economic resources to engage in politics as well as resist patron-client relationships. Under these circumstances, political and economic remittances

from migrants can transform individuals' political attitudes and behaviors. These remittances may have a more limited impact on localities with more democratic environments, especially when fair and competitive elections are already well established.

*Hypothesis 4:* The impact of migration on electoral outcomes is stronger in origins with low levels of democratic development.

#### Evidence for political remittances

We have proposed three mechanisms that link migration to electoral outcomes in origin communities: i) political remittances; ii) economic remittances; and iii) absence. Our data do not provide direct information on political and economic remittances.<sup>2</sup> The absence mechanism would manifest itself in a negative relationship between migration and the overall voter turnout rate. As for political remittances, we draw on rich electoral data across Brazil and make use of a novel empirical strategy to provide an indirect test for the presence of political remittances. Specifically, we examine the correlation between the electoral outcomes in the origin and destination localities. A high correlation would be suggestive of a transmission of political remittances.

*Hypothesis 5:* There is a high correlation in electoral outcomes between origin and destination localities.

### Data, Variables and Methods

#### Data

Data on municipal-level migration flows and socioeconomic characteristics are from the Censuses of 1991, 2000 and 2010 (IBGE 2018). The municipality is the lowest administrative division in Brazil. In 1991 and 2000, two sample coverage rates were used in the Census: 10% of households in municipalities with more than 15,000 inhabitants and 20% in other municipalities. In 2010, five sample coverage rates were used, ranging from 5% in municipalities with more than 500,000 inhabitants to 50% in municipalities with no more than 2,500 inhabitants. On average, 11% of the households were interviewed in 2010. There were some changes in municipality boundaries between 1991 and 2010: the number of municipalities increased from 4,491 in 1991 to 5,565 in 2010. Based on the methodology proposed by the *Instituto de Pesquisa Econômica Aplicada* (IPEA), we aggregated all municipalities into 4,267 *Minimum Comparable Areas* (MCAs), which represent common borders throughout the entire period of analysis (Ehrl 2017), and are henceforth our units of analysis.

MCAs are classified into urban and rural areas. Based on Veiga (2007), we define an MCA as rural when three criteria are met: i) the area is not located in any of the 35 metropolitan areas defined by the IBGE, *Instituto Brasileiro de Geografia e Estatística* (Brazilian Institute of Geography and Statistics); ii) the area had a 2010 population size of lower than 50,000; and iii) the area had a 2010 population density of lower than 80 inhabitants per square kilometer. According to this typology, 2,986 MCAs (70% of the total) are classified as rural, making up 22% (41.4 million) of the national population in 2010. The rest are classified as urban.

Data on election results for each municipality are compiled from the TSE, *Tribunal Superior Eleitoral* (TSE 2018a). Mayoral elections in Brazil are held every four years and the data for them have been available since 1996. We use data from the mayoral elections of 1996,

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<sup>2</sup> Quality data on economic remittances by internal migrants at the local level are very difficult to obtain. We explored the National Consumer Expenditure Survey but found that it seriously underreported remittances; also, the survey is only representative at the state and metropolitan level, and there were only a few points in time when information was collected (Barros, Cury, et al. 2007).

2000, 2004, 2008 and 2012, which can be matched to migration data from the 1991, 2000 and 2010 Censuses. Municipal-level data are aggregated into MCAs by adding the total votes for each party in the municipalities within each MCA. We use data from the first round of elections when all political parties are eligible to run. Brazil adopts a majority electoral system, in which a candidate must win more than 50% of the votes to win. If no mayoral candidate receives more than 50% of the valid votes, a runoff election with the top two candidates takes place. In reality, very few municipalities have carried out a second round election (TSE 2018a): 31 (0.6%) in 1996, 31 (0.6%) in 2000, 43 (0.8%) in 2004, 30 (0.5%) in 2008, and 50 (0.9%) in 2012.

Data on migration and socioeconomic characteristics are available for three years - 1991, 2000 and 2010 - whereas election data are available for 1996, 2000, 2004, 2008 and 2012. To align the migration and control variables with electoral outcomes, we use piecewise linear interpolation (Moler 2004) to derive values in intercensal years. We use piecewise linear extrapolation based on the trends between 2000 and 2010 to derive values after 2010. Because changes in socioeconomic conditions tend to be relatively insignificant during short time periods, the interpolated and extrapolated values are unlikely to deviate far from what the true values are (Honaker and King 2010).

We imputed all the missing electoral results data and outliers using predictive mean matching (PMM) (Rubin 1986). Missing electoral results occurs when the TSE nullifies a municipal election, after a confirmation of electoral fraud or impeachment of the candidate who attained a majority of the votes (TSE 2018a). Outliers may result from random fluctuation in data for small areas. We defined outliers as those higher than 3 interquartile ranges above the third quartile. Together, only a small fraction of elections (1.3%) had missing data or outliers. Details about PMM imputation are discussed at the bottom of Table 2. As discussed below, our main results are highly consistent with and without imputation. We use PMM in the main analysis because it provides more statistical power and mitigates micronumerosity fluctuations.

#### Migration measures and control variables

The Census asks all household members where they lived 5 years ago. Following the conventional practices of using census data, we define migrants as those aged 16 or older who did not live in the current MCA 5 years ago (Oliveira and Oliveira 2011). People aged 16 years and older are considered part of the working age population (hereby WAP) and are eligible to vote in Brazil. The key explanatory variable ( $m_{it}$ ) is the proportion of migrants relative to the WAP population ( $m_{it} = \frac{M_{it}}{WAP_{it-5}}$ ).  $M_{it}$  represents the total number of out-migrants that left the  $i$ -th MCA between year  $t - 5$  and  $t$ .  $WAP_{it-5}$  is the population in  $i$ -th MCA in the year  $t - 5$ . Using lagged migrant flows ( $t - 5$  to  $t$ ) reduces potential reverse causality between out-migration and electoral outcomes.

Descriptive statistics are presented in Table 1. On average, the percentage of out-migrants declined between 1991 and 2010 (from 13.0% to 8.9%), but still made up a notable share of the population in sending localities. About half of this flow was made up of rural-to-urban migrants. Appendix A displays the spatial distribution of the average share of out-migration during the 1996-2012 period. The share of out-migrants is higher in the traditional rural areas of the Northeast, North, Central-West and South regions (Gori Maia and Buainain 2015).

[Table 1 about here]

Control variables include socioeconomic factors that have been shown to be related to migration and electoral outcomes (Massey and Espinosa 1997; Power and Roberts 1995). Economic and labor market conditions are measured by per capita income (logged), size of the WAP (logged), and employment rate. Education level is measured by the share of WAP with no education (illiterate), with some primary education (reference category), and with some secondary or higher education. The composition of the population includes the following: age



structure (the share of WAP less than 30 years old [reference], 30 to 39 years old, 40 to 49 years old, 50 to 59 years old, and 60 years or older); gender (the share of the WAP who are female); and race (the share of the WAP who are white [reference], black, brown [*pardo*], and other races). Table 1 illustrates substantial improvements in per capita income and educational attainment between 1991 and 2010 although the level of socioeconomic development remains low.

We also include the share of non-labor income as a proxy for public transfers, which may shape political behavior by increasing political participation while reducing poverty and vulnerability to clientelism (De La O 2013). In 2010, non-labor income represented 29% of per capita income in Brazil. We could not use the census data to further disaggregate different sources of non-labor income. Prior research suggests that non-labor income mainly consists of pensions, rents and dividends, and cash transfers (Barros, Carvalho, et al. 2007).

Finally, we include the share of settled families to adjust for the political influence of the landless movement (*Movimento dos Trabalhadores Rurais Sem Terra*, MST).<sup>3</sup> The MST stages political mobilization that may affect the electoral preferences of local rural settlers (Navarro 2010). Data provided by the Brazilian Institute of Land Reform (INCRA) show that nearly 900,000 families were settled between 1988 and 2012 (INCRA 2015). In 2010, the share of settled families reached 2.4% of the population in sending MCAs.

## Measures of electoral outcomes

### *Political participation*

We construct three measures of political participation: voter turnout, voter turnout adjusted by out-migration, and youth registration. The first indicator, voter turnout ( $T$ ), is the share of registered voters who voted in an election, given by:

$$T_{it} = \frac{V_{it}}{R_{it}} \quad (1)$$

where  $R_{it}$  represents the number of eligible voters (age 16 or older) in the MCA  $i$  with a valid registration in the year  $t$ ; and  $V_{it}$  is the number of registered voters who voted.

As shown in Table 2, voter turnout has varied between 82% in 1996 and 86% in 2012. It was slightly lower in urban areas than in rural areas. Appendix B shows the spatial concentration of high turnout ratios in the poorest Northeast region. This is partly due to a combination of the smaller rural population size, the political mobilization of the Brazilian landless movement, and turnout buying. These factors are controlled for in the model.

[Table 2 about here]

A main limitation of  $T$  is that it does not consider the number of out-migrants who are registered locally but live in another municipality. By nature,  $T$  would be negatively related to the scale of out-migration because it captures the absence effect of migration. The potential positive impact of migrants' remittances would be captured by adjusting  $T$  by the number of voters registered in one MCA but residing in another. Although this information is not available, we have data for the number of justifications. Voters who fail to vote can justify their absence in a municipal electoral court. TSE provided the total number of justifications for each state in the municipal elections of 2004, 2008 and 2012 (TSE 2018a). We construct an adjusted measure ( $T_{adj}$ ) using the number of justifications, as below:

$$T_{adjit} = \frac{V_{it}}{(R_{it} - M_{it} \times (\frac{J_s}{M_s}))} \quad (2)$$

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<sup>3</sup> INCRA (2015) provides administrative records about the number of families living on farms officially incorporated in the Brazilian Program of Land Reform since 1988. This information does not consider dropouts or new families that are illegally living in the same lot.

where  $J_s$  is the number of justifications and  $M_s$  is the number of out-migrants in state  $s$ . The justification rate  $\frac{J}{M}$  is a proxy for the proportion of migrants who did not vote in their place of origin. Since three data points are available for each state, the justification ratio  $\frac{J}{M}$  represents the state average for the years of 2004, 2008, and 2012. The average justification ratio for all states is 0.65, suggesting that about two thirds of migrants justified their abstention and one third voted in their origin locality. This measure has some limitations because information on justifications is available at the state rather than the municipality level. There could be variability across municipalities within a state and over time that is not adequately captured by the justification ratio. Using PPM, we imputed 17 outliers in  $T_{adj}$  that result from random fluctuations in the data for small areas.

