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The Political Geography of Immigration Discontent

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Abstract

How does globalization influence domestic politics in advanced democracies? International factors can be extremely powerful in shaping domestic politics, whether they are operating invisibly in the background or highly salient. In my dissertation, I shed some light on these complex dynamics by looking at one of the most relevant factors for domestic politics: international migration. In doing so, I reserve particular attention to the local contexts under which international shocks are received. The local realization of global phenomena is not only interesting *per se*, but it also enriches our understanding of the scope conditions under which theories of discontent apply. Does anti-immigration backlash vary across geographies? If so, what determines those differences?

The urban-rural divide in voting for anti-immigration parties is one of the most striking patterns in contemporary Western democracies. In a first paper, I ask why cities are different. I propose that the interaction between city size and residential segregation plays an important role in determining the image of cosmopolitan city centers. In large cities, segregation reduces the probability of contact between immigrants and natives and, hence, it reduces the salience of the immigration issue in the decision of how to cast a ballot. I show that in France large and small municipalities are equally likely to vote more for far-right parties in response to immigration when segregation is low. However, in large cities the effect fades away as segregation increases. When the electoral response to immigration is analysed at the polling station level, i.e. when segregation is naturally controlled for, then standard results in the literature appear: (i) more immigration is associated with more far-right vote when immigrants are very distinct from natives, (ii) more so when natives perceive stronger competition over welfare resources.

Moving beyond the urban-rural dichotomy, in a second paper I investigate the still largely unexplored politics of suburbs. Most immigrants in Western Europe live in large metropolitan suburbs. Natives in the same suburbs are the privileged target of far right-wing politicians. How does immigration shape voting in large metropolitan suburbs? This study is the first to address this question directly. The answer is far from obvious, because metropolitan suburbs are located between the cosmopolitan city centers and the nationalist countryside. I exploit a natural experiment across French metropolitan suburbs, consisting of a legal

population-based discontinuity in the provision of social housing. I show that municipalities that increased their supply of social housing over the period 2000-2015 also experienced an increase in the share of immigrants over natives, resulting in more support for the far-right in the 2017 presidential election. The evidence suggests a role for perceived (but not realized) competition over welfare benefits to be the driving force behind the results.

Understanding discontent involves an important measurement problem. Constructs are often vague and the willingness to express sincere preferences is far from random. An important line of my research aims at developing techniques for eliciting political dimensions from natural language processing. In a joint work with Elliott Ash, we develop a new method to study political rhetoric and, specifically, to detect emotional and cognitive language. We start from the Linguistic Inquiry and Word Count word lists for affect and cognitive processes, to construct two poles within a word embedding space. We train a word embedding model on the corpus of speeches given in the American Congress between 1858 and 2016. For each speech, we define the emotionality score as the relative distance from each of the two poles. With our new measure, we study whether and how political language has evolved over time and across groups, and how it responds to electoral incentives and national broadcasting.

The Cosmopolitan Illusion: Anti-Immigration Vote in the City Center*

Gloria Gennaro†

Abstract

The urban-rural divide in voting for anti-immigration parties is one of the most striking patterns in contemporary Western democracies. Why are cities different? In large cities, segregation reduces the probability of contact between immigrants and natives and, hence, it reduces the salience of the immigration issue in the decision of how to cast a ballot. I show that citizens of large cities in France are more likely to vote more for far-right parties in response to immigration when segregation is low. The effect fades away as segregation increases. When the electoral response to immigration is analysed at the polling station level, i.e. when segregation is naturally controlled for, then standard results in the literature appear: (i) more immigration is associated with more far-right vote, (ii) more so if the immigrant population is very distinct from natives, (iii) more so if immigrants compete with natives for welfare.

Keywords: immigration, voting, segregation, cosmopolitanism, nationalism, urban politics

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1 Introduction

The urban-rural divide in preferences over immigration is one of the most solid and striking patterns in contemporary Western democracies. The recent electoral revamp of right-wing populist parties in countries like France, Italy and the UK has conveyed a clear sense of distinction of cosmopolitan cities, that appear to be immune to the general nationalist trend.

Why are cities different? The answer to this question in far from obvious. One possible explanation is that people in cities hold different attitudes towards immigrants (e.g. Maxwell, 2019). Positive attitudes toward immigrants may determine the choice of living in cities, that typically host significant diversity. An alternative explanation may relate to the effect of context on individual attitudes. The experience of living in cities, where contacts with immigrants are more likely, may determine a change in attitudes. However, long-standing evidence from the literature on racial threat does not suggests that individuals' behavioural response to immigration varies across inhabitants of large and small towns (e.g. Adida et al., 2016).

I propose that the interaction between city size and residential segregation plays an important role in determining the aggregate cosmopolitan result in voting patterns. The urban landscape in large cities influences anti-immigration voting by determining the likelihood that its average inhabitant is exposed to immigration. Possibilities of contact that come from sharing public spaces, cooperating on local projects, attending similar organizations are naturally constrained by the scattered residential location of different groups.

In large cities, immigrants may remain invisible to the large majority of the population if they live segregated in specific neighborhoods. Less segregation, conversely, corresponds to an increase in the possibility of inter-group contact. As the city size shrinks, segregation becomes less effective in hiding diversity from the eyes of the majority. As a result, inhabitants of large cities are expected to express on average low hostility towards immigration as long as their city is sufficiently segregated. Conversely, when segregation is low and inter-group contact more likely, the gap between voting patterns in cities and in smaller towns is expected to shrink.

To explore those patterns, I take an new angle to the analysis of immigration and extreme

right-wing voting in France, that consists of exploring variation at different geographical levels of aggregation. The municipality level allows to investigate the aggregate effect of segregation and city size on voting. In this setting, large cities appear *prima facie* to host widespread cosmopolitan attitudes, because higher immigration is systematically associated with less far-right voting. However, such an effect is moderated by segregation. Immigration has no effect on extreme right-wing vote in cities that display higher levels of segregation; for low levels of segregation, larger immigration shares are associated with more support for the far-right. Segregation is likely to be both a driver and a result of exclusionary attitudes, as people with more exclusionary attitudes are more likely to self-select in homogeneous areas. If this is true, then the mechanism proposed here is likely to play a much stronger role in reality than what I am able to measure.

I move, then, to study variation that takes place within large cities in order to understand whether immigration produces an electoral backlash, once segregation is held constant. I show that electoral precincts with more immigrants also show higher support for the far-right. Moreover, this effect appears to respond to well known determinants of outgroup hostility, i.e. it is stronger when the genetic distance between immigrants and natives increases, and when competition for welfare is more salient.

The scholarship on anti-immigration sentiment is increasingly vocal on the contextual factors that shape attitudes and behaviours. The discussion revolves around the correlations between diversity, economic and socio-demographic variables, and attitudes or voting. The welfare state (Facchini and Mayda, 2009), the sector of employment (Dancygier and Donnelly, 2012), the dominant political discourse (Hopkins, 2010) are all elements that are expected to interact with individual predispositions in the formation of political attitudes. In this context, segregation has been found to have numerous effects on inter-group attitudes and societal outcomes. Residential segregation of groups across space reduces trust (Uslaner, 2012), and increases in-group bias (Enos and Gidron, 2016). Inter-group hostility results in a deterioration of the quality of government (Alesina and Zhuravskaya, 2011) and influences the level and the distribution public good provision across groups and space (La Ferrara and Mele, 2006; Trounstine, 2016). Importantly, segregation plays a role on top and beyond diversity. In context of high segregation, frequent contacts may exacerbate the perception of

threat (Enos, 2016).

Crucially, for the cosmopolitan result to emerge, the mechanism postulated here does not require a specific predisposition of natives living in cities *vis-à-vis* the immigrant population. Because voting means selecting over bundles of issues, there is no one-to-one correspondence between sentiment and vote (Fetzer, 2000). Segregation may affect anti-immigration voting by acting on the salience of the immigration issue. Natives, living in homogeneous areas, may entertain negative attitudes towards immigrants, whilst not being willing to act on them when casting their ballot.

This article makes several contributions. First and foremost, my results suggest a word of caution when drawing inferences from observational data at different aggregation levels. Instead, I highlight how applying the same question to different geographical units can illuminate complex dynamics of urban politics. Substantively, I provide some of the first systematic evidence for the interplay between city size and segregation in explaining why city centers appear to respond less to the rhetoric of anti-immigration parties. This implies that electoral cosmopolitanism within large cities is the manifestation of more complex spatial dynamics. In this sense, my analysis contributes to ongoing debates about the urban-rural divide in anti-immigration sentiment (Maxwell, 2019). In the absence of clear findings (see for instance Hainmueller and Hangartner, 2013; Dustmann et al., 2016, for opposed findings on this matter), my results suggest that inhabitants of large city centers tend to respond to immigration by voting more for anti-immigration parties.

Second, my analysis contributes to long-standing debates about the electoral effects of immigration (Hainmueller and Hopkins, 2014; Dancygier and Laitin, 2014). In particular, it talks to studies that look at what happens within, rather than across, large agglomerations (Halla et al., 2017). In this sense, my findings resonate with the literature on the racial threat hypothesis, whose result appear to be very consistent across context (Brader et al., 2008; Enos, 2016; Adida et al., 2016), and only marginally driven by labour market competition (Dancygier and Donnelly, 2012; Hainmueller et al., 2015).

Third, this work has important implications for the research that studies the emergence of European right-wing parties, whose leaders have become increasingly vocal on immigration in recent years (Kriesi et al., 2012; Alonso and Fonseca, 2012; Mudde, 2013; Dancygier and

Margalit, 2019). In particular, my results allow to better qualify the geography of discontent that can be harnessed by those parties and built into political support.

Finally, this paper adds new empirical evidence to the large literature on the politics of cities, in the context of globalization (Brenner, 1998). Cities are studied both as agents in national and international politics (Goldstein and You, 2017), or as contexts where the politics is generated (Trounstine, 2010; Ferreira and Gyourko, 2009). My results can be broadly interpreted in this light, as adding to our current understanding of the local politics of global cities.

2 The Geography of Immigration Discontent

A large body of works, crossing discipline boundaries, agrees on the fact that segregation affects societal outcomes by structuring the space in which inter-group interactions take place. The geographical location of minority groups has been shown to determine the development of civil wars (Morelli and Rohner, 2015; Klašnja and Novta, 2016), to hamper inter-group coordination and exacerbate differences in group preferences over welfare (Trounstine, 2016; Beach and Jones, 2017). Segregation may have also unexpected positive effects, such as creating opportunities for segregated minority groups to better coordinate over their requests to the central government (Tajima et al., 2018), and hence reduce inequality in public good provision. La Ferrara and Mele (2006) find that, in the US, segregation is associated with higher average public school expenditure but also higher inequality in the distribution of the resources. In this case, segregation is a mechanism to escape the coordination problems posed by diversity.

In a similar vein, I argue that segregation in big cities protects the average native from being exposed to diversity. Consider an individual i belonging to the group of natives in town c. Assume that i moves within a circle with radius r centered at her residence, and that she is only exposed to diversity if an immigrant lives (or moves) within this circle. This is equivalent to assuming that people are more exposed to diversity if they live closer to immigrants. The city is a circle with radius d. If the city is small, i.e. if r is greater than d, then i is equally exposed to all immigrants in the city. If the city is large, r is smaller

than d and i is only exposed to a subset of immigrants, i.e. those that live within distance r from her residence. In this case, city level segregation may result in hiding diversity from i's sight. For any given share of immigrants, the more severe their segregation, the larger the share of city inhabitants that are not exposed to diversity. If exposure increases the salience of immigration as a political issue, aggregating individual experiences of no exposure results in the illusion of cosmopolitan city centers.

H1: In large cities, the effect of immigration on anti-immigration vote varies for different levels of segregation. Specifically, it is positive for low levels of segregation and it decreases as segregation increases.

If i lives in a big city, where r is smaller than d, then i is affected by changes in the group composition of her neighborhood. In sub-units of large cities, segregation does not affect the probability of contact between immigrants and natives. At the neighborhood level, i's exposure to diversity increases as the share of immigrants living around her increases.

H2: When comparing sub-units of large cities, the effect of immigration on anti-immigration vote is stricktly positive.

In sub-units of large cities, an increase in the share of immigrants mechanically translates into higher probability of contact. Still, contact may or may not generate hostility. Out-group hostility is typically triggered by competition for material or symbolic resources (Key, 1949; Stephan and Stephan, 2017), that is responsible for increasing ingroup bias and depressing inter-group trust (Enos and Gidron, 2016; Gereke et al., 2018). Assume that the utility of the native i depends negatively on diversity, but more so if in-group bias is larger and inter-group trust is lower. Competition increases the salience of diversity in the utility evaluation of i. For the same overall exposure to diversity, i is more opposed to it if immigrants have higher genetic and cultural distance with the natives (Alesina et al., 2018),

and if they appear to compete with natives for welfare provisions (Alesina et al., 2019). If cosmopolitanism in city centers is the result of an aggregation problem, then disaggregated data on sub-units of large cities should be devoid of this source of bias and respond to these mechanisms frequently identified in other settings.

H3: In sub-units of large cities, the effect of immigration on anti-immigration vote is stronger for groups of immigrants that are more distinct from natives.

H4: In sub-units of large cities, the effect of immigration on anti-immigration vote becomes stronger as immigrants are perceived as competitors for welfare provisions.

3 Data and Samples

In order to investigate anti-immigration voting at a sub-municipality level, I leverage on a novel dataset on immigrant population at a very high spatial resolution. This unique dataset has been assembled by the Joint Research Centre (hereinafter JRC) of the European Commission and provides a uniform grid showing the numbers of migrants (by country of origin) in cells of 100 by 100 meters for 8 EU countries. The quantities derive from the harmonization of the 2011 Censuses collected from different European National Statistical Institutes.[1] For France, the dataset includes all foreign-born legal residents, for municipalities with more than 5 000 inhabitants.

I combine this dataset with electoral results at the polling station level for France. In order to attribute each grid cell to the right polling station, I obtain information on the boundaries of the polling stations for the 2012 presidential elections. The shape file of the 2012 electoral precinct is available from the Cartelec Project, University of Rouen, for municipalities that belong to agglomeration with more than 100 000 inhabitants.[2] To map the immigration data

[1] The full dataset contains data for France, Germany, Ireland, Italy, Netherlands, Portugal, Spain and UK. For more information, see https://bluehub.jrc.ec.europa.eu/datachallenge/data

[2] For more information, see http://cartelec.univ-rouen.fr/?page$_id = 3609$

into electoral results, I perform a spatial merge that attributes to each precinct all grid cells whose centroids fall within its boundaries, and calculate aggregate statistics on immigration at the polling station level. Details of the merge procedure are available in section A.2 of the Appendix.

Data on social housing come from the *Répertoire des logements locatifs des bailleurs sociaux*, i.e. a register established in 2009 by the ministry for Sustainable Development with the intent of monitoring the status of social housing in France. This register contains information on the exact address of each building, its characteristics (e.g. number of rooms) and, importantly, the date of construction and first assignment.[3] I use the addresses to geolocalize buildings that were first assigned before 2011, and attribute the presence (or absence) of a social housing building to each grid cell. I use this data to construct a probabilistic measure of immigrants in social housing at the polling station level.

Finally, I obtain data on the share of immigrants in each municipality and its population from the 1999 national census, and the 2006 and 2011 yearly censuses.[4] I complement this dataset with electoral results for the first round of the 2002, 2007 and 2012 presidential elections aggregated at the municipality level, as made available by the Ministry for Internal Affairs.

I combine these different data sources into three main datasets. The first is composed of a cross-section of 36 541 French municipalities in 2011-2012, where for each observation I report demographic and political variables. The second is a panel of the same 36 525 French municipalities (some minor municipalities have been suppressed over the time period) for the election years 2002, 2007 and 2012, for a total of 109 575 observations. Both samples are used in section *The Cosmopolitan result* for illustrating the main puzzle and tie it to the literature on the urban-rural divide. A subset of each of those datasets is used in section *The Role of Segregation* in combination with segregation measures, to show that segregation moderates the effect of immigration on anti-immigration voting. Segregation measures are derived from the JRC data; as a result, the analysis can only be performed on the sub-

[3]The *Répertoire* is established after the bill 2009-1485, 2 December 2009. For more information, see https://www.data.gouv.fr/fr/datasets/repertoire-des-logements-locatifs-des-bailleurs-sociaux/

[4]The yearly census starts on 2006 in France. I assign immigration values to municipalities for the 2002 election based on the previous 1999 census.

sample for whom those data are available. This includes 2 510 municipalities (7 518 in the panel version). The third dataset is composed of a sample of 5 229 polling stations observed in 2011-2012. The sample is the intersection of the available JRC data on immigration, with the available electoral geographies in the Cartelec Project. This dataset is mainly used in the section *Anti-Immigration Vote in the City Center*.

4 Main Variables

This paper explores the effect of immigration on voting for extreme right-wing parties within and across municipalities. The timespan of my analysis is set by data availability. Specifically, the JRC data on immigration are only available for 2011. For this reason, I mainly consider the impact of immigration on vote in the first round of the 2012 presidential election, and use previous election rounds only in the longitudinal analysis.

Presidential elections in France take place every 5 years, with direct universal suffrage. The President is elected by the absolute majority of expressed votes. If absolute majority is not reached in the first round, a runoff between the two most voted candidates takes place two weeks later. The 2012 presidential elections saw the victory of the Socialist party led by François Hollande, gaining over the UMP lead by Nicolas Sarkozy by a very small margin. The results in the first and second round, in this sense, are very consistent. The two parties gained respectively the 28.63% and 27.18% of the vote shares. The National Front, guided by Marine Le Pen, was the third party in the first round with 17.90% of the vote shares.

The National Front is largely know for its extreme and anti-immigrant positions (Mitra, 1988; Van Kessel, 2015). Moreover, the party positions display high consistency over time, partly due to the fact that the party front-runners since 1988 have all come from the Le Pen family. Jean-Marie Le Pen founded the National Front in 1972, and then run for the presidential office in 1988 to 2007. Starting on 2011, his daughter Marine Le Pen took over the leadership of the party and run in the 2012 and 2017 elections. I use vote share for the FN as a proxy for anti-immigration vote. Importantly, this choice does not allow me to investigate the (possibly) separate effects on attitudes towards immigrants and salience of the issue.

I measure exposure to immigration as the share of immigrants over total population in a given municipality and year. At the electoral precinct level, I measure exposure as the average residential exposure, i.e. the average of the shares of immigrants within each grid cell (i.e. subunits of the precincts). Results do not change if the aggregate share of immigrants in the precinct is used instead. Immigrants are defined in the French census as people who were born foreigners in a foreign country. Thereby, the variable captures essentially first-generation immigrants. There is a possibility that some fraction of those immigrants, having gained the French citizenship, participates in national elections. However, if naturalized immigrants vote tend to vote against anti-immigration parties (Strijbis, 2014), then my results may be best interpreted as an lower bound for the overall effect (compared to what would happen if no foreign-born was allowed to vote).

Finally, I measure segregation using the multi-group version of the Dissimilarity index (Reardon and Firebaugh, 2002):

$$D_m = \sum_{i=1}^{C} \sum_{j=1}^{J} \frac{t_i}{2TI} |\pi_{ji} - \pi_j| \quad \text{where} \quad I = \sum_{j=1}^{J} \pi_j (1 - \pi_j)$$

Where D_m is the index for municipality m, i are grid cells, j are the immigrant groups, t_i is the population in cell i, T is total population in the municipality, π_{jm} and π_m are respectively the share of immigrant of group j in cell i and in the total municipality population. I is Simpson's Interaction Index calculated for the municipality. Intuitively, this index is a measure of dis-proportionality of groups across sub-units (the JRC grid cells) within a given unit of interest (the municipality), and captures the share of all individuals that should transfer among sub-units in order to equalize the proportion of groups, divided by the proportion that would have to change sub-unit if the unit area were perfectly segregated. The index varies between 0 and 1, where zero corresponds to perfect integration and 1 to perfect segregation. Results are consistent when other indices of segregation are used.

5 The Cosmopolitan result

The idea of an urban-rural divide in anti-immigration voting stems from the observation that, in spite of large cities hosting significant amounts of immigrants, support for nationalist parties is typically low. In this section, I show descriptively that this correlation is indeed visible in the cross-section of French cities. However, this argument does not pass the test of a more careful longitudinal analysis, where city fixed characteristics are controlled for.

Figure 1 shows the results of a univariate regression model where the vote share for FN in 2012 is regressed on the share of immigrants over total population in the same municipality in 2011. The relation appears to be negative on average, suggesting that having a larger share of immigrants is associated with a lower vote share for FN. A number of possible confounders are likely to drive the sign and the magnitude of this correlation. However, this simple plot shows already that large cities are systematically located below the regression line. In other words, in large cities, the realized anti-immigration vote is smaller than its predicted value for a given immigration level. Figure A4 in the appendix reports similar results after including region fixed effects.

This correlation resists when tested in an interacted regression model. In the first panel of Figure 2, I display the effect of immigration on voting for the FN by population deciles. The estimates are the coefficients of a regression at the municipality level, where the vote share for FN in 2012 is regressed on the share of immigrants in 2011 and all its interaction with population deciles (calculated on the total number of residents in 2011). More precisely, they are obtained as the linear combination $\beta + \gamma_{d|m \in d}$ from the following regression model:

$$FN_m = \alpha + \beta M_m + \sum_{1}^{d} \gamma_d D_{m,d} * M_m + \sum_{1}^{d} \delta_d D_{m,d} + \rho_m + \epsilon_m \tag{1}$$

Where FN_m is the vote share for FN in municipality m, M_m is immigration in the same municipality, $D_{m,d}$ is a dummy equal to 1 if the municipality is in the population decile D_d, and ρ_m are region fixed effects. Standard errors are clustered at the region and population decile level. Table A5 in the Appendix reports the all the regression coefficients and the marginal effects, for different percentiles of the population distribution. The association between immigration and FN vote is negative and statistically significant only for munici-

palities that belong to the 10th decile of the population distribution. In other words, the regression analysis suggests that in larger cities immigration is associated with less vote for the nationalist far-right.

The cosmopolitan result is stark in the cross-sectional analysis. However, it disappears as soon as municipality time invariant characteristics are controlled for. In the second panel of Figure 2, I estimate the effect of immigration on voting using a panel of French municipalities. In the panel, electoral outcomes for each municipality are observed at three election years (2002, 2007 and 2012). For each time period, immigration data are the closest available to the election year (1999, 2006 and 2011), whilst the population deciles are calculated once and for all at the beginning of the period (1999). The reported estimates are obtained as $\beta + \gamma_{d|m \in d}$ from the following regression model:

$$FN_{m,t} = \alpha + \beta M_{m,t} + \sum_{1}^{d} \gamma_d D_{m,d} * M_{m,t} + \mu_m + \tau_t + \epsilon_{m,t} \tag{2}$$

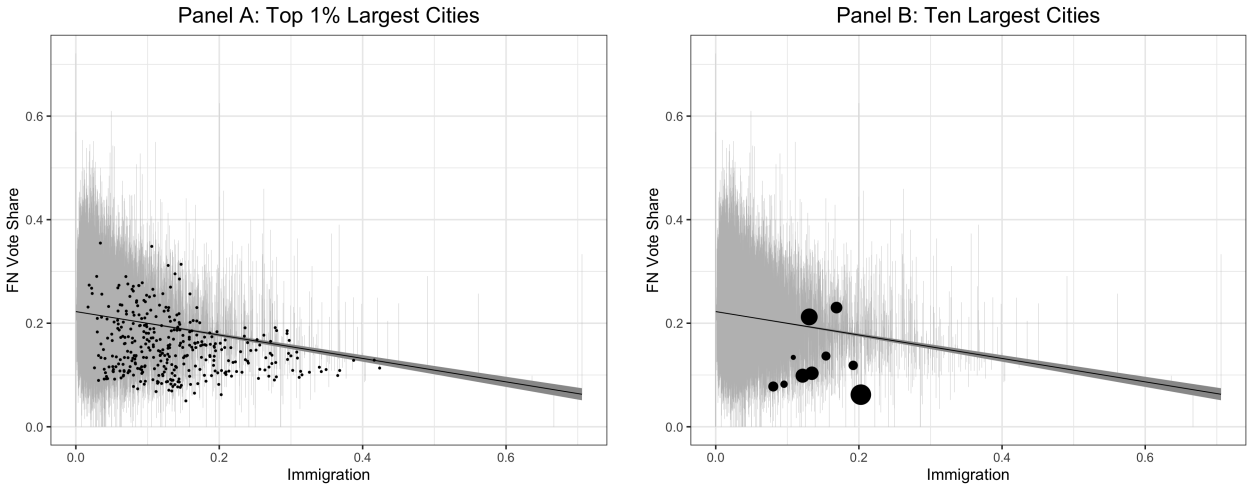
Where $FN_{m,t}$ is the vote share for FN in municipality m at year t, $M_{m,t}$ is immigration in the same municipality and year, $D_{m,d}$ is a dummy equal to 1 if the municipality is in the population decile D_d, μ_m are municipality fixed effects, and τ_m are year fixed effects.[5] Standard errors are clustered at the municipality level. Once municipality fixed characteristics are accounted for, the relation between immigration and FN vote share becomes positive and significant. Importantly, this is also true for large municipalities. For any municipality, an increase in the share of immigrants over time translates into an increase in the vote share for the far-right party.

6 The Role of Segregation

Why do the cross-sectional and the panel analysis convey different messages? In this section, I test whether segregation in large cities can be responsible for these diverging results. This boils down to testing Hypothesis 1, as the latter postulates that in large cities segregation moderates the effect of immigration on far-right vote. The emergence of anti-immigration vote depends crucially on the possibility that natives and immigrants interact in the urban space.

[5] Decile dummies are absorbed by the municipality fixed effects.

Figure 1: Univariate Correlation between Immigration and Voting



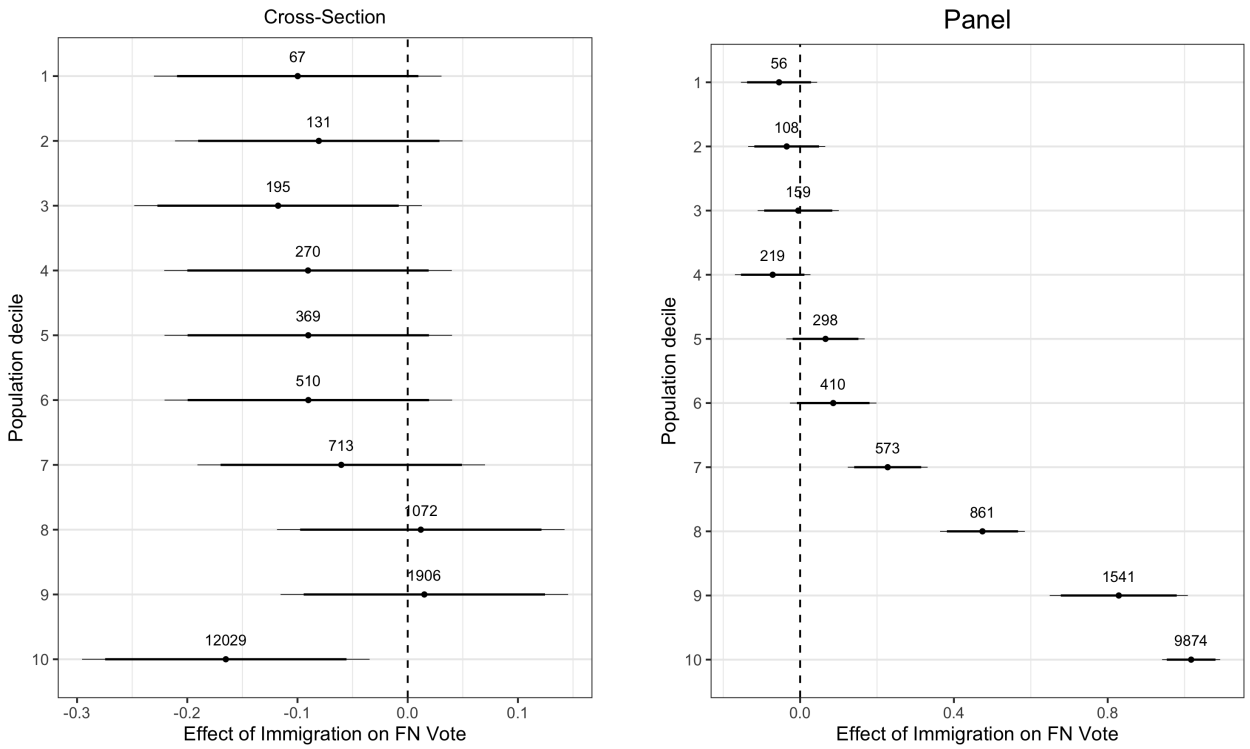
Note: Panel A and B report the result of a univariate regression model at the municipality level, where FN vote share in 2012 is regressed on the share of immigrants over total population in 2011. Vertical lines are residuals. The black dots represent the the top 1% largest French cities in Panel A, and the top 10 largest Cities in Panel B. In Panel B, the dot size is proportional to the city population.

If migration chains reproduce the spatial distribution of enclaves over time (MacDonald and MacDonald, 1964), then segregation is a persistent characteristic of each municipality and is captured by the municipality fixed effects when estimating equation 2.

Segregation is calculated as in equation 4, starting from the fine-grained information on the geographical distribution of migrants in 2011, available through the JRC dataset. Different groups are defined as immigrants coming from different continents (Africa, Asia, Europe, America and Oceania). This should provide for a rough approximation of genetic and cultural commonalities between migrants coming from the same region of origin. Table A1 reports the distributions and the correlations across population, immigration and segregation in the sample.

I begin by exploring those patterns in the cross-section. Panels A and B in Figure 3 report the estimated marginal effect of immigration on FN vote at different segregation deciles, for small and large cities separately. Specifically, the left and right panels are obtained respectively as $\beta_0 + \beta_3$, and $\beta_0 + \beta_1 + \beta_2 + \beta_3$, from the following regression model (the subscript m is omitted from all variables for notational convenience):

Figure 2: Effect of Immigration on FN Vote by Town Size



Note: Panel A and B report the effect of immigration on voting per population deciles, respectively estimated as in equation 1 and 2. Each point estimate the the linear combination of the coefficients of Immigration and Immigration interacted with the population decile. The average municipality size per each decile is next to the point representing the coefficient. Horizontal lines represent the 90% and 95% confidence intervals.

$$FN = \alpha + \beta_0 M + \beta_1 BM + \beta_2 BMS + \beta_3 MS + \beta_4 BS + \beta_5 B + \beta_6 S + \rho + \epsilon \tag{3}$$

Where B is a dummy equal to 1 for municipalities with more than 100 000 inhabitants and S is segregation in the same municipality.[6] Other variables are as described in equation 1. Standard errors are clustered at the regional level. The results suggest that anti-immigration vote in large cities is heterogeneous in the level of segregation. Immigration is associated with more support for FN when segregation is low; however, this relationship disappears for high enough levels of segregation. For low levels of residential segregation more diversity is associated with higher vote share for FN. In small towns, the relation between immigration and FN vote does not appear to vary across segregation levels.

The same analysis is repeated for the panel dataset including municipality fixed effects. In this case, segregation is treated as an invariant municipality characteristics. Even though this choice is primarily due to data limitations, there is large empirical evidence on the inter-generational persistence of segregation of minority groups in urban areas (Dawkins, 2005; Bolt et al., 2010). The results are reported in Panel C and D of Figure 3. Because population and segregation are fixed, I cannot estimate in the same model the marginal effect of immigration for different levels of both variables. Hence, I split the sample over the population threshold and estimate the same equation separately for small and large municipalities. The estimates are obtained as $\beta_0 + \beta_1$ from the following regression model:

$$FN_{m,t} = \alpha + \beta_0 M_{m,t} + \beta_1 M_{m,t} * S_m + \mu_m + \tau_t + \epsilon_{m,t} \tag{4}$$

Where the linear effect of S_m is absorbed by the municipality fixed effects. Standard errors are clustered at the municipality level. The panel analysis conveys a very consistent message. The effect of immigration on anti-immigration voting is positive for low levels of segregation, whilst the point estimate approximates zero and becomes non statistically significant as segregation increases. For sufficiently high levels of segregation, an increase in

[6] Results are similar for other arbitrary definitions of large municipality. Also, results are consistent when splitting the sample into big and small towns and performing the analysis separately.

immigration does not produce any effect on FN vote share. Here again, the positive effect of immigration on FN vote in small towns does not depend on segregation.

7 Anti-Immigration Vote in the City Center

Is there evidence of anti-immigration vote within city centers? If the cosmopolitan result is triggered by segregation at the municipality level, then zooming at a lower level should allow to capture the effect of immigration, devoid of the moderating effect of segregation. In this section, I test Hypothesis 2 by analysing the relation between immigration and FN vote shares at the most disaggregated electoral geography, i.e. the polling station. I combine the JRC dataset with the available precinct boundaries, and compare electoral results for polling stations with high and low levels of immigration within the same municipality. The electoral precinct is used here as a proxy for the neighborhood. This is an unavoidable simplification, as the electoral precinct in France does not have any real social meaning besides the pure practical organisation of the ballot process.

