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# Neighborhood heterogeneity and electoral turnout<sup>\*</sup>

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## Abstract

We perform an empirical analysis to investigate how neighborhood heterogeneity affects electoral turnout. To this end, we rely on a unique dataset on local elections in an Italian municipality, which merges information on socio-economic characteristics of about 370.000 individuals with turnout data for 434 electoral precincts in 2004 and 2009. Exploiting both across and within precincts variation, we are able to disentangle the contextual effects on precinct-level electoral turnout of two different dimensions of neighborhood heterogeneity: income inequality and ethnic composition. Our results support the idea that contextual heterogeneity negatively affects political participation.

**Keywords:** Electoral turnout, neighborhood heterogeneity, income inequality, ethnic diversity.

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# 1 Introduction

Well-functioning democracies require citizens' political participation to provide adequate representation of the general interest and to discipline politicians. The recent decline in political participation experienced by several countries, namely in the form of reduced voting turnout in democratic elections, is therefore a cause of concern. According to a recent publication of the International Institute for Democracy and Electoral Assistance (IDEA), "electoral participation is in general falling, at least as measured by voter turnout. Rising levels of public apathy or cynicism are of growing concern in both newer and older democracies, and are a particular focus of concern in Western Europe" (IDEA 2006, p. 5).

Historical trends show that in the last decades, along with decreasing rates of voter turnout, most democratic countries experienced also a substantial rise in economic inequality (see, for instance, the figures in Horn 2011, pp. 11-13). At the same time, ethnic diversity has increased in developed countries, mainly as a consequence of international migration.

These facts raise an important question: Are increasing socio-economic and ethnic heterogeneity and declining political participation correlated? According to a prominent view among economists and political scientists (see, for instance, Alesina and La Ferrara, 2000, 2002, and Putnam, 2003, 2007) increasing heterogeneity tends to reduce interpersonal trust and civic engagement, as heterogeneity-averse individuals shield from social interactions with others that are different from themselves. Reduced social cohesion translates into lower participation along many dimensions, including the political one.<sup>1</sup> Thus, according to this view, electoral turnout may be negatively associated to socio-economic and ethnic heterogeneity as individuals who live in increasingly heterogeneous communities tend to participate less in activities that affect collective outcomes.

In this paper we investigate these issues by focusing on the (not much explored) link between *neighborhood* heterogeneity and political participation. The main motivation to consider heterogeneity at the neighborhood level is that such geographically narrow measure seems particularly appropriate to shed light on the effects (if any) of heterogeneity on electoral turnout via changing social interactions and cohesion among increasingly unequal individuals.

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<sup>1</sup>Existing empirical evidence show that participation in social and civic activities and trust decrease with income inequality and ethnic diversity (see, among others, Alesina and La Ferrara, 2000, 2002, Costa Dora and Kahn, 2003; Uslaner and Brown, 2005; Bjornskov, 2006; Putnam, 2007, and more recently Barone and Mocetti, 2014).

Specifically, we investigate the relationship between income inequality, ethnic heterogeneity and electoral turnout at the precinct level, by means of a unique panel dataset for the 2004 and 2009 local elections in Bologna, an Italian municipality of about 370.000 inhabitants in the Center-North of Italy. Two are the most important and distinctive features of our dataset. First, all variables of interest are measured at the precinct level, that is, at the smallest unit for which electoral outcomes are officially reported. To the best of our knowledge, our study is the only one in the existing literature in which income inequality is measured at such a small unit of investigation. This feature allows us to work with a large number of observations even within the municipality's boundaries.<sup>2</sup> Second, we rely on data that come *exclusively* from official sources and cover the entire municipality's resident population. This distinguishes our paper from the majority of existing papers that use survey data.<sup>3</sup>

Note that electoral precincts in Bologna can be considered as good approximations of residential neighborhoods as they include geographically contiguous areas. Contrary to what one may expect, population is heterogeneous both in terms of income and ethnicity within precincts. In particular, considerable income inequality is observed at the precinct level: in the pooled sample, the average precinct Gini index is 0.45.<sup>4</sup> At the same time, there is no evidence of segregation of foreign immigrants in some specific precincts: their share over total resident population is everywhere below 31%. Moreover, and crucially for our analysis, the variability in terms of income inequality and foreign population composition is substantial across precincts and, at least for the latter variable, also over time.

Our main results are the following. By exploiting across-precincts variability, we show that political participation is undermined in socially and ethnically heterogeneous neighborhoods. Both income inequality and the proportion of foreign immigrants *who are not entitled to vote* turn out to be negatively associated with aggregate turnout. These results are robust to the use of alternative inequality measures, such as the Gini index, the median-to-mean ratio, and the ratio of the 80th to 20th percentiles, and to the inclusion

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<sup>2</sup>It is worth emphasizing that we could rely on precinct-level measures of income inequality and ethnic heterogeneity as information on *individual* incomes and nationality, taken from official income tax files and registry office records, were available.

<sup>3</sup>As we discuss below and extensively explain in the following Section, these features represent a remarkable advantage for the identification of a possible effect of socio-economic heterogeneity on turnout and for the interpretation of the empirical results.

<sup>4</sup>As a term of comparison, our average precinct Gini index is larger than the one reported for Italy as a whole in the same period.

of other neighborhood characteristics that may influence turnout.

Furthermore, by exploiting substantial within-precinct variation of the share of foreigners, we find evidence that the negative impact of ethnic heterogeneity on voter turnout is robust to time-invariant precinct unobservable factors. This result is confirmed using a more restrictive definition of the foreigners' group, which includes only African and Asian immigrants.

Note that, by focusing on immigrants who are not entitled to vote, our results point to an *indirect* effect of ethnic heterogeneity on electoral turnout. In fact, in our empirical analysis, the adverse effect of ethnic diversity cannot be ascribed to the well-documented lower electoral participation of immigrants relative to natives (see, for instance, OECD 2012, ch.8). Rather, we show that participation decreases as *natives* tend to engage less in political activities in the presence of higher shares of the foreign-born.

Additionally, we provide some evidence of a positive effect of social pressure (measured by population density) and population stability (measured by the percentage of home owners) on political participation, consistently with some long-established theories of turnout's determinants (see Geys, 2006).

The remaining of the paper is organized as follows. Section 2 discusses related literature. Section 3 describes the institutional and legal framework of Italian local elections. Section 4 illustrates the main features of our dataset and discusses the empirical strategy, while Section 5 presents the empirical results. Section 6 concludes.