As shown in Table 2, the difference between  $T_{adj}$  and  $T$  is within 7 percentage points. Both measures show a similar temporal trend.  $T_{adj}$  corrects for the tendency of localities with higher out-migration to have lower turnouts. The larger the number of out-migrants in a municipality, the larger the difference between  $T_{adj}$  and  $T$ .

Given the limitations of  $T_{adj}$ , we create a third indicator measuring the participation by young voters, namely the youth registration ratio ( $U$ ). Young people are not subject to the compulsory voting rules, and thus less directly affected by the absence effect of out-migration.

$$U_{it} = \frac{R_{16-17it}}{P_{16-17it}} \quad (3)$$

where  $R_{16-17it}$  is the number of persons aged 16 or 17 with a valid electoral registration<sup>4</sup> and  $P_{16-17it}$  is the total population aged 16 and 17 years in the MCA  $i$  for year  $t$ . We imputed 134 outliers in  $P_{16-17it}$  using PMM. Note that voting in Brazil is also optional for the illiterate and for elderly citizens 70 years or older. But the TSE does not provide accurate information on the number of voters in these categories.

### *Fragmentation index*

Political competition is measured by fragmentation, or the effective number of parties running in each election, using the Laakso-Taagepera index (Laakso and Taagepera 1979). This index uses the relative number of votes received by each competing party in a community to measure the extent of fractionalization along party lines. It is a well-established and widely used proxy for measuring the degree of clientelism (Coppedge 1998). The index ( $F$ ) can be interpreted in a meaningful way as the "effective number of parties" competing in the election. It is given by:

$$F_{it} = \left( \sum_{j=1}^k p_{jit}^2 \right)^{-1} \quad (4)$$

where  $p_{jit}$  is the share of votes received by party  $j$  in municipality  $i$  in year  $t$ , and  $k$  is the total number of parties in the election. The share of votes ( $p_j$ ) was computed as the ratio between the total number of votes received by party  $j$  and the total number of valid votes for all parties. The  $F$  index ranges from 1, when one party attains 100% of the valid votes, to  $k$ , when all the  $k$  parties attain the same share of valid votes. A larger "effective number of parties" indicates greater electoral competition. As shown in Table 2,  $F$  tends to be lower in rural areas, where hegemonic parties are common.  $F$  ranges from 1 to 8 across all MCAs over five election cycles. Similarly, Appendix B displays the spatial concentration of municipalities with low fragmentation in the poorest Northeast region.

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<sup>4</sup> Individuals aged 16 or 17 must register in order to vote. There is no direct data on voter turnout for this age group. Hence, we use youth registration, which closely corresponds to actual voting behavior (McFarland and Thomas 2006).

## Empirical strategy

### *Spatial panel models*

We use spatial panel data models to examine the impact of migration on electoral outcomes in sending areas. One main source of bias occurs when contextual factors of the locality (e.g., poor socioeconomic development or democratic institutions) affect both emigration and electoral outcomes. Some of these factors are unobserved. Analyses that fail to account for these factors risk biasing the estimate of the migration effect. We first used fixed-effects (FE) to account for potential endogeneity bias due to time-invariant omitted variables. The Hausman test in Appendix C suggests that FE is preferred over random-effects models. The conventional two-way fixed-effects model is:

$$Y_{it} = \alpha_t + \delta m_{it} + \mathbf{x}'_{it} \boldsymbol{\beta} + c_i + \varepsilon_{it} \quad (5)$$

where  $Y_{it}$  represents the electoral outcome in MCA  $i$  at time  $t$ ;  $m_{it}$  denotes the share of out-migrants from MCA  $i$  between time  $t - 5$  and  $t$ ;  $\mathbf{x}_{it}$  is a vector of all the control variables presented in Table 1;  $\alpha_t$  is the election year fixed-effects that absorb macro-level shocks that vary over time but are constant across the MCAs (e.g., political and macroeconomic cycles);  $c_i$  represents the MCA fixed-effects, effectively accounting for unobservable heterogeneity that varies across MCAs but is constant over time; and  $\varepsilon_{it}$  is the random disturbance term. Of primary interest is  $\delta$ - the net impact of out-migration on electoral outcomes.

One assumption of the conventional fixed-effects model is that the units of analysis (MCAs) are mutually independent. But in reality, the MCAs share common boundaries. The political environment in one MCA may be correlated with that of the neighboring MCAs. In fact, the LISA (Local Indicator of Spatial Association) cluster maps (Anselin 2010) in Appendix D provide some evidence for the presence of local spatial association in  $\Delta Y$  ( $\Delta Y = Y_t - Y_{t-4}$ ). To disentangle the impact of out-migration from potential spatial spillover effects, we tested several spatial models, which are increasingly used in studies of voting behavior (Beck 2006). We identified the Spatial Autocorrelation Model (SAC) (Anselin 1988; LeSage and Pace 2009) as the most appropriate model (Appendix C). Our main models are SAC with fixed effects, as specified below:

$$Y_{it} = \alpha_t + \rho_1 \mathbf{w}_i^1 \mathbf{y}_t + \delta m_{it} + \mathbf{x}'_{it} \boldsymbol{\beta} + c_i + u_{it}, \quad u_{it} = \lambda \mathbf{w}_i^1 \mathbf{u}_t + \varepsilon_{it} \quad (6)$$

where  $\mathbf{w}_i^1 \mathbf{y}_t$  is the weighted average of the electoral outcome in all neighboring MCAs of MCA  $i$ , and  $\mathbf{w}_i^1 \mathbf{u}_t$  is the weighted average error in the neighboring MCAs. The vector  $\mathbf{y}_t$  contains electoral outcomes in all MCAs at time  $t$ , and  $\mathbf{u}_t$  contains the errors at time  $t$ . The weight vector  $\mathbf{w}_i^1$  contains positive values for the five closest MCAs to MCA  $i$ , and is zero otherwise.<sup>5</sup> These positive values are equal to  $\frac{1}{d_{ij}^n}$ , where  $d_{ij}^n$  is the normalized distance between MCA  $i$  and  $j$  ( $d_{ij}^n = d_{ij} / \sum_{j=1}^5 d_{ij}$ , where  $d_{ij}$  is the spatial distance in km between  $i$  and  $j$ ). The normalized distance is proportional to the spatial distance and  $\sum_{j=1}^5 d_{ij}^n = 1$ . The coefficient  $\rho_1$  represents the degree of spatial dependence between electoral outcomes in the origin MCA and its neighboring MCAs, and  $\lambda$  is the coefficient of spatial dependence for the errors.

Using the specification in Eq. 6, we estimate three models. Model 1 uses the total share of out-migrants ( $m$ ) to assess the impact of out-migration on electoral outcomes (hypotheses 1 and 2). Model 2 uses more detailed migration variables by distinguishing the share of rural-rural ( $m_{rr}$ ), rural-urban ( $m_{ru}$ ), urban-urban ( $m_{uu}$ ), and urban-rural migrants ( $m_{ur}$ ). This model assesses how the impact of migration differs by the relative level of development in origin and

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<sup>5</sup> The nearest neighbor strategy mitigates the effects of irregular areas (MCAs). We adopted the mode of contiguous neighbors in Brazil, which is five (nearly three quarters of the municipalities in Brazil have 5 or more neighbors). MCAs with five neighbors also exhibited the strongest levels of spatial autocorrelation (Appendix E). Having more than 5 neighbors tended to undermine the strength of the spatial autocorrelation between our electoral outcomes.

destination localities (hypothesis 3). Model 3 includes  $Y_{it-4}$  and the interaction between  $m_{it}$  and  $Y_{it-4}$  ( $m_{it} \times Y_{it-4}$ ) in Eq. 6. This model assesses how the impact of migration depends on the (lagged) level of political development in the origin locality (hypothesis 4). Model 1 and 2 are estimated using maximum likelihood. Model 3 is estimated using the generalized method of moments (GMM) to better account for endogeneity of the lagged outcome variable  $Y_{it-4}$ , and its interaction  $m_{it} \times Y_{it-4}$  (Hansen, 1982; Roodman, 2006). We use two-step system GMM estimators, which include lagged levels and lagged differences of regressors as instruments for the endogenous variables (Arellano and Bover 1995; Blundell and Bond 1998). Because the algorithms for GMM estimators in SAC models are not yet available, Model 3 uses only the spatial lag for  $Y$  (SAR – Spatial Autoregressive Model - with GMM), which also provides unbiased and consistent estimates (Cizek et al. 2011). Importantly, SAR models with GMM (for Model 3) effectively adjust for unobserved time-variant factors and thus more rigorously account for potential endogeneity bias.

### *Spatial network models*

As a strategy to identify the presence of political remittances, we assess the relationship between electoral outcomes in sending and receiving localities. We do so by using a spatial network model (based on Eq. 6). The model is given by:

$$Y_{it} = \alpha_t + \rho_1 \mathbf{w}_i^1 \mathbf{y}_t + \rho_2 \mathbf{w}_{it}^2 \mathbf{y}_t + \mathbf{x}'_{it} \boldsymbol{\beta} + c_i + u_{it}, \quad u_{it} = \lambda \mathbf{w}_i^1 \mathbf{u}_t + \varepsilon_{it} \quad (7)$$

where  $\mathbf{w}_{it}^2 \mathbf{y}_t$  is the weighted average of the electoral outcome across the destinations of migrants from origin MCA  $i$  at time  $t$ . The vector  $\mathbf{w}_{it}^2$  contains the share of out-migrants from MCA  $i$  in each destination at time  $t$ . Electoral outcomes in destinations have a greater weight if the destination has a higher concentration of migrants originating from MCA  $i$ . The coefficient  $\rho_2$  measures the dependence between electoral outcomes in origin and destination MCAs. A positive  $\rho_2$  lends support to the presence of political remittances (Hypothesis 5). The model is estimated by maximum likelihood (Belotti et al. 2013). This study is among the first to apply spatial network models to the examination of the impact of networks forged by migration.