7.1 Hostility by Region of Origin

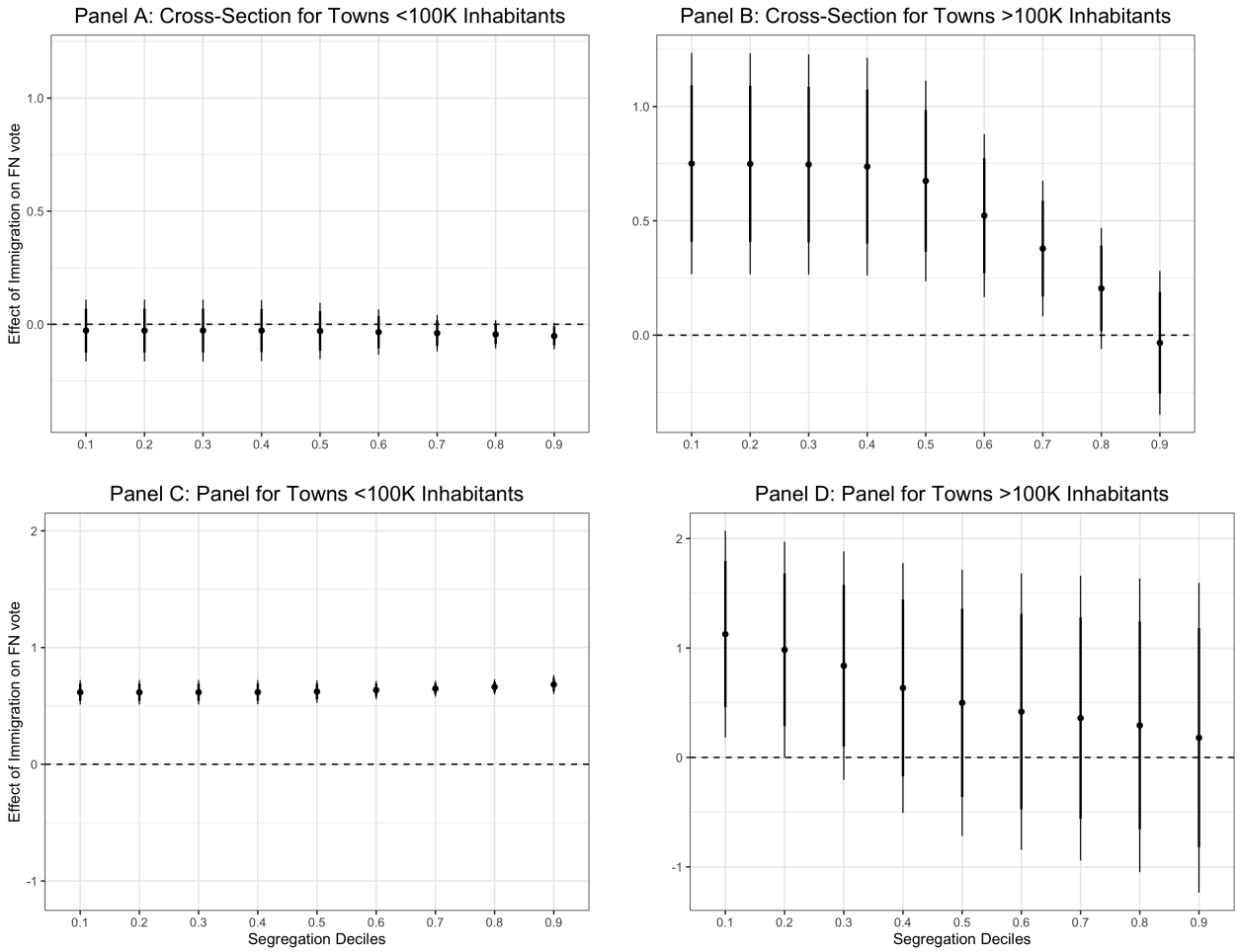
If racial threat is shaping the relations between immigrants and natives in the French city centers, then I should find a positive correlation between African immigration in the neighborhood and anti-immigration vote (Quillian, 1995). Hence, to test Hypothesis 3, I estimate the following regression model for each immigrant group:

$$FN_p = \alpha + \beta N_{p,r} + \gamma M_{p,m} + \delta I_p + \mu_m + \epsilon_p \tag{5}$$

Where FN_p is the vote share for FN in precinct p, $N_{p,r}$ is the share of immigrants from region r in the same precinct and $M_{p,m}$ is the share of immigrants in the same precinct, with $r \in \{Africa,\ America,\ Asia,\ Europe\}$ and $m \in \{nonFrench,\ nonEuropean\}$, I_p is average income in the polling station, and μ_m are municipality fixed effects.[7] Standard errors

[7] I exclude immigration from Oceania due to the very small share and variation in the presence of migrants from this continent. *Income* at the polling station level is reconstructed starting from the fiscal data at the IRIS level (*Indicateurs de structure et de distribution des revenus en 2011*). The IRIS is a statistical subdivision of the French territory that, in city centers, corresponds to cells of 200m×200m. I aggregate

Figure 3: Anti-Immigration Vote for Small vs. Large Towns, by Segregation



Note: This figure reports the marginal effect of immigration and FN vote shares estimated at different segregation levels (deciles), for small and big cities. In Panels A and B, each point estimate is the linear combination of the coefficients $\beta_0 + \beta_3$ and $\beta_0 + \beta_1 + \beta_2 + \beta_3$ respectively, for different Segregation deciles as in equation 3. In Panels C and D, each point estimate is the linear combination of the coefficients $\beta_0 + \beta_1$ estimated for large and small municipalities separately, for different Segregation deciles as in equation 3. Full regression results are reported in Table A4 in the appendix. Vertical lines represent the 95% and 99% confidence intervals.

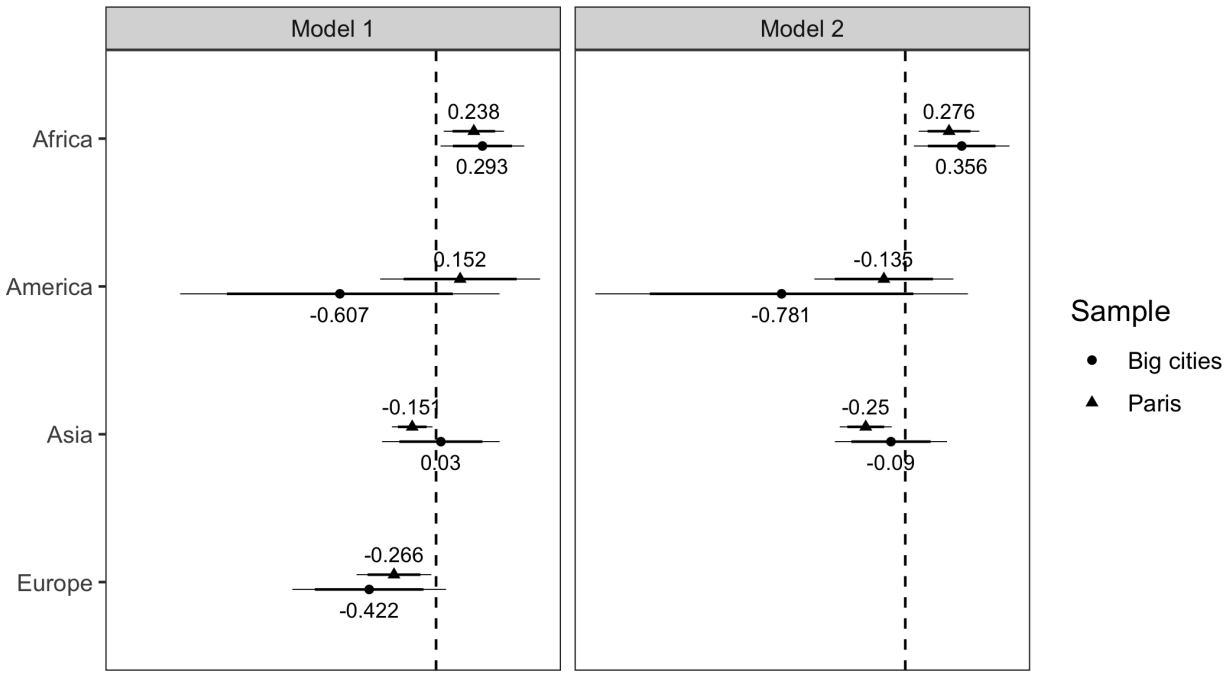
are clustered at the municipality level. In the case of Paris, Marseille and Lyon, municipality fixed effects capture municipal arrondissements, i.e. administrative subdivision of the city. Table A6 in the Appendix reports the full results.

Figure 4 reports the β coefficients estimated from model 5, for each of the mentioned immigrant groups and inclusion of controls. For robustness, I also report the results of the same analysis performed on Paris only, the largest city in France. The coefficients in the first panel can be interpreted as the effect of a change in the composition of the immigrant population in favour of one of the groups under consideration, holding fix the proportion between the whole immigrant population and the natives. Similarly, the estimates in the the second panel represent the effect of a change in the composition of the immigrant population whilst holding fixed the proportion between European-born and non-European born in the precinct. Both models convey a very similar message. For two electoral precincts with the same share of immigrants, the one that hosts more African immigrants shows on average more support for the far-right. This is not true for any other immigrant group. Table A7 in the appendix reports the same result for different specifications and clustering of standard errors.

The key identifying assumption that would allow the β coefficient to be interpreted as a causal effect of immigration on FN vote share is the absence of omitted factors that affect both variables at the same time. In this context, it is important to highlight that polling station boundaries do not correspond to any relevant administrative or social geography. They are arbitrarily drawn before every election by the prefect of the department based on an equal subdivision of the registered voters. Because votes are aggregated at the national level, there is no incentive in manipulating the boundaries of the polling stations. Details on how the polling stations are defined are available in section A.1 of the Appendix. However, if the spatial distribution of relevant factors is correlated with the spatial distribution of immigrants, these concerns persist. City fixed effect and, especially, *Arrondissement* fixed effects in large cities, should partly alleviate these concerns by capturing municipality characteristics (including local labour market conditions and urban politics). Further, controlling

these data by taking the mean of mean income for all cells falling within a precinct boundaries. Values for cells that cross precinct boundaries are attributed proportionally to the share of territory in each precinct.

Figure 4: Hostility by Region of Origin



Note: The point estimates represent the coefficients of separate regressions of FN vote shares on immigration at polling station level, as in equation 5, for different immigrant groups. Regressions in Model 1 include a control for the share of non French born in the population. Regressions in Model 2 include a control for the share of non EU born in the population. The point estimate is next to the point representing the coefficient. Horizontal lines represent 95% and 99% confidence intervals.

for income excludes that the correlation between immigration and vote is solely explained by sorting of lower income voters in neighborhoods with immigrants.[8]

[8]In future iterations of this work, I will perform a longitudinal analysis at the polling station level for larger cities, with polling station fixed effects and controlling for income. For large cities, I collected the shapefiles of the polling station boundaries for the 2007-2012-2017 national elections, together with high-spatial resolution datasets on the presence of immigrants (French vs. non-French) and income. Maintaining the electoral geography of 2012 as baseline, I can reconstruct the electoral results of those units in 2007 and 2017 as a weighted average of the 2007 and 2017 units respectively. This is necessary as most of the polling stations have been redrawn over time (however, a consistent subset of polling stations have remained unchanged, opening the possibility of a subset analysis). Immigration and income data come in the form of spatial grids, and hence can be safely attributed to the 2012 electoral geography for the whole period.

7.2 Priming Welfare Competition

Material competition for welfare provisions is expected to generate higher hostility across groups (Facchini and Mayda, 2009). However, when it comes to subjective evaluations of the stiffness of this competition, perceptions appear to play an important role. Natives typically overestimate immigrants' reliance on welfare, and this increases their opposition to further redistribution (Alesina et al., 2018).

I test Hypothesis 4 by investigating whether the presence of a social housing building with significant immigrant population in a given electoral precinct is associated with more support the the FN in the same precinct. Importantly, I do so after controlling for the share of immigrant and the amount of social housing in the precinct, to account for the fact that immigrants are over-represented in social housing in France (Verdugo, 2015) and the social housing may produce effects on the neighborhood other than priming cross-group redistribution (Glaeser and Sacerdote, 2000).

To construct a proxy for Immigrants in Social Housing, I geolocalize all social housing buildings which have been assigned before 2011 in the sampled municipalities. This allows me to associate each building with the respective JRC grid cell. For each cell, I multiply the local share of immigrants with an indicator function equal to one if the cell contains a social housing building. The final measure of Immigrants in Social Housing at the polling station level is the average of the shares of immigrants in social housing across the grid cells that fall within each polling station. Larger values corresponds to larger shares of immigrants that live in (or close to) social housing buildings. The effect of priming welfare competition is given by the the β_1 coefficient in the following regression model:

$$FN_p = \alpha + \beta_1 MSh_{p,r} + \beta_2 M_{p,r} + \beta_3 Sh_p + \mu_m + \epsilon_p \tag{6}$$

Where $MSh_{p,r}$ is the share of immigrants from region r per social housing neighborhoods in polling station p, $M_{p,r}$ is the total share of immigrants from region r in the same polling station, Sh_p is the number of social housing buildings. Standard errors are clustered at the municipality level. In the same regression, β_2 represents the direct effect of immigration on FN vote shares and β_3 is the direct effect of social housing. Table A8 in the appendix reports

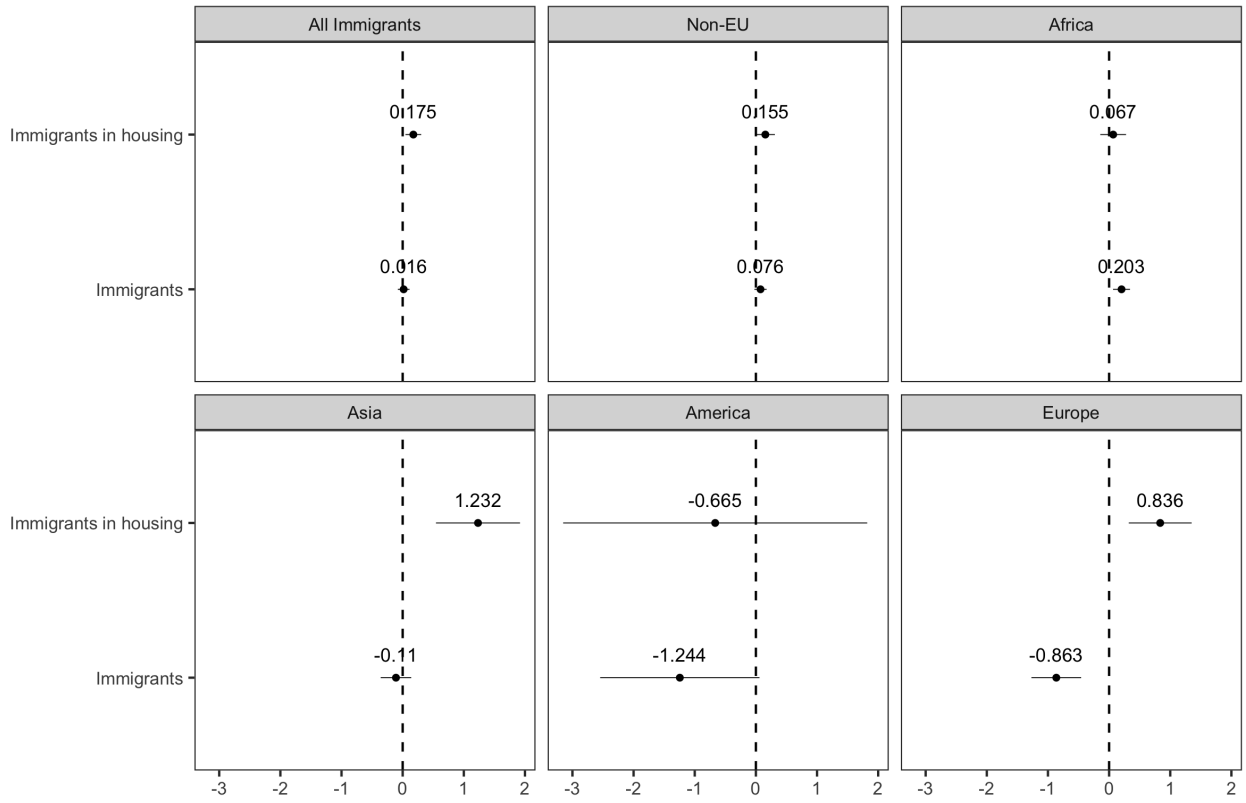
the full results and specification.

Figure 5 reports the estimated β_1 and β_2 coefficients, for different definition of immigrants. Because different migrant groups may be differently likely to ask and obtain social housing, I repeat the same analysis for immigrants coming from different continents. The presence of non-French born in social housing generates higher vote share for the FN across immigrant groups. The effect is stronger for Asian and European immigrants. Even though those groups do not appear to generate hostility on average, their presence in social housing buildings activates exclusionary attitudes. Immigration from Africa, conversely, is on average associated with increase in outgroup hostility, but living in social housing does not add up to that effect.

8 Conclusion

In this paper, I provide new evidence on the geography of immigration discontent. In particular, I show how the general perception of cosmopolitan city centers is not supported by evidence when more fine-grained geographic units of analysis are considered. The cosmopolitan result emerges when aggregating electoral behaviour in highly segregated municipalities. Future iterations of this work will mainly aim at strengthening the identification of causal effects.

Figure 5: Hostility by Region of Origin and Social Housing



Note: The point estimates are the coefficients of regressions of FN vote shares on immigration and immigrants in social housing and at the polling station level, as in equation 6, for different immigrant groups. The point estimate is next to the point representing the coefficient. Horizontal lines represent the 95% confidence intervals.

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Appendix

A Institutional Setting

A.1 Polling Stations and Electoral Precincts

French voters are assigned to Election Day polling locations based on the precinct they live in. Precincts represent the basic geographic unit for administering elections: they partition municipalities and constitute the building blocks of every geographic aggregation used for election purposes. However, these geographies have only organizational purposes, and do not correspond to any other decision making perimeter. All aspects of the organization of vote are governed by the *Code électoral*.

Being an administrative procedure, the prefect is in charge of defining the boundaries of electoral precinct and the location of the polling place for all municipalities in the department. The number of polling locations may vary according to the number of voters and specific circumstances of each municipality. The law established that in general, each polling location should not correspond to more than 800 to 1 000 voters. The location of the polling station typically correspond to a local town-hall, schools, or any other large building deemed appropriate by the prefect. Prefects are nonpartisan and non-elected officials, allocated to departments by the central administration. They have no direct, electoral incentive to manipulate precinct maps. Moreover, because precinct boundaries only define how the act of voting is administered, it seems hard to believe that there would be any interest at all in any manipulation. Reprecincting may typically occur to account for changes in precinct voting population, or for exogenous reasons such as closure or renovation of a building that functions as polling site.

Registration to electoral lists is compulsory and exclusionary. All citizens having the right to vote are automatically inscribed to the electoral registry of some polling station, and no-one can be registered in multiple ones.

All expenses coming from the organization of elections is paid by the State.

Table A1: Summary Statistics for Polling Stations

	Whole Sample			Paris		
	Mean	Median	SD	Mean	Median	SD
Number of Cells	53.21	22.08	81.86	10.55	7	15.64
Population	1845	1712	954.14	2588	2440	974.20
Density (population per cell)	131	86	124.06	336.66	344.85	137.39

A.2 Merging Immigration Data and Electoral Precinct

I attribute Immigration data from the JRC dataset to each electoral precinct in the available municipalities by performing a spatial merge. The JRC dataset provides a grid of cells of 100m×100m, and the geographic coordinates of each centroid expressed in WGS84. The data on the electoral precincts come in the form of a Shapefile. The merging procedure is composed of the following steps:

1. I project both the grid centroids and the precinct boundaries on the same geographic reference system for France (EPSG:2154), with accuracy at 1.0m.[9]

2. I overlay the two spatial objects (spatial points and polygons respectively) and assign to each precinct (polygon) the attributes of the grid centroids (point).

3. I aggregate the data at the level of the electoral precinct.

The average number of grid cells for each electoral precinct is 34.7, the median is 18. Only 12 electoral precincts (out of 5 230) include only one grid cell. The average number of residents for each electoral precinct is 1 845, the median is 1 712. Because electoral precincts are designed to include similar amount of voters, it is not surprising to observe that the median and the mean of the distribution of the resident population are very closed to each other.

[9]Consult https://epsg.io/2154 for more information.

Table A2: Summary Statistics for Grid Cells

	Whole Sample			Paris		
	Mean	Median	SD	Mean	Median	SD
Population	53.21	22.08	81.86	245.24	249.38	183.70
French citizens	47.66	20.43	71.03	209.02	212.68	156.38
Non EU	4.30	0.89	10.02	26.18	21.35	25.84

B Descriptive Statistics

B.1 Aggregate Analysis

I report here some descriptive statistics of the main variables used in the analysis. Figure A1 displays the distribution and the pairwise correlations of Immigration, Population size, and Segregation in the 2011 cross-section of municipalities, for which I can also calculate segregation. Figure A2 reports the same sample after excluding outliers along the segregation dimension. Estimates in Figure 3 and Table A4 are calculated on this sample.

B.2 Disaggregated Analysis

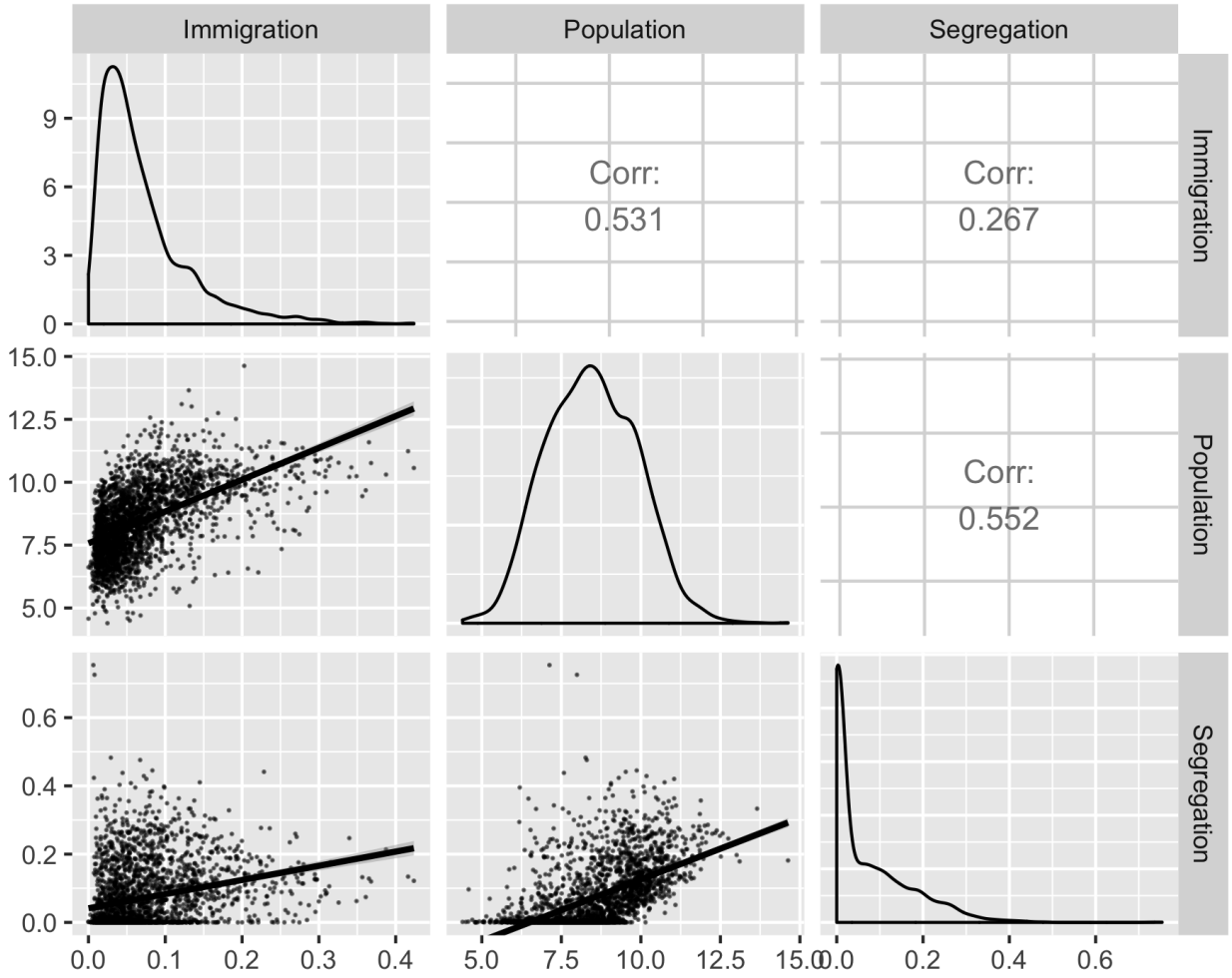
B.2.1 The Grid

The JRC dataset provides a grid of cells of 100m×100m. Each grid cell in my retained sample (i.e. resulting from merging the grid with the available polling station geographies) contains an average 53 residents, and the median is 22.

B.2.2 Distribution of Immigrant Groups

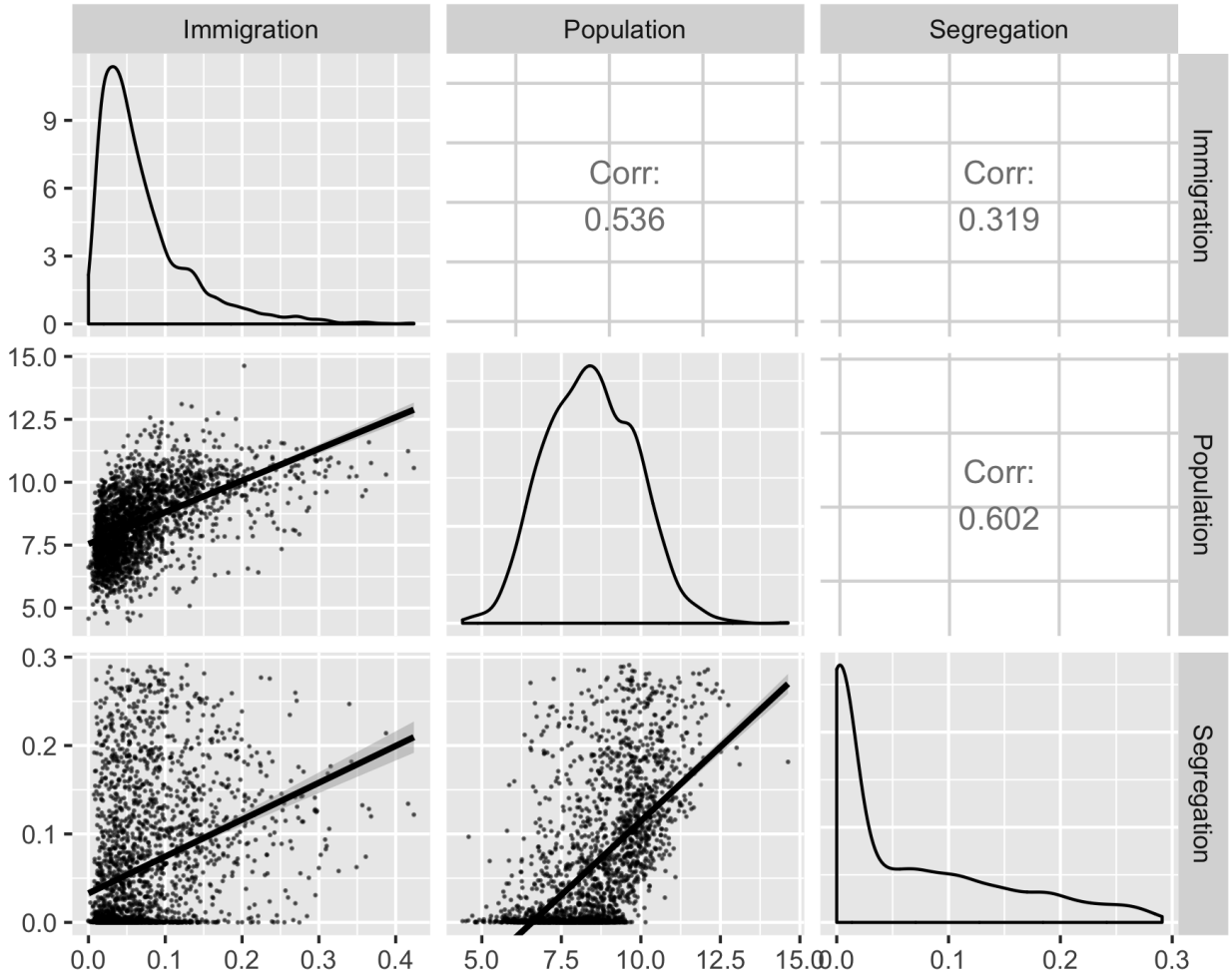
Figure A3 reports the distribution and the pairwise correlations across different immigrant groups, and with the natives. Table A3 displays the correlations between the share of immigrants from specific continents in a given electoral precinct, with the share of those immigrants in social housing in the same precinct.

Figure A1: Correlation between main variables



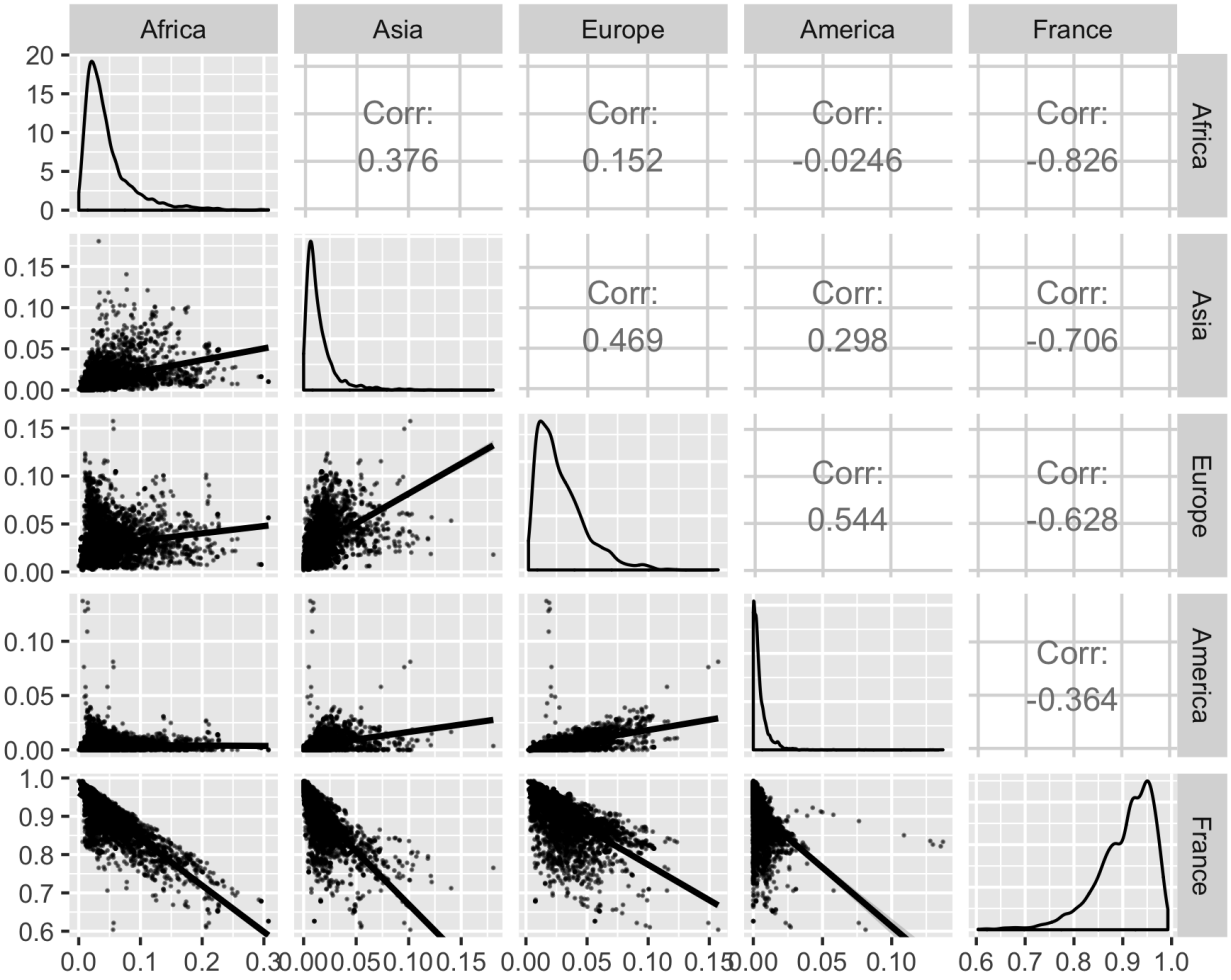
Note: The table reports the correlations between Immigration (share of immigrants over total population in 2011), Population (logarithm of population in 2011) and Segregation (Multigroup Dissimilarity Index in 2011) for French municipalities. The sample is composed of 2 510 municipalities.

Figure A2: Correlation between main variables - No Outliers



Note: The table reports the correlations between Immigration (share of immigrants over total population in 2011), Population (logarithm of population in 2011) and Segregation (Multigroup Dissimilarity Index in 2011) for French municipalities. The sample is composed of 2 439 municipalities, after excluding outliers on the segregation dimension.

Figure A3: Correlation between Immigrant Groups



Note: The table reports the correlations between the share of immigrants over total population in electoral precincts in 2011, for different continents of origin, and the share of French natives over total population. Oceania is not included because the number of immigrants originating from it is negligible, and never used in the disaggregated analysis performed here.