## 2 Related literature

Our contribution is related to two strands of literature. First, a voluminous empirical literature investigates the relationship between income inequality and electoral turnout. Several contributions use individual survey data and merge them with information on income inequality, typically measured at a large geographical level (such as nation, state/region, county/province/prefecture). Generally, these works tend to find a negative association between income inequality and the likelihood of voting (see Anderson and Beramendi, 2008; Horn, 2011; Jaime-Castillo, 2009; Nguyen and Garand, 2007; Seeber and Steinbrecher, 2011; Solt, 2008, 2010).<sup>5</sup> However, other studies find the opposite result, that is turnout increases with inequality, especially among the poor (see, for example, Brady,

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<sup>5</sup>Scervini and Segatti (2012) investigate the drop in Italian turnout rate since 1994 and relate it to income inequality at the regional level.

2003), or find no evidence of a differential effect of inequality on turnout among the rich and the poor (Horn, 2011; Wichowski, 2010).

Other studies rely on aggregate turnout data. Again, results are inconclusive. Some papers provide evidence of a negative association between income inequality and turnout using data at the country (Lister, 2007) or regional level (Mahler, 2002). Using prefecture-level panel data on national legislative elections in Japan, Yamamura (2011) finds that voter turnout is associated with social cohesion and fragmentation and that income inequality has a negative effect. In a recent work on national legislative elections in democratic countries, Stockemer and Scruggs (2012) find no relationship between inequality and turnout and suggest that the negative association estimated in previous studies may be spurious and driven by the omission of a time trend.

Even if they could be considered conclusive, these results may be hardly interpreted as evidence of a negative effect of socioeconomic heterogeneity in the community of residence on political participation, insofar as income inequality and other contextual variables are measured at too large units of observation to capture neighborhood effects.<sup>6</sup>

A second strand of literature investigates the association between ethnic and racial heterogeneity and electoral turnout. In his extensive review of aggregate-level determinants of turnout, Geys (2006) concludes that ethnic diversity is weakly related to turnout, while the latter is negatively affected by the share of the minority group in the population. Consistently with this conclusion, for the case of Britain, Fieldhouse and Cutts (2008) using individual data from marked election registers find that non-Asian turnout is negatively affected by the neighborhood density of Asian population (measured at census output or electoral ward level). Gimpel, Dyck and Shaw (2004) use individual registration and participation records for residents in 16 counties in Florida, Iowa, New Mexico and Pennsylvania matched with aggregate data at census tract or precinct level. They find that individual participation (especially for Republicans) is dampened in neighborhoods where the majority has different political affiliation and with high concentration of blacks and hispanic. More recently, using a very large data set of individual records for residents in California, Florida and North Carolina, Barber and Imai (2014) show that increases in the out-group neighborhood proportion (measured at census block level) depress the probability of turnout, where the out-group is defined in terms of race or political parti-

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<sup>6</sup>In this literature the explanation for the negative effect of inequality on turnout relies on the idea that higher inequality generates disaffection for politics among the poor, who increasingly feel that their interests have fallen out of the political agenda, as proposed by Schattschneider, 1960 and Goodin and Dryzek, 1980, in the so called “relative power theory” (see Solt, 2008, 2010).

sanship. Estrada-Correa and Johnson (2012) provide evidence that foreclosure rates and percentage of Latinos depressed aggregate and individual turnout in California zip-codes at 2008 Presidential elections.

A major shortcoming of these contributions is that income inequality is not included together with the share of ethnic groups or minorities as a source of heterogeneity, possibly due to the lack of reliable data on income inequality at the neighborhood level. The negative effect of out-group proportion on turnout may therefore capture the effect of socio-economic distance between residents, rather than being related to ethnic or racial heterogeneity. We contribute to this literature by including both income inequality and the share of foreign immigrants as explanatory variables. This allows us to disentangle the effect of different dimensions of neighborhood heterogeneity on political participation.

Indeed, to the best of our knowledge, our study is the only one in which income inequality is measured at the neighborhood (i.e. precinct) level. As we will discuss later, this represents a remarkable advantage for the identification of a possible causal effect of income inequality on turnout and for the interpretation of empirical results.

### **3 The institutional framework**

In this paper we focus on two consecutive municipal elections held in 2004 and 2009 in Bologna, a large municipality in the Center-North of Italy.

According to the Italian Law, the mayor and the municipality council are appointed through local elections which take place, as a general rule, every five years. The mayor is elected directly. Each candidate must be supported by a list or a coalition of lists of residents in the municipality, Italian or EU citizens, running for a seat in the council. Voters might cast separate preferences for the mayor and the council (“*voto disgiunto*”). In municipalities with more than 15.000 inhabitants, such as Bologna, the mayor is elected through a two-round majority system: if no candidate reaches the absolute majority of valid votes in the first round, the two most voted candidates run for a second round (“*ballottaggio*”) and the one who gets the relative majority is elected.

In the case of Bologna, Sergio Cofferati, a former union leader, was elected in the first round in 2004. The aggregate turnout rate was 81.81 % and Cofferati gained 55,92 % of the valid votes. In 2009, Cofferati chose not to run for re-election and the elected mayor was Flavio Delbono, a former professor of Economics at the University of Bologna, who gained 49.40% of the votes in the first round and won the elections in the second round



with 60.77% of the votes. In the first and second round, the turnout rate was 76.39 % and 62.20 % respectively.

Since the end of the Second World War, Bologna has had a long tradition of left-wing administrations and the two elections we consider here make no exception. In both years, the elected mayor was supported by center-left coalitions. This observation will play an important role in our identification strategy, as we discuss in the following Section. It is also worthwhile noting that the previous election, held in 1999, was peculiar in Bologna's electoral history, as a center-right mayor, Giorgio Guazzaloca, secured victory for the first time since the end of WWII. The desire to restore a left-wing government may have stimulated participation in 2004. This observation, together with the fact that the 2004 election has been the first one to be held under the current electoral system, and with the generalized downward trend in turnout (see the descriptive statistics presented below), makes the inclusion of a time trend in the empirical specification particularly advisable in our context.

The municipal electoral register in Bologna entails 436 different precincts which include geographically close areas. Eligible voters (Italian and EU citizens above 18 years of age who are residents in the municipality) are registered in a precinct depending on their residence address. Registration is automatic for Italian citizens. Instead, eligible foreign residents must apply for registration on electoral lists in order to vote.