## **Results**

The impact of migration on electoral outcomes

Table 3 presents results for various electoral outcomes: youth registration ( $U$ ); turnout adjusted by migration ( $T_{adj}$ ); and fragmentation ( $F$ ). Model 1 presents the overall net impact of migration ( $m$ ) and Model 2 examines how the impact differs depending on the type of migration ( $m_{rr}$ ,  $m_{ru}$ ,  $m_{uu}$ , and  $m_{ur}$ ). Model 3 includes an interaction between migration and past electoral outcomes in origin ( $m \times Y_{t-4}$ ).

[Table 3 about here]

As shown in Model 1, the impact of migration on political participation is positive and significant at the 0.01 level. Out-migration is associated with greater youth registration and voter turnout (adjusted for out-migration). For each 0.1 point increase in the share of out-migrants, the youth participation increases by 0.014 point and the adjusted voter turnout increases by 0.041 point. In contrast, the impact of migration on the overall unadjusted turnout rate (Appendix F) is negative and significant, as expected. This largely reflects the detrimental absence effect of out-migration in the context of compulsory voting. These results are consistent with Hypothesis 1, in that although overall voter turnout decreases with out-migration, voter turnout among those who are left behind and those who are not subject to compulsory voting is higher in localities with more out-migration than in similar localities with less migration.

The impact of migration on electoral competition, as measured by the fragmentation index, shows similar patterns to those observed for political participation. For each 0.1 point increase in the share of out-migrants, there is a 0.076 point increase in electoral fragmentation in

sending localities. These results are in line with Hypothesis 2 that out-migration is significantly associated with greater electoral competition in origin localities.

Model 2 examines how the role of migration varies by the socio-political environment in the origin and destination areas by distinguishing different types of migration. We see that with respect to both electoral participation and competition, the impact of migration is particularly salient in the context of rural-to-urban migration compared to other types of migration. This is especially true when we look at youth registration and fragmentation, for which only the share of rural-urban migration provides the statistically significant result. These results lend some support to Hypothesis 3 of a particularly strong positive impact of migration when migrants move from less developed rural localities to more developed urban localities with more democratic institutions and more competitive elections. This flow generates a higher level of political and economic remittances to affect change in the origin localities. The pattern is less clear when it comes to the adjusted turnout rate. Note that for the overall turnout (Appendix F), different types of migration are negatively associated with the turnout rate. This most likely reflects the absence effect of migration in that any type of migration-related absence tends to reduce the overall turnout when voting is compulsory (with the exception of urban-rural migration, which is small in scale).

Model 3 addresses the question of how the impact of migration depends on the level of political development in origin localities. Across all three outcomes, we find a negative interaction between the out-migration ratio and the electoral outcome (electoral participation or competition) in the previous election cycle. This is consistent with Hypothesis 4 that the role of migration is stronger in origin localities at lower levels of democratic development. It is in this context that political and economic remittances from migrants can shift the balance to more democratic attitudes and behaviors. The estimates in Model 3 are obtained through GMM estimators. The final number of instruments used in each model is presented at the bottom of Table 3 along with the Sargan's  $J$  test statistics for the joint validity of these instruments. The Sargan's  $J$  statistics in our models are all insignificant at the 5% level, suggesting that the instruments are exogenous and that GMM provides consistent estimates.

The different impact of migration for different levels of political development in origin localities is more clearly illustrated in Figure 1, which displays the net impact of migration across the nine deciles of the fragmentation index ( $F_{t-4}$ ). The estimated impact is the largest in the 1<sup>st</sup> decile ( $F_{t-4} = 1.58$ ), equaling 2.46. The impact declines in localities that have experienced more competitive elections and becomes insignificant at and above the 6<sup>th</sup> decile ( $F_{t-4} = 2.72$ ).

[Figure 1 about here]

All models control for spatial dependence. The Wald tests associated with the spatial terms ( $\rho$  and  $\lambda$ ) are significant across most models. This points to notable spatial dependence in political outcomes between origin localities and their neighboring MCAs. This could arise from regional strategies of political parties or could be a spillover effect of electoral behaviors in nearby localities.

#### Evidence for political remittances

Results from the spatial network models are displayed in Table 4. The explanatory variable of interest is (Eq. 7) the weighted average outcomes in receiving localities ( $\mathbf{w}^2\mathbf{y}$ ).

[Table 4 about here]

The estimate of  $\rho_2$  for all models is positive and significant. This means that the level of electoral participation and competition in a sending locality is positively associated with that across its receiving localities. This similarity provides some suggestive evidence for the presence of political remittances (Hypothesis 5): that is, the level of electoral participation and competition in origin localities tend to reproduce themselves in migrants' destinations. Although

this analysis provides only indirect evidence, the strong observed relationship is likely to result at least in part from the norms and practices that migrants acquire in destinations and transmit back to their communities of origin.

### Sensitivity Analysis

We conducted several sensitivity analyses to evaluate the robustness of the results. First, Appendix G compares the results of the overall impact of migration with listwise deletion (excluding all MCAs with any missing data or outlier on election results) and with PMM. The two sets of estimates are highly consistent, suggesting that the impact of out-migration is robust to missing data and outliers.

Next, we explored alternative rural-urban definitions (Appendix H). T1 is based on Veiga (2007) and is commonly used in rural development studies in Brazil. We have adopted it in the main analysis. T2 is based on the density-adjusted population size proposed by IBGE (2017), which distinguishes rural, intermediary, and urban municipalities (details in the bottom of Appendix H). In general, the main findings largely hold across the two typologies. In all models, we see that the impact is particularly strong for rural-urban migration (5 out of 6 estimates are significant at the 5% level). We also identify a positive effect of rural-intermediary and intermediary-urban migration (T2) on youth registration and turnout. These results provide further support to our hypothesis that migrants from less to more developed areas have a strong potential to promote electoral participation. Because the results are similar, we have kept T1 for the main analysis for it is more parsimonious and better aligns with the timing of the study (the typology was developed in the 2000s, in the middle of our study period).

Finally, to examine the change in the net impact of out-migration over time, we interacted the share of out-migrants with election-year dummy variables (from 1996 to 2012). Appendix I presents the impact of migration for each election year, which shows no clear trend over time. Importantly, the impact of out-migration remains strong and significant across different elections, especially when it comes to adjusted turnout and fragmentation. The impact of out-migration on youth registration became insignificant during PT's presidency (2004-2012). One possible explanation could be that the youngest group of voters generally became more politically engaged during this time period and thus became less influenced by others. This is an interesting question to explore for future research.

### Discussion

The present study examines how internal migration shapes electoral outcomes in sending localities in Brazil. We compiled a longitudinal dataset on internal migration and municipal election outcomes, perhaps the largest currently available in Brazil. We find that out-migration - *ceteris paribus* - increases electoral participation and competition for those left behind in sending areas. The impact of this is especially evident in the context of rural-urban migration, where changes in the socioeconomic and political environment are greater more pronounced in sending localities characterized by low levels of democratic development. Our results also provide suggestive evidence of the presence of political remittances. Overall, the findings underscore the importance of migration for political change in sending communities. Our analysis takes into account potential endogeneity and spatial correlation, which increases our confidence that the observed effects do not result from these potential biases.

The paper makes several contributions to existing research. First, our focus on the political impact of migration moves beyond the well-studied social and economic consequences of migration for sending areas and the often pessimistic views regarding the change induced by out-migration. We identify both positive and negative impacts of migration for different dimensions of electoral outcomes. We examine multiple measures that complement each other and provide a more complete picture of the political impact of migration. Migration from less to

more democratic places promotes greater electoral participation and competition in local elections for those left behind. However, migration can also have a detrimental impact on overall electoral participation by reducing the number of eligible voters who are present to vote. In this respect, our study extends the research on the "migration-development nexus" by demonstrating that migration can bring not only economic and social transformation but also political change back home.

In general, we join the developing body of research on "political demography." This line of research has postulated ways in which population dynamics shape political processes, from the stability of nation-states to national politics and international security (Goldstone et al. 2012). This conceptualization strengthens the relevance of the field of demography to politics, by moving beyond the conventional focus on the impact of politics on demographic outcomes to investigating the reverse question. There has been little systematic empirical investigation linking demographic forces to political affairs. The few but notable empirical studies have focused on the political consequences of age structure, namely "youth bulges" and population aging (Bhatti and Hansen 2012; Cincotta and Doces 2012). We add to this accumulating evidence by studying the impact of population mobility on electoral outcomes.

Second, the present study indicates that the role of migration is conditioned by the context of migration and by the level of political development in origin localities. The positive effect of migration on electoral outcomes is especially salient in rural-urban migration. This is consistent with the speculation that economic and political remittances from migrants are larger when there are greater differences between the origin and destination localities. Specifically, political remittances primarily flow from more democratic to less democratic settings. Given the large rural-urban gap in Brazil, urban areas are more developed socioeconomically and politically, resulting in greater political competition and more democratic norms. In contrast, citizens in less developed rural areas in Brazil have historically been more susceptible to clientelistic practices and experienced more hegemonic elections. Even so, their vulnerability seems to be alleviated to some extent by the resources generated by out-migration.

Migration also has a more pronounced impact on electoral outcomes in localities at low levels of democratic development (i.e., settings that have been marked by lower electoral participation and competition). This is particularly important in Brazil, where elections in many municipalities are undermined by clientelism and low participation. We find that these municipalities are where migration plays the greatest role in stimulating electoral participation and competition. This is potentially due to migration-driven political and economic remittances, which heighten democratic norms and mobilize those left behind to vote based on their true preferences.

Third, we provide an indirect test for the presence of political remittances using the spatial network model. The results highlight a strong association between electoral outcomes in origin and receiving localities, which provide some suggestive evidence of the transmission of political remittances. This finding draws parallel with the conception of "linked fate" discovered in African American politics (Dawson 1995). In the case of migration in Brazil, "linked fate" is forged between migrants and members who remain in their sending communities. Migration may open political spaces for migrants in destination localities, who often maintain enduring relationships with those left behind in sending communities. As such, migration may create a political linkage between destination and origin areas in ways that confer greater political activism on those left behind. To be sure, political remittances are not the only channel through which migration affects democratic development in origin localities. Economic remittances can also play an important role by increasing disposable income and subsequently decreasing clientelistic transactions. We are unable to directly test this channel because of a lack of accurate information on monetary remittances from internal migrants. But there are reasons to believe that political and economic remittances combine to shape electoral outcomes in origin communities.