C Additional Evidence

In Figure A4, I report the same correlation as in Figure 1, after controlling for region fixed effects. In this case, both graphs report the distance between the real and the predicted vote share for the FN. In Panel A, the dark lines indicate the residuals for the top percentile of the population distribution. Panel B reports only the residuals for those observation that

Table A3: Correlations with Immigrants in Social Housing

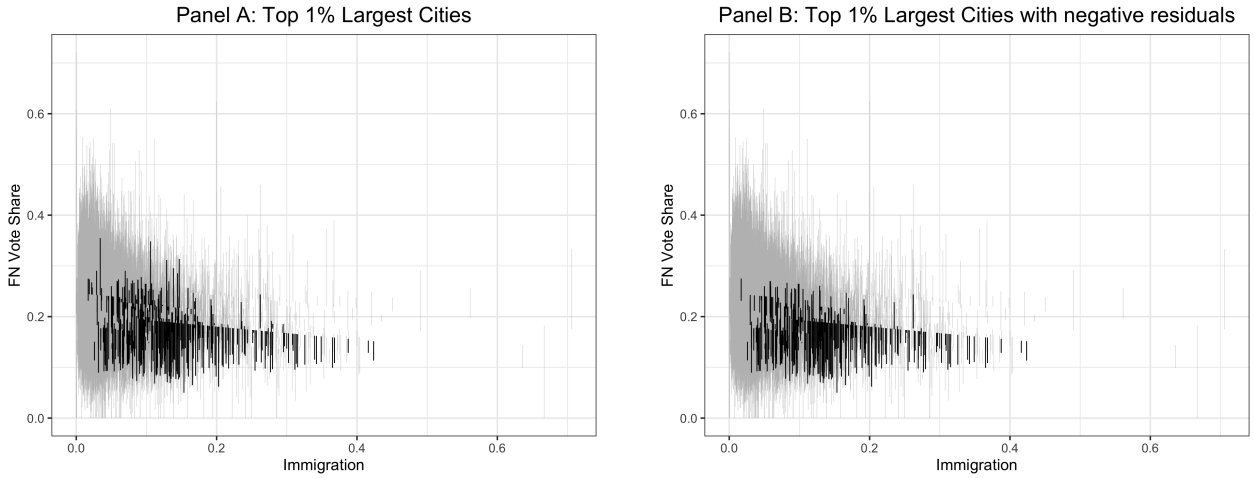
	Africa	Asia	Europe	America	Africa/SH	Asia/SH	Europe/SH	America/SH
Africa	1							
Asia	0.376	1						
Europe	0.152	0.469	1					
America	-0.025	0.298	0.544	1				
Africa/SH	**0.592**	0.157	0.061	-0.084	1			
Asia/SH	0.34	**0.422**	0.132	-0.074	0.671	1		
Europe/SH	0.272	0.128	**0.265**	-0.027	0.644	0.648	1	
America/SH	0.182	0.063	0.138	**0.182**	0.47	0.439	0.698	1

Notes. Each entry shows the pairwise correlation of the variables on the two axis, at the electoral precinct level. *Africa*, *Asia*, *Europe* and *America* indicate the share of immigrants from this continent of origin over total population; *SH* indicates those immigrants living in (or close to) social housing buildings as a share of total population.

belong to the top percentile and whose predicted FN vote share is higher than the realized one. The two panels are very similar, suggesting that, even after controlling for region fixed effects, largest municipalities appear to behave differently.

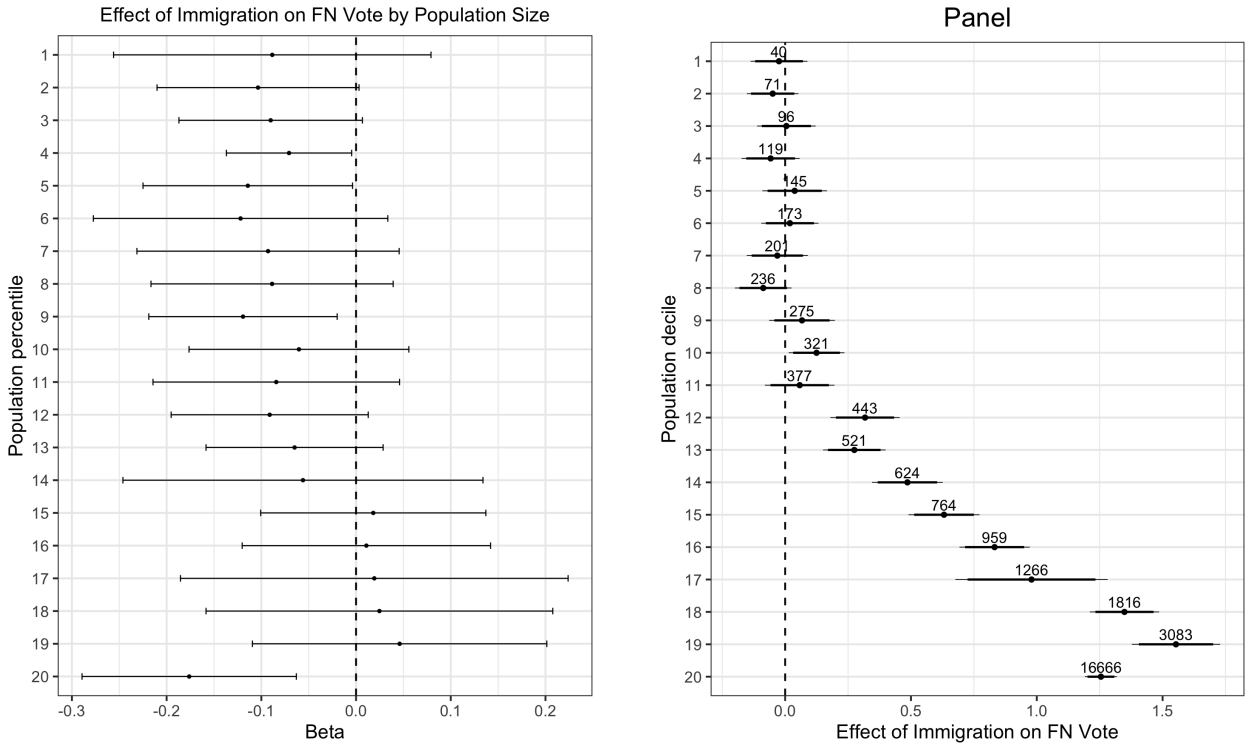
Figure A5 reports the same analysis as in Figure 2, for population percentiles calculates on 5 percentage point intervals.

Figure A4: Real and Predicted Vote for FN, controlling for Region FE



Note: Panel A and B report the result of a univariate regression model at the municipality level, where FN vote share in 2012 is regressed on the share of immigrants over total population in 2011. Vertical lines are residuals. The black lines represent the the top 1% largest French cities in Panel A, the subset of those with negative residuals in Panel B.

Figure A5: Effect of Immigration on FN Vote by Town Size



Note: Panel A and B report the effect of immigration on voting per population deciles, respectively estimated as in equation 1 and 2. Each point estimate the the linear combination of the coefficient of Immigration and the coefficient of the corresponding interaction terms. The average municipality size per each percentile is next to the point representing the coefficient. Horizontal lines represent the 95% confidence intervals.

D Regression Tables

Table A4: FN vote, Immigration and Segregation

	Cross-section	Panel	
FN Vote	(1)	(2)	(3)
Immigration	-0.028	2.850***	0.617***
	(0.059)	(0.651)	(0.045)
Big	-0.202***		
	(0.051)		
Segregation	-0.094***		
	(0.026)		
Immigration × Big	0.779***		
	(0.1754)		
Immigration × Segregation	-0.128	-9.495***	0.357
	(0.321)	(3.521)	(0.303)
Big × Segregation	0.782***		
	(0.193)		
Immigration × Big × Segregation	-4.018***		
	(1.231)		
Sample	Full	Big	Small
Region FE	Yes		
Municipality FE		Yes	Yes
Clustered SE	Reg	Mun	Mun
Observations	2 439	75	7 242
R^2	0.471	0.214	0.094

Notes. Each column shows the regression of FN vote share on the share of immigrants over total population and its interaction with segregation at the municipality level. The regression is a cross-section of municipalities as in equation 3 in column 1; it is a panel of municipalities as in equation 4 in columns 2-3. *Big* is a dummy variable equal to 1 if the municipality has more than 100 000 inhabitants. Column 1 includes region fixed effects, columns 2-3 include municipality and year fixed effects. Standard errors are clustered at the region or municipality level. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table A5: Cross-section Analysis

	25pp intervals		10pp intervals		5pp intervals	
	β	Marginal	β	Marginal	β	Marginal
M	-0.10	-0.10	-0.10	-0.10	-0.09	-0.09
	0.05	0.05	0.07	0.07	0.09	0.09
M × P2	0.01	-0.10	0.02	-0.08	-0.02	-0.10
	0.08	0.06	0.08	0.04	0.10	0.05
M × P3	0.04	-0.06	-0.02	-0.12	-0.00	-0.09
	0.08	0.06	0.10	0.06	0.10	0.05
M × P4	-0.05	-0.15	0.01	-0.09	0.02	-0.07
	0.09	0.07	0.10	0.06	0.09	0.03
M × P5			0.01	-0.09	-0.03	-0.11
			0.09	0.05	0.10	0.06
M × P6			0.01	-0.09	-0.03	-0.12
			0.09	0.05	0.12	0.08
M × P7			0.04	-0.06	-0.00	-0.09
			0.10	0.07	0.11	0.07
M × P8			0.11	0.01	-0.00	-0.09
			0.10	0.06	0.11	0.07
M × P9			0.11	0.02	-0.03	-0.12
			0.12	0.10	0.10	0.05
M × P10			-0.07	-0.17	0.03	-0.06
			0.10	0.07	0.10	0.06
M × P11					0.00	-0.08
					0.11	0.07
M × P12					-0.00	-0.09
					0.10	0.05
M × P13					0.02	-0.06
					0.10	0.05
M × P14					0.03	-0.06
					0.13	0.10
M × P15					0.11	0.02
					0.11	0.06
M × P16					0.10	0.01
					0.11	0.07
M × P17					0.11	0.02
					0.14	0.10
M × P18					0.11	0.02
					0.13	0.09
M × P19					0.13	0.05
					0.12	0.08
M × P20					-0.09	-0.18
					0.10	0.06
Observations	36 541		36 541		36 541	
R^2	0.258		0.265		0.269	

Notes. Each column shows the regression of FN vote share in municipality m in 2012 on immigration in 2011, and its interaction with population percentiles. β is the regression coefficient, and $Marginal$ is the marginal effect of Immigration for the given population decile. The population groups are calculated for every 25th percentile in columns 1-2, every 10th percentile in columns 3-4, and every 5th percentile in columns 5-6. All specifications include Region and Percentile fixed effects. Standard errors are clustered at the Region × Decile level.

Table A6: Analysis by Immigrant Group

FN Vote	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Africa	0.293***				0.356***		
	(0.114)				(0.130)		
Asia		0.030				-0.090	
		(0.159)				(0.152)	
America			-0.607				-0.781
			(0.739)				(0.506)
Europe				-0.422**			
				(0.209)			
Non-French	Yes	Yes	Yes	Yes			
Non-EU					Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered SE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5 278	5 278	5 278	5 278	5 278	5 278	5 278
R^2	0.697	0.640	0.651	0.656	0.653	0.644	0.654

Notes. Each column shows the regression of FN vote share in 2012 on the share of immigrants over total population at the polling station level in 2011. Immigrants are defined as people born in Africa in columns 1 and 5; in Asia in columns 2 and 6; in America in columns 3 and 7; in Europe in column 4. Columns 1-4 include a control for the total share of non-French born; columns 5-7 include a control for the total share of non-EU born. All specifications include (log) income and municipality fixed effects (*Arrondissements* for Paris, Marseille and Lyon). Standard errors are clustered at the municipality level. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table A7: Specific Effect of African Migration

	(1)	(2)	(3)	(4)	(5)
	FN Vote	FN Vote	FN Vote	FN Vote	FN Vote
Africa	0.143***	1.671***	0.257***	0.215***	0.217***
	(0.024)	(0.056)	(0.024)	(0.021)	(0.069)
Non-EU		−1.304***			
		(0.044)			
Asia			−0.778***	−0.010	−0.010
			(0.069)	(0.059)	(0.134)
America			−2.706***	−0.753***	-0.753*
			(0.158)	(0.119)	(0.442)
Oceania			−4.903*	−4.812**	-4.812*
			(2.733)	(1.946)	(2.528)
EU27			−0.494***	−0.587***	-0.587**
			(0.067)	(0.065)	(0.236)
Municipality FE				Yes	Yes
Clustered SE					Yes
Observations	5,229	5,229	5,229	5,229	5,229
R^2	0.007	0.149	0.199	0.662	0.662

Notes. Each column shows the regression of FN vote share in 2012 on the share of African immigrants over total population at the polling station level in 2011. Controls include the share of non-European immigrants in column 2, and the split over continent of origin in columns 3 to 5. Columns 4-5 include municipality fixed effect (*Arrondissements* for Paris, Marseille and Lyon). In column 5, standard errors are clustered at the municipality level. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table A8: Effect of Priming Welfare Competition

	(1)	(2)	(3)	(4)	(5)	(6)
	All	Non-EU	Africa	Asia	EU	America
Imm in Sh	0.175***	0.155*	0.067	1.232***	0.836***	-0.665
	(0.066)	(0.080)	(0.107)	(0.351)	(0.262)	(1.268)
Imm	0.016	0.076	0.203***	-0.110	-0.863***	-1.244*
	(0.049)	(0.051)	(0.071)	(0.128)	(0.208)	(0.665)
Sh	0.007*	0.007*	0.007*	0.008**	0.008*	0.008*
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes
Clustered SE	Yes	Yes	Yes	Yes	Yes	Yes
Obs	5 229	5 229	5 229	5 229	5 229	5 229
R^2	0.643	0.645	0.649	0.644	0.648	0.653

Notes. Each column shows the regression of FN vote share in 2012 on the share of immigrants in social housing over total population at the polling station level in 2011. Immigrants are defined as non-French born in column 1, non-Europeans in column 2, African born in column 3, Asian born in column 4, European born in column 5 and American born in column 6. All regressions include controls for the share of immigrants, the number of social housing buildings and municipality fixed effect (*Arrondissements* for Paris, Marseille and Lyon). Standard errors are clustered at the municipality level. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Banlieue at the Ballot Box: A Natural Experiment on Immigration and Political Outcomes*

Gloria Gennaro†

Abstract

Most immigrants in Western Europe live in large metropolitan suburbs. Natives in the same suburbs are the privileged target of far right-wing politicians. Still, very little is known about the politics of those highly relevant places. This study is the first to address this question directly: how does immigration shape voting in large metropolitan suburbs? The answer is far from obvious, because metropolitan suburbs are located between the cosmopolitan city centers and the nationalist countryside. I exploit a natural experiment across French metropolitan suburbs, consisting of a legal population-based discontinuity in the provision of public housing. I show that municipalities that increased their supply of public housing over the period 2000-2015 also experienced an increase in the share of immigrants over natives, resulting in different voting patterns in the 2017 presidential election. The policy-induced shock on preexisting migration chains allows to isolate the effect of immigration on voting, whilst controlling for the direct effects of public housing and past immigration. Immigration causes an increase in the vote share for far right parties. The evidence suggests a role for perceived (but not realized) competition over welfare benefits to be the driving force behind the results.

Keywords: immigration, voting behaviour, right-wing, public housing, racial threat

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Migration is a raising phenomenon on the global scale and a salient political issue in many Western democracies. One of the most divisive debates over immigration policy revolves around the residential concentration of immigrants in specific metropolitan neighborhoods. In Western Europe, large part of the immigrant population lives in enclaves in peripheral urban and suburban neighborhoods (Musterd, 2005). More generally, enclaves within large metropolitan areas seem to be the modal way in which immigrants reside in "global cities" (Castles et al., 2013). Throughout Europe, right-wing parties draw public attention on suburbs that host a large number of migrants as a vehicle to mobilize voters against immigration. Their campaigns typically emphasize the alleged role of immigrants in worsening the living standards of natives in those communities, appropriating an excessive share of welfare benefits, and posing a symbolic threat to the Western way of life.[1] Nonetheless, the presence of migrants in metropolitan suburbs is likely to keep increasing in the future as a consequence of the steady rise of global migration. The International Migration Report (UN, 2017) estimates that international migrants already account for the 14.4% of population in Western Europe.

Do European metropolitan suburbs experience an anti-immigration backlash? Do people living in those places react to immigration by voting against it? If so, under what conditions? The answer to these questions in far from obvious. A large body of literature examines the political consequences of immigration, generally comparing electoral results across municipalities with high and low immigration inflows, and finds that natives oppose immigration by voting for parties with clear anti-immigration platforms (Hainmueller and Hopkins, 2014).[2] However, this approach tells very little about what are the specific dynamics that invest metropolitan suburbs. An increasing number of studies call for a better understanding the geography of immigration discontent, generally framed around a renewed urban-rural divide (Lipset and Rokkan, 1967). The new cleavage would form around attitudes towards immigration, separating Cosmopolitans living in cities from Nationalists living in rural areas

[1] See, for example, "Banlieues: Marine Le Pen prône la "priorité nationale" pour l'accès au logement", *Le Nouvel Observateur*, May 23, 2018. Fabrizio Gatti, "La Lega conquista le periferie abbandonate dalla politica", L'Espresso, March 22, 2018.

[2] Some disagreement remains in this respect. Specifically, Steinmayr (2016) and Vertier and Viskanic (2018) find that the relocation of refugees in Austria and France, respectively, dampens the electoral success of extreme right-wing countries.

(Maxwell, 2019). Even though animated by a similar intent, the analysis of this dichotomy provides, again, little guidance for understanding how immigration influences voting in places where diversity is the highest.

Studying the suburbs is not only important under a political geography perspective. It can also shed light on the scope conditions under which important theories of immigration discontent apply. In most Western European regions, metropolitan suburbs are characterized by high population density and high diversity.[3] These places are also frequent targets of spatially defined welfare programs, where residents compete to obtain a share of finite benefits. All these features shape the frequency, quality and nature of the interactions between immigrants and natives.

This paper aims at two main goals: refining our understanding of the geography of immigration discontent and qualifying a set of sufficient conditions for hostility to emerge. To this purpose, I exploit a policy change in the supply of public housing across French metropolitan suburbs, and study the impact of policy-induced immigration on the electoral success of anti-immigration parties in the 2017 presidential race. In 1999, the French parliament passed the "Urban Solidarity and Renewal" bill (hereinafter SRU) with the intent of increasing the supply of public housing at subsidized rent in large urban areas. The law establishes a minimal amount of public housing for those municipalities that belong to a large metropolitan area and count at least 3 500 inhabitants (1 500 in Ile de France). Municipalities subject to this obligation must provide 20% of total housing under public housing conditions. I focus on the group of municipalities that, belonging to a metropolitan area, lay slightly above or below the population threshold set by the policy. Those municipalities precisely qualify as metropolitan suburbs.

Welfare policies have long been investigated as a possible pull factor for immigration (Borjas, 1999). In France, public housing assignment is based on households' income and composition. The process is blind to ethnic characteristics and citizenship status, and requests from all legal residents are processed in the same pool with no evidence of discrimination (Algan et al., 2016). Immigrant households are more likely to requested and obtain public

[3]Exceptions to this patter are some Northern European cities, that are typically more dispersed (Kasanko et al., 2006).

housing as they more frequently meet the assignment criteria (Verdugo, 2015; Domergue and Jourdan, 2017). On top of that, immigrants' location choices are also shaped by the preexisting geographic distribution of immigrants. In particular, new immigrants tend to move to locations where past immigration has already occurred, generating the so-called migration chains (MacDonald and MacDonald, 1964). The results from these lines of research suggest that welfare provision and migration chains may reinforce each-other's role as a pull factor for new immigration. In areas with a sufficiently large immigrant community, new public housing could act as an amplifier of preexisting migration chains.

Leveraging on those characteristics, I propose a novel research design that exploits the exogenous shock to migration chains provided by the increased supply of public housing. More specifically, I show that public housing does indeed magnify the effect of preexisting migration chains. For two initially identical municipalities, the one subject to the housing policy experiences stronger immigration, and more so the larger the initial share of immigrants. Because of the combined contribution of migration chains and affordable housing in raising recent immigration, I can isolate their joint effect from their direct effects on voting. In concrete terms, I estimate the effect of immigration in 2015 on vote for anti-immigration parties in 2017, and instrument immigration with the interaction between the historical stock of immigrants and a dummy equal to one for municipalities assigned to the policy. The model includes linear controls for the the historical stock of immigrants and for the assignment to the housing policy. This is a key element: both public housing and past immigration are likely to influence voting through many different channels beyond immigration, thus excluding them would violate the exclusion restriction in the IV estimation.

This research design has at least three advantages compared to previous work. First, it directly addresses the question of immigration and voting in metropolitan suburbs. By comparing suburbs with high and low immigrant inflows, I can look into the dynamics taking place in this highly relevant setting and surpass the dichotomy opposing the cosmopolitan center to the nationalist countryside. Second, building on well known concepts in the migration literature, I provide a clean identification that only exploits the exogenous policy-driven shift in migration chains.[4] Whereas their use normally requires assuming that past immi-

[4]The silence around the politics of suburbs may be motivated by important methodological challenges,

gration does not directly influence electoral outcomes, in this design I can control for past immigration and rely only on its additional joint effect when interacted with more public housing. Third, focusing on immigration generated by public housing allows to evaluate the specific contribution of competition for welfare benefits in generating an anti-immigration backlash. My design isolates the impact of immigrants who move to a municipality because of easier access to public housing. The French National Institute of Statistics (hereinafter Insee) estimates that in 2016 one every two immigrants from Sub-Saharan Africa lives in public housing, and around one every three of people from Turkey (39%) and Northern Africa (38%), against 14% for natives. Hence, results must be interpreted as stemming from this type of immigration, combined with an increase in the supply of public housing.

I find evidence of a political backlash against immigration in metropolitan suburbs. Places with larger historical shares of immigrants that are subject to the policy experience a stronger immigration shock. The policy-induced immigration in those communities generates a roughly equivalent increase in the vote share for the National Front, i.e. the party with the most salient anti-immigration stances. Losses are distributed across all other parties, with center-right-wing parties being the most affected. Interestingly, natives do not lose out in the competition against immigrants for the newly available public housing. Analysing the pending and satisfied applications for public housing by immigrants and natives, I find no evidence of a material disadvantage that would justify natives' discontent. Even though natives are equally likely to obtain public housing in places with more or less immigrants, it is only in the former that hostility manifests as an anti-immigration backlash.

These findings add support to the famous racial threat theory (Blumer, 1958; Blalock, 1967), that posits that a sudden increase in the size of the minority group can generate hostility in the majority group. Hostility emerges because the change in size generates a stronger perception of threat to the current allocation of material and symbolic resources (King and Wheelock, 2007). My results suggest that this mechanism can govern the relations between immigrants and natives, even in contexts where the two groups have a longer history

that become more severe in highly urbanized environments. First, immigrants are not randomly allocated across space. The choice of where to reside is subject to different considerations that are likely to confound any estimate of the impact of immigration on voting. Secondly, sub-units in urban contexts (e.g. neighborhoods, blocks) are highly heterogeneous in their immigration and voting patters. The risks of omitted variables and ecological inference are both amplified by the tight urban structure of the European metropolitan periphery.

of cohabitation, and absent any real threat to the distribution of material resources across groups. As new housing is made available, redistribution needs to be solved and rivalry between groups revamps. Inter-group hostility seems to emerge where a sufficiently large increase in the size of the minority group coincides with the allocation of welfare benefits. In those places, immigration becomes a politicized issue making group-boundaries more salient (Hopkins, 2010), and public housing offers an ideal terrain where immigrants and natives may compete for the allocation of finite, in-kind welfare benefits (Dancygier, 2010). When these conditions are met, individuals may perceive the redistribution problem as defined along group-boundary lines. Even if real competition over housing does not vary, natives systematically overestimate the amount of welfare spending in favour of immigrants (Alesina et al., 2019).

This study contributes to several bodies of literature. First and foremost, my results suggest that metropolitan suburbs make no exception to the accumulating evidence on how extreme right-wing parties enjoy an electoral premium when immigration increases. To the extent that it is still unclear whether voters in large and small towns respond differently to immigration (see for instance Hainmueller and Hangartner, 2013; Dustmann et al., 2016; Maxwell, 2019, for opposed findings on this matter), my results suggest that the geographic divide between urban and rural areas may be better understood as a divide between city centers and the rest. This has important implications for the research that studies the emergence of European right-wing parties, whose leaders have become increasingly vocal on immigration in recent years (Kriesi et al., 2012; Alonso and Fonseca, 2012; Mudde, 2013; Dancygier and Margalit, 2019; de Vries and Hobolt, 2020, e.g.).

Second, my analysis contributes to long-standing debates about the electoral effects of immigration (Hainmueller and Hopkins, 2014; Dancygier and Laitin, 2014). In particular, it talks to studies that look at dynamics taking place within, rather than across, large agglomerations (Halla et al., 2017). In this sense, my findings resonate with the literature on the racial threat hypothesis, whose result appear to be very consistent across context (Brader et al., 2008; Enos, 2016; Adida et al., 2016), and only marginally driven by labour market competition (Dancygier and Donnelly, 2012; Hainmueller et al., 2015). Within this vast literature, this paper clearly relates to works that highlight the role of competition for welfare

resources in generating discontent. It is still unclear whether people take into account the redistribution effects of welfare programs when forming attitudes towards immigration (e.g. see Hanson et al., 2007; Mayda, 2006; Facchini and Mayda, 2009; Hainmueller and Hiscox, 2010; Card et al., 2012). Cavaille and Ferwerda (2018) show that introducing competition for public housing between immigrants and natives increases the support for anti-immigration parties in Austria. They suggest that natives perceive a zero-sum relationship between their disposable income and that of immigrants. Read through this lens, my results indicate that natives indulge with zero-sum reasoning even when competition for housing does not change, but the total pie gets bigger.[5]

Third, my paper strongly relates to studies that attempt to identify a causal effect of immigration on voting (Hainmueller and Hopkins, 2014; Jaeger et al., 2018). In recent years, the refugee crises has provided for a source of exogenous variation in the location of migrants, either in the form of sudden inflows of people through European borders (Dinas et al., 2018) or in the quasi-random relocation of migrants across municipalities (Dustmann et al., 2016; Bratti et al., 2017; Vertier and Viskanic, 2018; Baldassarri et al., 2019). These works convincingly identify the effect of first exposure to international refugees on voting. However, it is unclear how their results can be generalized to larger migration, given that refugees differ in intrinsic features and legal status (Dustmann et al., 2017a).

Finally, this paper adds new empirical evidence to the large literature on housing and its effects on societal outcomes, such as social capital (Glaeser et al., 2002) and political participation (Glaeser and Sacerdote, 2000). Algan et al. (2016) exploit French public housing as a mechanism through which people are randomly exposed to ethnic diversity, to study the effects of diversity on social anomie. My results are broadly consistent with this take, and contribute to raise the attention on hidden side effects of one of the most widespread urban policies.

[5]This result is also compatible with failed expectations. Whilst natives may expect the policy to reduce competition on public housing, the relocation of immigrants to areas with more public housing leaves the initial level of competition unchanged. Unmet expectations of improvement may activate heightened perceptions of group competition over welfare benefits.

1 Public Housing in the Banlieue

Before I turn to the empirical analysis, it is helpful to explore the details of the public housing policy, and to put it in the context of the French banlieue.

1.1 The Public Housing Policy

In March 1999, the French minister for Transportation and Housing Jean-Claude Gayssot announces the beginning of a national debate on sustainable housing and transportation in French cities.[6] In this action, he was supported by a center-left coalition government led by Lionel Josepin that included all major leftist political groups, ranging from the Socialists to the Communists and Green Party. This initiative also enjoyed the favour of the President of the French Republic Jaques Chirac despite his different ideological orientation. The debate gave birth to the most important bill on public housing ever enacted in France, the law for "Solidarité et Renouvellement Urbain" (L.2000-1208), adopted in 2000 and first applied in 2002.

The new housing policy tries to respond to two major issues emerged in the debate, namely the low levels of social diversity and the progressive gentrification of urban areas. With the intent of granting access to affordable housing also in major cities, the law explicitly targets those municipalities that belong to major metropolitan agglomerations, and imposes the minimum target of 20% of public housing over total residential buildings to be reached by 2020. Hence, the policy only applies to municipalities that belong to a large agglomeration, and in particular to those that count at least 3 500 inhabitants (1 500 in Ile-de-France).[7]

The policy implementation passes through the establishment of 3-year plans of action. At the beginning of each programming period, the *Ministère de la Cohésion des territoires* sets the objectives over the next one, and assesses past performance. Those objectives typically

[6] See, for example, Matthieu Écoiffier, "Gayssot lance un grand débat sur l'urbanisme: 85% des gens vivent en ville, il faut retrouver une harmonie", *Libération*, March 19, 1999. Robert Belleret "Un état des lieux négatif mais des pistes d'espoir", Le Monde, June 23, 1999.

[7] Population refers to 1999 for the first programming period. The policy applies to agglomerations with more than 50 000 inhabitants and including a city with at least 15 000 inhabitants. Insee defines agglomerations, as "a municipality or a group of municipalities which includes a continuously built up zone (no cut of more than 200 meters between two constructions) and at least 2 000 inhabitants." Insee website, accessed on November 2, 2018. Municipalities are exempted if they comply with the target, are in demographic decline or under environmental constraints.

include a minimum number of public housing projects to be financed or delivered over the period, and the share of those projects that shall be dedicated to very low to middle income users.[8] Those intermediate steps are meant to create a path of convergence towards the policy target. An important reform in 2013 increased the initial target from 20% to 25% to be reached by 2025.[9]

All municipalities subject to a convergence plan have to comply with an yearly mandatory contribution to a common fund for housing. This contribution is proportional to the distance from the target, but is reduced by the amount that is spent on local public housing projects. Once the target is attained the municipality is relieved of any obligation. More importantly, municipalities that do not comply with the set target at the end of the programming period can be subject to important fines and the possibility for the prefect to proceed with the plan without the approval of the municipal council. All these aspects make compliance to the policy to be more likely.

The policy has a number of important features for my research design. First, it explicitly targets municipalities that belong to large metropolitan areas. Second, within each agglomeration, the population threshold selects among small municipalities, i.e. precisely those that are often qualified as suburbs of large cities. Third, public housing is a specific welfare provision that is proportionally more used by immigrant households. Fourth, public housing in France is equally used by poor to middle-income households and, hence, more housing does not necessarily entail a drastic change to the local income distribution. Finally, the policy assignment mechanism remains exogenous and unchanged between 2000 and 2017, creating a sufficiently large window for studying the effects of a policy whose implementation requires time.

Figure 1 shows an example of the application of the SRU law in Ile-de-France. The agglomerations of Paris and Meaux are indicated in colors; the darker areas indicate munic-

[8] There are four different types of public housing, for different revenue ceilings. For a single person, those ceilings range from €11 342 (€13 050 in Ile de France) to €28 049 (€38 236). The SRU law requires that at minimum 30% of new public housing is dedicated to the lowest income bracket and a maximum of 30% to the highest one.

[9] After 2017, the "Égalité et Citoyenneté" law revised the public housing target. In particular, it exempts municipalities with weak local demand for public housing from the 25% target. Also, it extends the 20% target to municipalities with strong demand for public housing. Hence, the policy application is no longer exogenous to local characteristics.

ipalities subject to the SRU law in 2002.

1.2 Immigration in the Banlieue

Immigration to France features some specific traits that contribute to making it particularly sensitive to the offering of welfare policies.[10] The numbers of immigration to France are similar to those of other European countries. In 2015, first generation immigrants were 2.4 millions, i.e. the 9.3% of the total resident population. In parallel to the global rise in migration, this share has been increasing over the last decades.[11] More peculiar to the French case is the country of origin composition of the pool of migrants. 44.6% of the migrants in France in 2015 were born in Africa, with Algeria and Morocco accounting for more than the 12% each. This stable feature has produced over time a large population of migrant descendants, estimated at 12% of residents aged between 18 and 50 in 2008. Within this pool, descendants of African immigrants are relatively young and mainly issued from Algeria, Morocco and Tunisia. As a result, France hosts today the largest community of African immigrants, and specifically first generation migrants, in Europe.

The nature of this migration has changed drastically over time, with important consequences on the demographics of this phenomenon. Since the middle of the 1970s, immigration changed from being strongly characterised by young men looking for jobs in the manufacturing sector, to become a tool for family reunification. As a result, the share of women in the pool of immigrants steadily increases and reaches the 51% in 2015 (from the 44% in 1968).

Families issued form the African migration tend to live in large agglomerations, and in particular in the agglomeration of Paris. This reproduces the historical distribution of African immigrants across the French territory, as new immigrants tend to locate in areas where similar migration has occurred. A large share of those immigrants, once they obtain a residence permit, find an accommodation under public housing conditions. The share of immigrants living in public housing amounts to the 31% of the total in 2016, against 14% of

[10] The figures presented in this section come from the Insee publications. Namely, Pauline Delance, "11 millions de personnes sont locataires d'un logement social", October 24, 2018, Insee Première No 1715; "Immigrés, étrangers", December 12, 2018, Chiffres-Clés; Catherine Borrel and Bertrand Lhommeau "Être né en France d'un parent immigré", March 30, 2010, Insee Première No 1287.

[11] The share of immigrants over total population was 7.4% in 1975 and 5% in 1946.