## 4 Data description and case selection

Data on our key variables (electoral turnout, income inequality and ethnic heterogeneity) come from a unique source of information, i.e. the Municipal Statistical Office (MSO) in Bologna.

We were provided with the actual number of registered voters and the number of voters casting a ballot in each precinct for the 2004 and 2009 administrative elections.<sup>7</sup> The precinct's voter turnout was then merged with socio-economic individual data for the population residing within the precinct boundary. It is worthwhile emphasizing that all socio-economic data are *official* and came from income tax files and civil registries. Income tax files years correspond to the election years, while information from civil registers was drawn at the available calendar time closest to the election date.<sup>8</sup>

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<sup>7</sup>For the 2009 election we considered only the first-round vote.

<sup>8</sup>This date was May 31 for both 2004 and 2009 elections, which took place on June 12-13 and June 6-7 respectively.

Building on individual data, different socio-economic variables - such as the average income, the population size and density, and the percentage of home owners - were computed at the precinct level and provided to us by the MSO.

Most importantly for our purposes, we were provided with (i) a set of income inequality indicators - such as the Gini index, the median-to-mean ratio, the ratio of the 80th to 20th percentile (p80/p20) - computed from individual income tax files, and (ii) the percentage of foreign immigrants who reside in the precinct, calculated from individual register data, which we take as a measure of ethnic heterogeneity. As highlighted in the previous Section, EU citizens who are resident in the municipality are eligible to vote. As the percentage of foreigners is meant to capture a contextual effect in our analysis, and we have full information on residents' nationality, we included only non-EU foreign residents (i.e. not eligible to vote) in its calculation. We also built a more stringent version of this variable which includes residents with African and Asian citizenship only. The latter variable could be more accurate in capturing ethnic heterogeneity as perceived or felt by eligible voters given that these ethnic groups are the most distant from Europeans in terms of somatic and cultural traits.

Table 1a in the Appendix presents descriptive statistics by year, while Table 1b refers to the pooled sample. The number of precincts observed in both elections was 434, excluding electoral sites in hospitals, so that we built a panel dataset with  $n = 434$ ,  $t = 2004, 2009$ . Variables' names are self-explanatory. With the exception of *turnout*, whose denominator is given by the number of *registered voters*, all other percentage variables refer to the whole population residing in the precinct (*population*). Population density is the number of residents by square kilometer. In order to capture real income changes across the two years, the 2009 income was deflated using inflation indexes reported by the Italian Statistical Office (ISTAT).

In order to identify the impact of income inequality and ethnic heterogeneity on aggregate electoral participation we will proceed in two steps.

In a first step, we will estimate OLS regressions that exploit the cross sectional (between-precincts) variation that we observe in our dataset. The magnitude of the sample averages shown in Table 1a documents that there is sizable income inequality at the precinct-level, despite the tiny geographical dimension of these units of observation. Moreover, we observe considerable cross-precinct variability in income inequality and ethnic heterogeneity. Take, for example, the Gini index in 2009. The average value is 0.45, with values ranging from 0.31 to 0.70. Both the order of magnitude and the cross-sectional variability of the Gini index are larger than the one reported in cross-nation or

cross-region studies.<sup>9</sup> The percentage of foreigners turns out to be another precinct characteristic which exhibits high cross-sectional variation, with precincts where foreigners are almost absent and others in which they represent about 30% of the resident population.

Figure 1 presents maps showing foreigners' shares, turnout rates, and Gini indexes in Bologna's precincts in 2004, with darker areas representing higher quintiles. Visual inspection of these maps confirms the substantial cross-sectional variability exhibited by our main variables of interests. It can also be noticed that turnout rates and foreigners' share do not follow specific geographical patterns, while the Gini index tends to be higher in the central and southern areas of Bologna, corresponding to the historical part of the town and to neighborhoods on the hills surrounding the town, where real estate is more expensive. Although the observed range of precinct-level Gini index values in these areas is quite ample - from about 0.50 to about 0.69 - we will take into account this clustering pattern in our empirical analysis.<sup>10</sup>

In a second step, we will turn to fixed effects estimation to refine the identification of our parameters of interest exploiting the time variation that we observe in the corresponding regressors. Looking at the dynamics across the two years, Table 1a reveals a general increase of income inequality. However, the change in income inequality indicators is rather moderate, which is not surprising given that inequality tends to be quite persistent over time. Note that income inequality measures show similar evolution in Italy and in most OECD countries, following the economic crisis that hit western economies since 2007 (for detailed information, see OECD, 2011, and Acciari and Mocetti, 2013).

On the contrary, the percentage of foreign residents in precincts shows a sharp increase over the two years, from about 5% to about 8% on average, due to the growing inflows of foreign immigrants. Indeed, the number of foreign residents in Bologna (one of the main destinations of international migration in Italy) grew from 25.385 (6,8% of the population) in 2004 to 43.664 (11.6% of the population) in 2009. A similar trend has been observed in most OECD countries. In fact, according to OECD (2012), the stock of foreign-born persons living in OECD countries increased by a third between 2000 and 2010, reaching 9 % of total population. In countries like Ireland, Norway or Spain the increase has been especially spectacular, as the share of foreigners doubled or even trebled.

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<sup>9</sup>According to OECD (2011), the average Gini index in 2008 was 0.314 in OECD -27 countries (based on household income), with a minimum of 0.24 (Slovenia) and a maximum of 0.49 (Chile). In the case of Italian provinces, Acciari and Mocetti (2013) find that the average Gini index in 2011 was 0.37 in Italy (0.38 in the province of Bologna), with values ranging from 0.35 (Vercelli) to 0.45 (Caltanissetta).

<sup>10</sup>For the sake of space we do not show the 2009 maps as they display very similar patterns to the ones of 2004.

Table 1c displays some descriptive statistics on time-differenced variables and provides some additional insights on the extent of regressors' time variation. In particular, the last column shows the ratio between the within-precinct variation and the overall variation. Notice that, for the share of foreigners, the variation across the two years account for a large percentage of the total variation (about 45%) while, for income inequality measures, the corresponding figure is lower (16% for the Gini index, 14% for the median-to-mean ratio, 31% for the ratio of the 80th to 20th percentile, respectively). We will make use of this information when interpreting fixed effect results. While the above figures seem to confirm that the fixed effects strategy is suitable for the identification of the impact of ethnic heterogeneity, the fixed effects estimates of the impact of income inequality might be plagued by insufficient within-precinct variation.