A limitation of our study is the lack of direct measures of the underlying mechanisms that generate the migration effect, namely political and economic remittances. Qualitative research based on in-depth interviews would yield useful information about the specific ways that migration-driven transmission takes place and contributes to the transformation of people in origin areas. Nonetheless, the robustness of our results across different measures of electoral outcomes and different empirical strategies strengthens the central thesis of this study that migration can foster democratic development in sending localities, especially when it takes place between more and less democratic settings. A good understanding of the overall political impact of migration is a first step toward a deeper knowledge of these underlying mechanisms, and we hope this study will inspire future research to collect qualitative and quantitative data on the mechanisms.

This study represents one of the first that examines the political consequences of migration in Brazil. The findings have some implications for understanding electoral politics in other developing democracies, where political actors have often relied on clientelism to build and maintain their power bases. This is particularly true in poor areas where a large share of voters depends heavily on social transfers from the government. In this context, migration can help undermine the hegemony of political players and reshape local power relationships by instituting more democratic political ideas and behaviors that are prevalent in more developed areas. This allows people who stay behind to defy clientelistic arrangements. As such, traditional oligarchies may gradually lose their ability to sustain patronage in areas characterized by large out-migration flows.

The impact of migration may not be limited to electoral competition and participation. Political remittances may have broader consequences for democratization, including promoting political consciousness and non-electoral democratic participation such as protests. This possibility is pertinent in Brazil, where waves of protests erupted in 2016, especially in metropolitan areas, in response to corruption scandals and dissatisfaction with the federal government. These protests culminated in the impeachment of the president. In 2018, a little-known congressman rose from obscurity and was elected as president without either the support of the traditional political elites or propaganda time on TV. His victory has relied almost exclusively on social networks and the mobilization of widespread discontent about rampant violence and corruption in the country. His right-wing ideas initially attracted young voters from the middle and upper classes in metropolitan centers. But his popularity rapidly spread to less developed regions. That election has underscored the importance of interpersonal channels of transmission in the process of political learning and influence.

In Brazil, internal migration has remained a salient phenomenon. Migrants also have increasingly explored intermediary cities as destinations. Our analysis shows that migration to intermediary cities also generates political remittances. With the advancement of communication and transportation technologies, as well as the continuing flow of migration in Brazil, the political importance of migration may remain a reality for years to come. We find an overall positive impact of internal migration on electoral participation and competition in Brazil. Future studies can investigate how migration shapes preferences for political parties, populism, and polarization, all of which are areas of growing concern in Latin American countries. Although the study was conducted in Brazil, migration has increased worldwide. Similar questions are worth investigating in other societies characterized by internal and international migration from less to more democratic settings. The conceptual and analytic framework developed in the present study can be adapted to future research.



## Ethics and Consent

The research follows standard procedures for secondary data analyses. The authors report no ethical issues.

## Conflict of Interest

The authors declare no conflicts of interest.

## Author's Contributions

The authors contributed equally to this article.

## Data Availability

The datasets used in the current study were compiled from several sources: *Instituto Brasileiro de Geografia e Estatística* (<https://www.ibge.gov.br/estatisticas/downloads-estatisticas.html>); *Tribunal Superior Eleitoral* (<http://www.tse.jus.br/eleicoes/estatisticas/repositorio-de-dados-eleitorais-1>); and *Instituto Nacional de Colonização e Reforma Agrária* (<http://painel.incra.gov.br/sistemas/index.php>).

## References

- Ames, B. (1994). The Reverse Coattails Effect: Local Party Organization in the 1989 Brazilian Presidential Election. *American Political Science Review*, 88(01), 95–111. doi:10.2307/2944884
- Anselin, L. (1988). *Spatial Econometrics: Methods and Models* (Vol. 4). Dordrecht: Springer Netherlands. doi:10.1007/978-94-015-7799-1
- Anselin, L. (2010). Local Indicators of Spatial Association-LISA. *Geographical Analysis*, 27(2), 93–115. doi:10.1111/j.1538-4632.1995.tb00338.x
- Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics*, 68(1), 29–51. doi:10.1016/0304-4076(94)01642-D
- Baeninger, R. (2012). Rotatividade Migratória : um novo olhar para as migrações internas no Brasil. *Revista Internacional de Mobilidade Humana*, 20(39), 77–100.
- Baiardi, A. (1995). Padrões culturais e Resistência a Mudanças: Obstáculos à Democracia e ao Desenvolvimento no Brasil. *Organizações & Sociedade*, 3(4), 95–120.
- Baptista, E. A., & Rigotti, J. I. R. (2017). Return Migration in Brazil. *Mercator*, 16(4), 1–18. doi:10.4215/rm2017.e16010
- Barros, R. P. de, Carvalho, M. de, & Franco, S. (2007). O Papel das Transferências Públicas na Queda Recente da Desigualdade de Renda Brasileira. In R. P. de Barros, M. N. Foguel, & G. Ulysea (Eds.), *Desigualdade de Renda no Brasil: Uma Análise da Queda Recente* (Volume 2., pp. 41–86). Brasília: Instituto de Pesquisa Econômica Aplicada.
- Barros, R. P. de, Cury, S., & Ulysea, G. (2007). A desigualdade de renda no Brasil encontra-se subestimada? Uma análise comparativa com base na PNAD, na POF e nas Contas Nacionais. *Texto para Discussão - IPEA*, (1263), 39.
- Beck, N. (2006). Space is more than geography: Using spatial econometrics in the study of political economy. *International Studies ...*, 50(1), 27–44. doi:10.1111/j.1468-2478.2006.00391.x
- Belotti, F., Hughes, G., & Mortari, A. P. (2013). Xsmle-a command to estimate spatial panel models in stata. In *German Stata Users' Group Meetings* (pp. 1–36). Potsdam.
- Bhatti, Y., & Hansen, K. M. (2012). The effect of generation and age on turnout to the European Parliament – How turnout will continue to decline in the future. *Electoral Studies*, 31(2), 262–272. doi:10.1016/j.electstud.2011.11.004

- Birch, S. (2008). *Full participation : a comparative study of compulsory voting*. Manchester; New York: Manchester University Press.
- Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, 87(1), 115–143. doi:10.1016/S0304-4076(98)00009-8
- Brollo, F., Kaufmann, K. M., & Ferrara, E. (2017). *The Political Economy of Program Enforcement: Evidence from Brazil* (No. 316).
- Brooks, S. M. (2014). Insecure Democracy: Risk and Political Participation in Brazil. *The Journal of Politics*, 76(4), 972–985. doi:10.1017/S0022381614000553
- Cajado, A. F. R., Dornelles, T., & Pereira, A. C. (2014). *Eleições no Brasil - uma história de 500 anos*. Brasília: Tribunal Superior Eleitoral.
- Camarano, A. A., & Abramovay, R. (1999). *Êxodo rural, envelhecimento e masculinização no Brasil: Panorama dos últimos 50 anos* (No. 621). Rio De Janeiro.
- Carvalho, J. M. de. (1997). Mandonismo, Coronelismo, Clientelismo: Uma Discussão Conceitual. *Dados*, 40(2), 229–250. doi:10.1590/S0011-52581997000200003
- Carvalho, R. C. de, & Charles-Edwards, E. (2019). Migration flows between levels of the Brazilian urban hierarchy in the period 1980-2010. *Revista Brasileira de Estudos de População*, 36, 1–19. doi:10.20947/S0102-3098a0087
- Cincotta, R., & Doces, J. A. (2012). The Age-Structural Maturity Thesis: The Impact of the Youth Bulge on the Advent and Stability of Liberal Democracy. In J. Goldstone, E. Kaufmann, & M. D. Toft (Eds.), *Political Demography: How Population Changes Are Reshaping International Security and National Politics* (pp. 98–116). Oxford University Press.
- Cizek, P., Jacobs, J. P. A. M., Ligthart, J. E., & Vrijburg, H. (2011). GMM Estimation of Fixed Effects Dynamic Panel Data Models with Spatial Lag and Spatial Errors. *SSRN Electronic Journal*. doi:10.2139/ssrn.1971176
- Coppedge, M. (1998). The Dynamic Diversity of Latin American Political Systems. *Party Politics*, 4(4), 547–568. doi:10.1177/1354068898004004007
- Corporación Latinobarómetro. (2018). Latinobarómetro database.
- Cunha, J. M. P. (2015). A migração interna no Brasil nos últimos cinquenta anos: (des) continuidades e rupturas. In M. Arretche (Ed.), *Trajetórias das desigualdades: como o Brasil mudou nos últimos cinquenta anos* (pp. 279–307). São Paulo: Editora Unesp.
- De La O, A. L. (2013). Do Conditional Cash Transfers Affect Electoral Behavior? Evidence from a Randomized Experiment in Mexico. *American Journal of Political Science*, 57(1), 1–14. doi:10.1111/j.1540-5907.2012.00617.x
- Docquier, F., & Rapoport, H. (2011). Globalization, Brain Drain and Development. *IZA Discussion Paper, March*(5590), 1–60.
- Dota, E. M., & Queiroz, S. N. de. (2019). Migração interna em tempos de crise no Brasil|Internal migration in times of crisis in Brazil. *Revista Brasileira de Estudos Urbanos e Regionais*, 21(2), 415. doi:10.22296/2317-1529.2019v21n2p415
- Durand, J., Parrado, E. A., & Massey, D. S. (1996). Migradollars and Development: A Reconsideration of the Mexican Case. *International Migration Review*, 30(2), 423–444. doi:10.1177/019791839603000202
- Ehrl, P. (2017). Minimum comparable areas for the period 1872-2010: an aggregation of Brazilian municipalities. *Estudos Econômicos (São Paulo)*, 47(1), 215–229. doi:10.1590/0101-416147182phe
- Epstein, D. J. (2009). Clientelism Versus Ideology. *Party Politics*, 15(3), 335–355. doi:10.1177/1354068809102250
- Fazito, D. (2010). Análise de redes sociais e migração: dois aspectos fundamentais do “retorno.” *Revista Brasileira de Ciências Sociais*, 25(72), 89–100. doi:10.1590/S0102-