French natives. The offer of public housing in France is particularly developed and largely concentrated in metropolitan areas.[12]

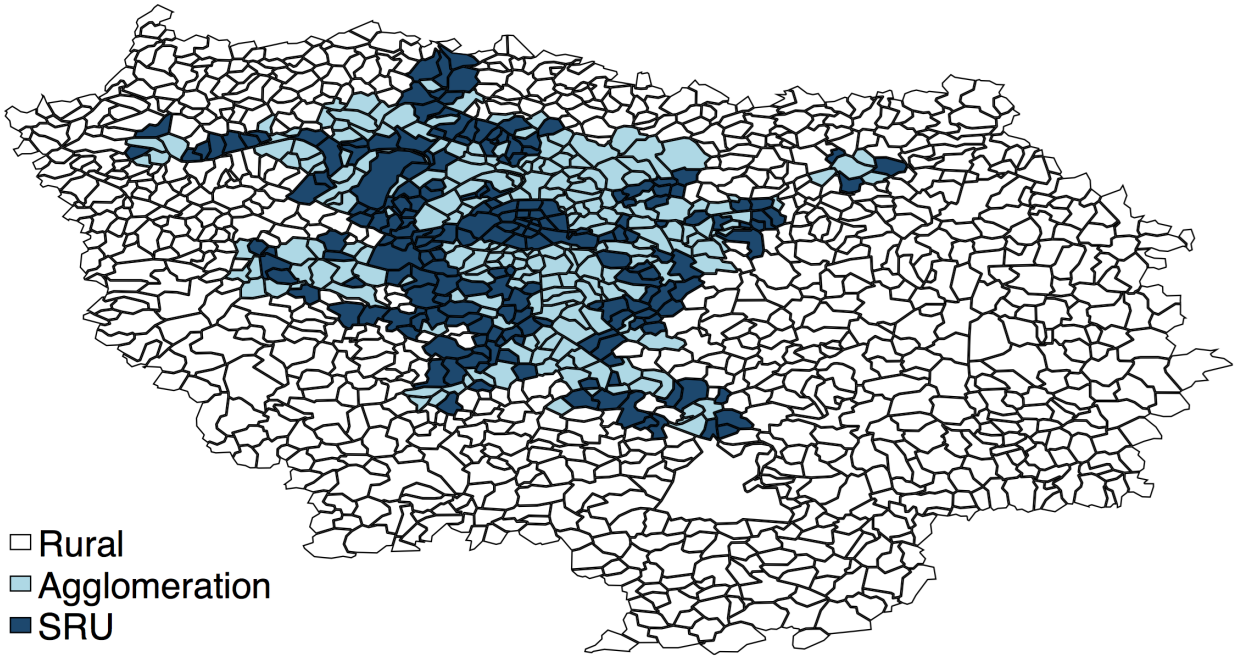

Figure 1: Ile de France and the Agglomeration of Paris

2 Empirical Strategy

This article aims at understanding the causal effect of immigration on political outcomes in French metropolitan suburbs. In order to do so, I exploit a natural experiment that elicits some exogenous variation in the immigration flows experienced by different municipalities. I restrict the sample to municipalities around the policy application threshold and exploit the quasi-random variation in the policy assignment to elicit an exogenous shock to local migration chains. All the analysis in this paper are performed on the same set of municipalities. In the Online Appendix, I show robustness to different bandwidths and, hence, different samples.

[12]Public housing in France represents the 16% of total housing in 2015. The offer of public housing is larger in large metropolitan areas, where 57% of total housing is located in 2016.

Figure 2: Sample in Ile de France

2.1 Sample

As described in section 1.1, the housing policy targets municipalities in large metropolitan areas that meet specific population thresholds. To ensure balance, I include in the sample only municipalities that belong to a large agglomeration, whose population is slightly above or below to the legal population threshold set by the policy. The main bandwidth used in this analysis is set at ±900 inhabitants around the 3 500 (1 500 in Ile de France) legal population threshold above which the policy applies.[13] City centers are automatically excluded from this sample. There is no evidence that municipalities were able to select into or out of the pool of municipalities subject to the policy.[14]

The final sample includes 325 municipalities, 132 of which are assigned to the policy in the first programming period. Overall, the sample covers about 19% of all municipalities in metropolitan agglomerations, and about 0.8% of the total number of municipalities in

[13]I obtain the optimal bandwidth (Calonico et al., 2017) of ± 904 for estimating the effect of policy assignment on immigration, starting from the set of municipalities below 7 000 inhabitants (symmetric around the 3 500 threshold). To ensure comparability, I adopt the same bandwidth of 900 throughout the analysis, but show that results are robust to many different bandwidths.

[14]The MacCrary test is reported in figure A4 in the Online Appendix.

Table 1: Balance Table

	Main Sample				
	SRU=0	SRU=1	Difference	Agglomerations	France
Immigration 90	0.089	0.093	0.004 (0.57)	0.106	0.049
National Front vote 95	0.166	0.163	−0.165 (0.49)	0.163	0.144
Population 90	2681	3308	626 (0.00)	7187	1550
Population density 90	538	457	−80 (0.21)	640	141
Higher education 90	0.081	0.085	0.082 (0.34)	0.086	0.048
High-school dropout 90	0.173	0.166	−0.007 (0.24)	0.174	0.243
Unemployment 90	0.095	0.087	−0.008 (0.10)	0.098	0.092
Private employment 90	0.561	0 .558	0.003 (0.72)	0.568	0.494
Social housing 90	0.023	0.015	−0.020 (0.01)	0.041	0.009
Home ownership 90	0.240	0.250	0.009 (0.02)	0.223	0.273

Notes. Columns 1-3 refer to municipalities that belong to the main sample used in the analysis; namely, column 1 includes municipalities in the sample that are not subject to the SRU law, column 2 include those that are subject to the SRU law, column 3 reports the difference between the two and the p-value in parenthesis. Column 4 refers to all municipalities in French agglomerations. Column 5 refers to all municipalities in France.

France.[15] Table 1 provides some information on the main pre-policy characteristics. Municipalities in the sample appear fairly similar across the two groups, but they differ in the pre-policy share of public housing and home ownership. Moreover, I do not find any evidence of discontinuity in those baseline characteristics at the threshold,[16] suggesting that there is no pre-existent policy affecting the housing market at the same cutoff. Yet, to account for the difference in means, I include them as controls in all empirical specifications.[17]

The timespan of my analysis is set by the policy timeline. Because the policy consists in the construction or readaptation of buildings for public housing, its effects are likely to be delayed with respect to the adoption of the law. At the same time, the 2017 reform sets a limit after which the policy can no longer be considered exogenous to other municipality characteristics. For this reason, I consider the impact of the policy on immigration in 2015, and observe the effects of the 2015 immigration figures on the 2017 election results.

[15] A list of included agglomerations is available upon request.
[16] Figure A5 in the Online Appendix reports the distributions around the cutoff.
[17] Results do not change when including all these variables as controls.

2.2 Main Variables and Data Sources

The first round of the 2017 presidential elections set forth the crisis of the traditional party system in France, with the center-right party led by François Fillon gaining the 20.01% of the vote shares and the Socialist party led by Benoît Hamon gaining the 6.36%.[18] The two clear winner of the first round were the newly established centrist party *Republique en Marche* founded by Emmanuel Macron, and the long-lived but mostly marginal extreme-right wing party *Front National* led by Marine Le Pen. The two parties gained respectively the 24.01% and 21.30% of the vote shares, and the National Front was defeated in the second round. The National Front is largely know for its extreme and anti-immigrant positions (Mitra, 1988; Van Kessel, 2015), expressed with high consistency over time.[19] I use vote share for the National Front at the municipality level as a measure for the anti-immigration electoral backlash, for the 2017 election and the last election before the policy. Data on the electoral results for the first round of the 1995 and 2017 presidential elections aggregated at the municipality level are made available by the Ministry for Internal Affairs.

Immigration is measured as the share of immigrants over total population in a given municipality. Immigrants are defined in the French census as people who were born foreigners in a foreign country. Thereby, the variable captures essentially first-generation immigrants.[20] These data extract from the 2015 yearly census, for the main immigration variable, and the 1990 national census for the pre-policy immigration level.

Being assigned to the housing policy is a binary variable that assigns the value of 1 to those municipalities that were subject to the policy in the first programming period, and 0 otherwise.[21] The report on the first programming period reports the list of municipalities

[18]Presidential elections in France take place every 5 years, with direct universal suffrage. The President is elected by the absolute majority of expressed votes. If absolute majority is not reached in the first round, a runoff between the two most voted candidates takes place two weeks later.

[19]This consistency is partly due to the fact that the party front-runners since the foundation have all come from the Le Pen family. Marine Le Pen took over the leadership of the party from her father Jean-Marie in 2011.

[20]Some fraction of those immigrants may have gained French citizenship and participate in national elections. However, naturalized immigrants tend to vote against anti-immigration parties (Strijbis, 2014). Then, my results may be best interpreted as an lower bound for the overall effect (compared to what would happen if no immigrant was allowed to vote).

[21]Out of the 325 municipalities in the sample, 132 are subject to the policy since the first programming period. Because there is a delay between policy assignment and the allocation of public housing, I expect to find effect for municipalities that have been exposed for a longer period. This ensures conservative estimates

subject to the policy. To define the sample, I obtain data on the population of French municipalities in 1999 (the baseline year used to define the obligation) from the yearly population census. These data are linked to the repository of French agglomerations hosted by the Insee, and to the figures on the share of public housing per municipality in 1990, 1999 and 2015 available in the Housing Survey, as part of the national census.

Finally, I collect the data on demand for public housing in 2015, 2016 and 2017 by immigrants and natives, for most of the municipalities in my sample. These data come from a national registry handled by the *Ministère du Logement et de l'Habitat Durable*, and contain the number of both pending and satisfied applications for public housing for each municipality and year.[22] For each municipality in my sample, I use the average of pending or satisfied applications over the three years, for immigrants and natives.

3 Public Housing and Immigration

In this section, I show that public housing increases immigration, and that it does so particularly where there is a larger historical presence of migrants. In other words, public housing amplifies preexisting migration chains. These two elements are not only instrumental to identify the immigration shock, but they also convey substantial information to the interpretation of the results.

To verify the welfare magnet effect of housing on immigration, I explore whether municipalities where the policy applies receive more applications from immigrants and, consequently, if they host larger shares of immigrants. I do that with a fuzzy regression discontinuity design. In this case, the dependent variable is regressed on the change in public housing over the period. The change in public housing is instrumented with the policy assignment dummy, as being quasi-randomly assigned to the policy induces a higher probability of increasing public housing. Equations 1 and 2 are respectively the first and second stage of this instru-

as, if anything, the increase in public housing and immigration in municipalities in the control group should provide for a stronger test of my results.

[22]Municipalities in France are organized in inter-municipality cooperation groups (EPCI). In few cases, the smallest municipality in each EPCI are lumped together under the generic title "Others". I disaggregate these data by attributing public housing applications to each missing municipality proportionally to its population, as a share of the total population of missing municipalities in the EPCI.

mental variable specification, estimated on the sample of observations around the population threshold:[23]

$$\Delta H_{post} = \alpha + \beta T + \gamma M_{pre} + \theta \mathbf{C}_{pre} + \rho + \epsilon \tag{1}$$

$$Y = \alpha' + \beta' \hat{\Delta H}_{post} + \gamma' M_{pre} + \theta' \mathbf{C}_{pre} + \rho + \omega \tag{2}$$

Y is either immigrants' open applications for public housing, or the share of immigrants; ΔH is the real increase in the supply of public housing in the municipality between 1999 and 2015, T is a dummy equal to 1 if the municipality is assigned to the policy, M_{pre} is the share of immigrants in the municipality in 1990. $\mathbf{C}_{pre}$ indicates a set of pre-policy (1990) covariates, including population, a dummy equal to 1 for border municipalities, public housing and home-ownership. To account for possible spatial correlation in the increase in public housing, I always cluster standard errors at the regional level. β' measures the local linear effect of an increase in the supply of public housing on immigration in 2015, for those municipalities that have increased their supply of public housing because subject to the policy.

Table 2 shows the results. Columns 1 and 2 report the reduced form and the IV estimate of the effect of public housing on applications by immigrants. In municipalities assigned to the policy and where the supply of public housing increases, immigrants present more applications. Columns 4 and 5 show that the effect of the policy translates into an actual increase in the local share of immigrants.[24]

For two identical municipalities, with the same initial share of immigrants and public housing, a larger increase in the supply of public housing in the municipality subject to the policy is associated with a higher share of immigrants at the end of the period. Because I control for past immigration, these results may be best understood in terms of change: a larger increase in the supply of public housing corresponds to a larger increase in immigration. In

[23]Figure A1 in the Online Appendix reports the result of estimating the same equation for different bandwidths. I omit the municipality subscript to simplify the notation.

[24]The F-test in columns 2 to 4 do not signal weakness problems. Specifically, it is higher than the conventionally accepted value of 10 and comparable values (Stock and Yogo, 2002). The Underidentification test (Kleibergen-Paap rk LM statistic) rejects the null of irrelevant instrument with P-value of 0.0114 in the two IV specifications.

terms of magnitude, the specification in column 5 suggests that a standard deviation increase in the change in housing (4.3 percentage points) corresponds to a 2 percentage point increase in the local share of immigrants.

Having verified the welfare magnet effect of public housing, I now show that public housing acts as an amplifier of existing migration chains. This amounts to verify if the interaction between pre-policy immigration levels and policy assignment has a positive and significant effect on recent immigration, after controlling for their linear terms. I estimate the following regression model:

$$Y = \alpha + T \times [\gamma + \beta M_{pre}] + \delta M_{pre} + \theta \mathbf{C}_{pre} + \rho + \epsilon \tag{3}$$

Where public housing applications or immigration in 2015 (Y) is regressed on policy assignment (T), immigration in 1990 (M_{pre}) and their interaction, alongside with usual controls ($\mathbf{C}_{pre}$). γ and δ capture the direct effects of, respectively, policy assignment and past immigration on the dependent variable. β captures the magnifying effect of the public housing shock on pre-existing migration chains, for municipalities around threshold.

I report the results in columns 3 and 6 of table 2. The coefficient of the interaction term is positive and significant across all specifications, suggesting that even though past immigration is the strongest predictor for immigration in 2015, municipalities that are subject to the policy experience a further increase in immigration. Not only the policy increases immigration, but it also further magnifies migration chains are magnified by providing affordable housing.

These dynamics are better illustrated in figure 3, where the demands for public housing from immigrants and natives, and the numerosity of both groups are displayed for different municipality types. The baseline municipality has average past immigration and is not subject to the policy. Compared to the baseline, municipalities where the housing policy applies receive on average more applications from immigrants and more immigrants in the population. This is also true for municipalities with (one standard deviation) larger past immigration shares than the baseline. Crucially though, the incidence of immigrants' applications and immigrants in the population is significantly greater in municipalities with both

past migration and the housing policy.

Natives show a different behaviour. They respond to the public housing policy by increasing their demand for housing. Importantly, they respond equally to the public housing policy in places with high and low past immigration: there is no evidence of endogenous response of natives to past migration, indicating for instance a native fly out of immigration areas (Card and DiNardo, 2000). I further explore this point in section B.5 of the Online Appendix, where I show that places where the housing policy applies have significantly more recent native residents, but again there is no difference across places with and without past immigration.

Interpreted jointly, these analysis show that the policy induces a significant and exogenous variation in the share of immigrants across municipalities. More importantly, the policy magnifies the pull effect of preexisting migration chains. The instrument, hence, captures movements of immigrants that decide to relocate based on the characteristics of the community and the availability of affordable housing. In table A9 of the Online Appendix, I show that immigrants below 15 years old are over-represented in the the immigration shock generated by the policy (compared to their share within the immigrant population in the sample and in France). This is an important sanity check, as it suggests that the instrument is indeed capturing movement of nuclear families.

4 Immigration and Electoral Backlash

Do voters in metropolitan suburbs express anti-immigration preference? Having verified that the public housing policy magnifies migration chains, I can now evaluate the electoral effect of the immigration shock so generated. Equations 4 and 5 are respectively the first and second stage of an instrumental variable specification where I regress the change in vote share for the National Front between 2017 and the pre-policy period, on immigration in 2015, instrumented by the interaction between policy assignment and immigration in 1990. In doing so, I include the linear terms of the two variables, alongside with usual controls. I estimate the model for the usual sample of municipalities around the policy threshold:[25]

[25]Figure A2 in the Online Appendix shows that results are robust to the specification of different bandwidths, and remain consistent in magnitude and significance even when the sample size shrinks.

Table 2: The Effect of Public Housing on Immigration

	Immigrants' Demand of Housing			Immigration		
	(1)	(2)	(3)	(4)	(5)	(6)
Policy×Immigration '90			0.221***			0.147***
			[0.059]			[0.039]
Policy	0.244***		0.242***	0.232***		0.230***
	[0.094]		[0.075]	[0.086]		[0.087]
Δ Housing		0.439***			0.417***	
		[0.156]			[0.155]	
Immigration '90	0.222***	0.238***	0.134***	0.893***	0.908***	0.834***
	[0.051]	[0.049]	[0.042]	[0.115]	[0.106]	[0.092]
Reg. FE	yes	yes	yes	yes	yes	yes
Controls	yes	yes	yes	yes	yes	yes
Observations	325	325	325	325	325	325
Bandwidth	900	900	900	900	900	900
R-squared	0.03	-0.11	0.04	0.60	0.48	0.61
Estimator	OLS	2SLS	OLS	OLS	2SLS	OLS
Instrument		Policy			Policy	
KP F-stat		16.468			16.468	

Notes. In columns 1-3 the dependent variable is the (standardized) number of immigrants' pending applications for public housing in 2015-2017 in municipality m. In columns 4-6 the dependent variable is the (standardized) share of immigrants over natives in 2015 in municipality m. Columns 1 and 4 report the reduced form; columns 2 and 5 report the IV estimate, where the change in public housing between 1999 and 2015 is instrumented with policy assignment; columns 3 and 6 report OLS regressions on the interaction between policy assignment and immigration in 1990. All specifications include pre-treatment controls for population, immigration, border municipalities, public housing, home ownership and region fixed effects. *Bandwidth* indicates the deviation around the population threshold that is admitted for sampled municipalities. *F-stat* is the Kleibergen-Paap rk Wald F statistic for the first stage. Standard errors are clustered at the regional level. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively.

$$M_{post} = \alpha' + T \times [\gamma' + \beta' M_{pre}] + \delta' M_{pre} + \theta' \mathbf{C}_{pre} + \rho + \omega \tag{4}$$

$$Y = \alpha + \beta \hat{M}_{post} + \gamma T + + \delta M_{pre} + \theta \mathbf{C}_{pre} + \rho + \epsilon \tag{5}$$

Y is the change in the vote share for the National Front between 1995 (the last election before the policy debate begins) and 2017 in a given municipality. β captures the effect of immigration on vote. I cluster standard errors at the regional level, to account for the possible spatial correlation in the location of migrants. The key identifying assumption is that the interaction between policy assignment and immigration in 1990 only influences electoral

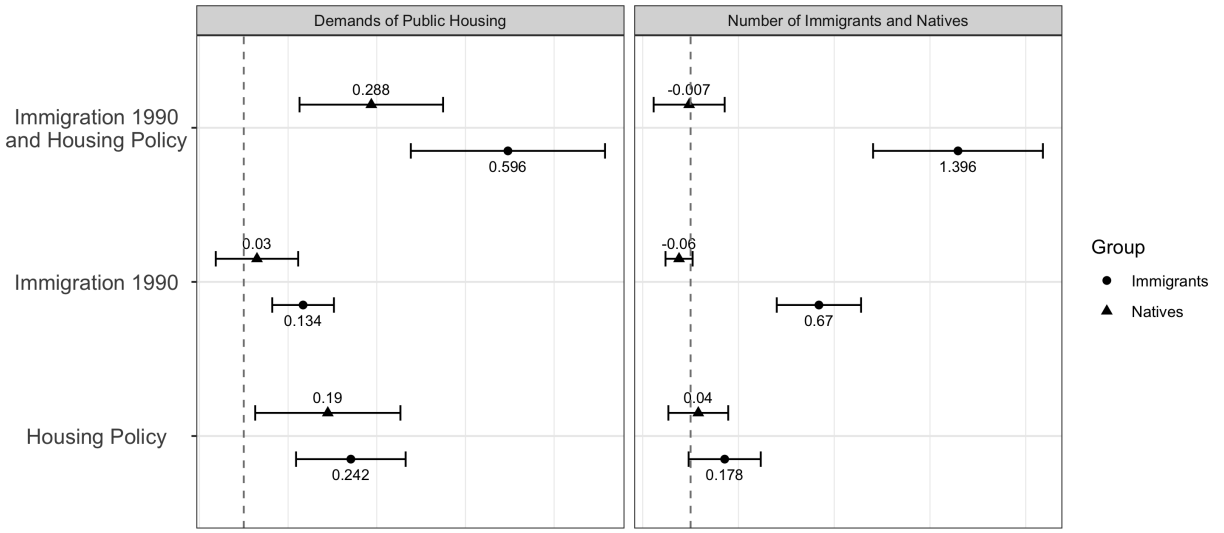

Figure 3: Effect of Public Housing on Immigration

Marginal effects of the housing policy and past immigration, calculated starting from equation 3. The same regression model is estimated separately for immigrants and natives, for public housing applications and frequency in the population. The error bars denote significance at the 5% level.

outcomes through immigration in 2015. This condition has to hold for municipalities around the population threshold, conditional on the linear terms of immigration in 1990 and policy assignment. If excluded, both factors would represent important omitted variables. Past immigration is likely to shape many aspects of local politics in a municipality and, hence, to influence voting behaviour through other channels than recent immigration. At the same time, municipalities that are subject to the policy increase their provision of public housing, which may influence the composition of the population as well as voters' policy preferences.

Table 3 reports the results. Column 1 highlights that the correlation between recent immigration and National Frontvote is negative, i.e. places with a larger immigrant population show less support for the far-right. However, the reduced form in column 2, i.e. the regression of vote on the interaction term, is positive and statistically significant. The main specification is reported in column 3. Here, immigration in 2015 is instrumented using the interaction between policy assignment and immigration in 1990.[26] In columns 4 to 6, I further interact

[26]The first stage F-statistic does not signal a weakness problem. Specifically, it is higher than the conventionally accepted value of 10 and comparable values (Stock and Yogo, 2002). The Underidentification test (Kleibergen-Paap rk LM statistic) rejects the null of irrelevant instrument with P-value of 0.1166, 0.0224, 0.0924 and 0.0200 in the four IV specifications.

the controls with past immigration and policy assignment to account for possible omitted non-linear effects of the controls.

The instrumental variable estimates are significant and consistent, and suggest that immigration in 2015 increases the support for the National Front in the 2017 presidential election. For two municipalities with the same initial share of immigrants, similar public housing and political preferences, a larger increase in the share of immigrants generates higher vote share for the main anti-immigration party. More specifically, a 5 percentage point (one standard deviation) increase in the share of immigrants translates into a 6 percentage points gain (0.85 of a standard deviation) in vote share for the National Front.

Results differ importantly between the OLS and IV specifications. More precisely, the coefficient estimated with OLS is negative and significant. This suggests that on average in my sample places where there are more immigrants, the National Front gains less votes. The negative bias in the OLS suggests some interesting interpretations. First, this may be the result of people sorting into municipalities according to their preferences for diversity: people that are more hostile towards immigrants live in municipalities with lower levels of immigration. A second possible explanation is that contact with immigrants does not make natives more likely to vote for the National Front in general; however, the specific shock to immigration that is due to public housing activates the electoral response. In this line of reasoning, the allocation of public housing to immigrant families would increase natives' perception of group-based competition over welfare benefits and, hence, translate into a exclusionary attitudes.

The Online Appendix reports some important robustness on the empirical specification, besides those mentioned above. In particular, table A6 reports a range of placebo tests, where I show that the main specification obtains null results when estimated for arbitrary population thresholds. Further, in section B.2, I test the robustness of the results against the use of alternative specifications. In table A4, I report the estimates of an interacted difference-in-differences model, where vote share for the National Front in municipality m at time t is regressed on past immigration, a dummy for treated municipalities, a dummy for the post policy period and their interactions. Each municipality is observed multiple times: in the pre-policy period (1990) and then again in the 2012 and 2017 presidential elections.

This allows me to estimate the effect of being subject to the housing policy and having high historical immigration on vote for the National Front.[27] Estimates from this analysis are very consistent in magnitude and significance with the reduced form in column 2 of table 3, suggesting that the results do not hinge upon the specific the specific functional form adopted here.

Table 3: The Effect of Immigration on Vote for the Far-Right

	OLS		IV			
FN Vote	(1)	(2)	(3)	(4)	(5)	(6)
Immigration '15	-0.009*		0.063**	0.055**	0.074*	0.060**
	[0.005]		[0.031]	[0.028]	[0.042]	[0.028]
Policy×Immigration '90		0.009*				
		[0.005]				
Region FE	yes	yes	yes	yes	yes	yes
Controls	yes	yes	yes	yes	yes	yes
Controls×Imm90				yes		yes
Controls×Policy					yes	yes
Observations	325	325	325	325	325	325
Bandwidth	900	900	900	900	900	900
R-squared	0.01	0.01	0.38	0.44	0.31	0.42
Estimator	OLS	OLS	2SLS	2SLS	2SLS	2SLS
Instrument			P×Imm90	P×Imm90	P×Imm90	P×Imm90
KP F-stat			12.218	19.362	19.109	22.756

Notes. Each column shows the regression of the change in vote share for the National Front in municipality m between 1995 and 2017 on immigration in 2015. Column 1 shows the OLS regression on the main regressor. Columns 2 shows the reduced form. Columns 3-6 report IV estimates, where immigration in 2015 is instrumented by the interaction between immigration in 1990 and policy assignment. All specifications include controls for policy assignment, pre-policy immigration, population, public housing, home ownership, border municipalities and region fixed effects. *Bandwidth* indicates the deviation around the population threshold that is admitted for sampled municipalities. *KP F-stat* is the Kleibergen-Paap rk Wald F statistic for the first stage. Standard errors are clustered at the regional level. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively.

5 Competition Over Housing?

I have shown that municipalities with more public housing and an historical experience of immigration attract more immigrants. Natives in those places show discontent by voting more

[27]The main estimand is the interaction term between belonging to the SRU policy group, a dummy equal to one for the post-policy period, and the historical presence of immigrants.

for political parties with strong anti-immigration platforms. What is the role of competition for public housing in driving natives' discontent? Does it emerge when natives are losers in the competition for welfare benefits? Is material loss a necessary condition for inter-group conflict to emerge?

The setting analysed in this paper provides for a relevant context to answer this question (Malhotra et al., 2013). The increased availability of public housing imposes a redistribution problem, where all eligible residents compete to obtain a share of the lager - but finite - pie. At the same time, the sudden increase in immigration and the tone of national political rhetoric around immigration and housing (Hopkins, 2010) build the perfect conditions where group threat is expected to emerge. In this context, the redistribution problem is likely to be framed and perceived as a group-based problem. Natives are likely to develop hostility against immigrants as they perceive group-based competition over finite material resources.

Under these conditions, animosity can emerge also absent any material loss. The racial threat theory has long stressed the importance of perceptions about competition for material resources in generating hostility (King and Wheelock, 2007). However, perceptions may or may not correspond to the real state of the world. Alesina et al. (2019) show that natives in Western Europe overestimate the amount of welfare spending going to immigrants. If this is true, then public housing, as a form of in-kind transfer whose supply is constrained in the short-run, is the ideal candidate to generate misperceptions (Dancygier, 2010).

In order to address this point, I analyse how pending and satisfied applications for public housing vary with past immigration and the housing policy, for both immigrants and natives. The final goal is to understand whether natives suffer a disadvantage in the allocation of public housing in those places where anti-immigration vote is higher. Following the same method as in section 3, I estimate the following regression model on the usual sample of municipalities around the threshold:

$$Y = \alpha + T \times [\gamma + \beta M_{pre}] + \delta M_{pre} + \theta \mathbf{C}_{pre} + \rho + \epsilon \tag{6}$$

Where pending or satisfied public housing applications (Y) is regressed on policy assign-

ment (T), immigration in 1990 (M_{pre}) and their interaction, alongside with usual controls and region fixed effects. Figure 4 reports the marginal effects of past immigration and the housing policy on demand for housing for immigrants and natives. The full regression results are reported in Table A1 in the Online Appendix.

As we already know, immigrants demand more public housing in places with past immigration and the housing policy. The first panel in Figure 4 shows that, in those places, immigrants also receive more housing. Does this translate into less housing assigned to natives? The second panel in Figure 4 shows that natives demand and receive more housing in municipalities where the housing policy is in place. However, there is no difference in the amount of housing they receive between places with high or low past immigration. This evidence runs against the idea that natives lose out more in the competition for welfare benefits in places with past immigration and the housing policy. Because these are also the places where vote for the National Front is strongest, this evidence suggests that material competition for welfare resources is not a necessary condition for hostility to emerge.[28] Rather, inter-group conflict appears in this setting when a sudden increase of the immigrant population is combined with a renewed redistribution problem.

6 Discussion of Alternative Mechanisms

This analysis aims at verifying if immigration creates discontent among natives. However, mayors may anticipate the effect of housing on migration chains, and be more reluctant to comply with the housing policy in municipalities where the stock of migrants is larger. If this is the case, then discontent may manifest as a reaction to low (or high) compliance, rather than immigration *per se*.[29] In table A2 of the Online Appendix, I verify whether municipalities affected by the policy and with different levels of pre-policy immigration show different realized supply of public housing. There is no evidence in favour of a joint effect of

[28] If anything, immigrants seem to be disadvantaged in the competition for public housing in those places. Conditional on having applied for housing, the probability of an immigrant getting public housing is lower in a municipality with higher past immigration and the housing policy. This probability remains instead constant among natives across places. This, on the other side, does not prove discrimination; the marginal applicant in places with more past immigration may be less likely to meet the assignment criteria than the marginal applicant in any other municipality.

[29] Technically, this would entail a violation of the exclusion restriction in my main specification.

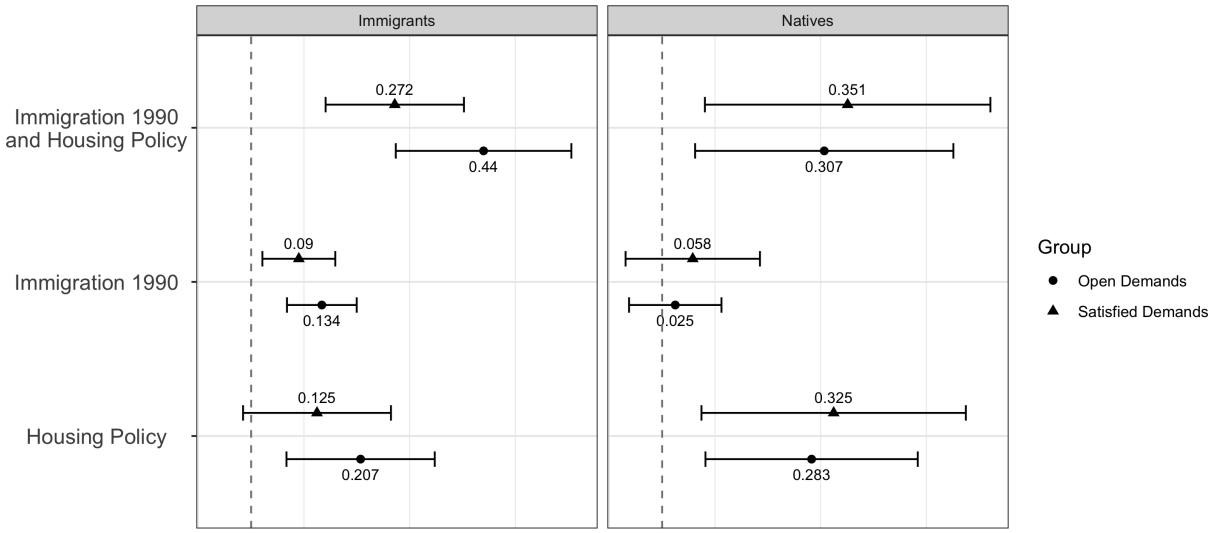

Figure 4: Open and Satisfied Demands for Housing

Marginal effects of the housing policy and past immigration on (log of) pending and satisfied demands for housing, estimated from equation 6. The same regression model is estimated separately for immigrants and natives, and for pending and satisfied demands. The error bars denote significance at the 5% level.

policy assignment and past immigration on compliance.

A second possible interpretation of these results could be that hostility towards immigrants emerges because of stiffer labour market competition. It has been shown that immigrants can displace natives by reducing entry of new natives workers (Dustmann et al., 2017b), and that natives develop anti-immigration sentiment when exposed to such a direct competition (Malhotra et al., 2013). This mechanism is unlikely to drive results in my setting. The inclusion of regional fixed effects in all specifications ensures that treated metropolitan suburbs are compared to control ones within the same region. Any local immigration shock is likely to have effects on the larger regional labour market, hence including both control and treated municipalities.

More relevant to my analysis is the expectation that immigration reduced preferences for redistribution (Alesina et al., 2019; Mayda, 2006). Specifically, natives may become more conservative as a reaction to the increased pressure on welfare, especially when welfare is proportionally more used by immigrants. This would suggest that vote for the National Front, more than a expressing inter-group conflict, signals discontent with the level of redistribution in society. A complementary prediction of this reading would posit that pro-redistribution

left-wing parties are the main losers in the electoral competition. In section C.4 of the Online Appendix, I report the effect of immigration on the vote share of all parties in the election. There is no evidence that immigration decreases the vote share for left-wing parties; on the contrary, losses are distributed and the most affected appear to be the moderate right-wing parties. The same empirical evidence excludes an interpretation based on changes in the polarization of the electorate over the immigration issue, or selective mobilization.

Finally, the results are not a simple reaction to the announcement of the policy. The main analysis performed on the 2012 presidential election reveals that the effect remains precisely estimated, but the magnitude of the coefficient is almost halved with respect to the estimates for 2017. Table A8 in the Online Appendix reports these results. This pattern is consistent with the fact that the public housing policy takes time before being deployed in full force, and accommodations are assigned. The effect on inter-group conflict grows over time, in parallel with the increase in the supply of public housing and the corresponding immigration flows.

7 Conclusion

Metropolitan suburbs host today large part of the immigrant population in Western democracies. They are also a chosen target for right-wing populist parties that leverage on the spatial concentration of migrants to build their exclusionary rhetoric. Scholars across social sciences have devoted only limited attention to the politics of the suburbs. However, because geography influences the likelihood of interpersonal and inter-group contact, the study of migration and its political effect would gain significant insights from taking the spatial approach beyond the usual urban-rural divide. Metropolitan suburbs, characterised by high population density and high diversity, host very peculiar grounds for the study of immigration, integration and political preferences.