Overall, the magnitude and variability of our variables of interest indicate that there is scope for empirically investigating the association between socio-economic and ethnic heterogeneity and electoral turnout at precinct level. Before moving forward, we want to emphasize the advantages of our case of study in the investigation and interpretation of the relationship between socio-economic heterogeneity and electoral turnout.

First, and most important, a negative association between income inequality, the share of foreign immigrants and aggregate turnout detected at such tiny level of observation as the precinct can indeed be interpreted as evidence of a negative effect of heterogeneity in the community of residence on individual participation, reflecting reduced social interactions and lower social cohesion, which translates into lower aggregate turnout in more heterogeneous neighborhoods (precincts). As discussed in the Introduction, previous work on income inequality and political participation can hardly be interpreted along these lines, as inequality is measured at too large units of observation to capture effects that go through the interactions of individuals in the community of residence.

Second, by focusing on a single municipality and on administrative local elections, we can safely rely on a rather parsimonious specification, as several controls typically included in aggregate-level studies of the determinants of electoral turnout, such as institutional characteristics (electoral systems, compulsory voting, registration requirements) and political factors (political fragmentation, closeness of elections, campaign expenditures) can be overlooked in our context, as they are common across units of observation.<sup>11</sup>

Third, the homogeneous environment strongly reduces the possibility of an omitted

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<sup>11</sup>For a critical review of empirical evidence on the causes of variations in turnout across countries see Blais (2006).

variable bias,<sup>12</sup> which we further tackle by exploiting the panel dimension of the data. Furthermore, in our context, it seems unlikely that a negative association between turnout and inequality could be driven by reverse causality.<sup>13</sup>

Finally, by considering income inequality and ethnic heterogeneity as separate explanatory variables, we can capture the effect of neighborhood heterogeneity on political participation along different dimensions. As discussed in the Introduction, previous studies on the relationship between income inequality and turnout cannot investigate the effect of increasing population diversity in the community of residence, as income inequality and other contextual variables are measured at too large units of observation. Moreover, previous results on the effects of neighborhood ethnic composition are questionable, as they do not control for economic inequality. Insofar as ethnic minorities generally belong to the poor segment of the population, one may mistakenly associate the effect on political participation to ethnic heterogeneity while it actually goes through economic diversity.

## 5 Empirical Strategy and Estimation Results

In order to identify the effect of income inequality and ethnic heterogeneity on electoral turnout we estimate the following linear model:

$$turnout_{it} = \beta_1 ineq_{it} + \beta_2 ethnic\_het_{it} + \beta_3 X_{it} + \eta_t + \varepsilon_{it} \quad (1)$$

where  $i$  denotes the precinct,  $t$  denotes the year of elections (2004 or 2009),  $ineq_{it}$  is income inequality,  $ethnic\_het_{it}$  is the percentage of foreign residents,  $X_{it}$  is a vector of controls, and  $\eta_t$  is a time effect.

Our testable hypothesis is that increasing income inequality and a higher share of foreign residents should be *negatively* associated with aggregate electoral turnout at precinct level, as increasing heterogeneity in the neighborhood (precinct) of residence discourages social interactions and reduces individual civic engagement and participation to activities that affect collective outcomes, including political participation, of which voting is one dimension.

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<sup>12</sup>For a discussion of the econometric advantages of using information on mayoral elections in a single city see Haspel and Gibbs Knotts (2005).

<sup>13</sup>Although, in general, it may be the case that lower turnout influences the political orientation of the elected government and determines policy changes which increase income inequality (as suggested, for example, by Mueller and Stratmann, 2003), this should not be an issue in our case study, in which the left-wing orientation of municipal political institutions has remained basically unchanged over the relevant time span.

As discussed in the previous Section, several factors that have been previously found to affect aggregate turnout play no role in our context, so that our specification is deliberately parsimonious. To isolate the effect on turnout of a mean-preserving spread in income distribution we will always include the precincts' average income among controls. Depending on specifications, we will also include other variables that can be associated to turnout, such as measures of social pressure (population density) and population stability (percentage of home owners). The time effect controls for the general downward trend in turnout and for the possibility that the 2004 election had peculiar characteristics, as already discussed in Section 2.

We will first estimate our coefficients of interest by means of pooled OLS regressions with different set of controls. Then, we will allow for a composite error term in the model and let  $\varepsilon_{it} = \alpha_i + \nu_{it}$ , where  $\alpha_i$  represents time-invariant unobserved heterogeneity at the precinct level, and adopt a fixed effect approach.<sup>14</sup> As long as the regressors exhibit sufficient time variation across the two years, the resulting estimators are net of the potential bias arising from precinct-level unobservables  $\alpha_i$  correlated with any observed regressors. We start our empirical analysis by investigating the effect of income inequality and ethnic heterogeneity on electoral participation through pooled OLS regressions. As shown in Table 2a, in the first column we estimate a *strong negative* impact on turnout of both precincts' heterogeneity dimensions: income inequality, measured by the Gini index and ethnic heterogeneity, measured by the percentage of foreigners who are not eligible to vote.<sup>15</sup>

In the next two columns we include other contextual variables such as the population density and the percentage of home owners, to purge out the estimated effects of possible omitted variable bias due to observable precinct's characteristics that capture social pressure and population stability and might influence political participation. In the last column we insert additional controls for the gender and the age composition in the precinct. We allow for non-linear effects of age by means of two variables: the percentage of very young people (younger than 14 years old) and the percentage of very old people (older than 80 years old).

The coefficient of the Gini index remains positive and highly significant across all speci-

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<sup>14</sup>In our case, unobserved heterogeneity accounts for different social and cultural attitudes characterizing people living in different precincts, who are exposed to different local initiatives, both public and private, shaping the sense of local community.

<sup>15</sup>In what follows we will mainly rely on Gini indexes to investigate the effect of income inequality. However, as reported below, as a robustness check we replicated several results using other inequality measures, such as the median-to-mean ratio and the share of the 80th to the 20th percentile.

fications, while its magnitude is gradually reduced once we condition to other determinants of turnout, ranging from about -64 to about -36. The coefficient for ethnic heterogeneity is negative and generally statistically significant. As for other potential contextual determinants of turnout, the percentage of home owners is estimated to have a positive impact, suggesting that population stability is positively associated with turnout. An increase in the percentage of the elderly in the precinct is associated with a decrease in turnout, while a higher percentage of the young results in higher aggregate electoral participation.<sup>16</sup>

To make sure that these results (in particular the estimated standard errors) are not plagued by the clustering pattern displayed by the Gini index in Figure 1, we estimate the same specifications on the subsample obtained after dropping precincts located in the southern and central areas of Bologna, which all belong to two (out of nine) administrative units (called “*quartieri*”) in which the town of Bologna is divided.<sup>17</sup> As shown in Table 2b, dropping these precincts does not affect our OLS inference about the Gini index and ethnic heterogeneity coefficients, despite the reduced sample size (we drop 104 precincts each year, 208 observations overall). The coefficients for the Gini index are still negative, ranging from about -74 to about -30, and statistically significant. The effect of ethnic heterogeneity is again negative throughout the different specifications.