69092010000100007

- Ferraz, C., & Finan, F. (2005). Reelection Incentives and Political Corruption: Evidence from Brazilian Audit Reports. In *American Agricultural Economics Association Annual Meeting*. Providence.
- Fornos, C. A., Power, T. J., & Garand, J. C. (2004). Explaining Voter Turnout in Latin America, 1980 to 2000. *Comparative Political Studies*, 37(8), 909–940. doi:10.1177/0010414004267981
- Franklin, M. N. (1999). Electoral engineering and cross-national turnout differences : what role for compulsory voting? *British Journal of Political Science*, 29(1), 205–216.
- Frey, A. (2019). Cash transfers, clientelism, and political enfranchisement: Evidence from Brazil. *Journal of Public Economics*, 176, 1–17. doi:10.1016/j.jpubeco.2019.05.002
- Gay, R. (1998). Rethinking clientelism : Demands , discourses and practices in contemporary Brazil. *European Review of Latin American and Caribbean Studies*, 65(December), 7–24.
- Genicot, G., Mayda, A. M., & Mendola, M. (2017). *The impact of migration on child labour: Theory and evidence from Brazil. Markets, Governance, and Institutions in the Process of Economic Development*. doi:10.1093/oso/9780198812555.003.0014
- Goldsmith, W. W., & Wilson, R. (1991). Poverty and distorted industrialization in the Brazilian Northeast. *World Development*, 19(5), 435–455. doi:10.1016/0305-750X(91)90187-M
- Goldstone, J. A., Kaufmann, E. P., & Toft, M. D. (Eds.). (2012). *Political Demography: How Population Changes are Reshaping International Security and National Politics*. New York: Oxford University Press.
- Gori Maia, A., & Buainain, A. M. (2011). Pobreza objetiva e subjetiva no Brasil. *Confins*, (13), 21. doi:10.4000/confins.7301
- Gori Maia, A., & Buainain, A. M. (2015). O novo mapa da população rural brasileira. *Confins*, 25(25), 1–26. doi:10.4000/confins.10548
- Greene, K. F. (2007). *Why Dominant Parties Lose: Mexico's Democratization in Comparative Perspective*. Cambridge: Cambridge University Press. doi:10.1017/CBO9780511509803
- Hansen, L. P. (1982). Large sample properties of generalized method of moments estimators. *Econometrica*, 50(4), 1029–1054.
- Hirschman, C., Kasinitz, P., & DeWind, J. (Eds.). (1999). *The Handbook of International Migration*. Russell Sage Foundation.
- Honaker, J., & King, G. (2010). What to Do about Missing Values in Time-Series Cross-Section Data. *American Journal of Political Science*, 54(2), 561–581. doi:10.1111/j.1540-5907.2010.00447.x
- IBGE. (2010). *Nupcialidade, fecundidade e migração. Censo Demográfico 2010 - Nupcialidade, fecundidade e migração*. Rio De Janeiro.
- IBGE. (2017). *Classificação e Caracterização dos Espaços Rurais e Urbanos do Brasil : Uma Primeira Aproximação*. Rio de Janeiro: Instituto Brasileiro de Geografia e Estatística.
- IBGE. (2018). Portal do Instituto Brasileiro de Geografia e Estatística. *Instituto Brasileiro de Geografia e Estatística*. <https://www.ibge.gov.br>. Accessed 25 November 2018
- IICA. (2012). *A nova cara da pobreza rural - Desafios para as políticas públicas*. (A. M. Buainain, C. Dedecca, & H. Neder, Eds.) *A Nova Cara Da Pobreza Rural: Desafios para as políticas públicas*. Brasília: Instituto Interamericano de Cooperação para a Agricultura.
- INCRA. (2015). Instituto Nacional de Colonização e Reforma Agrária. *Números da Reforma Agrária*. <http://www.incra.gov.br/>. Accessed 17 March 2016
- Itzigsohn, J., & Giourguli, S. S. (2002). Immigrant Incorporation and sociocultural transnationalism. *International Migration Review*, 36(3), 766–798.
- Kapur, D. (2010). *Diaspora, Development, and Democracy: The Domestic Impact of International Migration from India*. Princeton: Princeton University Press.
- Kapur, D. (2014). Political Effects of International Migration. *Annual Review of Political*

- Science*, 17(1), 479–502. doi:10.1146/annurev-polisci-043010-095807
- Kurtz, M. J. (2004). *Free market democracy and the Chilean and Mexican countryside*. New York: Cambridge University Press.
- Laakso, M., & Taagepera, R. (1979). “Effective” Number of Parties. *Comparative Political Studies*, 12(1), 3–27. doi:10.1177/001041407901200101
- Lavareda, A., & Telles, H. (Eds.). (2016). *A lógica das eleições municipais*. Rio de Janeiro: FGV Editora.
- LeSage, J., & Pace, R. K. (2009). *Introduction to spatial econometrics*. Boca Raton: CRC Press.
- Levitt, P. (2001). *The Transnational Villagers*. Berkeley: University of California Press.
- Lima, E. E. C., & Braga, F. G. (2016). Nuevos patrones de migración intermunicipal en el Brasil: influencia de la dinámica económica y de los programas de transferencia de ingresos. *Notas de Población*, (103), 101–122.
- Lu, Yao. (2019). Empowerment or Disintegration? Migration, Social Institutions, and Collective Action in Rural China. *American Journal of Sociology*, 125(3), 683–729. doi:10.1086/706755
- Lu, Y., Zheng, W., & Wang, W. (2017). Migration and Popular Resistance in Rural China: Wukan and beyond. *China Quarterly*, 229(February 2017), 1–22. doi:10.1017/S0305741016001582
- Magaloni, B., & Kricheli, R. (2010). Political Order and One-Party Rule. *Annual Review of Political Science*, 13(1), 123–143. doi:10.1146/annurev.polisci.031908.220529
- Massey, D. S., & Espinosa, K. E. (1997). What’s Driving Mexico-U.S. Migration? A Theoretical, Empirical, and Policy Analysis. *American Journal of Sociology*, 102(4), 939–999. doi:10.1086/231037
- McFarland, D. A., & Thomas, R. J. (2006). Bowling Young: How Youth Voluntary Associations Influence Adult Political Participation. *American Sociological Review*, 71(3), 401–425. doi:10.1177/000312240607100303
- Moisés, J. A. (1993). Elections, Political Parties and Political Culture in Brazil: Changes and Continuities. *Journal of Latin American Studies*, 25(03), 575. doi:10.1017/S0022216X00006672
- Moler, C. (2004). *Numerical Computing with MATLAB*. Philadelphia: SIAM.
- Navarro, Z. (2010). The Brazilian Landless Movement (MST): Critical Times. *Redes*, 15(1), 196–223. doi:10.17058/redes.v15i1.1362
- Oliveira, L. A. P. de, & Oliveira, A. T. R. de (Eds.). (2011). *Reflexões sobre os Deslocamentos Populacionais Brasileiros*. Rio de Janeiro: Instituto Brasileiro de Geografia e Estatística.
- Pais, P. S. M., de Mattos, L. B., & Teixeira, E. C. (2018). Interstate migration and human capital formation in Brazil. *International Journal of Social Economics*, 45(8), 1159–1173. doi:10.1108/IJSE-03-2017-0121
- Pérez-Armendáriz, C. (2014). Cross-Border Discussions and Political Behavior in Migrant-Sending Countries. *Studies in Comparative International Development*, 49(1), 67–88. doi:10.1007/s12116-014-9152-4
- Pérez-Armendáriz, C., & Crow, D. (2010). Do migrants remit democracy? International migration, political beliefs, and behavior in Mexico. *Comparative Political Studies*, 43(1), 119–148. doi:10.1177/0010414009331733
- Perz, S. G. (2000). The rural exodus in the context of economic crisis, globalization and reform in Brazil. *International Migration Review*, 34(3), 842–881. doi:10.2307/2675947
- Pfutze, T. (2012). Does migration promote democratization? Evidence from the Mexican transition. *Journal of Comparative Economics*, 40(2), 159–175. doi:10.1016/j.jce.2012.01.004
- Pfutze, T. (2014). Clientelism versus social learning: The electoral effects of international migration. *International Studies Quarterly*, 58(2), 295–307. doi:10.1111/isqu.12072

- Power, T. J., & Roberts, J. T. (1995). Compulsory voting, invalid ballots, and abstention in Brazil. *Political Research Quarterly*, 48(4), 795–826.
- Przeworski, A., Alvarez, M. E., Cheibub, J. A., & Limongi, F. (2000). *Democracy and Development*. Cambridge: Cambridge University Press. doi:10.1017/CBO9780511804946
- Rocha, M. M., & Kerbauy, M. T. (Eds.). (2014). *Eleições, partidos e representação política nos municípios brasileiros*. Juiz de Fora: Editora UFJF.
- Roninger, L. (1987). Caciquismo and coronelismo : Contextual dimensions of patron brokerage in Mexico and Brazil. *Latin American Research Review*, 22(2), 71–99.
- Rubin, D. B. (1986). Statistical Matching Using File Concatenation With Adjusted Weights and Multiple Imputations. *Journal of Business & Economic Statistics*, 4(1), 87–94. doi:10.1080/07350015.1986.10509497
- Samuels, D. (2001). Money, Elections, and Democracy in Brazil. *Latin American Politics and Society*, 43(02), 27–48. doi:10.1111/j.1548-2456.2001.tb00398.x
- Stokes, S. C., Dunning, T., Nazareno, M., & Brusco, V. (2013). *Brokers, Voters, and Clientelism*. Cambridge: Cambridge University Press. doi:10.1017/CBO9781107324909
- Sugiyama, N. B., & Hunter, W. (2013). Whither Clientelism? Good Governance and Brazil's Bolsa Família Program. *Comparative Politics*, 46(1), 43–62. doi:10.5129/001041513807709365
- TSE. (2015). Pesquisa revela que compra de votos ainda é realidade no país. *Tribunal Superior Eleitoral*.
- TSE. (2018a). Portal do Tribunal Superior Eleitoral. *Tribunal Superior Eleitoral*.
- TSE. (2018b). Repositório de dados eleitorais. *Tribunal Superior Eleitoral*. <http://www.tse.jus.br/eleitor-e-eleicoes/estatisticas/repositorio-de-dados-eleitorais-1/repositorio-de-dados-eleitorais>. Accessed 5 April 2018
- TSE. (2018c). Eleições 2018: Saiba como Justificar o Voto em Caso de Ausência às Urnas. *Tribunal Superior Eleitoral*.
- TSE. (2019). Saiba como Solicitar a Transferência do Título de Eleitor. *Tribunal Superior Eleitoral*.
- United Nations. (2013). *Cross-national comparisons of internal migration: An update on global patterns and trends*. UN Population Division Technical Paper. New York.
- Vanhanen, T. (2003). *Democratization: A Comparative Analysis of 170 countries*. London: Routledge.
- Veiga, J. E. Da. (2007). Mudanças nas relações entre espaços rurais e urbanos. *Revista Brasileira de Gestão e Desenvolvimento Regional*, 3(1), 123–149.
- Villarreal, A., & Hamilton, E. R. (2012). Rush to the border? Market liberalization and urban-rural-origin internal migration in Mexico. *Social Science Research*, 41(5), 1275–1291. doi:10.1016/j.ssresearch.2012.02.007