In this paper, I show that metropolitan suburbs experience an anti-immigration backlash, when confronted with an influx of immigrants. Moreover, in places where the increase in immigration happens in conjunction with a welfare redistribution problem, the conflict is likely to take the form of group level competition over welfare. Such an effect produces

hostility among natives, even when they do not suffer any material loss against immigrants. All in all, the evidence adds support to the racial threat hypothesis and the idea that natives' overestimate the threat that immigrants pose in the competition for welfare benefits.

How generalizable are these findings? Although the evidence provided in this work relies on a specific policy shock in a specific country, similar cases can be found across Europe and the United States. Public housing is one of the most important, long-lived and widespread welfare policies. Large cities are at the forefront in the construction of public housing. Munich is engaged in delivering approximately 3 000 dwellings by 2019, half of which openly reserved for refugees; Copenhagen has imposed that 25% of every new development project is devoted to public housing; a number of other global cities such as London, Barcelona, Berlin and Amsterdam have adopted different plans to increase public housing. This study suggests the need for a closer look at how these projects may affect the dynamics of local integration and, ultimately, the social support for the policy per se.

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Appendix

A Tables

Table A1: Demand for housing

	Immigrants			Natives		
	(1) Pending	(2) Satisfied	(3) Rate	(4) Pending	(5) Satisfied	(6) Rate
T×Imm	0.099*	0.057**	0.179***	-0.001	-0.031	-0.028
	[0.054]	[0.028]	[0.027]	[0.060]	[0.080]	[0.050]
T	0.207**	0.125	-0.083	0.283**	0.325**	-0.008
	[0.085]	[0.085]	[0.156]	[0.122]	[0.152]	[0.082]
Imm	0.134***	0.090**	-0.301***	0.025	0.058	0.024
	[0.040]	[0.042]	[0.105]	[0.053]	[0.077]	[0.050]
Region FE	yes	yes	yes	yes	yes	yes
Controls	yes	yes	yes	yes	yes	yes
Observations	325	321	309	324	323	322
Bandwidth	900	900	900	900	900	900
R-squared	0.07	0.06	0.24	0.02	0.02	0.00

Notes. Each column shows the regression of demand for public housing in municipality m in 2015-2017 on the interaction between policy assignment and immigration in 1990. The dependent variable is the log of pending applications for public housing in columns 1 and 4; the log of satisfied applications for public housing in columns 2 and 5; the ratio between pending and satisfied demands in columns 3 and 6. All specifications include pre-treatment controls for population, immigration, border municipalities, public housing, home ownership and region fixed effects. *Bandwidth* indicates the deviation around the population threshold that is admitted for sampled municipalities. Standard errors are clustered at the regional level. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively.

B Robustness

B.1 Endogenous Compliance

This analysis aims at estimating the effect of immigration on voting essentially relying on an instrumental variable strategy, where the instrument is the interaction between policy assignment and past immigration. The key identifying assumption is that this interaction term does not influence voting through channels other than immigration in 2015. This has to hold conditional on the controls, i.e. including the separate effects of past immigration and policy assignment.

The exclusion restriction is possibly violated if municipalities with different pre-policy immigration levels comply differently with the policy. If mayors anticipate the effect of housing on migration chains, they may be more reluctant to comply in municipalities where the stock of migrants is larger. In this case, the instrument would be correlated with the realized supply of public housing, which in turn is likely to influence voting behaviour. A simple test for verifying this hypothesis consists in regressing the realized share of public housing in 2015 on the instrument, including the usual controls.

$$\begin{aligned} \Delta H_m^{post} = \alpha + \beta T_m * M_m^{pre} + \gamma T_m + \delta M_m^{pre} \\ + \theta C_m^{pre} + \zeta P_m + r_m + \epsilon_m \end{aligned} \tag{7}$$

A non significant β coefficient is evidence in favour of the validity of my instrumental variable specification.

Table A2 reports the estimate of equation 7, with different specifications of the dependent variable. The dependent variable is the share of public housing over total residential building in 2015 in columns 1 and 2. I substitute it with the change in the share of public housing between 1999 and 2010 in columns 3 and 4, and between 1999 and 2015 in columns 5 and 6. In columns 7 and 8 I use the growth rate is public housing between 1999 and 2015. After controlling for policy assignment and past immigration, the instrument does not appear to be correlated with public housing. In other words, there is no evidence is support of the idea that there is a joint effect of policy assignment and past immigration on the realized supply

Table A2: Test for Exclusion Restriction

	Housing 15		Δ Housing 10		Δ Housing 15		Δ% Housing	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
T×Imm 90		-0.037		0.037		-0.026		-1.795
		[0.076]		[0.025]		[0.040]		[24.817]
T	-0.001	0.002	0.023***	0.019***	0.024***	0.026***	0.269	0.431
	[0.010]	[0.011]	[0.003]	[0.003]	[0.006]	[0.007]	[1.049]	[2.732]
Imm 90	0.010	0.024	-0.031	-0.046	-0.021	-0.011	-19.743	-18.987
	[0.093]	[0.119]	[0.029]	[0.040]	[0.025]	[0.038]	[14.092]	[13.838]
Region FE	yes	yes	yes	yes	yes	yes	yes	yes
All controls	yes	yes	yes	yes	yes	yes	yes	yes
Observations	325	325	326	326	325	325	301	301
Bandwidth	900	900	900	900	900	900	900	900
Polynomial	1st	1st	1st	1st	1st	1st	1st	1st
R^2	0.75	0.75	0.38	0.39	0.50	0.50	0.14	0.14

Notes. Each column shows the regression of public housing in municipality m in 2015 on the instrument, i.e. the interaction between policy assignment and immigration in 1990. The dependent variable is the share of public housing in 2015 in columns 1-2; the change in public housing between 1999 and 2010 in columns 3-4; the change in public housing between 1999 and 2015 in columns 5-6; the growth rate in public housing between 1999 and 2015 in columns 7-8. All specifications include separate controls for policy assignment and immigration in 1990, region fixed effects and all controls included in the main specification of Table A10 column 6. *Bandwidth* indicates the deviation around the population threshold that is admitted for sampled municipalities. *Polynomial* indicates the polynomial order of the population variable. Standard errors are clustered at the regional level. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively.

of public housing and, hence, on compliance.

B.2 Alternative Specification

My main identification strategy relies on the existence of an amplifying effect of public housing on migration chains. This translates into a specification where the significance of the interaction term has to hold after partialling out the two linear effects of the public housing policy and past migration. This procedure impose some structure on the functional form that I have to assume for the relationship between migration and public housing, on the one side, and between migration and voting on the other. In this section, I propose two alternative empirical specifications that rely on a more standard approach to show that my results do not depend on these function form choices.

First, I estimate the following equation on the usual sample of municipalities:

$$Y_m = \alpha + M_m^{pre}[\beta_0 + T_m[\beta_1 + \beta_2 P_m]] + T_m[\gamma_0 + \gamma_i P_m] + \delta P_m + C_m[\omega_0 + \omega_1 P_m] + \rho_r + \epsilon_m$$

Where Y_m is the difference in vote share for National Front between 2017 and 1995, M_m^{pre} is a dummy equal to one if immigration in 1990 is significantly different from zero, T is a dummy equal to one if m is subject to the SRU law, P is population, C is the usual vector of controls, ρ are region fixed effects. The results are presented in table A3.

Second, I estimate an interacted difference-in-differences model, observing municipalities over time, in 1995, 2012 and 2017:

$$Y_{mt} = \alpha + \beta T_m Post_t M_m^{pre} + P_m[\beta_1 + T_m[\beta_2 + Post_m[\beta_3 + M_m^{pre}]]] + \rho_{rt} + \epsilon_{mt}$$

Where Y_{mt} is the vote share for National Front between in municipality m and year t, T is a dummy equal to one if m is subject to the SRU law, $Post_t$ is a dummy equal to one in the post policy period, M^{pre} is immigration in 1990, P_m is population, ρ_{rt} are region-year fixed effects. Municipalities are observed three times, in 1990, 2012 and 2017. The results are presented in table A4.

Table A3: Diff-in-Diffs: cross-section

Δ FN vote share	(1)	(2)	(3)
Policy × Immigration '90	0.030*	0.026*	0.041**
	[0.018]	[0.015]	[0.017]
Immigration '90	-0.033***	-0.303***	-0.039***
	[0.006]	[0.065]	[0.005]
Policy	-0.029	-0.026*	-0.234**
	[0.018]	[0.014]	[0.119]
Region FE	yes	yes	yes
Controls	yes	yes	yes
× Population	yes	yes	yes
× Immigration		yes	
× Policy			yes
Observations	325	325	325
Bandwidth	900	900	900
R-squared	0.04	0.08	0.07

Notes. Each column shows the regression of the change in vote share for the National Front in municipality m between 1995 and 2017 on the interaction between past immigration and policy assignment. All specifications include controls for pre-policy immigration, policy assignment, population, public housing, home ownership, border municipalities and region fixed effects. All regressors are interacted with the population. *Bandwidth* indicates the deviation around the population threshold that is admitted for sampled municipalities. Standard errors are clustered at the regional level. Standard errors are clustered at the regional level. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table A4: Interacted Diff-in-Diffs

Δ FN vote	(1)	(2)	(3)	(4)
T×Post×Immigration '90	0.007*	0.012*	0.019	0.020*
	[0.004]	[0.006]	[0.012]	[0.012]
Immigration '90	Std	Std	Present	High
Region-Year FE	yes	yes	yes	yes
× Population		yes	yes	yes
Observations	975	975	975	975
Bandwidth	900	900	900	900
R-squared	0.23	0.24	0.24	0.24

Notes. Each column shows the regression of the change in vote share for the National Front in municipality m between 1995 and 2017 on the interaction between a dummy equal to one for municipalities subject to the policy, a dummy equal to one for the period after the policy, past immigration in the municipality. The sample includes all municipalities in the main sample, observed in 1995, 2012 and 2017. All regressions include all the interaction terms and region-year fixed effects. Past Immigration is the standardized immigration share in 1990 in columns 1 and 2; a dummy equal to one for municipalities whose immigration share is significantly different from zero in column 3; a dummy equal to one for municipalities with more than median immigration in column 4. *Bandwidth* indicates the deviation around the population threshold that is admitted for sampled municipalities. Standard errors are clustered at the municipality level. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively.

B.3 Other bandwidths

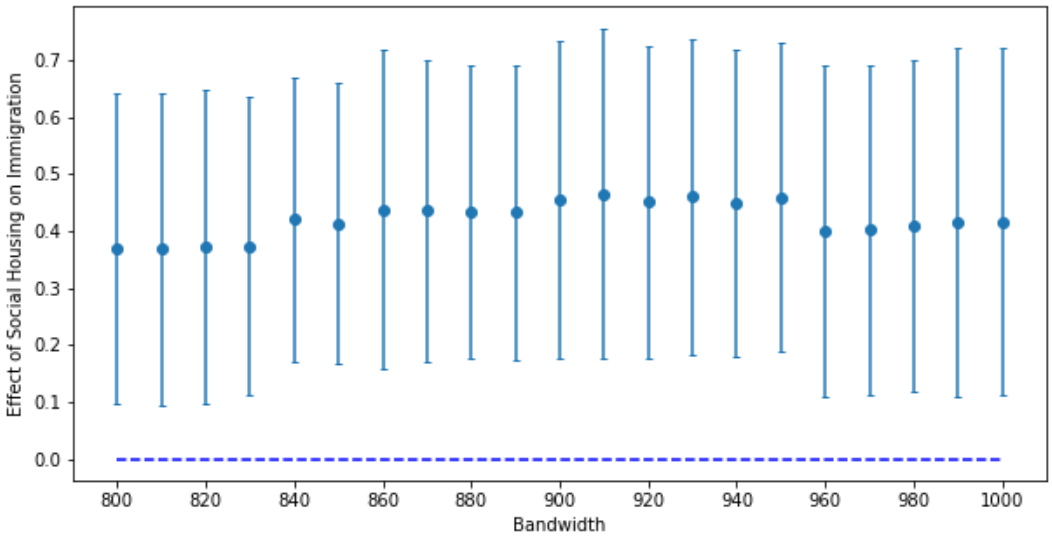

Figure A1: Effect of Public Housing in Immigration
Different bandwidths, 90% confidence interval

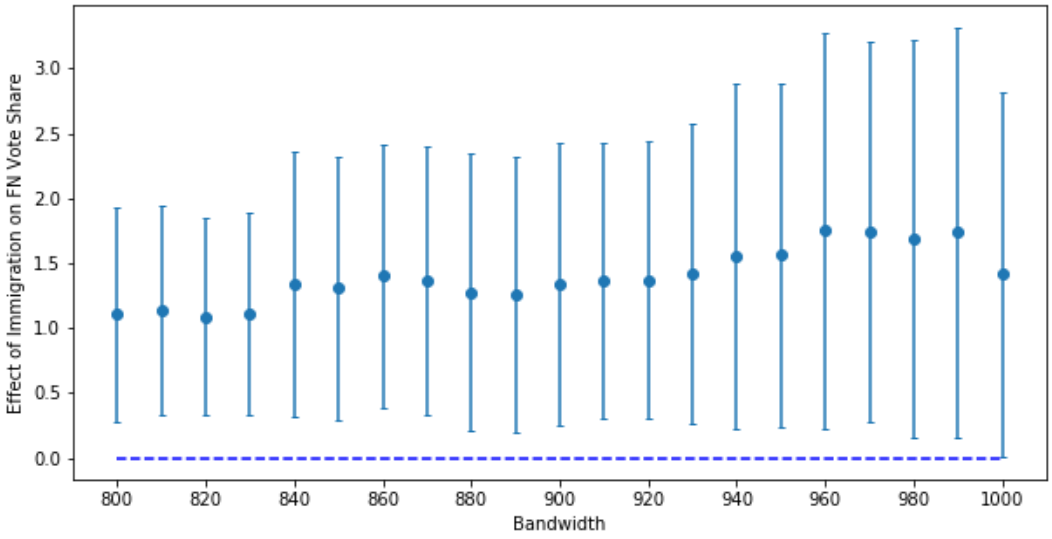

Figure A2: Effect of Immigration on Vote for NF
Different bandwidths, 90% confidence interval

B.4 Other policy changes at the thresholds

A number of other policies change at the same threshold. Eggers et al. (2018) list the policies that change at the same 3 500 threshold in France: Council size, salary of mayor and deputy mayors, maximum number of deputy mayors, electoral system, gender parity, outsourcing scrutiny, council must debate budget prior to vote, committees follow PR principle, amount of paid leave for council work. All the rules on elections here refer to the municipal elections only. There is no difference in the way national elections are carried out. It is unlikely that these policies would have an impact on immigration and on national political vote. Eggers et al. (2018) show that, in the context of a classical RDD design, ignorability ensures that the RDD estimator is consistent. More importantly, confounding treatments are a challenge to the identification insofar as their interaction with the pre-treatment share of immigrants has an influence on the outcome. Given the nature of of possibly confounding policies, it seems very unlikely. Moreover, all these policies where already in places in 1995, during the last election before the policy was implemented. The interacted difference-in-differences specification in table A4 should partial out any effect of policies that change at the same population threshold, but implemented at different times.

B.5 Migration across municipalities

The public housing policy may induce migration of both immigrants and natives across municipalities. People may move in or out a municipality as a reaction to the policy, for instance in order to be allocated a public housing accommodation or in order to avoid negative externalities of the new policy. In table A5 I estimate the effect of the policy on migration across municipalities. Specifically, the dependent variable *Flows* is the share of residents in a municipality that in 2015 declare having moved to the municipality during the previous year. Municipalities subject to the public housing policy experience inward migration from other municipalities. However, these flows does not seem to depend on the local share of immigrants. Hence, in my main specification, the possible confounding effects of these flows should be captured by the linear policy assignment term. Finally, in column 4 I report the main specification, after controlling for inter-municipality migration. Even though this

Table A5: Migration Across Municipalities

	Flows			FN vote
	(1)	(2)	(3)	(4)
T	0.007*		0.007	
	[0.003]		[0.006]	
Δ Housing		0.280**		
		[0.138]		
Immigration 15			-0.002	0.064
			[0.016]	[0.039]
Flows				-0.480*
				[0.274]
Observations	325	325	325	325
Bandwidth	900	900	900	900
R^2	0.205	-0.039	0.041	0.171
Specification	Main	Main	Main	Main
Estimator	OLS	2SLS	2SLS	2SLS
IV		T	T×Imm90	T×Imm90
1st Stage F-stat		16.117	14.157	19.239

Notes. Columns 1 to 3 show the regression of the share of recent movers to municipality m in 2015 on the public housing policy and immigration. Column 4 reports the main regression of National Frontvote share on Immigration, after controlling for the share of recent movers. All columns adopt the main specification as in table 3, column 6. *Bandwidth* indicates the deviation around the population threshold that is admitted for sampled municipalities. Standard errors are clustered at the region level. Standard errors are clustered at the regional level. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively.

control may introduce some post-treatment bias, hence reducing the precision of the estimate, it also reveals that the main effect is stable (pval=0.102). This test is complementary to and stronger than the results summarized in figure 3.

B.6 Placebo cut-offs

Table A6 reports the main effect of immigration on voting for the National Front, for different specifications of the policy cut-offs. Crucially, none of the placebo specifications display significant results.

Table A6: Placebo cut-offs specifications

	(1) -100	(2) -50	(3) -20	(4) -10	(5) +10	(6) +20	(7) +50	(8) +100
Imm 15	0.000	0.019	0.026	0.024	0.019	0.031	0.040	0.020
	[0.024]	[0.023]	[0.024]	[0.024]	[0.024]	[0.027]	[0.029]	[0.026]
Obs.	325	325	325	325	325	325	325	325
R2	0.085	0.012	-0.029	-0.020	0.012	-0.066	-0.145	0.008
C	y	y	y	y	y	y	y	y
Imm 90	y	y	y	y	y	y	y	y
Reg FE	y	y	y	y	y	y	y	y
Border	y	y	y	y	y	y	y	y
Ses	y	y	y	y	y	y	y	y
Pol	y	y	y	y	y	y	y	y
Est.	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
IV	C×Imm90	C×Imm90	C×Imm90	C×Imm90	C×Imm90	C×Imm90	C×Imm90	C×Imm90
Bandwidth	900	900	900	900	900	900	900	900
F-stat	4.177	3.764	3.345	3.369	3.585	3.225	2.568	2.952

Notes. Each column shows the regression of the change in vote share for the National Front in municipality m between 1995 and 2017 on the interaction between past immigration and policy assignment, where the instrument is constructed starting from placebo cut-offs C. The header of the table reports the placebo cut-offs as deviations from the real policy cut-off. All columns adopt the baseline specification as in table A10. *Bandwidth* indicates the deviation around the population threshold that is admitted for sampled municipalities. Standard errors are clustered at the region level. Standard errors are clustered at the regional level. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively.

C Additional results

C.1 Did the policy increase public housing?

The analysis rests on the assumption that the policy was effective increasing the share of public housing in those municipalities that have been subject to the legal obligation. Table A7 reports the regression of the change in public housing between 1999 and 2015 on assignment to the treatment. Treated municipalities display a larger increase by 2 percentage points in the share of public housing between 1999 and 2015. Figure A3 shows the same results. Municipalities above the threshold shows a larger increase in public housing over the period.

Figure A3: Effect of the Policy on the Change in public housing

Table A7: The Effect of the Policy on public housing

Housing 15	(1)	(2)	(3)	(4)
T	0.047***	0.023***	0.023***	0.024***
	[0.007]	[0.006]	[0.006]	[0.006]
Region FE	yes	yes	yes	yes
Housing Controls		yes	yes	yes
Immigration 90			yes	yes
Vote for FN 95				yes
Border				yes
Observations	325	325	325	325
Bandwidth	900	900	900	900
Polynomial	1st	1st	1st	1st
R^2	0.26	0.49	0.49	0.50

Notes. Columns 1-4 show the OLS regression of the change in the share of public housing over total housing in municipality m between 1999 and 2015 on treatment assignment. Columns 2-4 include a control for the share of public housing and home ownership in 1990. Columns 3-4 include immigration in 1990. Column 4 adds the vote share for the National Front in 1995 and a dummy equal to one for border municipality. *Bandwidth* indicates the deviation around the population threshold that is admitted for sampled municipalities. Standard errors are clustered at the region level. Standard errors are clustered at the regional level. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively.

C.2 Analysis on the 2012 elections

Table A8 reports the results results of estimating the main equations as in Table A10, for electoral results in 2012 and immigration in 2011. It is interesting to observe that the most complete specification remains precisely estimated, but the magnitude of the coefficient is almost halved with respect to the estimates for 2017 as in table 3. This seems to be very consistent with the fact that the public housing policy takes time before being deployed in full force, and before the accommodations are actually assigned. The effect appears to be growing over time.

Table A8: The Effect of Immigration on Vote for the Far-Right in 2012

	OLS		IV			
FN Vote	(1)	(2)	(3)	(4)	(5)	(6)
Immigration '15	-0.001		0.040**	0.048***	0.038***	0.044***
	[0.005]		[0.016]	[0.018]	[0.012]	[0.017]
Policy×Immigration '90		0.006**				
		[0.002]				
Region FE	yes	yes	yes	yes	yes	yes
Controls	yes	yes	yes	yes	yes	yes
Controls×Imm90				yes		yes
Controls×Policy					yes	yes
Observations	325	325	325	325	325	325
Bandwidth	900	900	900	900	900	900
R-squared	0.02	0.03	0.31	0.30	0.20	0.22
Estimator	OLS	OLS	2SLS	2SLS	2SLS	2SLS
Instrument			P×Imm90	P×Imm90	P×Imm90	P×Imm90
KP F-stat			12.218	19.362	19.109	22.756

*Notes.*Each column shows the regression of the change in vote share for the National Front in municipality m between 1995 and 2012 on immigration in 2011. Column 1 shows the OLS regression on the main regressor. Columns 2 shows the reduced form. Columns 3-6 report IV estimates, where immigration in 2011 is instrumented by the interaction between immigration in 1990 and policy assignment. All specifications include controls for policy assignment, pre-policy immigration, population, public housing, home ownership, border municipalities and region fixed effects. *Bandwidth* indicates the deviation around the population threshold that is admitted for sampled municipalities. *KP F-stat* is the Kleibergen-Paap rk Wald F statistic for the first stage. Standard errors are clustered at the regional level. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively.

C.3 Qualifying the immigration shock

Immigration is a composite phenomenon, that may take different features depending on the empirical setting and, in particular, on the specific pull and push factors at play. In this paper, I identify the political consequences of immigration, as generated by the increase in the supply of public housing. The allocation of public housing strongly depend on family composition. In particular, large families with children are the most likely winners.

Table A9 shows that, indeed, the policy generates an immigration flow where the youngest age group is over-represented. Columns 1 to 3 report the same specification as in equation 2, where the dependent variable is the share of young immigrants (below 15) over the total population. In columns 4 to 6, the dependent variable is the share of adult immigrants (above 15) over the total population. Comparing the effect of the policy on immigration across age groups and with the total effect in table 2, it can be observed that young migrants account for almost the 16% of the total immigration flow. This is remarkable if compared to 5%, i.e. the average incidence of children over the total immigrant population in 2015.[30]

[30]For the average municipality, the share of immigrant children over the total population is 0.3%. The share of all immigrants over the total population is 6%.

Table A9: Immigration by Age Groups

	Immigrants < 15 years old			Immigrants > 15 years old		
Immigration 15	(1)	(2)	(3)	(4)	(5)	(6)
Δ Housing	0.051***	0.069**	0.070**	0.091	0.375**	0.384***
	[0.013]	[0.029]	[0.028]	[0.068]	[0.155]	[0.148]
Region FE	yes	yes	yes	yes	yes	yes
Housing		yes	yes		yes	yes
All Controls			yes			yes
Observations	325	325	325	325	325	325
Bandwidth	900	900	900	900	900	900
Polynomial	1st	1st	1st	1st	1st	1st
R^2	0.48	0.48	0.52	0.67	0.62	0.62
Estimator	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
Instrument	T×Imm90	T×Imm90	T×Imm90	T×Imm90	T×Imm90	T×Imm90
1st Stage F-stat	34.675	15.276	16.117	34.675	15.276	16.117

Notes. Each column shows the IV regression of immigration in municipality m in 2015 on public housing, where the change in public housing between 1999 and 2015 is instrumented with policy assignment. In columns 1-3, the dependent variable is the share of immigrants aged below 15 over the total population. In columns 4-6, the dependent variable is the share of immigrants aged above 15 over the total population. All specifications include immigration in 1990 and region fixed effects. Columns 2 and 5 include controls for public housing and home ownership in 1990. Columns 3 and 6 also add the vote share for the National Frontin 1995 and a dummy equal one for border municipalities. *Bandwidth* indicates the deviation around the population threshold that is admitted for sampled municipalities. *Polynomial* indicates the polynomial order of the population variable. *1st Stage F-stat* is the Kleibergen-Paap rk Wald F statistic for the first stage. Standard errors are clustered at the regional level. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively.

C.4 Vote for Other Parties

In this paper, I interpret the increase in the vote share for the National Front as a signal of hostility towards immigration. This is likely to be a credible proxy because the National Front has a strong, consistent over time and salient anti-immigration platform. However, it is difficult to pin down exactly why voters opt for a specific party, as voting implies selecting over bundles of policies. Analysing the effects of immigration on the specificity of the mechanism captured here.

In table A10, I show effect of immigration on the vote share for all the main parties competing in the 2017 election and turnout. To improve comparability, the estimated models include the same controls as the main specification in table 3. The dependent variable is the vote share for the UMP (François Fillon) in column 2; *Republique en Marche* (Emmanuel

Macron) in column 3; Socialist Party (Benoît Hamon) in column 4; *France Insoumise* (Jean-Luc Mélenchon) in column 5; turnout in column 6. In column 1, I report the main result for the National Front for comparison. The change in immigration appears to have a significant effect only on the vote share for the National Front.

It is interesting to observe that the negative effect of immigration on the vote share for *Republique en Marche* is close to the 10% significance level, whilst there is no evidence of a shift away from left-wing parties. This may suggest that immigration re-orients voting choices within, rather than across, party families.

Table A10: The Effect of Immigration on Vote for other Parties

	(1) FN	(2) UMP	(3) REM	(4) SOC	(5) FI	(6) Turnout
Immigration 15	1.338**	-0.716	-0.833	-0.169	0.355	-0.047
	[0.659]	[0.963]	[0.531]	[0.191]	[0.888]	[0.526]
Immigration 90	yes	yes	yes	yes	yes	yes
T	yes	yes	yes	yes	yes	yes
Region FE	yes	yes	yes	yes	yes	yes
Housing	yes	yes	yes	yes	yes	yes
Border	yes	yes	yes	yes	yes	yes
Observations	325	325	325	325	325	325
Bandwidth	900	900	900	900	900	900
Polynomial	1st	1st	1st	1st	1st	1st
R^2	0.13	0.15	0.03	-0.03	0.10	0.33
Estimator	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
Instrument	T×Imm90	T×Imm90	T×Imm90	T×Imm90	T×Imm90	T×Imm90
1st Stage F-stat	14.157	14.157	14.157	14.157	14.157	14.157

Notes. Each column shows the regression of electoral outcomes in municipality m in 2017 on immigration in 2015. The dependent variable is the vote share for the National Front in column 1, the UMP in column 2, *Ressemblement pour la République* in column 3, the Socialist party in column 4, *France Insoumise* in column 5, turnout in column 6. All columns report the instrumental variable specification, where immigration is instrumented with the interaction between policy assignment and immigration in 1990. All specifications include separate controls for policy assignment and immigration in 1990, region fixed effects and a dummy equal one for border municipalities. They also include controls for public housing, home ownership, unemployment, employment in the private sector, higher education and high-school dropouts in 1990, and the vote share for the National Frontin 1995. *Bandwidth* indicates the deviation around the population threshold that is admitted for sampled municipalities. *Polynomial* indicates the polynomial order of the population variable. *1st Stage F-stat* is the Kleibergen-Paap rk Wald F statistic for the first stage. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively.

D Pre-treatment covariates

D.1 Sorting around the threshold

Figure A4 reports the McCrary test for the continuity of the running variable around the threshold. The test strongly reject the hypothesis of a discontinuity around the threshold, i.e. there is no evidence to suggest that municipalities manipulate their population estimates to sort on the two sides of the threshold.

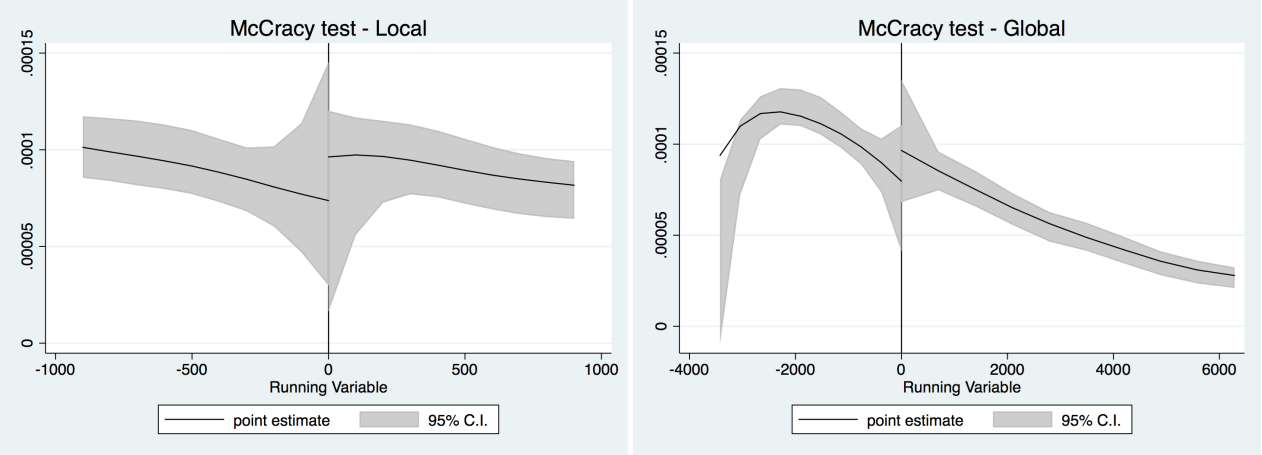

Figure A4: McCrary test on the running variable

D.2 Continuity of other variables

Figure A5 reports the distribution of pre-treatment variables over the running variable. I include the municipalities in the main sample, i.e. within a bandwidth of 900 inhabitants around the population threshold. There is no evidence of any discontinuity around the population threshold.

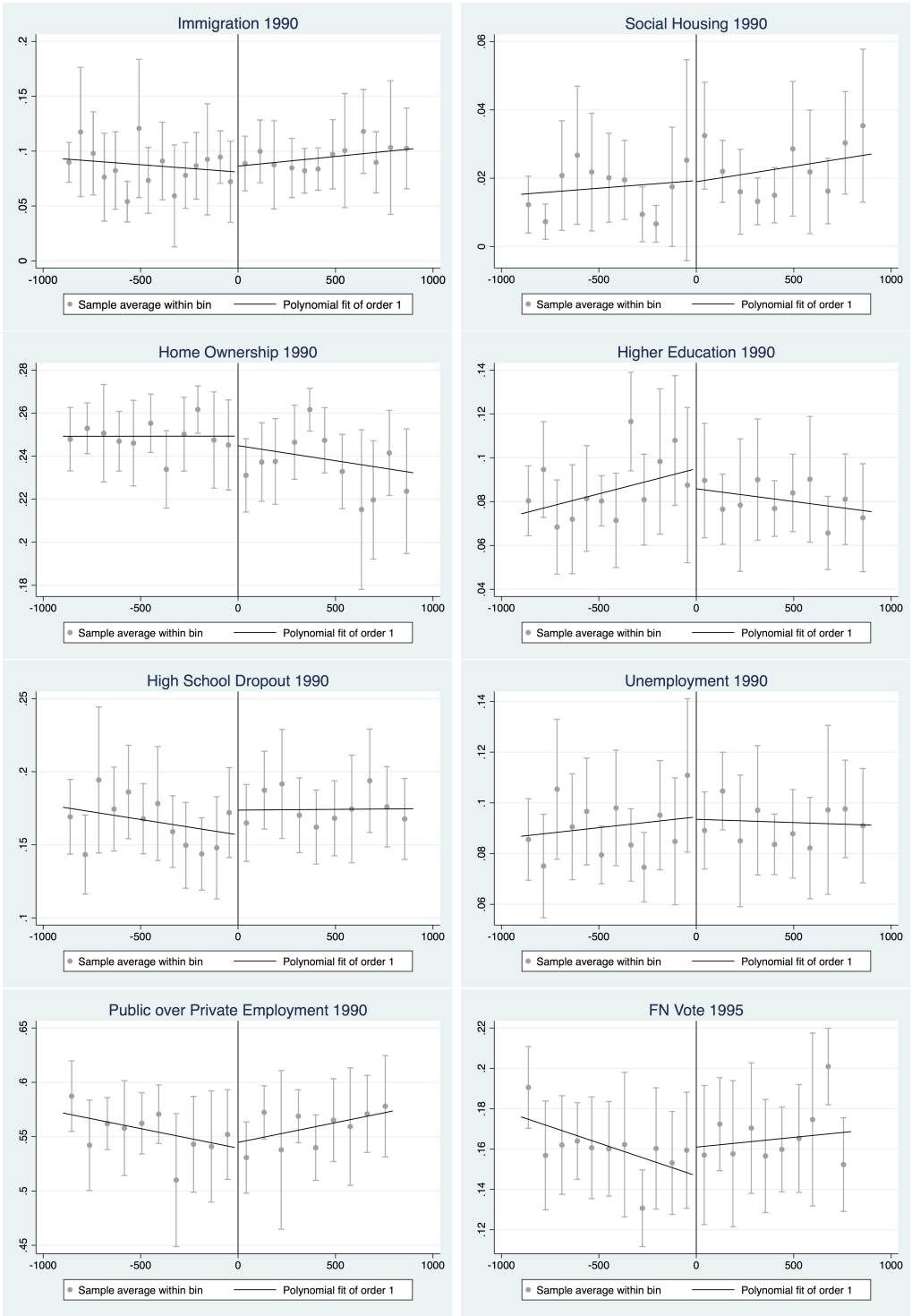

Figure A5: Continuity in the pre-treatment variables

Emotion and Reason in Political Language*

Gloria Gennaro† Elliott Ash‡

Abstract

We use computational linguistics techniques to study the use of emotion and reason in political discourse. Our new measure of emotionality in language combines lexicons for affective and cognitive processes, as well as word embeddings, to construct a dimension in language space between emotion and reason. Applying the method to the U.S. Congressional Record for the years 1858 through 2014, we show that emotionality in U.S. politics was stable until the early 1970s, after which time it increased significantly. More polarized politicians use more emotional language in their speeches. Emotionality increased after floor speeches became televised.