The negative impact of economic inequality and ethnic heterogeneity on turnout is strongly corroborated by the evidence that we show in Tables 2c and 2d, where the same estimation exercise is performed with two alternative measures of income inequality: the median-to-mean ratio (Table 2c), and the share of 80th to 20th percentile,  $p_{80}/p_{20}$  (Table 2d).<sup>18</sup> A joint look at the last column of Tables 2a, 2c and 2d reveals that the estimated effect of ethnic heterogeneity remains similar, independently of the different measure of inequality adopted, ranging from -0.15 to -0.21.<sup>19</sup>

In Table 3a, we present fixed effect estimation results, which take care of a possible omitted bias due to unobservable precinct’s characteristics that do not vary across our

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<sup>16</sup>These age-related variables may capture a contextual effect in terms of more intense social interaction and participation in neighborhoods inhabited by families with young children or, more simply, the well-known hump-shaped relationship between age and political participation.

<sup>17</sup>The robustness check based on dropping these precincts is the best solution we can envisage. Indeed, it would not be appropriate to evaluate clustered standard errors on the basis of the nine administrative units (*quartieri*), given the resulting very small number of clusters.

<sup>18</sup>Notice that an increase in the median-to-mean ratio (for given mean income) corresponds to lower inequality. On the contrary, higher Gini or  $p_{80}/p_{20}$  correspond to an increase in income inequality.

<sup>19</sup>This finding is robust to the inclusion, among the controls, of the percentage of foreign people who are eligible to vote, which might be correlated with the percentage of not eligible foreigners (results not shown).

period of analysis. We start by noting the negative coefficient for the time dummy, which is expected given the observed general downward trend in political participation. Average precinct income seems to positively affect turnout, consistently with the view that political participation increases with affluence.<sup>20</sup> We also find some evidence of the role played by “social pressure” in explaining electoral participation. In fact, population density is usually included in studies on turnout anticipating that, in densely populated neighborhoods, social pressure on potential voters to cast their ballot will be lower. While existing evidence from aggregate studies fails to support this argument (see Geys, 2006), we find a negative, though marginally significant, effect of population density on turnout.<sup>21</sup>

Turning to our main coefficients of interest, we observe that the Gini index parameter loses its significance and appears to be very imprecisely estimated (see again Table 3a). This finding is not surprising since income inequality measures tend to be rather persistent over time, as we noted in the previous Section, making it difficult to identify its effect on turnout based on within-precinct variability.<sup>22</sup> On the contrary, we obtain a negative and significant coefficient of the percentage of foreigners, which is robust across all specifications (see the different columns of Table 3a), and confirms the important role played by this contextual variable in shaping electoral behavior.

In Table 3b, we present fixed effect estimation results using a narrow measure of ethnic heterogeneity, which is limited to the share of African and Asian residents over the precinct’s population. Note that the coefficient remains negative and significant in all specifications, with magnitude ranging from -0.20 (first column) to -0.14 (last column). The fact that the coefficients of this narrow measure are almost unchanged with respect to those of Table 3a suggests that the effect of ethnic heterogeneity is driven by ethnicities who are culturally and physically more distant from Europeans and therefore more likely perceived as diverse by voters. In the last column of Table 3b we control for both unob-

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<sup>20</sup>The interpretation of the coefficient of average income as a contextual effect on electoral participation is, however, problematic. In particular, we are not able to assess whether the estimated positive effect of the average precinct income on turnout is due to an individual effect (that is, the rich tend to vote more than the poor) or to a contextual effect (that is, higher precinct income increases individual participation, for example by providing a safer and more pleasant environment thereby increasing social cohesion).

<sup>21</sup>Some studies provide evidence that electoral participation is lower in large communities, where social pressure is weaker. For instance, Funk (2010) shows that the introduction of postal voting - which has ambiguous effect on turnout as it reduces voting costs but also the social pressure to vote, as the voting act is no longer observable - had stronger negative effect on electoral participation in smaller communities in Swiss federal party elections, consistently with the idea that social incentives play a role in voting decisions.

<sup>22</sup>Regressions (not shown) that include the median-to-mean ratio or the p80/p20 ratio reach similar findings.



served fixed effects and for the largest number of observable contextual regressors. The fixed effect ethnic heterogeneity coefficient implies that, *ceteris paribus*, a two percentage points increase in the share of African and Asian residents in the precinct (which is about the sample average variation observed between 2004 and 2009, see Table 1a) is estimated to cause about a 0.3 percentage points decrease in electoral participation.

As a final robustness check, we test for the assumption of linear effects of ethnic heterogeneity and income inequality, which was implicitly maintained in our estimation exercise so far. In Table 3c we allow for: a) the effect of the Gini index to vary across precincts with high and low income inequality (by means of a dummy variable indicating whether the Gini index is higher than the sample mean); b) the effect of the percentage of immigrants from Asia and Africa to vary across precincts with high and low presence of the same type of immigrants; c) the effect of the percentage of immigrants from Asia and Africa to vary across precincts with high and low income inequality (interaction effect). The fixed effect coefficient of the Gini index still appears not statistically different from zero (first column), while the assumption of linearity of the effect of our narrow ethnic heterogeneity’s measure is not rejected within the considered non-linear specifications (second and third column). The third column also testifies the absence of an interaction effect between the two heterogeneity measures: the effect of the share of immigrants from Asia and Africa does not appear statistically different across high and low inequality precincts.<sup>23</sup>

## 6 Conclusions

In this paper we contribute to the empirical literature on the link between socio-economic heterogeneity and political participation. The access to information on incomes and precinct’s electoral turnout for two local elections in a medium-sized Italian municipality allows us to investigate the effect of socio-economic heterogeneity on electoral turnout at the neighborhood level. Moreover, given the availability of data on both income inequality and ethnic heterogeneity at the precinct level, we can disentangle the effects of different dimensions of local heterogeneity.