## Tables

Table 1 - Means and standard deviations (SD, in parentheses) of explanatory variables in MCA

	1991		2000		2010	
	Mean	SD	Mean	SD	Mean	SD
<b>Migration</b>						
Share of out-migrants	0.130	(0.069)	0.114	(0.053)	0.089	(0.036)
Share of rural-rural migrants	0.034	(0.039)	0.031	(0.033)	0.025	(0.026)
Share of rural-urban migrants	0.064	(0.060)	0.060	(0.051)	0.046	(0.039)
Share of urban-rural migrants	0.006	(0.014)	0.006	(0.012)	0.005	(0.010)
Share of urban-urban migrants	0.026	(0.047)	0.027	(0.046)	0.020	(0.034)
<b>Economy and labor market</b>						
Per capita income (R\$)	240	(145)	344	(197)	491	(239)
Working age population (1,000s)	21.6	(132.8)	27.1	(155.4)	33.6	(183.4)
Employment-to-population ratio	0.558	(0.070)	0.552	(0.085)	0.568	(0.092)
<b>Gender</b>						
Share of females	0.495	(0.021)	0.496	(0.018)	0.500	(0.016)
<b>Education</b>						
Share of illiterate people	0.310	(0.170)	0.216	(0.126)	0.168	(0.102)
Share of some primary education	0.571	(0.132)	0.576	(0.081)	0.492	(0.076)
Share of some secondary education or more	0.119	(0.067)	0.208	(0.088)	0.341	(0.092)
<b>Age</b>						
Share of 16-29 years	0.412	(0.038)	0.377	(0.048)	0.325	(0.046)
Share of 30-39 years	0.205	(0.024)	0.209	(0.020)	0.194	(0.017)
Share of 40-49 years	0.148	(0.013)	0.158	(0.019)	0.171	(0.018)
Share of 50-59 years	0.106	(0.014)	0.113	(0.015)	0.129	(0.021)
Share of 60 years or older	0.128	(0.031)	0.143	(0.031)	0.182	(0.031)
<b>Race</b>						
Share of white	0.500	(0.278)	0.527	(0.249)	0.469	(0.234)
Share of black	0.052	(0.045)	0.064	(0.048)	0.070	(0.052)
Share of brown	0.440	(0.267)	0.396	(0.228)	0.446	(0.207)
Share of others	0.007	(0.024)	0.014	(0.026)	0.015	(0.032)
<b>Public Transfer</b>						
Share of non-labor income	0.112	(0.051)	0.222	(0.085)	0.288	(0.102)
<b>Political Mobilization</b>						
Share of settled families	0.002	(0.020)	0.016	(0.060)	0.024	(0.072)

Note: R\$ means constant Brazilian Reais of August 2010 (R\$1 equals \$0.57). S.D. is the standard deviation.

Table 2 – Mean and standard deviation (SD, in parentheses) for electoral outcomes in MCAs

Election	Listwise Deletion				PMM Imputation			
	Rural		Urban		Rural		Urban	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
<i>Youth Registration (U)</i>								
1996	0.594	(0.206)	0.430	(0.181)	0.596	(0.207)	0.431	(0.182)
2000	0.734	(0.214)	0.533	(0.206)	0.738	(0.219)	0.533	(0.206)
2004	0.800	(0.215)	0.607	(0.204)	0.805	(0.221)	0.608	(0.205)
2008	0.731	(0.223)	0.521	(0.222)	0.734	(0.226)	0.521	(0.222)
2012	0.781	(0.271)	0.548	(0.254)	0.787	(0.276)	0.549	(0.255)
<i>Turnout adjusted by migration (<math>T_{adj}</math>)</i>								
1996	0.887	(0.089)	0.879	(0.077)	0.888	(0.090)	0.882	(0.083)
2000	0.941	(0.083)	0.919	(0.063)	0.942	(0.084)	0.919	(0.064)
2004	0.950	(0.068)	0.923	(0.050)	0.950	(0.068)	0.923	(0.050)
2008	0.950	(0.065)	0.917	(0.049)	0.950	(0.065)	0.917	(0.049)
2012	0.914	(0.060)	0.897	(0.049)	0.914	(0.060)	0.897	(0.050)
<i>Turnout (T)</i>								
1996	0.817	(0.080)	0.837	(0.336)	0.818	(0.081)	0.861	(0.488)
2000	0.867	(0.068)	0.858	(0.058)	0.867	(0.068)	0.858	(0.058)
2004	0.882	(0.058)	0.868	(0.045)	0.882	(0.058)	0.868	(0.045)
2008	0.887	(0.055)	0.867	(0.044)	0.887	(0.055)	0.867	(0.044)
2012	0.861	(0.055)	0.852	(0.047)	0.861	(0.055)	0.852	(0.047)
<i>Fragmentation (F)</i>								
1996	2.370	(0.835)	2.756	(0.989)	2.376	(0.839)	2.761	(0.992)
2000	2.534	(0.889)	2.857	(1.094)	2.534	(0.890)	2.857	(1.097)
2004	2.500	(0.917)	2.892	(1.110)	2.502	(0.916)	2.890	(1.111)
2008	2.460	(0.947)	2.854	(1.132)	2.458	(0.948)	2.854	(1.131)
2012	2.238	(0.673)	2.593	(0.974)	2.238	(0.673)	2.592	(0.973)

*Note:* Listwise deletion excludes missing values or outliers. PMM Imputation replaces missing data and outliers with a randomly selected imputed value from the 5 elections with the closest observable characteristics. Observable characteristics included in the imputation are non-missing lagged ( $t - s$ ) and forwarded ( $t + s$ ) values of all electoral results, log of per capita income, log of WAP, employment-to-population ratio, share of female WAP, share of WAP by education, share of WAP by age, share of WAP by race, share of non-labor income, and share of settled families.

Table 3 - Estimates of the impact of migration on electoral outcomes based on spatial panel data models

	Youth Registration ( $U$ )			Turnout adjusted ( $T_{adj}$ )			Fragmentation ( $F$ )		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Share of migrants ( $m$ )	<b>0.137***</b> (0.034)		<b>1.140***</b> (0.275)	<b>0.409***</b> (0.012)		<b>2.017***</b> (0.639)	<b>0.763***</b> (0.210)		<b>4.701***</b> (1.217)
Share of rural-rural ( $m_{rr}$ )		0.138 (0.079)			<b>0.371***</b> (0.028)			0.147 (0.516)	
Share of rural-urban ( $m_{ru}$ )		<b>0.141***</b> (0.046)			<b>0.431***</b> (0.017)			<b>1.001***</b> (0.297)	
Share of urban-urban ( $m_{uu}$ )		0.108 (0.089)			<b>0.355***</b> (0.033)			0.645 (0.545)	
Share of urban-rural ( $m_{ur}$ )		0.299 (0.275)			<b>0.533***</b> (0.099)			1.585 (1.853)	
$Y_{t-4}$			<b>0.451***</b> (0.161)			<b>0.762***</b> (0.150)			<b>0.161***</b> (0.043)
$m \times Y_{t-4}$			<b>-1.653***</b> (0.405)			<b>-1.635*</b> (0.685)			<b>-1.425***</b> (0.391)
Wald test ( $\rho = 0$ )	607.4***	603.5***	93.0***	1,384***	1,380***	356.9***	355.5***	354.7***	123.3***
Wald test ( $\lambda = 0$ )	2,574***	2,555***		13,927***	13,877***		139.9***	139.6***	
$R^2$	0.727	0.727	0.632	0.552	0.599	0.284	0.418	0.418	0.139
$n$	4,267	4,267	4,267	4,267	4,267	4,267	4,267	4,267	4,267
$t$	5	5	4	5	5	4	5	5	4
Number of instruments			26			26			31
Hansen $J$ statistic			4.18			4.86			16.64

\* p<0.05, \*\* p<0.01, \*\*\* p<0.001. SAC with fixed effects in Model 1 and 2. SAR with two-step system GMM estimates in Model 3. All models include controls for log of per capita income, log of WAP, employment-to-population ratio, share of female WAP, share of WAP by education, share of WAP by age, share of WAP by race, share of non-labor income, share of settled families, and year dummy variables.



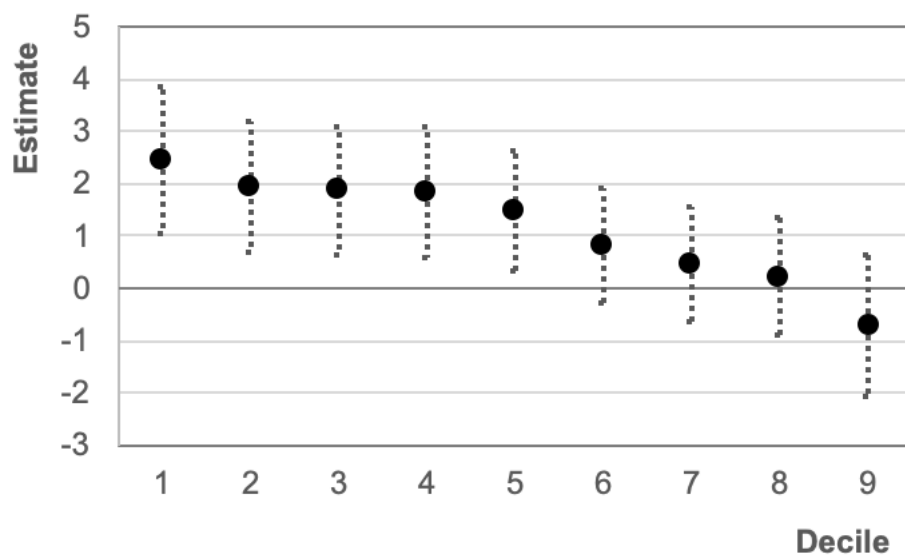
Table 4 - Estimates of spatial network models of migration and electoral outcomes

	Youth Registration ( $U$ )	Turnout adjusted ( $T_{adj}$ )	Fragmentation ( $F$ )
Avg. $Y$ destination ( $\mathbf{w}^2\mathbf{y}$ )	<b>0.450***</b> (0.015)	<b>0.266***</b> (0.011)	<b>0.199***</b> (0.012)
Wald test ( $\rho = 0$ )	2,004***	7,217***	918.4***
Wald test ( $\lambda = 0$ )	875.4***	1,435***	492.6***
$R^2$	0.707	0.472	0.417
$n$	4,267	4,267	4,267
$t$	5	5	5

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . SAC with fixed effects. All models include controls for log of per capita income, log of WAP, employment-to-population ratio, share of female WAP, share of WAP by education, share of WAP by age, share of WAP by race, share of non-labor income, share of settled families, and year dummy variables.