Key Words: Political Rhetoric, Word Embeddings, Emotions, LIWC, US Congress

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"In politics, when reason and emotion collide, emotion invariably wins." –Drew Westen

"An emotional speaker always makes his audience feel with him, even when there is nothing in his arguments; which is why many speakers try to overwhelm their audience by mere noise." – Aristotle

1 Introduction

On the traditional enlightenment view of a deliberative discourse, rhetoric serves the goals of representation and deliberation on objectives and means among an educated elite (Dryzek, 2010). On a more realist note, political rhetoric can be understood as the art of persuasion – the ability to find effective strategies to gain the favour of the audience (Riker and Mueller, 1996). In his treatise on *Rhetoric*, Aristotle suggests that persuasion can be achieved through either logical argumentation or emotional arousal in the audience; success depends on selecting the most appropriate strategy for the given context. Do politicians follow this venerable wisdom? When are emotional appeals preferred over cognitive argumentation in political discourse? In particular, do career concerns and electoral incentives shape the way in which politicians select between the two?

These old questions of how emotion and reason serve the goals of the politician and the needs of the polity remain actively contested by political theorists. Therefore new evidence on this debate could have important positive and normative implications for our understanding of the functioning of deliberative democracy. In recent years political scientists have begun to apply principles and methods from cognitive and affective psychology to understand empirically the roles of emotion and reason in politics. The use of emotions in political persuasion (from campaigning to agenda setting) has increasingly gained the attention of scholars who are interested in the formation of attitudes and opinions. It has been shown that emotionality, along with cognitive reasoning, significantly affects the formation of predispositions, political attitudes, and behaviours, as well as opinions on issues and candidates. Emotions can be elicited by political elites to persuade or mobilize voters.

This project aims to analyze empirically the use of emotion and reason in political speech. The empirical context is the two houses of U.S. Congress for the years 1858 through 2014. Our measures of rhetoric are constructed from the text of parliamentary speeches published in the *U.S. Congressional Record* for these years.

To construct a scalar dimension for emotion and reason in language, we begin with the affective processing (emotion) and cognitive processing (reasoning) lexicons from Linguistic Inquiry and Word Count (LIWC) (Tausczik and Pennebaker, 2010). Using a word embedding trained on the Congressional Record, we construct vector representations for the affective and cognitive poles in semantic space. The relative emotionality of a word, then, is the proximity to the affective pole, relative to the cognitive pole. In turn, the emotionality of a document is the relative proximity of the document centroid to each of the two poles. We compute emotionality measures for each speech in the Congressional Record corpus. These emotionality/deliberativeness scores, linked to metadata on speeches and congressmen, provide the dataset for our analysis.

With these measures of emotion and reason in political speech, we ask a number of questions about the rhetoric of U.S. Congressmen. First, how has the use of emotion and reason changed in Congress over the last two centuries? Does the emotional quality of rhetoric vary by gender or by political party? We find that emotionality has increased since the 1970s (a trend not observed in non-political language), and that women and minorities use more emotion in their speeches. Also, in both parties, congressmen use more emotion in their speeches when they belong to the opposition or they are more extreme on the left-right dimension (in the sense that they are more partisan in their roll call votes).

Looking to institutional determinants of rhetoric: Does the use of emotional speech respond to electoral pressures and media exposure? Do politicians respond to strategic incentives and sacrifice cognition to favour emotions? We find that the introduction of television cameras to the congressional floor increased emotionality of speeches. The effect is strongest under higher electoral pressure.

To summarize, our contribution is threefold. First, we propose a novel methodology for estimating the relative importance of emotional and cognitive language in political speech, both over time and across policy domains. Second, we provide a thorough and systematic

description of how the emotional content of political language has evolved over time, and differentially across parties and demographic groups. Third, we apply this method to shed new light on old but open questions in the study of politics, providing empirical evidence of a strategic use of emotional language that serves politicians' career concerns.

This work relates to other recent attempts of analysing political speech with automated text analysis tools (e.g. Jordan et al., 2019; Rheault et al., 2016). Among those, by exploring the dichotomy between emotions and cognition in political speech, we contribute to the literature that investigates the use of specific political language to the purpose of persuasion. This is a growing body of literature that spans from the the study of positive and negative language in political campaigns (e.g. Ansolabehere and Iyengar, 1997; Lau et al., 2007), to incivility (Brooks and Geer, 2007).

Our epistemological approach is particularly close to other attempts of using new methods to shed light on old political concepts. One important example of this endeavour is the new body of works around textual sophistication of political speech. The question of how politicians strategically select the level of complexity when communicating to the public has seen a resurgence of academic interest. Spirling (2016) shows how British cabinet ministers simplified the language of their speeches in Congress following a large wave of enfranchisement. On a similar note, Bischof and Senninger (2018) find that voters are more likely to correctly guess party positions on specific policy issues when textual complexity in their manifestos is lower, and observe that populist parties typically communicate with simpler language. Lin and Osnabrügge (2018) similarly show that German congressmen use less sophisticated language in the Bundestag meetings, when their constituency is relatively poor. A recent paper by Benoit et al. (2019) builds on this renewed interest and proposes a novel measure of linguistic sophistication in political text.

Finally, we add to the efforts of other scholars that use computational social science techniques to study the US Congress across various dimensions. This includes, among others, political polarization (Gentzkow et al., 2019) and posturing (Ash et al., 2017).

The theme of this literature is that new technical possibilities have encouraged efforts to answer substantive questions in innovative ways. Our paper builds on this literature toward understanding emotion and reason in political rhetoric. We hope the results are useful to a

range of researchers in political science and computational social science.

2 Cognition and Emotions in Political Discourse

The analysis of emotions and cognition in political discourse dates back to the earliest studies of rhetoric. Aristotle's treatise (*Rhetoric*) identifies three methods through which persuasion can be achieved. First, one can demonstrate the speaker's credibility or virtue (ethos). Second, logical argumentation (logos) is exemplified by syllogistic reasoning and works best in the presence of a sophisticated audience. Third, emotional arousal (pathos) works by convincing the audience of one's sincere feelings and is recommended for a wider audience.[1]

Starting from these early attempts, the dichotomy between emotions/affect and rationality/cognition has informed all realms of social sciences, from social psychology (LeDoux, 1998) to political philosophy (Elster, 1999). However, limited systematic evidence exists today on the specific use of emotional (as opposed to cognitive) language for the purposes of political persuasion.

If the choice of rhetoric styles is tied to the audience, one should expect that politicians adapt their level of emotional and cognitive language to the audience they want to reach. When political discourse is aimed at fellow congressmen (a sophisticated audience), then cognitive language may be expected to prevail. However, closer to an election politicians may try to address their talk toward voters (a less sophisticated audience), and logical argument may be substituted by emotional arousal.

Recent studies by political communications scholars have produced evidence for how emotions might influence voting. First, emotions can modify voters' political behaviour. It has been shown, for instance, that eliciting enthusiasm and anxiety through electoral

[1] Aristotle argues, "Your language will be appropriate if it expresses emotion and character, and if it corresponds to its subject [...] To express emotion, you will employ the language of anger in speaking of outrage; the language of disgust and discreet reluctance to utter a word when speaking of impiety or foulness; the language of exultation for a tale of glory, and that of humiliation for a tale of and so in all other cases. This aptness of language is one thing that makes people believe in the truth of your story: their minds draw the false conclusion that you are to be trusted from the fact that others behave as you do when things are as you describe them; and therefore they take your story to be true, whether it is so or not. Besides, an emotional speaker always makes his audience feel with him, even when there is nothing in his arguments; which is why many speakers try to overwhelm their audience by mere noise."

campaigns affect differentially political participation, vigilance and information acquisition (Marcus and MacKuen, 1993; Marcus et al., 2000; Brader, 2005). Emotional appeals allow politicians to target specific subgroups in the wider audience if voters who are higher in emotive sensitivity tend to respond to political arguments phrased in emotional language (Gault and Sabini, 2000; Loewen et al., 2017).

Eliciting emotions can also modify voters' attitudes towards candidates and policy issues. It has been shown that politicians with happy faces are more likely to attract votes(Sullivan and Masters, 1988). In a similar vein, politicians can use frames over policy issues to trigger emotions that, in turn, inform voters' opinions on those issues (Gross, 2008; Brader et al., 2008; Renshon et al., 2015).

Finally, emotional language is more likely to communicate large and consensual values (Jerit, 2004), and is more likely to be reported by the media (Bennett, 2016). This is also true for modern political communication through social media. Brady et al. (2017) shows that the use of moral-emotional language is associated with increased sharing of political messaging on social media.

3 Measuring Emotion and Reason in Text

This section outlines the approach to measuring dimensions of emotion and reason in unstructured text. First we describe our source lexicons for identifying the dimensions, then outline the application to U.S. Congressional speeches. Third, we discuss how we measure sentiment.

3.1 Lexicons for Emotion and Cognition

We aim to measure emotionality and cognitionality in political speech. To build lexicons of emotive and cognitive words, we start with Linguistic Inquiry and Word Count (LIWC) 2015 edition (Pennebaker et al., 2015). LIWC researchers have collected coherent sets of words, word stems, and idiomatic expressions that map onto various structural, cognitive, and emotional components of text.

From LIWC we take two lexicons. First, to get at reasoning we use the "Cognitive

Processing" lexicon, consisting of 799 words, phrases, and wildcard expressions. This lexicon embraces concepts of insight, causation, discrepancy, certainty, inhibition, inclusion, and exclusion. Second, to get at emotion we use the "Affective Processing" lexicon, consisting of 1 445 tokens, phrases, and wildcard expressions. This lexicon refers to emotions, both positive (joy, gratitude) and negative (anxiety, anger, sadness).

We reviewed the raw LIWC dictionaries to exclude non-verbal expressions (e.g. emojis), punctuation, digits, and multi-word expressions. We applied the wildcard expressions to WordNet's list of English words, examining the resulting output and excluding false positive matches (such as "admir*" matching to "admiral"). To partially automate the process of discovering false positives, we computed the cosine distance (in embedding space, using spaCy's pre-trained GloVe model) from each word to the centroid of the associated lexicon and then excluded the top quartile of most dissimilar words.[2] Finally, we filter the lists by part of speech (noun, adjective, verb)[3] and stem. At the end of the process, we have a list of stemmed nouns, verbs, and adjectives representing affective processing (848 tokens) and cognitive processing (359 tokens). In Appendix A.8 we report the two final dictionaries and the frequency of each dictionary word in the corpus.

3.2 Scaling Congressional Speeches by Emotion and Cognition

Our empirical corpus comprises digitized transcripts of the universe of speeches in the U.S. Congress and Senate between 1858 and 2014 ($N = 9\,799\,375$ speeches). This constitutes the whole corpus of speeches available from the *U.S. Congressional Record*, after removing those speeches that contain readings of pieces of legislation.[4]

Each speech in the corpus is first segmented into sentences. To extract the most informative tokens, we tag parts of speech and take only nouns, adjectives, and verbs. Punctuation, capitalization, digits, and stopwords (including names for states, cities, months, politicians and procedural words) are removed.Tokens are stemmed using the Snowball stemmer. After

[2]This procedure eliminates 279 words from the dictionary of cognitive language, and 536 words from the dictionary of affective language. In Appendix A.2, we report all the excluded words.

[3]This procedure eliminates 185 words from the dictionary of cognitive language, and 293 words from the dictionary of affective language.

[4]We identify those by the presence of list identifiers, e.g. (a), (b).

filtering out rare stems (those occurring in less than 10 speeches), we have 63 334 token types left in the vocabulary. The pre-processing steps are detailed in section A.1 of the Appendix.

To map the semantics of congressional language, we train a Word2Vec model on the corpus of all speeches. Word2Vec is a popular word embedding model which embeds words in a relatively low-dimensional vector space (here, 300 dimensions). Semantically similar words (those used in similar language contexts – here, an eight-word window) tend to co-locate in the space. For our purposes, the important feature of word vectors is that directions in the space correspond to semantic dimensions of language (e.g., emotion and cognition dimensions). We use the implementation from the Python package *gensim* and train the model for 10 epochs.

As an indication for what semantic dimensions are encoded, Figure 1 shows clouds for the non-dictionary words in our lexicon that are closest to the emotive and cognitive centroids. Word size indicates closeness to the centroid. The word clouds illustrate the clear, intuitive, and distinct flavors of language at each linguistic pole.

Using the word vectors we now produce document vector representations for each congressional speech. We follow the method for embedding sentences and short documents from Arora et al. (2016). A speech i is a list of words indexed by w with corresponding vectors $\vec{w}$. The document vector for speech i is computed as

$$\vec{d_i} = \frac{1}{|i|} \sum_{w \in i} \frac{\alpha}{f(w) + \alpha} \vec{w} \tag{1}$$

where $|i|$ is the number of tokens in the speech, $f(w)$ is the relative frequency of word w in the corpus, and $\alpha = 0.001$ is a smoothing parameter. This expression gives the centroid (average) of the vectors of the words, weighted by smoothed inverse frequency. This aggregation metric serves to up-weight relatively rare words, which tend to be more informative about a speech's distinguishing content.

Meanwhile, we use our lexicons to construct two "poles" in the semantic space of the *Congressional Record*, representing the concepts for emotion and cognition. Formally, these poles are the respective (SIF-weighted) vector centroids for the affective and cognitive lexicons, calculated as in equation 1. Let these vectors be represented by $\vec{A}$ and $\vec{C}$, respectively.

Now we have the ingredients for scaling texts along the emotion and cognition dimensions. Our measure for the emotionality of speech i is

$$Y_i = \frac{\text{sim}(\vec{d_i}, \vec{A}) + 1}{\text{sim}(\vec{d_i}, \vec{C}) + 1}$$

where $\text{sim}(a, b)$ gives the cosine similarity between vectors a and b. The addition of one in the numerator and denominator is for smoothing outliers. An increase in Y_i indicates a shift towards the emotion pole and away from the cognition pole.

How does this metric work in practice? To get a sense, we report in Tables 1 and 2 a selection of speeches illustrating our semantic poles. Again, there is a clear differential in the tone, following intuitive language for logic and emotion.

For robustness, we calculate alternative measures of emotionality in speeches, based on different metrics as proposed in the literature. In section A.6 of the Appendix, we report our main results when using the Tf-Idf incidence of emotional or cognitive words in our corpus. In section A.7 of the Appendix, we follow the method by Kozlowski et al. (2019) to recover hidden geometries in language; we report our main result where emotionality is measures as the cosine similarity of each document vector to the affect-cognition vector. All alternative measure yield very similar results.

3.3 Emotionality and Sentiment

We further seek to investigate the relation between emotionality and sentiment, by distinguishing positive versus negative sentiment. For this purpose, we made analogous lexicons, starting with the seed lexicons from Demszky et al. (2019), which have 7 positive words and 5 negative words. We then enlarge those dictionaries to include, for each dictionary word, the 10 most similar words in our lexicon. The complete word lists are available in Appendix A.9. Let $\vec{P}$ and $\vec{N}$ be the centroids of the positive and negative dictionaries respectively. The measure of sentiment for each document i is the ratio between its cosine similarity with the positive pole and the negative pole:

$$S_i = \frac{\text{sim}(\vec{d_i}, \vec{P}) + 1}{\text{sim}(\vec{d_i}, \vec{N}) + 1}$$

Figure 3 shows the joint distribution of emotionality and sentiment across speeches. There is no stark preponderance of positive or negative sentiment for different levels of emotionality. This suggests that emotionality and sentiment are two distinct dimensions in our corpus. Hence, the affect-cognitive dimension is capturing a distinct feature of language.

To explore the role of sentiment within our emotion and cognition dictionaries, we classify each word in the two dictionaries into a positive or negative sentiment subset. We do that by computing the sentiment score for each word in our dictionary, and assigning the label of the closer centroid. Hence, we divide our initial dictionaries into four subsets, and we construct centroids for the positive-emotive words ($\vec{A}_+$), negative-emotive words ($\vec{A}_-$), positive-cognitive words ($\vec{C}_+$), and negative-cognitive words ($\vec{C}_-$). As an indication for what semantic dimensions are encoded, Figure 2 shows clouds for the non-dictionary words in our lexicon that are closest to the centroids: positive-cognitive, positive-emotive, negative-cognitive, and negative-emotive, respectively. Word size indicate closeness to the centroid. The word clouds illustrate the clear, intuitive, and distinct flavors of language at each linguistic pole.

4 Empirical Analysis

This section reports our empirical analysis. First, we look at long-run variation in emotive language over time in Congress. Second, we look at how emotive language varies across congressmen. Third, we look at the impacts of the electoral cycle and of televised debates.

4.1 Variation in Emotion over Time

Figure 5 shows how emotive language has evolved over the years 1858 through 2014. We observe a general trend towards higher emotionality in political language. Two major spikes in our time series occur in 1917 and 1939. These two years correspond to the entry of the United States into World War I (with President Wilson's declaration of war against Germany

being approved by the Congress), and the beginning of World War II (with Germany's invasion of Poland). Further investigation is needed to safely attribute those spikes to the events mentioned here.

A key concern with these estimates is that language in general, not just in politics, has become more emotional. This concern is increased by the fact that our dictionary is time-invariant and based on contemporary language as of 2015. Therefore the change could be due to general changes in language toward more recent years, combined with the fact that we have more emotion words than cognition words in our lexicon. We address these possible concerns by comparing to a corpus that is representative of more general cultural corpora: Google Books.[5] Emotionality in the Google corpus slightly declines over time, suggesting that the trends that we observe in the Congressional Record are specific to politics. In addition, the trend is unchanged if we normalize each data point by year by the emotionality score calculated over Google unigrams for that year (see Appendix Section A.4).

Figure 6 reports the timeseries break down by speaker characteristics for the years 1900-2014. Both party and gender seem to matter in intuitive ways. Congresswomen score highest in emotion for the whole period. Democrats were more emotional in the 1980s through 2000s, with Republicans becoming more emotional since 2008. We unpack these differences statistically through regression analysis in Subsection 4.2.

Next, Figure 7 shows the trends in emotionality by Chamber. The House of Representatives is characterised by higher levels of emotional language than the Senate throughout the period. After a long period of relative stability, both chambers have an upward trend starting around 1980 until today. An intriguing hypothesis is that these trends breaks are due to C-SPAN, the public television network that broadcasts floor speeches. In the graph we annotated the founding of the C-SPAN organization, the introduction of C-SPAN 1 (for the House of Representatives), and the introduction of C-SPAN 2 (for the Senate). In Subsection 4.3, we further analyze these events.

[5]We use unigrams from Google N-grams, which are counts over single tokens extracted from the universe of books collected in Google Books, between 1900 and 2009.

4.2 Variation in Emotion Across Politicians

Now we look at variation across politicians in emotive language. First, to give texture to the descriptive evidence, in Table 3 we report the highest-ranking members on the metric for the period 2009-2014. The top 5 most emotional members of Congress include famous names, such as Nancy Pelosi, Hillary Clinton, and Joe Biden. It is reasonable to expect that more visible politicians would make use of more emotional language in Congress. Indeed, their speeches are more likely to be covered by the press and hence to be heard by the general public.[6]

What are the characteristics of congressmen that drive this variation? In order to capture the individual correlates of emotional language, we estimate a linear model for emotionality Y_{ijt} of speech i by politician j in chamber c at year t:

$$Y_{ijct} = \alpha_{jct} + X'_{jct}\beta + \epsilon_{ijct} \tag{2}$$

where α_{jct} includes fixed effects (chamber-year or speaker, as discussed further below), and X_{jct} includes the congressional characteristics of interest. Standard errors are clustered by speaker.

Table 4 reports the OLS estimates for time-invariant congressman characteristics. Chamber-year fixed effects are included, so estimates use variation between congressmen and their colleagues in the same chamber in the same year. The most robust finding, from columns 1, 3, and 4, is that female congressmen use more emotional language than their male colleagues. There is no statistical difference between Democrats and Republicans, however (columns 2, 3, 4). Black members of Congress tend to use more emotional language than white congressmen, while there is no difference for Hispanics (Column 4).

Table 5 reports the OLS estimates for time-varying congressman characteristics. All regressions include chamber-year fixed effects, and in addition we add speaker fixed effects to estimate within-congressmen responses to changes in institutional conditions. In particular,

[6]For the same time period, we also pooled the House and Senate and ranked the associated U.S. States by emotionality. The five most emotional states are Rhode Island, Ohio, South Carolina, Illinois, and Vermont. The five most cognitive states are Nevada, Montana, North Dakota, West Virginia and New Mexico. The full table of emotionality by State is available in Appendix Section A.5.

we look at the effect of being in the minority party. We find that speech is more emotional on average when pronounced by a member of the minority party. The correlation holds controlling for individual fixed effects, suggesting that the same individual uses more emotional language when her party is in the opposition.

A key question from a policy perspective is whether emotionality is correlated with partisan ideology. Figure 4 plots the emotionality score against the first dimension of the DW-Nominate score. The plot reveals a striking U-shaped relationship: congressmen with more extreme ideological positions (either left or right) tend to use more emotionally charged language in their floor speeches. Table 6 shows this in a regression, where the explanatory variable is the absolute value of the DW-Nominate score. There is a significant positive effect of the first dimension, but no effect of the second dimension. The correlation holds when controlling for demographic characteristics.

4.3 Emotionality, Elections, and Television

When speaking in floor debates, politicians are expected mainly to address fellow Members of Congress. But speakers are also mindful about how their words may be interpreted by voters – through reporting by journalists, or directly through the C-SPAN television feed. That is, congressional speeches may become a device for appealing to voters, especially when TV can communicate speeches to the larger electorate. In our case, we analyze how the introduction of C-SPAN impacts the emotionality in congressional speeches.

C-SPAN was founded in 1975 as a nonprofit public service. C-SPAN1 started broadcasting from the House in 1979. In 1986 C-SPAN2 started its operations transmitting from the Senate. The graph in Figure 7 provides some suggestive evidence of a possible role of broadcasting in increasing the use of emotional language in the Congress.

Zooming in on this time period, we note that the first Congress elected after the founding of C-SPAN takes office in 1977. This is the precise timing of the trend break in emotional language. Importantly, the trend is more pronounced in the House than in the Senate. A possible explanation for this difference in the aggregate trends is that the two Chambers are subject to different electoral institutions. Specifically, members of the House are elected every two years and the Chamber is completely renewed. The Senate, on the contrary, is renewed

by one third every two years, and each term lasts six years. It is likely that electoral incentives are stronger on members of the House who undergo re-election at the same time. The different timing in senators' re-election my water down the effect that electoral competition has on aggregate emotionality in the Senate.

Table 7 reports the results of a difference-in-differences strategy, where we estimate the effect of the introduction of C-SPAN in the House of Representatives on the use of emotional language. In this case, the differential levels in emotionality in the House before and after C-SPAN are compared to the same trends in the Senate, where broadcasting is introduced only six years later. Specifically, we estimate the following equations for different temporal windows around the introduction of C-SPAN:

$$Y_{ijt} = \alpha_{ijt} + H_{jt} \times CSPAN_{ijt} + H_{jt} + CSPAN_{ijt} + \epsilon_{ijt} \tag{3}$$

where H_{jt} is a dummy equal to one if speaker j in year t is a member of the House, $CSPAN_{ijt}$ is a dummy equal to one if speech i is pronounced after 1979, α_{ijt} includes fixed effects (year or speaker). Standard errors are clustered at the speaker level. Different estimation strategies yield consistent results, suggesting that (i) speeches in the House are on average more emotional than speeches in the Senate and (ii) C-SPAN increases the use of emotional language in the House by around 10% of a standard deviation.

In Table 8 we provide an alternative specification where the full sample is included. In this case, the effect of C-SPAN in the House (after 1979) and in the Senate (after 1986) are pooled together, and the marginal effect of C-SPAN is estimated as the differential with the average emotionality in the period.

Columns 6 and 7 of Table 7 provide some indicative evidence on the mechanisms at play. On the one hand, C-SPAN may act on selection of politicians. Candidates anticipate that their speeches will be televised; this may induce a self-selection into the pool of candidates that is driven by personality traits correlated with the use of emotional rhetoric. Similarly, parties anticipate that elected officials will be observed by voters, and hence they may select candidates that are more likely to appeal to voters once in office. On the other hand, C-SPAN may act on the behaviour of politicians. Elected officials may respond to the introduction of C-SPAN by changing their rhetoric and, specifically, by using more emotional language.

In Column 6, we see that the individual fixed effect absorbs the whole effect of C-SPAN on emotionality. Interestingly though, evidence of a marginal individual response to C-SPAN appears again when we restrict the sample to speeches starting in 1977. As previously observed, the adjustment to C-SPAN is already visible in 1977. This date corresponds to the beginning of the 95th Congress, i.e. the first after the foundation of C-SPAN. Once we exclude 1976 - *de facto* conditioning on having being elected in 1976 when the adjustment through entry is likely to have taken place - C-SPAN shows significant explanatory power for the change of emotionality within individual speaker. All in all, the results suggest that both mechanisms are in place: (i) a main effect of substitution of less emotional Members of Congress with more emotional ones, starting on the 1976 election and (ii) a secondary effect of adjustment, where individuals increase their level of emotionality after C-SPAN is introduced.

Finally, we explore the effect of C-SPAN on the use of emotional language in the Senate. If broadcasting matters because politicians intend to persuade voters, then we should find a stronger incidence of emotional language when electoral incentives are stronger. This should be the case during the months before the elections, leading to electoral cycles in the use of emotional language. Figure 8 reports the trends of emotionality in Senators' speeches during the months before the elections. The sample is split in two groups, i.e. speeches occurring before the introduction of C-SPAN and those occurring after. The graph suggests an increase in emotionality occurring during the months before the elections, only for those speeches given after C-SPAN was introduced.

5 Conclusion

This paper has provided an analysis of emotion and reason in the language of U.S. Members of Congress. We produced a new measure of emotive speech, which combines dictionary methods with word embeddings to look at the relative use of affective and cognitive language. We then analyzed how that measure evolves over time, varies across individuals, and changes in response to electoral and media pressures.

These results add to the literature in political science on the determinants of political

communication. Emotionality has been increasing over time in Congress while it has been decreasing in the broader culture. Emotionality is higher for women and for minorities. It increases in response to electoral and media pressure. These results indicate a role for both behavioral and institutional factors in determining the emotionality of political rhetoric.

In future work, we will explore how emotionality varies across topics, and whether the dynamics exposed here are driven by the selection of more or less emotional topics rather than by change in the emotional framing of the same topics. Further, we will try to analyze the impacts on voters of emotionality in political language. Using the document embeddings, it is possible to identify comparable political arguments that differ in their use of emotive language. We will put these arguments to voters in an experimental context to assess their impacts on attitudes and vote intentions.

We also hope that the emotionality metric would be useful in analyzing other (non-political) corpora. In future work, we will produce measures for news articles, judicial decisions, and academic articles. Comparing the type of language across these different rhetorical contexts will provide evidence on how emotionality is used for different persuasive and professional purposes.

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Tables

Speaker, I am honored to join with my colleagues in paying tribute to my fellow Minnesotan.
President, last Saturday night, in the city of Chicago, some 2, 300 enthusiastic citizens of Illinois met together at dinner in a tribute to their great fellow citizen and public servant, U.
Speaker, I rise today to pay tribute to a dear friend of mine, and a fellow Missourian, who dies this week after a lifetime of service to his country and to his community.
Speaker, I would like to join today with my good friend Congressman RoSTENHOwsxI and the rest of my colleagues in honoring a good friend, a fellow Democrat and a neighbor who will be retiring at the end of this Congress, Representative GEORGE SHIPLEY.
Today, on behalf of a grateful State, I rise to honor Scott County Sheriff Cody Carpenter and Arkansas Game and Fish wildlife officer Joel Campora, who died heroically last week trying to save their fellow Arkansans from flash floods.
President, today, as America celebrates National Agriculture Week, I rise to pay tribute to our country's farmers and ranchers.
Speaker, It is with great pleasure that I pay tribute to our retiring colleague from my neighboring State of Michigan
Speaker, it is a pleasure and honor to join in paying deserved tribute to the dean of the Senate, the Honorable CARL HAYDEN, of Arizona, a great American who has served his country in public office for a half century.
On behalf of the people of central Texas, I thank Mayor Massey for all his years spent in service to his neighbors.
Madam Speaker, I rise today to pay tribute to a dear friend who departed this Earth last week, who I know is headed to glory because of the great things he did in Tarrant County for working men and women.

Table 1: Most affective sentences

This is not a request for additional authorization but it is rather an amendment to provide $200, 000 for a study under the pending current authorization.

President, I ask unanimous consent that the unanimous consent agreement be modified to delete the amendment by Senator STEVENS providing for additional funding for the Office of Technology Assessment.

This resolution requests funding at the same level as was requested and approved for the second session of the 94th Congress except for the additional funds identified for the summary of debate clerks.

Therefore, the Chair, in order to clarify the RECORD, requests that the page and line numbers be specified.

The purpose of the pending motion Is to recommit the bill to the Committee on Public Works, with instructions to make a substantial reduction in the total amount of the authorizations contained in the bill, so as to be in conformity with the criteria and standards which the Congress itself has established in the 1944 Flood Control Act, for application to projects of this kind, prior to the time of their authorization.

President, the request should be modified further as follows: the Weicker-Dixon amendment containing technical and conforming amendments to the bill to the relevant provisions of the DOD bill as passed by the Senate.

The report required by the act does not include the information requested in the resolution of the Senator from Nebraska.

I would not object to the unanimous-consent request to modify the Senate substitute to include that operative paragraph.

Speaker, in line with the point of order which was made by the gentleman from New York, I would like to propound a parliamentary inquiry because if this motion to instruct is a motion which in arriving at the total under dispute would limit the conferees to the items included in the motion, then the point of order, I think, is good insofar as, for example, an item in New Mexico, the Chamita Reservoir, for which $75, 000 for planning was included in the budget report and included in the total amount which the House approved for flood control when the bill was passed here first, and then included by the Senate as part of the construction money provided by the Senate.

In explanation of this, I find in the report, on page 11, a statement approving this amount, as follows: The Joint Committee has restored the full $2, 250, 000 originally requested by AEC for project 63-g-4 in order that improvement of these important research facilities may proceed without delay.