Exploiting the cross-sectional variation in income inequality and ethnic heterogeneity measures, we document a negative effect of socio-economic heterogeneity on electoral

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<sup>23</sup>We also experimented with the interaction term between the percentage of immigrants and the Gini level, rather than the dummy variable indicating a high value of the latter. However, we incurred in a typical multicollinearity problem, caused by the very high correlation (0.96) between the immigrant variable and the interaction term. Using the dummy which captures high inequality precincts, we manage to get rid of the high correlation between the two measures.

turnout. In the cross-section, we also find evidence of a positive effect of population stability, captured by the share of home owners in the precinct, on turnout.

When we use the substantial time variability of our ethnic heterogeneity measures to control for unobserved fixed effects at the precinct level, we still detect a negative and significant coefficient of ethnic heterogeneity. Additionally, we find some evidence of a positive effect of social pressure, measured by population density, on electoral participation.

Overall, our empirical findings are consistent with the argument that higher socio-economic heterogeneity discourages electoral turnout, insofar as it reduces social cohesion, civic engagement, and participation in activities that affect collective outcomes. As income inequality is measured at a tiny level of observation (i.e. the electoral precinct), its negative effect in OLS estimations may indeed reflect a deterioration of social interactions and cohesion among increasingly unequal neighbors, that translates into lower political participation. Moreover, since our measure of ethnic heterogeneity captures the presence in the neighborhood of foreign people who are not entitled to vote, its estimated negative effect suggests that natives tend to engage less in political activities as the number of foreigners who live around them increases. Finally, by including income inequality together with the percentage of foreigners as explanatory variables, we managed to disentangle the effects of both dimensions of neighborhood heterogeneity on political participation, thus improving on existing studies that investigate the relationship between contextual heterogeneity and turnout.

We believe that the our empirical results have important policy implications, that go beyond the specific case of the city of Bologna. In fact, contextual heterogeneity is generally increasing in most industrialized countries. Our analysis suggests that the increasing trend in ethnic heterogeneity might adversely affect political participation not only directly as immigrants tend to participate less (see OECD, 2012, ch. 8) but also *indirectly*, by inducing native-born to vote less. If this is the case, policies aimed at promoting the integration and civic participation of immigrants might also succeed in bringing natives back to polling places.

In our precinct-level case study we have identified the effect of contextual variables that the existing literature has put forward as important determinants of aggregate turnout. The next step in our research agenda is to perform a similar analysis at the individual level. Combining individual-level data on electoral participation and socio-economic status with the precinct-level determinants of turnout will make it possible to reach the ambitious goal of disentangling individual effects from contextual ones.

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Table 1a. Summary statistics, by year

Variable	2004				2009			
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
% Turnout	81.49	5.40	54.22	92.90	76.25	5.81	45.55	87.14
Registered voters	733.44	57.18	450	920	698	69.92	470	1010
Income distribution indicators								
Mean Income (Thousand Euros)	25.34	7.86	13.20	56.19	24.88	7.87	13.63	61.90
Gini Index	0.44	0.08	0.30	0.69	0.45	0.08	0.31	0.70
Median to Mean Income Ratio	0.81	0.12	0.42	1.02	0.82	0.12	0.41	1.03
Ratio of percentiles: p80/p20	4.04	1.46	2.05	11.89	4.44	1.92	2.55	15.05
20th percentile, p20	8.69	1.49	4.59	15.00	8.03	1.64	2.38	13.74
% foreign residents (all, not eligible voters)	5.35	3.24	0.37	30.77	8.29	4.27	0.99	30.06
% foreign residents from Africa and Asia	3.49	2.67	0.00	28.74	5.46	3.52	0.00	25.60
% home-owners	55.93	13.36	3.98	89.80	52.35	11.86	4.36	85.64
% female	47.76	2.79	34.71	62.76	47.25	2.70	36.12	61.31
% aged more than 80 years old	7.12	3.04	1.32	39.11	8.08	3.09	1.75	42.86
% aged less than 14 years old	8.92	2.10	2.68	17.87	9.60	2.16	2.38	18.16
Population density <sup>^</sup>	11.18	7.16	0.07	45.35	11.14	7.13	0.07	45.14
Population	859.70	87.36	496	1388	860	103	470	1238
Number of obs. (precincts)								
	434				434			
<sup>^</sup> population in thousands/ $km^2$								

Table 1b. Summary statistics, years 2004-2009 pooled

Variable	Mean	Std. Dev.	Min	Max
% Turnout	78.87	6.19	45.55	92.90
Registered voters	716.11	66.15	450	1010
Income distribution indicators				
Mean Income (Thousand Euros)	25.11	7.87	13.20	61.90
Median to Mean Income Ratio	0.82	0.12	0.41	1.03
Gini Index	0.45	0.08	0.30	0.70
Ratio of percentiles: p80/p20	4.24	1.71	2.05	15.05
20th percentile, p20	8.36	1.60	2.38	15.00
% foreign residents (not eligible)	6.82	4.07	0.37	30.77
% foreign residents from Africa and Asia	4.48	3.27	0.00	28.74
% homeowners	54.14	12.75	3.98	89.80
% female	47.51	2.75	34.71	62.76
% aged more than 80 years old	7.60	3.10	1.32	42.87
% aged less than 14 years old	9.26	2.16	2.38	18.16
Population density <sup>^</sup>	11.16	7.14	0.07	45.35
Population	860.10	95.98	470	1388
<hr/>				
Number of obs. (precincts)	868			
<hr/>				
<sup>^</sup> population in thousands/ $km^2$				
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Table 1c. Variation across the two years

Differenced variable (2009-2004)	Mean	Std. Dev.	Min	Max	Ratio Variation Within/Overall
%Turnout	-5.24	2.59	-19.48	3.17	0.47
Registered voters	-34.66	41.86	-143	203	0.42
Income distribution indicators					
Mean Income (Thousand Euros)	-0.4512	1.8107	-9.9479	17.3885	0.12
Median to Mean Income Ratio	0.0025	0.0323	-0.1641	0.1774	0.14
Gini Index	0.0072	0.0227	-0.0993	0.1160	0.16
Ratio of percentiles: p80/p20	0.4060	0.9963	-1.7019	10.7054	0.31
20th percentile, p20	-0.6576	1.1658	-6.3602	2.2815	0.42
% foreign residents (all, not eligible voters)	2.94	2.49	-4.33	13.35	0.47
% foreign residents from Africa and Asia	1.98	2.15	-9.97	10.99	0.45
% homeowners	-3.58	4.79	-26.90	35.81	0.23
% female	-0.50	1.46	-5.81	5.58	0.28
% aged more than 80 years old	0.95	1.44	-6.75	5.12	0.22
% aged less than 14 years old	0.68	1.47	-3.33	8.61	0.37
Population density <sup>^</sup>	-0.04	0.83	-3.89	7.59	0.06
Population	0.80	55.20	-192	253	0.28
<hr/>					
Number of obs. (precincts)	434				
<hr/>					
<sup>^</sup> population in thousands/ $km^2$					
<hr/>					