### Figures

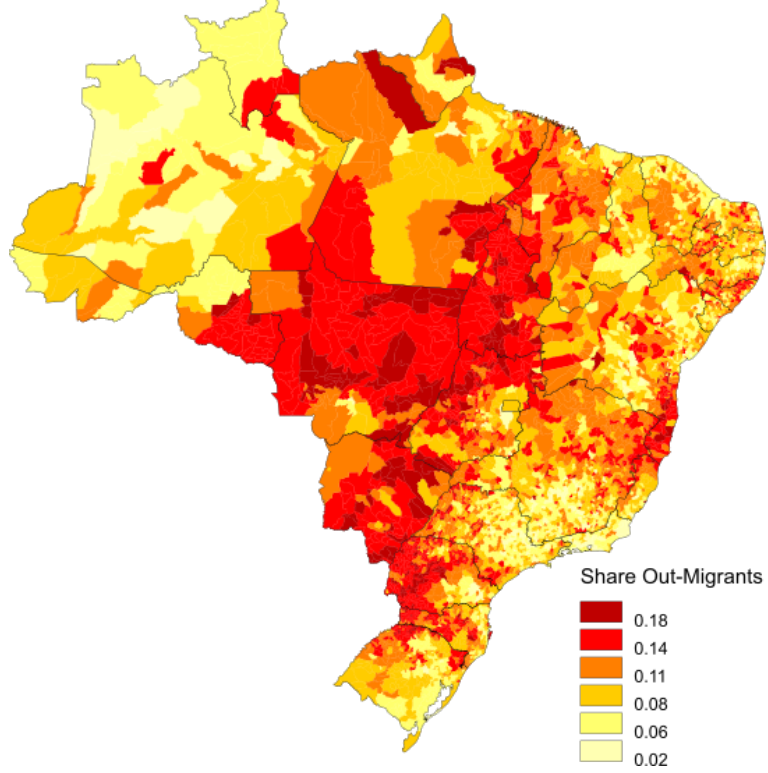
Figure 1 - The impact of migration ( $m$ ) on fragmentation ( $F_t$ ) and 95% confidence interval, by deciles of  $F_{t-4}$



Note: Estimates are based on Model 3 in Table 3.

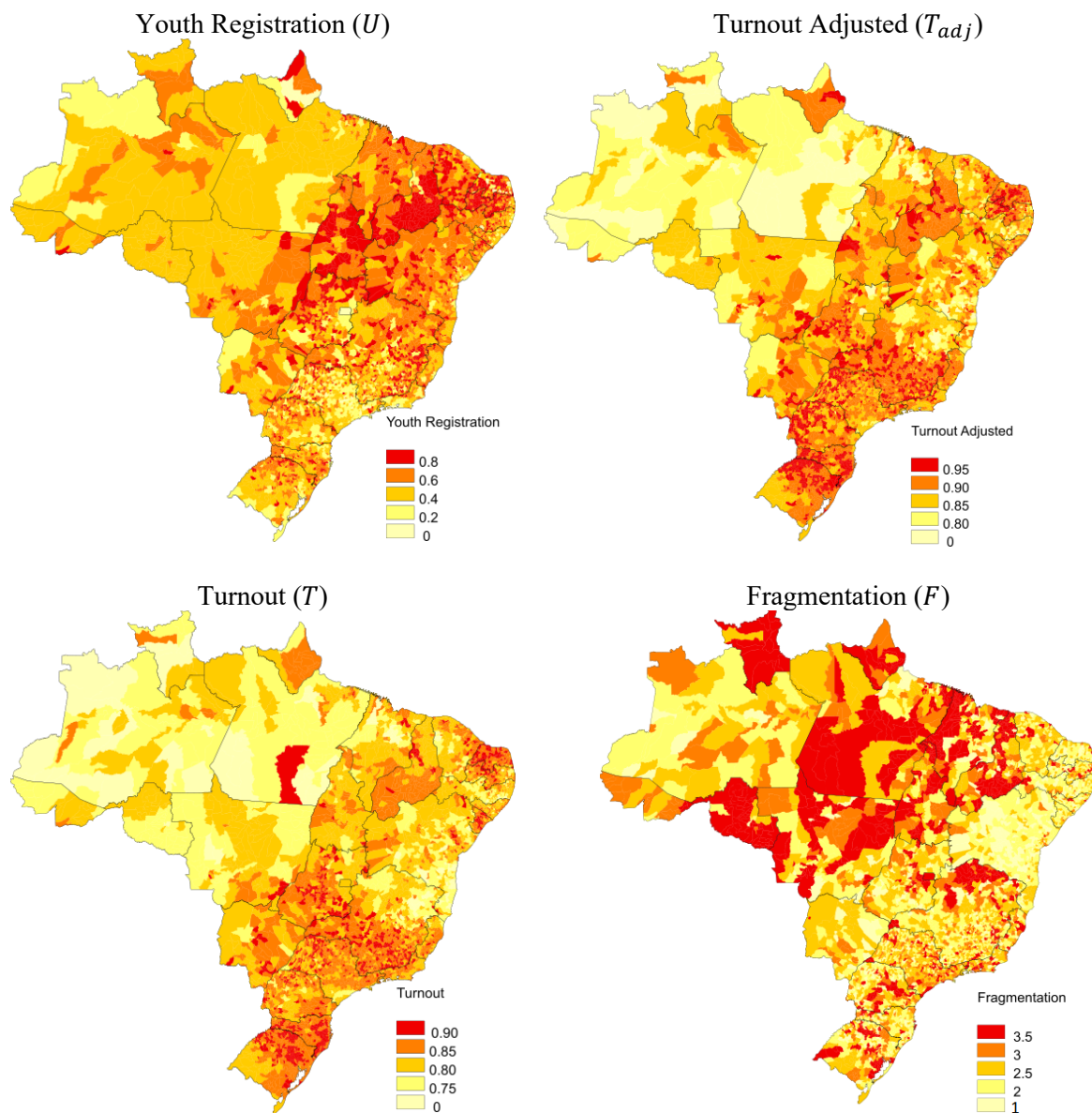
## Appendices

### Appendix A - Average of the share of out-migrants, 1996-2012



Source: Demographic Census, 1991, 2000 and 2010

Appendix B - Average youth registration rate, turnout rate (adjusted), turnout rate, and fragmentation, 1996-2012



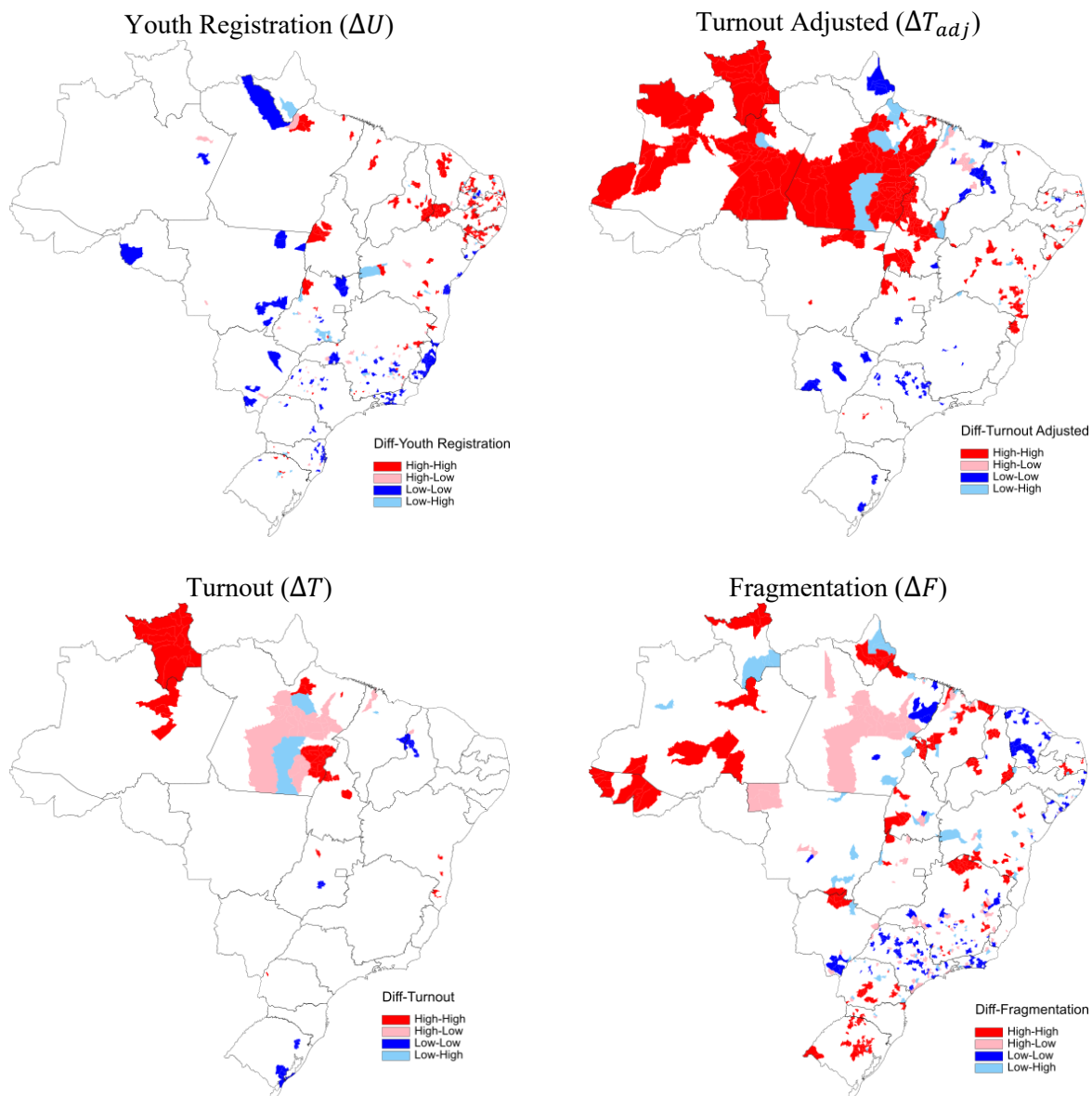
Source: *Tribunal Superior Eleitoral*, 1996, 2000, 2004, 2008 and 2012