Table 2: Most cognitive sentences

Table 3: Most Emotional and Cognitive Members of Congress

House				Senate			
Name	State	Score	No Speeches	Name	State	Score	No Speeches
Artur DAVIS	AL	1.464	3	Hillary CLINTON	NY	1.402	4
Nancy PELOSI	CA	1.359	283	Joseph BIDEN	DE	1.391	3
Walter JONES	NC	1.339	279	Jeffrey CHIESA	NJ	1.358	5
Robin KELLY	IL	1.327	55	Ken SALAZAR	CO	1.246	4
Joyce BEATTY	OH	1.318	75	Paul KIRK	MA	1.240	20
Edward WHITFIELD	KY	0.900	411	Carte GOODWIN	WV	0.839	19
Robert ADERHOLT	AL	0.903	299	Jeff BINGAMAN	NM	0.880	533
Melissa BEAN	IL	0.904	39	Daniel INOUYE	HI	0.891	467
Justin AMASH	MI	0.910	39	Mark PRYOR	AR	0.893	521
Frederick BOUCHER	VA	0.911	105	Harry REID	NV	0.898	10286

Table 4: Individual Characteristics

	(1)	(2)	(3)	(4)
Female	0.293***		0.258***	0.281***
	[0.043]		[0.049]	[0.043]
Democrat		0.026	0.017	0.009
		[0.016]	[0.016]	[0.016]
Female × Democrat			0.043	
			[0.073]	
Black				0.151**
				[0.068]
Hispanic				0.086
				[0.069]
Catholic				0.048*
				[0.028]
Jewish				0.042
				[0.050]
Observations	5 532 609	5 532 609	5 532 609	5 532 609
R-squared	0.05	0.05	0.06	0.06

Notes. Each column shows the OLS regression of the standardized emotionality score in a given speech on individual speaker characteristics. The sample is composed of all speeches pronounced by Democrat or Republican Members of Congress, between 1858 and 2015. All specifications include chamber times year fixed effects. Standard errors are clustered at the speaker level. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 5: Party Characteristics

	(1)	(2)	(3)	(4)
Minority Party	0.104***		0.093***	0.104***
	[0.011]		[0.012]	[0.011]
Divided Government		0.001	-0.012	0.000
		[0.010]	[0.013]	[0.010]
Chamber × Year FE	Y	Y	Y	Y
Speaker FE	Y	Y		Y
Observations	5 532 559	5 532 559	5 532 609	5 532 559
R-squared	0.11	0.11	0.05	0.11

Notes. Each column shows the OLS regression of the standardized emotionality score in a given speech on party structure characteristics. The sample is composed of all speeches pronounced by Democrat or Republican Members of Congress, between 1858 and 2015. *Minority Party* is a dummy equal to one if the speech is given by a member of the party representing the minority in a given chamber and year. *Divided Government* is a dummy equal to one if at least one institution among the House, the Senate and the President is expression of a different political party. All specifications include chamber times year fixed effects. Columns 1, 2 and 4 also include speaker fixed effect. Standard errors are clustered at the speaker level. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 6: Ideology

	(1)	(2)	(3)
DW nominate 1	0.061***	0.062***	0.051**
	[0.018]	[0.022]	[0.024]
DW nominate 2		0.002	0.002
		[0.012]	[0.012]
Female			0.282***
			[0.016]
Democrat			0.009
			[0.013]
Black			0.143***
			[0.029]
Hispanic			0.094***
			[0.036]
Catholic			0.049***
			[0.010]
Jewish			0.043**
			[0.017]
Observations	5 471 685	5 471 685	5 471 685
R-squared	0.05	0.05	0.06

Notes. Each column shows the OLS regression of the standardized emotionality score in a given speech on the DW nominate score for the speaker. The sample is composed of all speeches pronounced by Democrat or Republican Members of Congress, between 1858 and 2015. *DW nominate 1* is the absolute value of the DW nominate score, first dimension. *DW nominate 2* is the absolute value of the DW nominate score, second dimension. All specifications include chamber times year fixed effects. Columns 1, 2 and 4 also include speaker fixed effect. Standard errors are clustered at the speaker level. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 7: Emotionality and C-SPAN: Congress

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
House × C-SPAN	0.133***	0.129***	0.095*	0.088**	0.042**	-0.005	0.041**
	[0.039]	[0.039]	[0.050]	[0.043]	[0.021]	[0.041]	[0.017]
House	0.082***	0.083***	-3.227	0.123***	0.112***		
	[0.024]	[0.023]	[2.765]	[0.036]	[0.037]		
C-SPAN	-0.138***						
	[0.036]						
Year FE		Y	Y	Y	Y	Y	Y
Time Trends			Y				
Speaker FE						Y	Y
Window	1858-1985	1858-1985	1858-1985	1973-1985	1977-1980	1973-1985	1977-1980
Observations	3 727 840	3 727 840	3 727 840	968 569	329 566	968 569	329 562
R-squared	0.00	0.01	0.01	0.01	0.01	0.06	0.06

Notes. Each column shows the OLS regression of the standardized emotionality score in a given speech on time and Chamber dummies. The sample is composed by all speeches given in the House or the Senate by Republican or Democrat Members of Congress. *House* is a dummy equal to one if the speech is given in the House of Representatives. *C-SPAN* is a dummy equal to one of the speech have been given in 1979 onwards. Regressions 1 to 3 include all available years until 1985. Regressions 4 to 7 include only observations within a symmetric window around 1979, as indicated by *Window*. Regression 3 includes differential time trends for the House and the Senate. Regression 6 and 7 include individual speaker fixed effects. Standard errors are clustered at the speaker level. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 8: Emotionality and C-SPAN: Alternative Specification

	(1)	(2)	(3)	(4)
6-years window	-0.223***	-0.107***	-0.063***	
	[0.002]	[0.002]	[0.002]	
6-years window × C-Span	0.091***	0.047***	0.019***	
	[0.002]	[0.002]	[0.003]	
12-years window				-0.061***
				[0.002]
12-years window × C-Span				0.030***
				[0.002]
Chamber FE	Y			
Speaker FE		Y	Y	Y
Speaker time trend			Y	Y
Observations	5 532 609	5 532 559	5 532 559	5 532 559
R-squared	0.03	0.11	0.12	0.12

Notes. Each column shows the OLS regression of the emotionality score in a given speech on time dummies. The sample is composed by all speeches given in the House or the Senate by Republican or Democrat Members of Congress. *6-years window* (*12-years window*) is a dummy equal to one if the speech is pronounced within 6 (12) years before or after the introduction of C-SPAN. *C-Span* is a dummy equal to one if the speech is pronounced after C-SPAN is introduced. All specifications include chamber times year fixed effects. Standard errors are clustered at the speaker level. *,**, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Figures

Figure 1: Cognitive/Emotional Language
Size denotes closeness to the centroid of the cognitive (green/left) and emotional (purple/right) dictionaries. Distance is normalized to the maximum distance by dictionary.

Figure 2: Cognitive/Emotional Language and Sentiment
Size denotes closeness to the centroid of the cognitive-positive (top-left/light green), emotional-positive (top-right/light purple), cognitive-negative (bottom-left/dark green), , emotional-negative (bottom-right/dark purple) dictionaries. Distance is normalized to the maximum distance by dictionary.

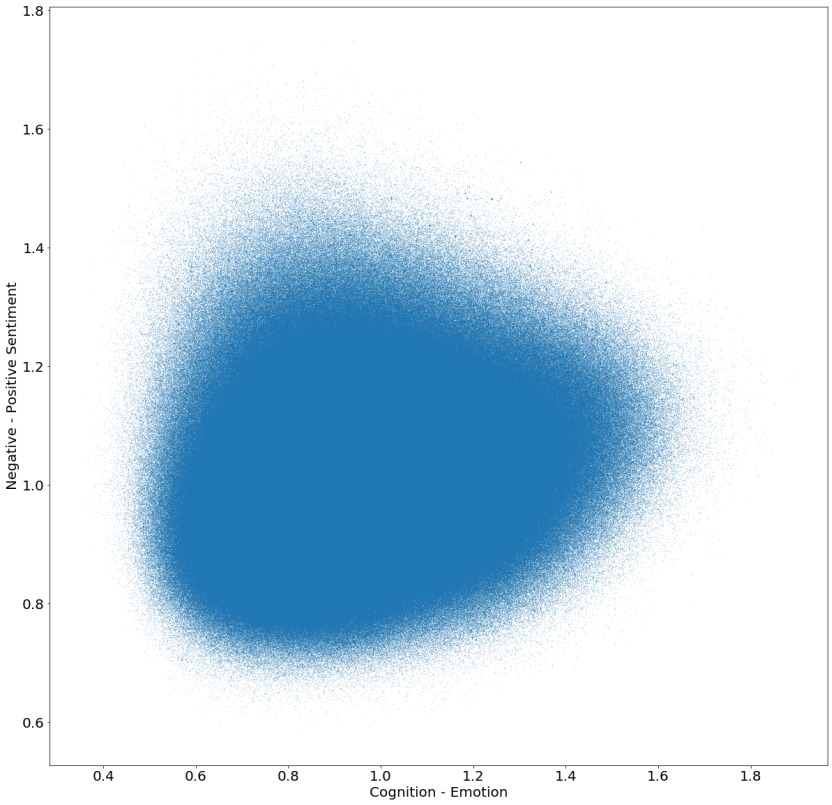

Figure 3: Emotionality and Sentiment
Joint distribution of Emotionality and Sentiment

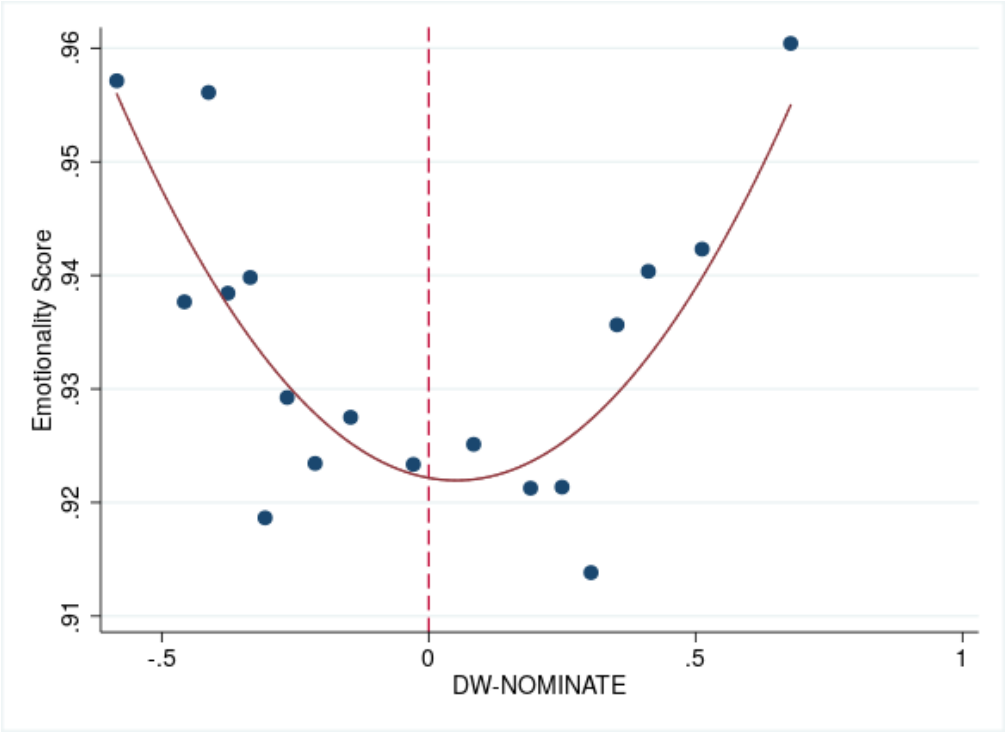

Figure 4: Emotionality and Ideology
The horizontal axis reports the DW Nominate Score, dimension 1; the vertical axis reports the average emotionality score by bin.

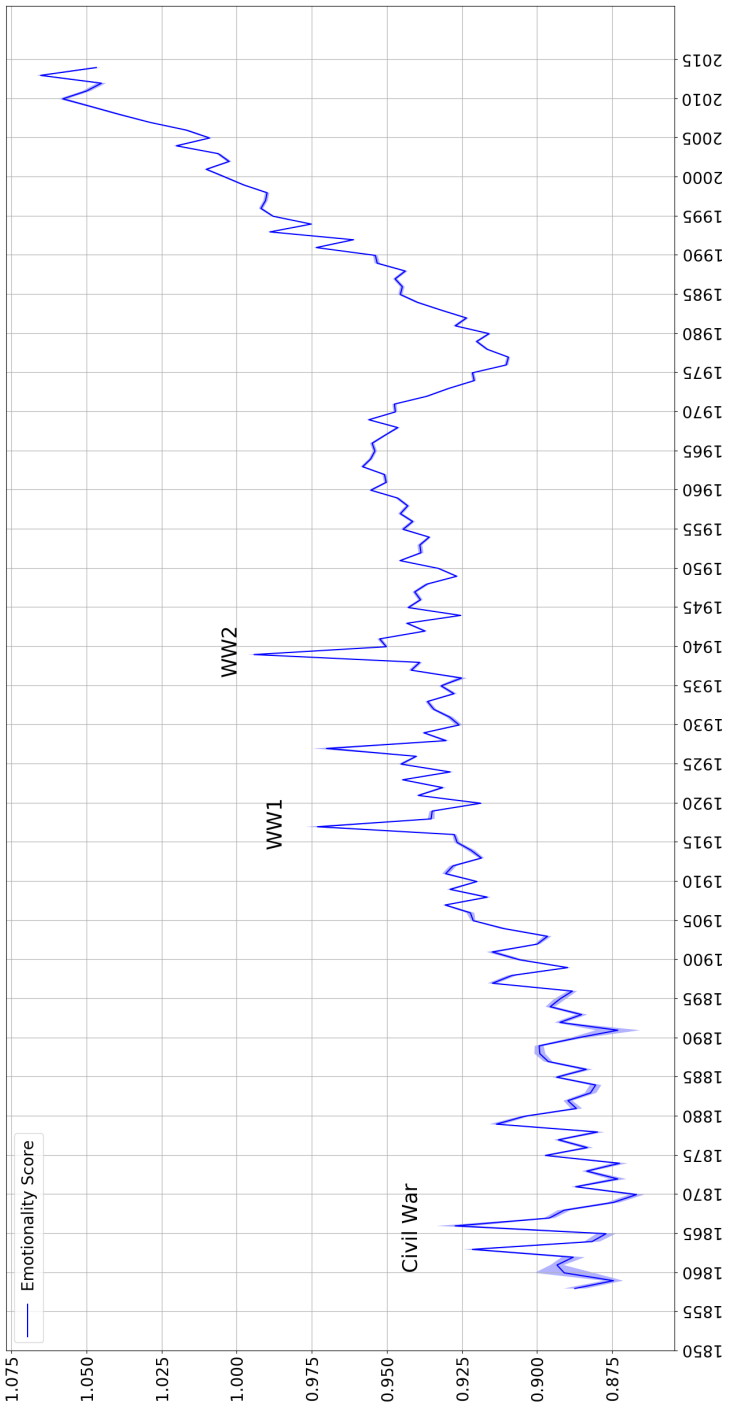

Figure 5: Emotionality in U.S. Congress, 1858-2014
Timeseries of emotionality

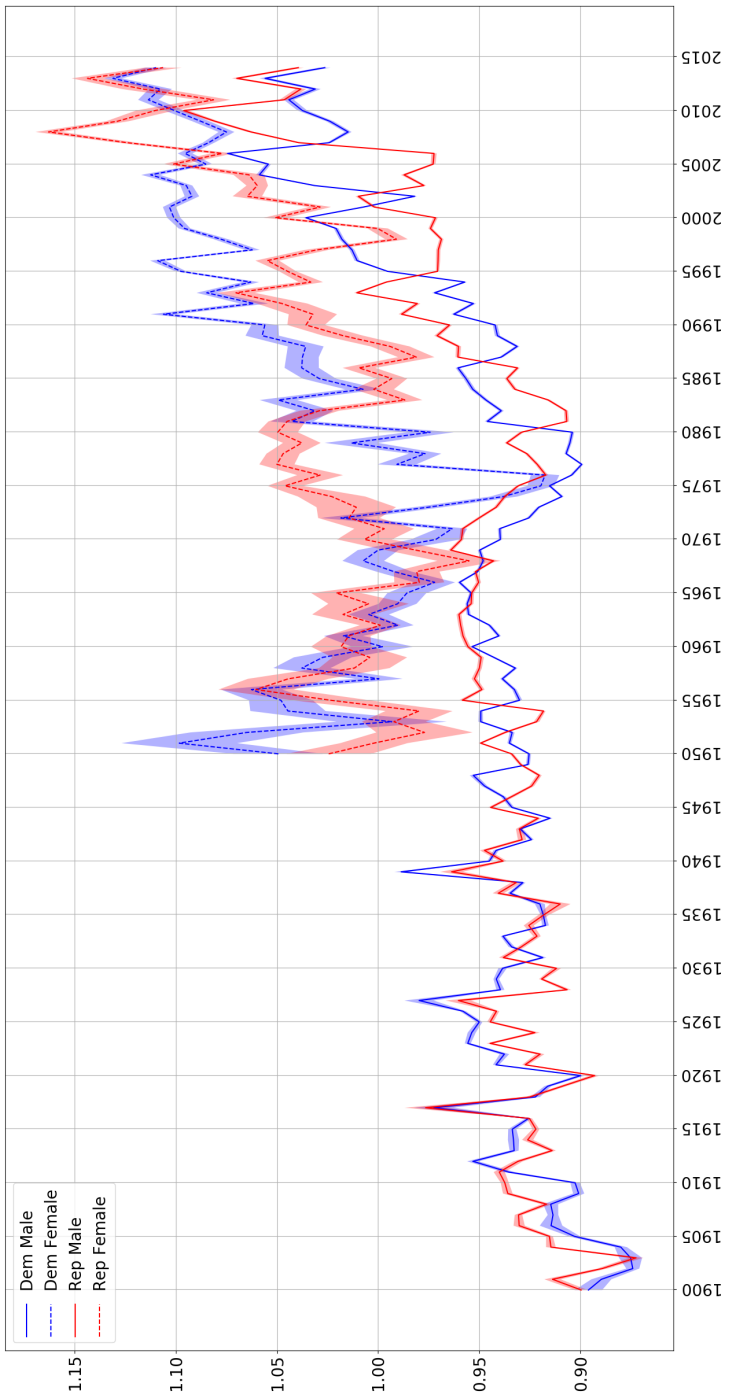

Figure 6: Emotionality in U.S. Congress, 1900-2014
Timeseries of emotionality in Congress by gender and party.

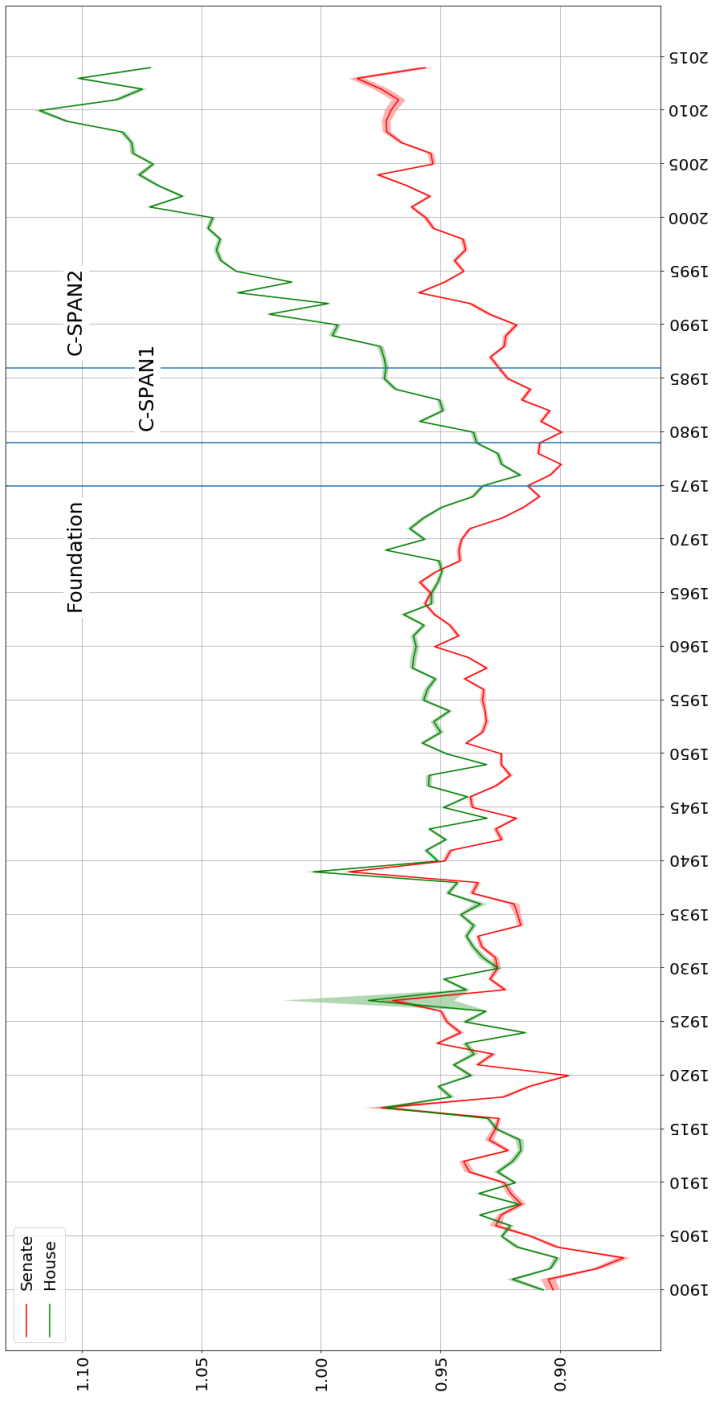

Figure 7: Emotionality in U.S. Congress, 1858-2014
Timeseries of emotionality in Congress by chamber.

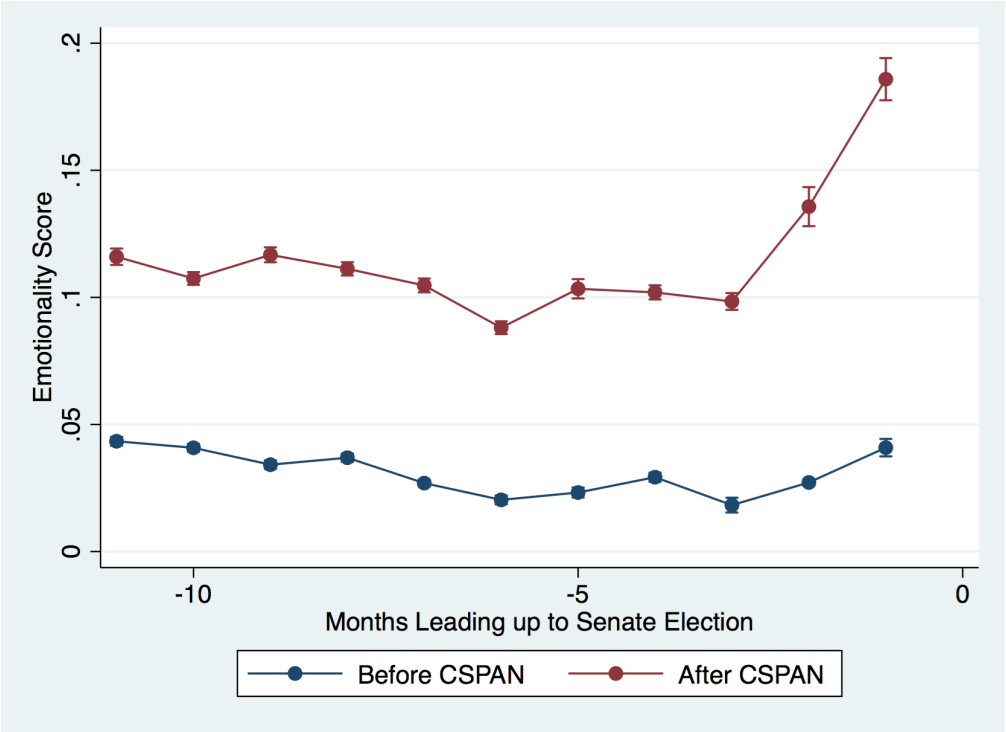

Figure 8: Emotionality Before the Elections
The horizontal axis reports the months before the senator's term end; the vertical axis reports the average emotionality score. The emotionality score is residualized on Chamber-Year fixed effects.

A Appendix

A.1 Text Pre-processing

We report here the pre-processing steps to obtain the document vectors:

1. Remove punctuation
2. Remove capitalization
3. Tokenize
4. Remove digits
5. Remove words with less than three letters
6. Assign part of speech to words, and keep only Adjectives, Verbs and Nouns
7. Stemming (Snowball Stemmer)
8. Remove stopwords

The model is trained on the full set of sentences obtained by splitting the documents in the corpus. The above-mentioned steps are applied to the sentences, and the final corpus is then used as an input to the word embedding model.

A.2 Excluded dictionary words

The following words have been excluded from the dictionary on affect:

battlement, challengeable, helpful, treasury, struggler, achene, vitalism, amortize, sentimentalize, neatest, benefice, harmfulness, murderess, amortization, harasser, missing, smuggling, credits, successful, radiance, strengthening, blamelessness, active, killingly, harmonium, honours, grand, shakeout, excellent, destroyer, graced, acheson, aggressing, fave, murderee, screamer, gracile, disgustedly, victimizer, original, insecurely, rapeseed, amorphous, funnest, weaponry, shakedown, grossing, reliever, witchlike, free, popularize, beautify, petrify, charity, strengthener, depressor, luv, entertainer, smh, supporter, meritocratic, friendliest, kissinger,

loneliest, dumpling, sceptically, award, nagi, improving, honorarium, feudatory, elegance, devotional, messiest, sharing, besties, lowest, naga, pettier, molestation, shockable, complimentary, teaser, fucks, guiltiest, winnebago, weapon, painfulness, pessimistically, bonus, freesia, dreadlock, fantasist, exhaust, agreed, shakiness, thanx, approval, exhaustible, fault-finding, richest, yum, faulty, bestie, merrimac, aversive, smilax, snobbishly, warmest, trusty, supremacism, bitchery, violate, graves, strainer, nurturance, puka, successfully, dreadnought, excellence, super, interested, exhaustive, terrorization, humoral, approve, best, easement, ready, harmonica, defendant, damaged, harmonics, wimple, play, winning, approver, sexy, divinatory, approved, ha, nagoya, treasurer, lowers, fav, merrimack, special, diving, warred, violator, superbug, playing, screwtop, triumphal, louse, weirds, grossed, engagement, degradation, freestanding, demote, grosser, wealthiest, panicle, powerlessly, impressionist, graverobber, helpfulness, cheat, miser, fantasia, honoree, bereave, harmonizer, battlemented, shakespeare, moronity, energy, amoralism, profit, lovingness, shared, dumps, comedienne, agitator, morone, villainess, diviner, emptier, winnipeg, romanticist, virtuoso, inhibit, useful, impoliteness, favorite, popularizer, screwdriver, defect, stunk, weaponize, nast, loss, enthusiast, gloomier, neater, flexible, profiteer, pest, prickle, peacekeeper, braved, easy, share, defectively, champagne, supported, outgoing, entertainment, dominatrix, gratis, solemnize, hugger, values, played, relaxation, vitalize, wrongful, bastardy, faille, partygoer, impressive, magnification, adventure, wellness, safest, joylessly, irritant, demotion, amoralist, save, disgustingness, benefits, adorability, impolitely, thriller, flatterer, adventurousness, pesto, adorned, comedian, intellectualization, traumatology, bestest, impressionism, creditworthiness, rancidity, livelong, relaxant, bastardize, tranquilizer, supports, crude, humorist, approving, boreas, inhibitor, antagonist, discouragingly, sunniest, pityriasis, raper, security, plays, easygoingness, interrupt, merrymaking, low, damage, suprematist, nagano, benefic, huggins, dummy, pukka, safety, supporting, miserliness, fabulous, whorehouse, stammerer, contemptibly, emptiest, fighter, lower, killable, pesticide, nagasaki, gravestone, excel, profitless, gloriosa, graveness, honoring, offenses, pressurize, passionflower, festival, champion, flexibly, smuggle, rigidity, teaspoon, win, honorific, braves, stealth, pettiest, prickliness, gloomiest, heartbreaker, screw, aggress, fired, prize, trusted, teasdale, harmonically, prickling, beneficiary, freestone, suprematism, troubleshooter, gravel, disappointedly, riskily, stuns, harmonic, tranquilly, valued, gorgeous,

thx, magnifico, aok, dissatisfy, credit, humorlessly, hazard, dorking, pestle, please, lossy, securely, argus, feudalism, champaign, joyride, poisoning, joystick, destruct, supremo, agreement, yummy, creditworthy, harmonization, creditor, shares, energizer, winner, blameworthiness, dumpster, misses, sunny, value, violation, helps, cutest, gravedigger, diss, adventuress, shakers, lamer, champ, destroyable, vulnerability, murderousness, disturber, radian, panicum, admiralty, comedy, fume, meritoriously, interrupter, improved, party, adventurer, neglectfully, superb, inhibitory, warmer, supremacist, cut, glamorize, divination, admiral, funnies, acheron, popularism, riskiness, improvement, secure, winnings, dishonorably, killdeer, agreeableness, kissimmee, amora, wins, fatality, magnificat, delicatessen, vomiter, petrifaction, screwup, elegant, popular, enjoyer, freedman, bastardization, defendable, thnx, moocher, vitalist, thanks, shamefulness, winnow, witching, boreal, screwball, depressurize, shockley, champlain, prizefighter, fatigues, darlingtonia, energizing, charitable, welcome, won, support, defender, guiltier, oks, graver, easiest, alarm, glamorization, nasturtium, stressor, smuggler, dignifies, benefit, depressant, finest, flunky, madder, joyce, destructed, killifish, lossless, gravelly, defeated, pressure, repressor, funner, grating, battleship, beneficially, smiler, freestyle, popularization, feud, teashop, shamefacedly, flexibility, proudly, hazardous, okays, demotic, handsomest, punishingly, tragedian, shakespearian, pisser, nurturant, complaint, warner, relaxer, battlefront, okayed, weaponless, yay, shaker, messier, ty, easel, laughton, honorary, aggresses, defective, aggressed, dump, weeper, weepiness, ignorable, poisoner, pleased, damages, championship, optimally, grinner, relaxin, amorously, punishable, fab, inhibition, sweets, defectiveness, grandee, peacekeeping, trusts, maddest, unimpressively, credited, graven

The following words have been excluded from the dictionary on cognition:

perceptually, causeway, figuration, meaninglessness, mightve, oughta, fuzz, mustve, causeless, purest, undo, dissimilarity, whyever, figural, indirectness, allowance, imaginatively, activating, preferment, total, pretender, ignition, effector, correctable, disorienting, curiousness, reevaluation, informatively, perceptibly, mindfulness, mindfully, didnt, splitsville, incompleteness, variably, unclearly, attributive, proverbially, links, wasnt, obscurantism, com-

mits, comprehensibility, ponderousness, marginalia, couldve, forceps, identifier, persuader, picked, productiveness, reactance, imaging, reflector, unambiguity, neednt, stimulative, excluding, vaguer, analyst, separatist, marginalize, triggerfish, proverb, reasoner, closure, theorization, memorizer, obscurantist, hows, fundamenta, wanna, optionally, analyzer, reactivity, logicism, ambiguously, completed, ponderous, theorem, purposelessly, referent, secretively, unresolvable, production, lotof, obediently, deducible, effectually, perceptively, bordered, odder, correctional, havent, cannot, undid, maker, caustic, launcher, unquestioningly, reconcilable, igniter, decisiveness, wouldve, hasnt, preciseness, version, shouldve, sortof, pureness, categorial, reactant, perceiver, exacta, ponderosa, lotta, caustically, factuality, expectable, correlational, rearrangement, quern, betting, purposeless, evaluator, perfects, cohere, kindof, approximately, borderland, confessor, reactionism, versus, ignited, shouldnt, disorient, implicative, curiosa, expectantly, obeys, overal, comprehensiveness, probabilistically, reactor, aint, stimulant, bc, vaguest, recognizance, link, meaningfulness, manipulatively, separateness, theorist, reconstructive, confessional, deductible, querulousness, completes, inductee, categoric, arent, analyzable, restructure, analysand, activate, ignite, howd, resoluteness, distinctness, differentiator, compliant, knowledgeability, indirection, splitter, assumptive, rationalistic, rootless, isnt, marginalization, memorably, guarantor, activation, border, inductor, bets, corrections, activated, categorized, induction, figurine, heeded, bosses, purposefulness, expectorant, unquestioning, producer, puzzle, mustnt, referee, complies, manipulator, reconstructed, motiveless, unlikelihood, logicality, proverbs, adjustable, spose, diagnosable, rationalist, oddest, purposelessness, rooting, jus, unawares, activator, reasonless, cant, tryna, excludes, obscurely, rootbound, inquirer, convincible, reactivate, expectorate, relatedness, logician, attentional, understandingly, generator, founded, insightfulness, sortsa, lotsa, reflectively, motivational, quercus, referendum, explicitness, curio, marginality, misleader, percept, identifiably, oppositely, ponderously, wouldnt, adjuster, persuasiveness, disorientation, optional, precis, presumptuously, fuzzed, inducer, undoes, category, induct, referral, launching, examiner, consequentially, picks, perceptiveness, figurehead, presumable, couldnt, uncleared, werent, provence, provencal, explorer, separatism, reflectiveness, vs, enactment, info, namely, launch, possibility, appeared, analyze, infallibility, exaction, blurred, reorganized, analyticity, diagnostician, distinguishable, initiation, informing, particularly, rootstock, grasping, else,

everytime, notices, lot

A.3 Full timeseries

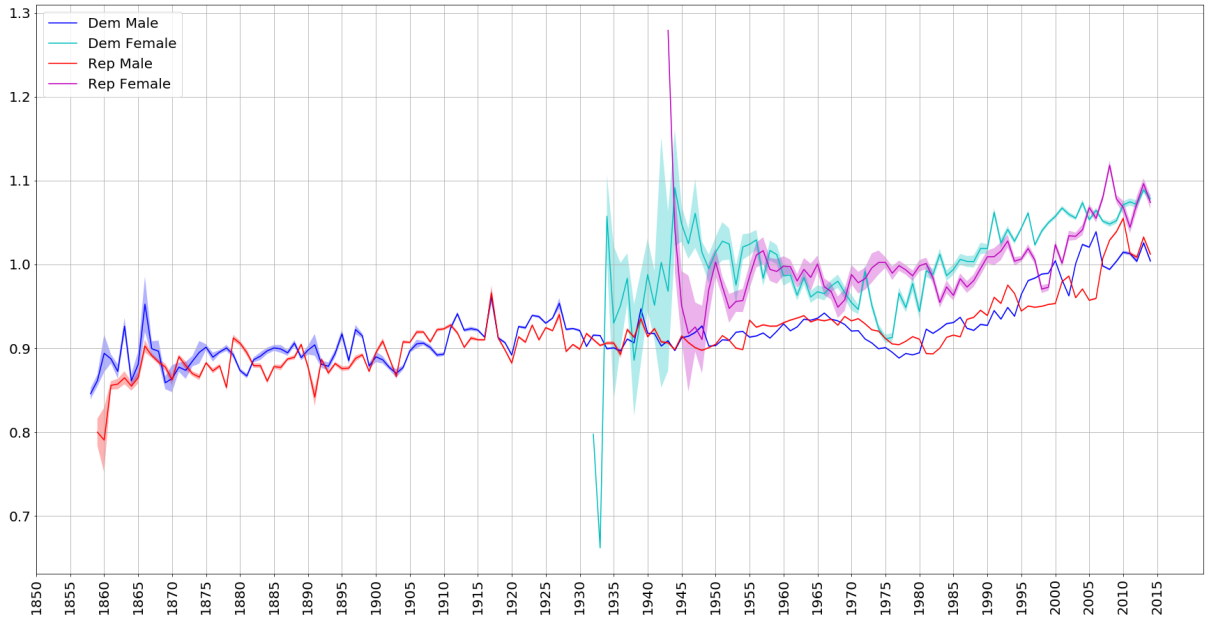

Figure A1: Emotionality in U.S. Congress, 1858-2014
Timeseries of emotionality in Congress by gender and party.

A.4 Normalized score

In this section, we account for possible time variations in the level of emotionality in the English language. We calculate our emotionality score on the corpus of Google books unigrams, and average the score by year. Figure A2 shows that emotionality has on average declined in that corpus.

We further normalize our main score by the metrics constructed on Google unigrams. If changes in the language drive our results, then the trend should disappear once we plot the normalized score. This does not seem to be the case, as of Figure A3 and A4.