Table 2a. Turnout, Gini Index and ethnic heterogeneity

	OLS regressions			
year 2009	-3.83***	-3.84***	-3.95***	-3.50***
	(0.37)	(0.37)	(0.34)	(0.36)
Gini index	-63.87***	-63.34***	-43.79***	-35.55***
	(7.70)	(7.81)	(8.62)	(6.63)
Mean Income	0.50***	0.49***	0.36***	0.23***
	(0.07)	(0.07)	(0.08)	(0.06)
% foreign residents (all, not eligible voters)	-0.25***	-0.25***	-0.05	-0.15***
	(0.05)	(0.05)	(0.05)	(0.06)
Population density		-0.02	-0.00	0.02
		(0.02)	(0.02)	(0.02)
% homeowners			0.19***	0.18***
			(0.02)	(0.02)
% female				0.30*
				(0.15)
% aged more than 80 years old				-0.51***
				(0.11)
% aged less than 14 years old				0.47***
				(0.15)
Constant	98.49***	98.61***	81.70***	67.38***
	(1.68)	(1.68)	(2.57)	(9.05)
R-squared	0.36	0.36	0.47	0.48
Obs	868	868	868	868

Robust S.E. in brackets  
 $\hat{p} < 0.15$ , \* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$

Table 2b. Turnout, Gini Index and ethnic heterogeneity  
Subsample excluding areas in southern and central Bologna

	OLS regressions			
year 2009	-3.84***	-3.87***	-3.96***	-3.29***
	(0.44)	(0.44)	(0.40)	(0.41)
Gini index	-73.72***	-73.31***	-46.16***	-30.46***
	(12.11)	(12.17)	(14.14)	(10.03)
Mean Income	0.54***	0.54***	0.22	-0.01
	(0.14)	(0.14)	(0.17)	(0.13)
% foreign residents (all, not eligible voters)	-0.25***	-0.24***	-0.08	-0.21***
	(0.07)	(0.07)	(0.06)	(0.05)
Population density		-0.04	-0.01	0.02
		(0.03)	(0.03)	(0.02)
% homeowners			0.20***	0.19***
			(0.02)	(0.02)
% female				0.26
				(0.19)
% aged more than 80 years old				-0.61***
				(0.12)
% aged less than 14 years old				0.35**
				(0.16)
Constant	101.44***	101.71***	84.92***	73.46***
	(2.23)	(2.25)	(3.26)	(11.40)
R-squared	0.37	0.37	0.49	0.51
Obs	660	660	660	660

Robust S.E. in brackets  
 $\hat{p} < 0.15$ , \* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$

Table 2c. Turnout, ratio Median/Mean income and ethnic heterogeneity

	OLS regressions			
year 2009	-4.08***	-4.10***	-4.12***	-3.66***
	(0.38)	(0.38)	(0.35)	(0.37)
Median to Mean Income Ratio	43.41***	42.94***	26.89***	19.38***
	(6.23)	(6.27)	(7.41)	(5.06)
Mean Income	0.54***	0.54***	0.35***	0.19**
	(0.09)	(0.09)	(0.11)	(0.08)
% foreign residents (all, not eligible voters)	-0.35***	-0.34***	-0.12**	-0.21***
	(0.05)	(0.05)	(0.05)	(0.06)
Population density		-0.03 <sup>^</sup>	-0.01	0.01
		(0.02)	(0.02)	(0.02)
% homeowners			0.19***	0.18***
			(0.02)	(0.02)
% female				0.30*
				(0.15)
% aged more than 80 years old				-0.50***
				(0.11)
% aged less than 14 years old				0.51***
				(0.14)
Constant	34.23***	35.22***	40.97***	36.73***
	(7.50)	(7.55)	(8.24)	(7.41)
R-squared	0.34	0.34	0.45	0.46
Obs	868	868	868	868

Robust S.E. in brackets  
<sup>^</sup>p < 0.15, \*p < 0.10, \*\*p < 0.05, \*\*\*p < 0.01

Table 2d. Turnout, ratio p80/p20 percentiles

	OLS regressions			
year 2009	-3.61***	-3.64***	-3.91***	-3.41***
	(0.38)	(0.38)	(0.35)	(0.37)
p80/p20	-1.57***	-1.54***	-0.65**	-0.63**
	(0.32)	(0.32)	(0.27)	(0.25)
Mean Income	0.21***	0.20***	0.08 <sup>^</sup>	0.02
	(0.06)	(0.06)	(0.05)	(0.05)
% foreign residents (all, not eligible voters)	-0.31***	-0.30***	-0.11**	-0.20***
	(0.06)	(0.06)	(0.05)	(0.06)
Population density		-0.04	-0.02	0.01
		(0.03)	(0.02)	(0.02)
% homeowners			0.20***	0.18***
			(0.02)	(0.02)
% female				0.30**
				(0.14)
% aged more than 80 years old				-0.55***
				(0.12)
% aged less than 14 years old				0.53***
				(0.14)
Constant	84.18***	84.67***	71.53***	59.17***
	(0.93)	(0.99)	(1.43)	(7.78)
R-squared	0.31	0.31	0.43	0.45
Obs	868	868	868	868

Robust S.E. in brackets  
<sup>^</sup>p < 0.15, \*p < 0.10, \*\*p < 0.05, \*\*\*p < 0.01