Appendix C – Model specification tests for fixed versus random effects (Hausman) and for spatial dependence (Likelihood Ratio – LR)

	Youth Registration ( $U$ )	Turnout adjusted ( $T_{adj}$ )	Turnout ( $T$ )	Fragmentation ( $F$ )
Hausman test	848.1***	369.2***	112.8***	158.3***
LR test ( $\rho = 0$ ), SAR	638.9***	2740.7***	45.8***	138.4***
LR test ( $\lambda = 0$ ), SEM	668.1***	2807.3***	38.3***	133.8***
LR test ( $\rho = 0, \lambda = 0$ ), SAC	925.2***	3492.9***	45.8***	193.8***

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . The Hausman test compares Model 1 using fixed effects and random effects estimators. The LR test compares Model 1 without (Eq. 5) and with spatial dependence (Eq. 6).

Appendix D – LISA clusters for the average difference ( $\Delta$  or Diff) of the youth registration, turnout adjusted, turnout and fragmentation



*Note:* The LISA cluster map classifies the significant ( $p < 0.05$ ) patterns of spatial association into four groups (Anselin 2010): high-high (MCAs with high value of  $\Delta Y$ , average difference between 1996 and 2012, surrounded by MCAs with high values of  $\Delta Y$ ); high-low; low-low; and low-high.

Appendix E – Moran’s I for different  $k$ -nearest neighbors (NN) and standard deviations (SD, in parentheses)

Electio n	5-NN		8-NN		10-NN	
	I	SD	I	SD	I	SD
<i>Youth Registration (U)</i>						
1996	0.264	(0.010)	0.253	(0.008)	0.246	(0.007)
2000	0.261	(0.010)	0.251	(0.008)	0.244	(0.007)
2004	0.306	(0.010)	0.296	(0.008)	0.290	(0.007)
2008	0.306	(0.010)	0.295	(0.008)	0.288	(0.007)
2012	0.318	(0.010)	0.312	(0.008)	0.307	(0.007)
<i>Turnout adjusted by migration (<math>T_{adj}</math>)</i>						
1996	0.307	(0.009)	0.299	(0.007)	0.297	(0.007)
2000	0.442	(0.010)	0.428	(0.008)	0.421	(0.007)
2004	0.395	(0.010)	0.379	(0.008)	0.369	(0.007)
2008	0.352	(0.010)	0.337	(0.008)	0.328	(0.007)
2012	0.404	(0.010)	0.386	(0.008)	0.377	(0.007)
<i>Turnout (T)</i>						
1996	0.107	(0.008)	0.105	(0.007)	0.105	(0.006)
2000	0.530	(0.010)	0.517	(0.008)	0.510	(0.007)
2004	0.447	(0.010)	0.433	(0.008)	0.424	(0.007)
2008	0.379	(0.010)	0.362	(0.008)	0.354	(0.007)
2012	0.520	(0.010)	0.499	(0.008)	0.488	(0.007)
<i>Fragmentation (F)</i>						
1996	0.179	(0.010)	0.173	(0.008)	0.170	(0.007)
2000	0.108	(0.010)	0.102	(0.008)	0.102	(0.007)
2004	0.093	(0.010)	0.092	(0.008)	0.092	(0.007)
2008	0.098	(0.010)	0.091	(0.008)	0.088	(0.007)
2012	0.147	(0.010)	0.141	(0.008)	0.139	(0.007)

Note: All estimates are significant at 0.05%.

Appendix F - Estimates of the impact of migration on voter turnout (unadjusted) based on spatial panel data models

	Turnout ( $T$ )		
	Model 1	Model 2	Model 3
Share of migrants ( $m$ )	<b>-0.168***</b> (0.037)		<b>-0.720**</b> (0.231)
Share of rural-rural ( $m_{rr}$ )		<b>-0.216*</b> (0.090)	
Share of rural-urban ( $m_{ru}$ )		<b>-0.175***</b> (0.052)	
Share of urban-urban ( $m_{uu}$ )		0.066 (0.098)	
Share of urban-rural ( $m_{ur}$ )		<b>-0.695*</b> (0.320)	
$Y_{t-4}$			<b>-0.095*</b> (0.043)
$m \times Y_{t-4}$			<b>0.816**</b> (0.280)
Wald test ( $\rho = 0$ )	7.9****	7.7**	2,176***
Wald test ( $\lambda = 0$ )	0.0	0.0	
$R^2$	0.317	0.317	0.515
$n$	4,267	4,267	4,267
$t$	5	5	4
Number of instruments			23
Hansen $J$ statistic			3.86

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . SAC with fixed effects in Model 1 and 2. SAR with a two-step system GMM estimates are in Model 3. All models include controls for log of per capita income, log of WAP, employment-to-population ratio, share of female WAP, share of WAP by education, share of WAP by age, share of WAP by race, share of non-labor income, share of settled families, and year dummy variables.



Appendix G - Estimates of the impact of migration on electoral outcomes for Model 1 using listwise deletion and PMM imputation

	Youth Registration		Turnout adjusted		Fragmentation	
	Listwise deletion	PMM Imputation	Listwise deletion	PMM Imputation	Listwise deletion	PMM Imputation
Share migrants ( <i>m</i> )	<b>0.165***</b> (0.035)	<b>0.137***</b> (0.034)	<b>0.404***</b> (0.012)	<b>0.409***</b> (0.012)	<b>0.816***</b> (0.216)	<b>0.763***</b> (0.210)
<i>n</i>	4,083	4,267	4,083	4,267	4,083	4,267

\* p<0.05, \*\* p<0.01, \*\*\* p<0.001. All models are based on SAC with fixed effects and control for log of per capita income, log of WAP, employment-to-population ratio, share of female WAP, share of WAP by education, share of WAP by age, share of WAP by race, share of non-labor income, share of settled families, and year dummy variables. Listwise deletion excludes MCAs with any missing values or outliers. PMM Imputation replaces the missing data and outliers with a randomly selected imputed values from the 5 elections with the closest observable characteristics.

Appendix H - Estimates of the impact of migration on electoral outcomes for Model 1 using two different rural vs. urban typologies

Type of Migration Flow	Youth Registration		Turnout adjusted		Fragmentation	
	T1	T2	T1	T2	T1	T2
Share of rural-rural	0.138 (0.079)	<b>-0.349*</b> (0.147)	<b>0.371***</b> (0.028)	<b>0.429***</b> (0.056)	0.147 (0.516)	0.393 (0.989)
Share of rural-intermediary		<b>0.599***</b> (0.188)		<b>0.211**</b> (0.072)		0.269 (1.268)
Share of rural-urban	<b>0.141***</b> (0.046)	0.078 (0.051)	<b>0.431***</b> (0.017)	<b>0.401***</b> (0.019)	<b>1.001***</b> (0.297)	<b>0.930**</b> (0.341)
Share of intermediary-rural		0.6796 (0.353)		<b>0.533***</b> (0.135)		1.068 (2.383)
Share of intermediary-intermediary		-0.717 (0.400)		-0.259 (0.153)		-2.851 (2.698)
Share of intermediary-urban		<b>0.528***</b> (0.097)		<b>0.303***</b> (0.037)		0.63 (0.654)
Share of urban-rural	0.299 (0.275)	<b>1.317**</b> (0.431)	<b>0.533***</b> (0.099)	<b>0.445**</b> (0.164)	1.585 (1.853)	2.138 (2.907)
Share of urban-intermediary		0.587 (0.523)		-0.087 (0.200)		0.839 (3.529)
Share of urban-urban	0.108 (0.089)	<b>0.467***</b> (0.099)	<b>0.355***</b> (0.033)	<b>0.464***</b> (0.038)	0.645 (0.545)	<b>1.692*</b> (0.671)

\* p<0.05, \*\* p<0.01, \*\*\* p<0.001. All models are based on SAC with fixed effects and control for log of per capita income, log of WAP, employment-to-population ratio, share of female WAP, share of WAP by education, share of WAP by age, share of WAP by race, share of non-labor income, share of settled families, and year dummy variables. T1 is based on Veiga (2007), currently adopted in the main analysis. T2 is based on population density proposed by IBGE (2017). T2 uses the total population living in dense areas and the share of the total population living in dense areas within each municipality. Dense areas are defined as those with a population density above 300 inhabitants/km<sup>2</sup> and a total surrounding population (sum of its population and the eight closest contiguous areas) greater than or equal to 3,000 inhabitants. Using this definition of dense areas, IBGE constructs a table to classify municipalities into urban, intermediary, and rural (IBGE 2017, p. 58).

Appendix I - Estimates of the impact of migration by election year

	Youth Registration	Turnout Adjusted	Fragmentation
Share of out-migrants in 1996	<b>0.215***</b> (0.041)	<b>0.218***</b> (0.016)	<b>0.575*</b> (0.277)
Share of out-migrants in 2000	<b>0.301***</b> (0.043)	<b>0.465***</b> (0.016)	<b>1.127***</b> (0.287)
Share of out-migrants in 2004	0.098 (0.054)	<b>0.538***</b> (0.020)	<b>0.798*</b> (0.362)
Share of out-migrants in 2008	0.070 (0.061)	<b>0.656***</b> (0.023)	<b>1.498***</b> (0.411)
Share of out-migrants in 2012	0.053 (0.056)	<b>0.550***</b> (0.021)	<b>1.152**</b> (0.380)

\* p<0.05, \*\* p<0.01, \*\*\* p<0.001. All models are based on SAR with fixed effects, and control for log of per capita income, log of WAP, employment-to-population ratio, share of female WAP, share of WAP by education, share of WAP by age, share of WAP by race, share of non-labor income, share of settled families, and year dummy variables.