Table 3a. Turnout, Gini Index, ethnic heterogeneity

	FE regressions			
year 2009	-4.61***	-4.72***	-4.70***	-4.59***
	(0.19)	(0.19)	(0.25)	(0.25)
Gini index	0.46	0.19	0.16	-0.21
	(6.42)	(6.29)	(6.25)	(6.20)
Mean Income	0.19**	0.19**	0.19**	0.19**
	(0.09)	(0.09)	(0.09)	(0.09)
% foreign residents (all, not eligible voters)	-0.19***	-0.15***	-0.15***	-0.14**
	(0.05)	(0.05)	(0.05)	(0.06)
population density		-0.29 <sup>^</sup>	-0.29 <sup>^</sup>	-0.31 <sup>^</sup>
		(0.19)	(0.19)	(0.20)
% homeown			0.00	0.00
			(0.04)	(0.04)
% female				0.14 <sup>^</sup>
				(0.10)
% aged more than 80 years old				-0.13
				(0.10)
% aged less than 14 years old				0.05
				(0.09)
Constant	77.38***	80.70***	80.37***	74.71***
	(2.50)	(3.26)	(4.25)	(6.19)
Number of groups	434	434	434	434
Obs	868	868	868	868

Robust S.E. in brackets  
<sup>^</sup>p < 0.15, \*p < 0.10, \*\*p < 0.05, \*\*\*p < 0.01

Table 3b. Turnout, Gini Index, ethnic heterogeneity: immigrants from Africa and Asia

	FE regressions			
year 2009	-4.76***	-4.85***	-4.82***	-4.71***
	(0.17)	(0.18)	(0.25)	(0.25)
Gini index	-0.40	-0.52	-0.53	-0.83
	(6.38)	(6.24)	(6.23)	(6.17)
Mean Income	0.21**	0.21**	0.21**	0.20**
	(0.09)	(0.09)	(0.09)	(0.09)
% foreign residents from Africa and Asia	-0.20***	-0.16**	-0.16**	-0.14**
	(0.07)	(0.07)	(0.07)	(0.07)
Population density		-0.32*	-0.31 <sup>^</sup>	-0.33*
		(0.19)	(0.19)	(0.20)
% homeowners			0.01	0.01
			(0.04)	(0.04)
% female				0.15 <sup>^</sup>
				(0.10)
% aged more than 80 years old				-0.12
				(0.10)
% aged less than 14 years old				0.05
				(0.09)
Constant	76.93***	80.67***	80.05***	73.76***
	(2.50)	(3.25)	(4.30)	(6.13)
Number of groups	434	434	434	434
Obs	868	868	868	868

Robust S.E. in brackets  
<sup>^</sup>p < 0.15, \*p < 0.10, \*\*p < 0.05, \*\*\*p < 0.01

Table 3c. Non linear effects of inequality and ethnic heterogeneity

	FE regressions. Non linear effects		
	in Gini index	in % foreign	Interaction
year 2009	-4.70*** (0.25)	-4.70*** (0.25)	-4.72*** (0.25)
Gini index	-3.43 (6.80)	-1.04 (6.17)	-1.01 (6.52)
Gini index*I(Gini index higher than average)	0.95 (1.04)		
Mean Income	0.21** (0.09)	0.21** (0.09)	0.21** (0.09)
% foreign residents from Africa and Asia	-0.14* (0.07)	-0.25** (0.11)	-0.15** (0.07)
% foreign res.*I(%foreign res. higher than average)		0.09 (0.06)	
% foreign res.*I(Gini index higher than average)			0.01 (0.08)
Population density	-0.32* (0.20)	-0.33* (0.20)	-0.33* (0.20)
% homeowners	0.00 (0.04)	0.01 (0.04)	0.00 (0.04)
% female	0.16 <sup>^</sup> (0.10)	0.15 <sup>^</sup> (0.10)	0.15 <sup>^</sup> (0.10)
% aged more than 80 years old	-0.12 (0.10)	-0.12 (0.10)	-0.12 (0.10)
% aged less than 14 years old	0.05 (0.09)	0.05 (0.09)	0.06 (0.09)
Constant	74.34*** (6.26)	73.98*** (6.14)	73.80*** (6.21)
Number of groups	434	434	434
Obs	868	868	868

Robust S.E. in brackets

<sup>^</sup>p < 0.15, \*p < 0.10, \*\*p < 0.05, \*\*\*p < 0.01

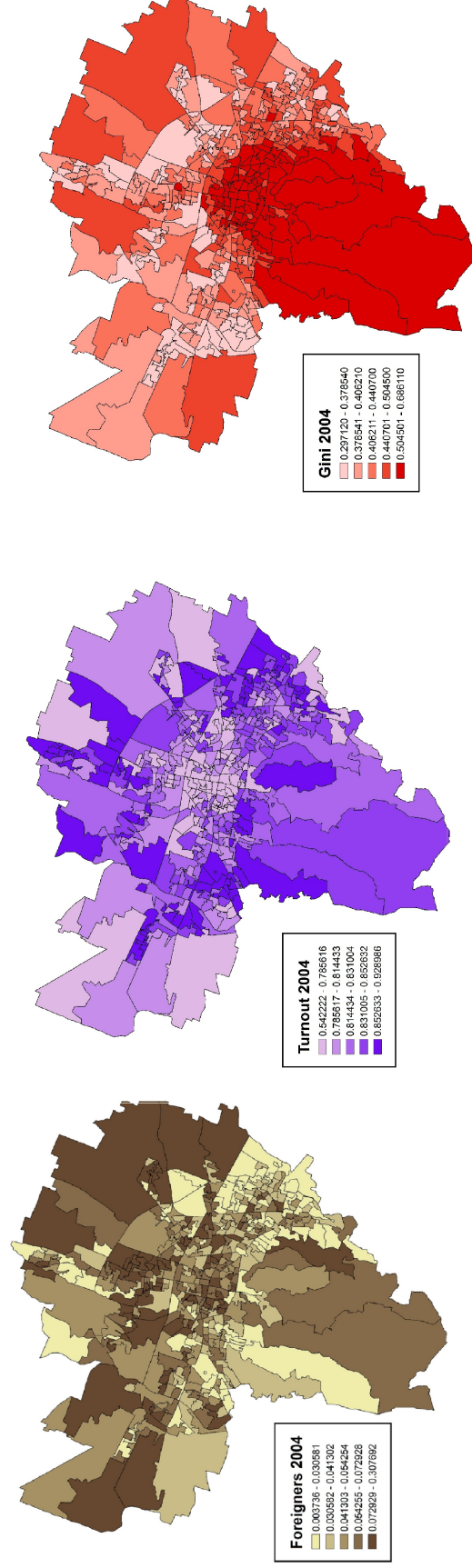


Figure 1: Foreigners' shares, turnout rates, and Gini indexes in 2004.