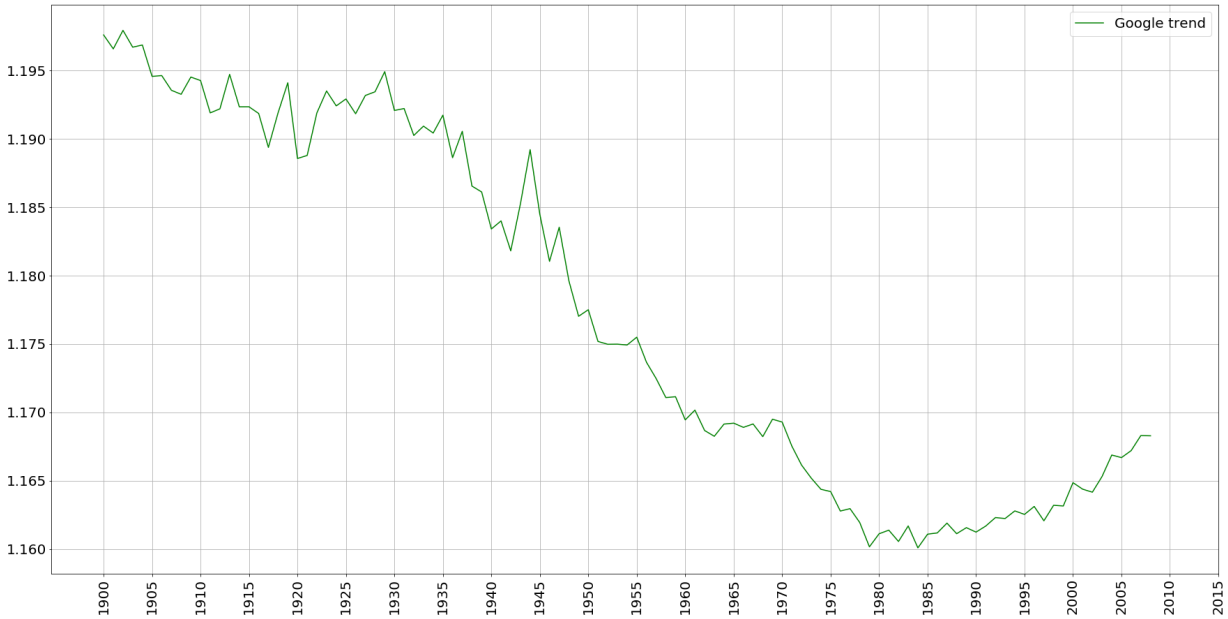

Figure A2: Emotionality in Google Books
Timeseries of emotionality in Google unigrams, 1900-2009. The score is calculated for each year, over all available unigrams.

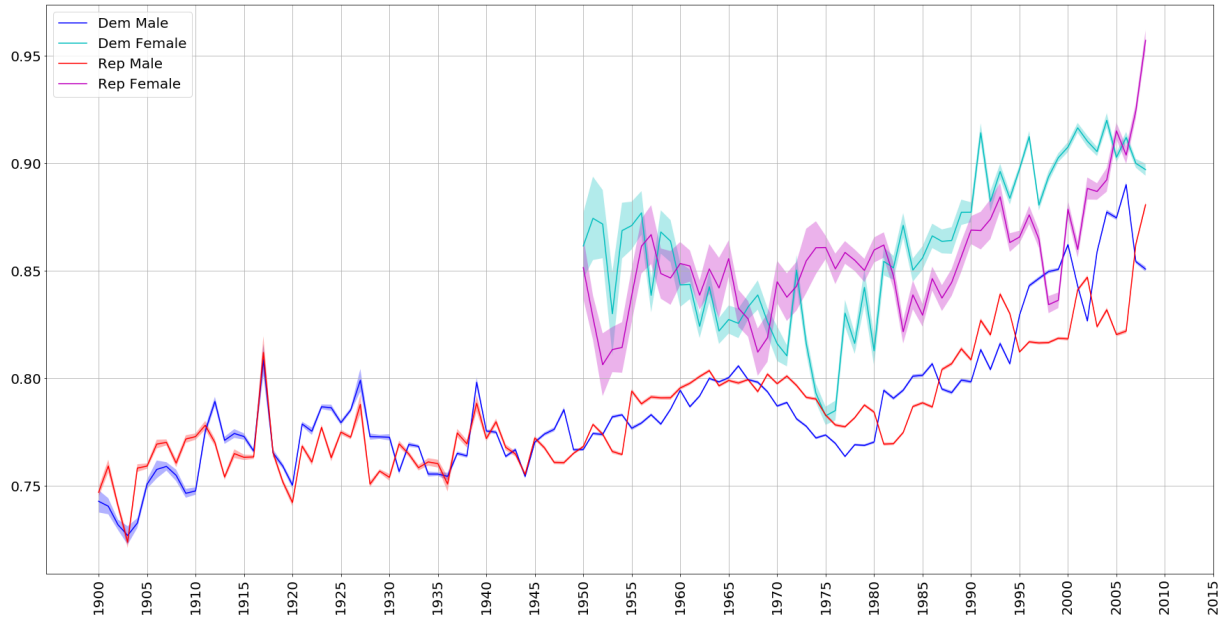

Figure A3: Emotionality in U.S. Congress, 1900-2009
Timeseries of emotionality in Congress by gender and party. The score is normalized by the yearly average emotionality score in Google unigrams.

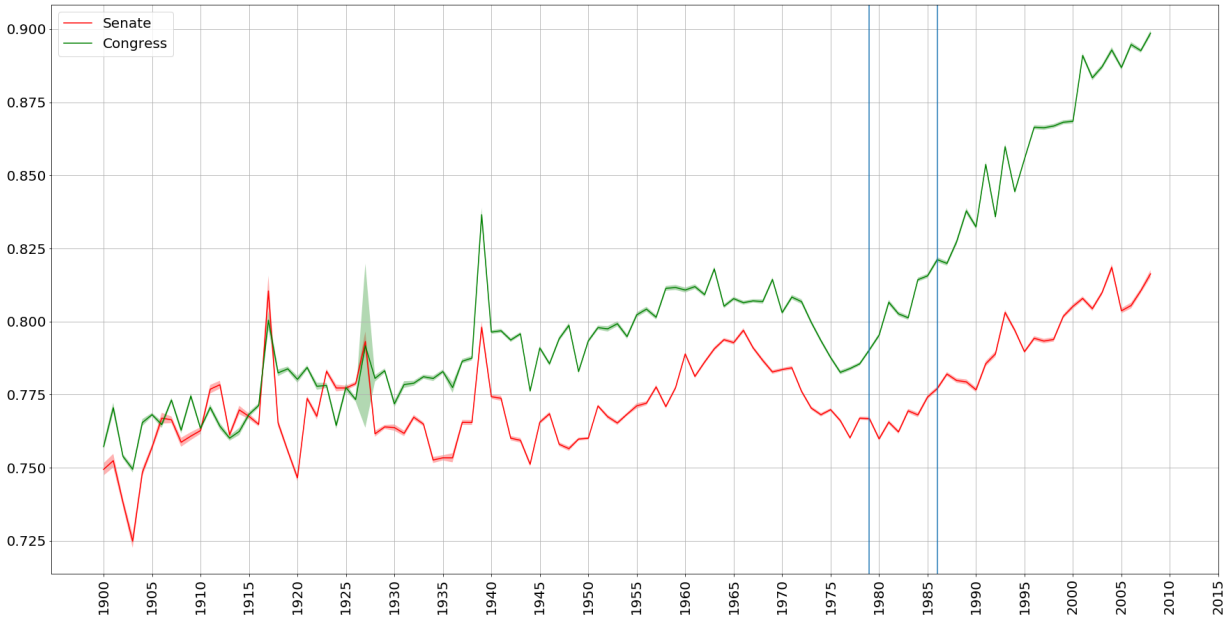

Figure A4: Emotionality in U.S. Congress, 1900-2009
Timeseries of emotionality by Chamber. The score is normalized by the yearly average emotionality score in Google unigrams.

A.5 Emotionality by State

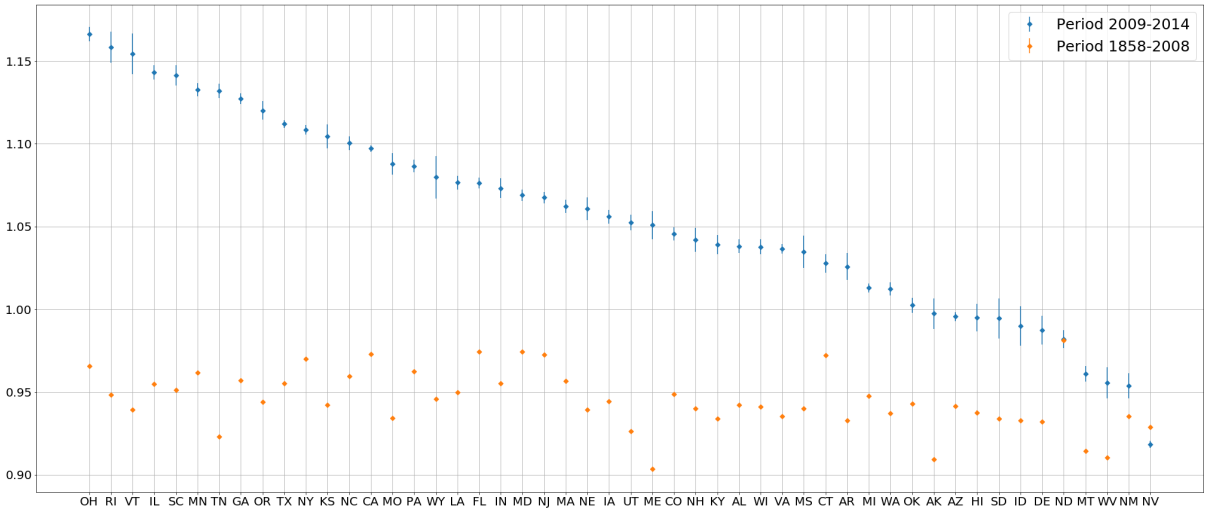

Figure A5: Emotionality by State
Aggregate score of emotionality at the State level.

A.6 Alternative measure of emotionality: Tf-Idf

This appendix provides results with a more traditional dictionary-based specification for measuring emotive language. Specifically, for each speech and each dictionary, we calculate the sum of the frequency of dictionary words. The final score is the ratio between the affect and the cognitive score:

$$Y_i = \frac{\sum_{w \in (i \cap A)} f(w)}{\sum_{w \in (i \cap C)} f(w)}$$

Where A is the dictionary of affective words, C is the dictionary of cognitive words, and $i \cap A$ and $i \cap C$ indicate sets of words in speech i that belong to dictionary A or C. f is the tf-idf frequency of word w calculated on the whole corpus. Figure A6 shows that the trends in emotionality detected with this measure are very consistent with our main analysis.

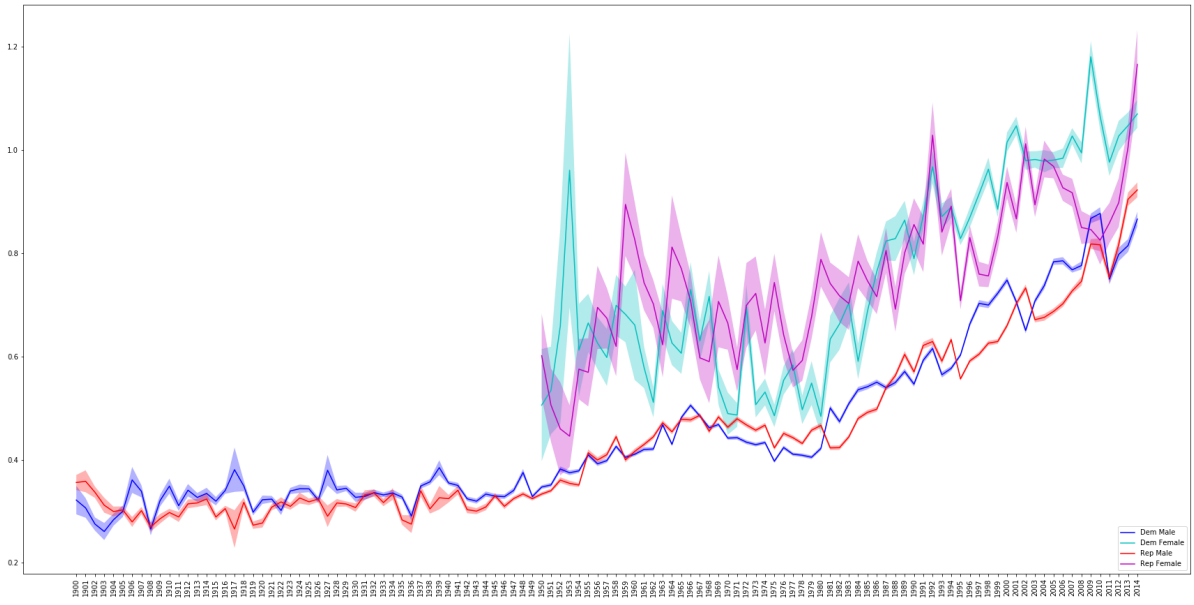

Figure A6: Emotionality in U.S. Congress, 1858-2009
Timeseries of emotionality in Congress by gender and party. The score for each speech is the ratio between the sum of Tf-Idf values for affect words over cognitive words contained in the speech.

A.7 Alternative measure of emotionality: Vector Distance

This appendix provides results with a measure of emotionality using the method by Kozlowski et al. (2019). Specifically, starting from our affect and cognition centroid, we take their difference to elicit the affect-cognition dimension. The final score for each document is the cosine similarity between the document vector and the affect-cognition dimension.:

$$Y_i = \frac{\vec{d_i}(\vec{A} - \vec{C})}{||\vec{d_i}|| \; ||\vec{A} - \vec{C}||}$$

Where $\vec{d}$ is the document vector, $\vec{A}$ is the centroid of the affect dictionary and $\vec{C}$ is the centroid of the cognition dictionary. Figures A7 and A8 show that the trends in emotionality detected with this measure are very consistent with our main analysis.

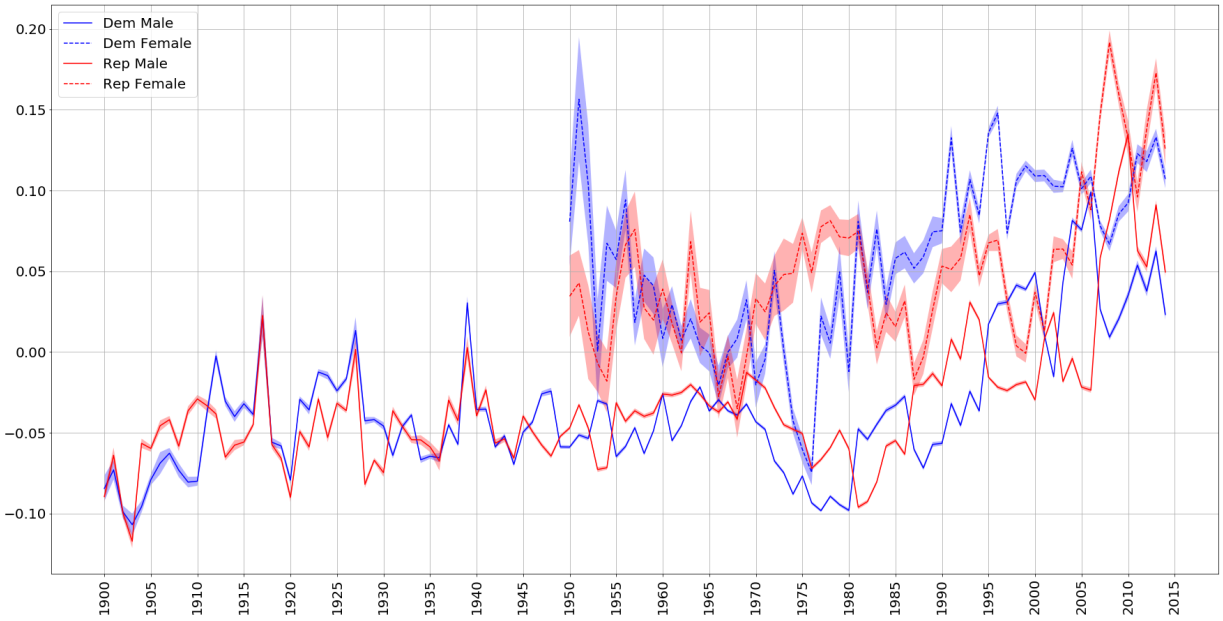

Figure A7: Emotionality in U.S. Congress, 1858-2009
Timeseries of emotionality in Congress by gender and party. The score for each speech is the cosine similarity between the A-C vector and each document vector.

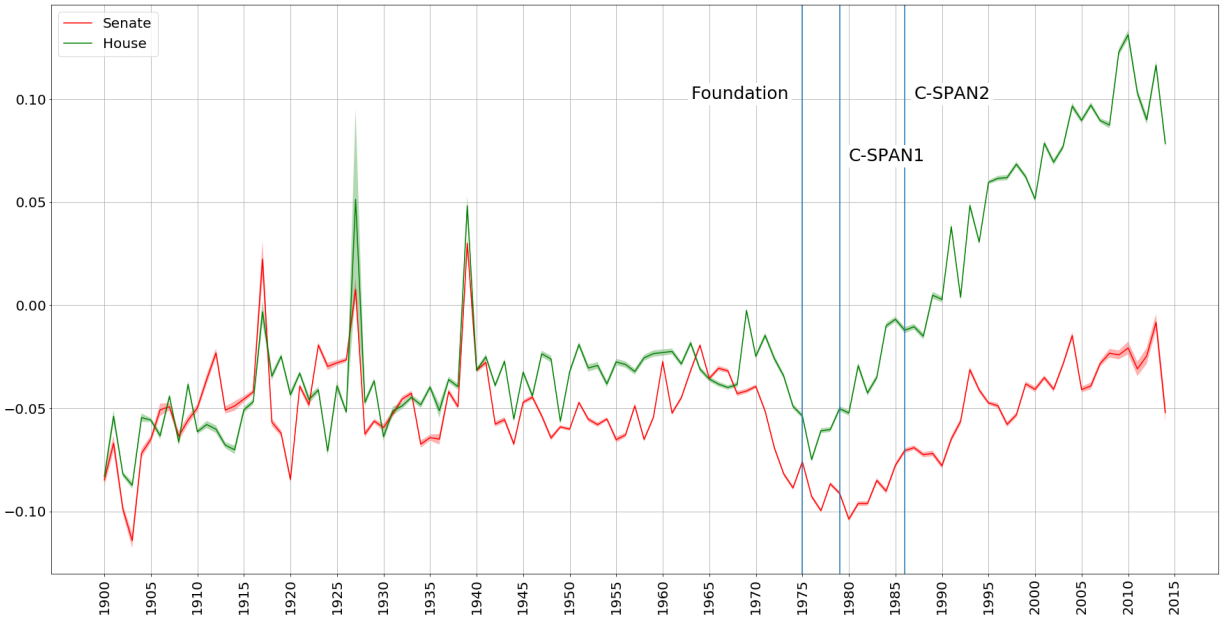

Figure A8: Emotionality in U.S. Congress, 1858-2009
Timeseries of emotionality by Chamber. The score for each speech is the cosine similarity between the A-C vector and each document vector.

A.8 Dictionary word count

We report there the affect dictionary words with their count in the corpus:

Affect: support (1765047), import (1421018), like (1327182), great (1195251), agre (1147658), care (1018579), help (945406), concern (834363), thank (746428), opportun (662106), defens (647623), polit (560160), interest (511530), critic (358826), credit (355314), favor (344079), open (330082), give (312834), person (297694), valu (295900), fight (273278), encourag (255137), fail (254356), relief (244541), argument (234996), attack (231244), will (231176), difficult (231129), greater (230193), trust (226411), wrong (223848), pleas (222760), lost (215665), suprem (207407), unfortun (203479), danger (199621), lose (194573), engag (191979), privileg (191819), intellig (190802), success (190361), threat (186035), suffer (185778), promis (182905), abus (182144), play (181085), profit (174714), vital (174202), re-

ject (169572), kill (168554), defend (159789), proud (159078), poor (154155), damag (148873), bad (148757), honor (146456), glad (141824), fear (136374), greatest (136084), victim (135533), advantag (135199), safe (134334), defeat (130431), argu (130344), sever (128463), treat (124171), failur (123622), miss (122448), avoid (121928), troubl (121900), violenc (121348), strengthen (119151), disast (118716), enjoy (117240), terrorist (111688), good (109358), threaten (108020), terror (107324), incent (106251), struggl (105775), difficulti (104814), ignor (104205), excel (103453), courag (102785), challeng (102261), kid (99418), strength (98544), impress (97810), disagre (95952), harm (91428), devot (88804), serious (88754), unfair (88488), confront (86689), destruct (86051), enemi (85332), admir (77310), wors (74520), valuabl (73759), fair (73611), satisfi (72106), honest (70920), tough (70552), succeed (69997), fought (69269), offens (68820), content (68702), punish (68400), worri (65345), protest (64360), warn (64097), overwhelm (64089), aggress (63755), disagr (63586), terribl (61448), sincer (61327), abandon (60605), murder (60448), tragic (59329), merit (59214), tragedi (58912), pleasur (58213), devast (57772), depress (56700), disturb (56535), pain (55826), advers (55070), condemn (54635), attract (51450), popular (50942), innoc (50843), war (50425), disappoint (50302), worst (50260), healthi (48862), love (48782), desper (48629), afraid (48468), grate (48378), outrag (47022), compliment (46774), vulner (46677), interrupt (46502), depriv (45922), blame (45716), risk (45534), vigor (45282), wealth (45169), reliev (44176), violent (43694), frustrat (43596), surpris (43575), sad (43517), stress (43366), assault (43173), sorri (42816), peac (42782), disadvantag (42761), reward (42558), complain (42335), sick (42300), domin (41938), grave (40907), weak (40900), stronger (40565), delight (39503), fault (39362), hate (39085), burden (38567), sentiment (38175), weaken (37681), digniti (37615), evil (37364), guilti (36316), wealthi (36060), neglect (35986), decent (35784), toler (35764), distress (35528), satisfactori (35360), hero (35051), beauti (35011), hostil (34712), exhaust (34489), warm (34274), offend (34163), discourag (33914), entertain (33769), bless (33244), prejudic (33059), amaz (32943), easier (32502), emot (31403), prais (30202), ok (30145), alarm (30122), anxiou (30027), shock (29800), dump (29643), wellb (29464), virtu (29380), liberti (29224), gratitud (28627), resign (28519), benefici (28417), isol (28292), intellectu (28030), excit (27787), faith (27608), lower (27571), readi (27568), brutal (27507), shame (27255), passion (26543), reluct (26475), ridicul (25868), eas (25491),

freedom (25099), hurt (24944), tortur (24775), safer (24712), broke (24568), talent (23686), splendid (23622), needi (23296), worthwhil (23074), rape (23060), embarrass (22947), preciou (22521), tear (22283), compass (21813), poison (20967), magnific (20657), strongest (20485), belov (19986), cri (19967), harass (19817), contempt (19658), satisfact (19646), denial (19554), strain (19353), intimid (19219), fatal (19141), loyalti (18916), agreeabl (18693), battl (18526), comfort (18460), aw (18372), ruin (17750), fool (17566), fine (17320), upset (17169), repress (17056), bitter (16814), mess (16653), honesti (16306), battlefield (16275), bother (16242), bold (16149), resent (16094), happi (16009), horribl (15788), horror (15595), tension (15368), cruel (15290), contradict (15230), cherish (15078), harsh (14975), enthusiasm (14853), insult (14715), poorest (14689), scare (14677), treasur (14550), optimist (14255), foolish (14242), meritori (14233), gratifi (14021), sorrow (14009), ineffect (13994), frighten (13949), adversari (13852), mourn (13735), forbid (13722), cynic (13512), useless (13492), welcom (13397), enthusiast (13214), heroic (13206), viciou (13122), heaven (13082), disgrac (13003), humor (12817), steal (12814), burdensom (12691), tender (12672), decept (12564), degrad (12390), crush (12234), heroin (11999), reassur (11973), smile (11779), dwell (11700), appal (11516), delic (11422), rigid (11335), superior (11014), hatr (10791), generos (10623), hell (10610), compassion (10424), arrog (10296), helpless (10133), cheer (10094), mad (10043), anger (10041), selfish (9995), keen (9943), laugh (9880), incompet (9873), killer (9865), temper (9857), relax (9781), inferior (9657), angri (9639), heal (9612), glori (9609), startl (9591), inhibit (9570), unsaf (9567), graciou (9443), unhappi (9412), worship (9349), optim (9260), terrif (9197), despair (9160), cheat (9053), shake (8855), grievanc (8853), worsen (8834), anxieti (8804), gentl (8801), sin (8790), nightmar (8509), immor (8443), miseri (8414), heartfelt (8279), vain (8187), unsuccess (8136), doom (8134), dare (8075), dislik (8069), agit (8034), calm (8023), uncontrol (7867), beaten (7827), dread (7800), grief (7792), panic (7781), stun (7665), joke (7623), poorer (7321), aggressor (7298), trauma (7244), phoni (7191), wrongdo (7133), turmoil (7097), rage (7058), adventur (7030), fantast (7010), foe (6986), fairer (6823), fun (6759), casual (6753), loser (6704), stupid (6624), asham (6612), crazi (6547), cool (6474), guilt (6454), heroism (6397), amus (6281), hopeless (6260), humili (6229), greed (6161), worthless (6161), fond (6005), devil (5980), grim (5900), brave (5869), miser (5866), weaker (5818), divin (5783), griev (5778), bore (5743), troublesom (5722), gloriou (5680), mood

(5662), energet (5621), rejoic (5599), harmless (5521), awesom (5471), thrill (5444), distrust (5407), piti (5363), disgust (5237), richer (5205), scream (5101), forbidden (5053), traumat (5045), insecur (5018), gracious (4997), anguish (4921), powerless (4851), haunt (4849), funni (4786), irrit (4784), trivial (4772), unpleas (4737), pervers (4708), dignifi (4686), envi (4625), dishonor (4620), nervou (4612), weari (4542), contradictori (4531), li (4485), damn (4439), finer (4387), dissatisfact (4358), demean (4344), careless (4255), impati (4244), uncomfort (4134), cruelti (4100), free (4040), antagon (4030), warmth (4014), irrat (3934), stubborn (3814), agoni (3674), prejud (3631), smarter (3592), arguabl (3552), defenseless (3544), benevol (3479), grievou (3470), terrifi (3418), succe (3417), harmon (3401), timid (3395), unfriendli (3382), rich (3380), sinist (3318), grace (3284), suck (3221), lone (3170), obsess (3125), greedi (3119), dumb (3118), curs (3117), unimport (3110), handsom (3107), charm (3102), pathet (3090), affection (3050), woe (2941), uneasi (2919), happier (2906), agon (2859), unprotect (2836), isolationist (2831), benign (2793), fake (2777), rotten (2719), mock (2648), lame (2645), harmoni (2644), pessimist (2622), fantasi (2610), fearless (2609), molest (2608), bash (2607), ly (2578), dishearten (2570), antagonist (2468), fabul (2467), fatigu (2451), bereav (2433), fairest (2427), weakest (2383), lover (2374), triumph (2372), thiev (2330), joy (2317), pervert (2308), sweetheart (2265), apathi (2265), palat (2261), tens (2204), strang (2193), isolation (2163), benefic (2156), jealou (2123), gratif (2116), trustworthi (2085), flatter (2076), discomfort (2064), demeanor (2045), tediou (2021), empti (2021), dull (1982), brillianc (1967), furi (1959), despis (1952), kiss (1941), wick (1914), reveng (1913), pride (1912), yell (1902), anxious (1896), fright (1891), gloom (1885), jealousi (1843), scari (1833), frantic (1831), stale (1827), sicken (1800), disreput (1799), seriou (1774), liar (1763), nasti (1720), rude (1700), eager (1664), lazi (1652), prejudici (1628), idiot (1607), neat (1606), thief (1599), sucker (1598), liken (1598), proudest (1591), glamor (1583), lousi (1580), heartless (1568), hug (1564), smother (1552), avers (1542), long (1530), calmli (1520), glorifi (1514), giver (1500), restless (1483), nice (1480), savag (1479), unkind (1471), witch (1452), trembl (1426), villain (1359), adorn (1349), contemptu (1341), sicker (1340), vicious (1338), fume (1337), invigor (1304), ach (1281), gloomi (1276), alarmist (1274), saddest (1251), painless (1242), triumphant (1235), whine (1232), joyou (1214), wow (1174), loyal (1160), bravest (1143), feudal (1137), libertarian (1130), unwelcom (1109), tranquil (1102),

numb (1081), pessim (1065), splendor (1049), sigh (1033), shameless (1030), virtuou (1025), romant (997), cute (982), jerk (975), nag (961), truer (951), opportunist (948), grudg (942), smartest (931), fieri (928), stink (924), unsavori (912), forbad (910), happiest (889), insincer (885), sickest (877), ador (873), loneli (863), heartwarm (848), prouder (828), cruelest (819), weird (810), gross (773), troublemak (771), enrag (770), pestil (770), feroci (765), sweet (757), niceti (751), vaniti (743), chuckl (742), gossip (734), peculiar (722), paranoia (720), grin (719), delici (706), gentler (704), bolder (685), ecstasi (682), unattract (671), joker (670), messi (653), melancholi (652), defeatist (647), paranoid (630), distraught (629), trite (619), nicest (605), apathet (590), sob (571), reek (560), flatteri (557), ungrat (543), sarcast (543), flirt (537), teas (523), damnabl (510), wept (504), upbeat (502), whore (501), nervous (501), bittersweet (497), smug (489), crap (489), grossest (487), impression (487), nicer (486), mourner (476), unlucki (474), enviou (472), faithless (472), blameless (470), flawless (466), pitiabl (458), vomit (441), sarcasm (436), prick (436), irration (435), feroc (427), sadder (425), petti (416), impolit (396), meanest (396), maniac (390), horrid (365), strangest (362), smart (362), bright (361), freak (360), boldest (355), boredom (354), calmer (351), sweetest (349), petrifi (349), amor (346), unimpress (344), hurrah (344), sweeter (329), jade (328), ecstat (324), hater (320), pleasantri (310), panicki (303), bliss (292), easygo (271), egotist (258), hurtl (255), ugliest (252), hellish (245), devilish (241), daze (241), glorif (236), braver (230), meaner (229), alright (227), weakli (222), rancid (218), witchcraft (212), bastard (210), tenderli (206), cheeri (205), hilari (203), weakl (203), romantic (202), moron (200), clever (197), homesick (192), phobia (191), delect (186), shocker (185), fatalist (181), giggl (179), loveliest (163), dumbest (162), wimp (162), egot (161), loveli (156), unlov (154), dumber (148), villaini (143), uglier (141), pleasant (137), silliest (130), snob (129), prettiest (127), faultless (126), damnat (126), sociabl (125), angrier (124), masochist (120), loveless (119), fantas (118), condemnatori (117), neurot (111), scariest (107), impressionist (103), sentimentalist (103), craziest (101), prettier (101), gentlest (101), funniest (101), blameworthi (98), liveli (90), meritocraci (90), scarier (85), crueler (85), whiner (84), darl (77), romanc (75), bitch (75), stammer (73), grimac (69), pushi (66), dear (65), ignoramu (65), stupidest (64), snobberi (62), sillier (57), freakish (57), shyness (57), strong (56), joi (55), charmer (54), crazier (54), virtuos (51), shook (49), calmest (49), lol (47), legit (45), grouch (45), crappi (44),

masoch (43), wimpish (40), angriest (40), woebegon (40), funnier (39), hah (38), humorless (37), geek (37), weirdo (36), libertin (36), mooch (35), paradis (31), comedown (30), stinki (29), blessed (28), lamest (26), shit (25), pleaser (24), worrier (24), cuter (23), goddam (22), gorgeous (20), weirdest (19), moodi (19), shyli (19), joyless (19), laidback (19), shamefac (17), pervi (16), laziest (16), passionless (16), phobic (15), lazier (15), weirder (13), cunt (12), kisser (10), flirtati (9), freaki (8), weepi (7), dumpi (6), melancholia (6), perv (6), annoi (5), twitchi (4), melanchol (3), contented (3), brilliant (2), obsession (2), okai (2), fuck (2), destroi (1), smilei (1), dismai (1), decai (1), sucki (1), flirti (1), carefre (0), fucktard (0), cry (0), shitless (0), hoorai (0), asshol (0), fucker (0), shy (0), bitchi (0)

We report there the cognition dictionary words with their count in the corpus:

Cognition: think (2222390), want (1933090), need (1858735), question (1765467), know (1761052), believ (1294547), fact (1278946), resolut (1204296), reason (870024), understand (860049), effect (829068), consid (802972), chang (800344), purpos (794236), make (755361), allow (741097), product (738070), recogn (722642), result (685842), control (675044), distinguish (672218), respons (669281), statement (649465), inform (628884), differ (616581), refer (610823), possibl (562677), necessari (530297), wish (526819), relat (501840), decis (472838), produc (451383), complet (424154), forc (412664), base (404946), feel (402103), answer (401872), attent (400132), commit (395928), correct (384906), permit (376290), entir (375123), determin (374160), appear (356010), caus (346302), enact (331139), opinion (297820), basi (294977), expect (293868), specif (293688), figur (289222), origin (287684), mean (279407), sens (278234), mind (272393), intend (271231), idea (257984), decid (253226), probabl (245846), tempor (245800), opposit (241951), intent (238770), evid (237275), rememb (227813), known (227430), depend (223248), initi (220738), essenti (203642), absolut (195930), realiz (184770), assum (182188), conclus (180207), sourc (178772), chanc (176736), potenti (165574), examin (163038), independ (162858), altern (160714), guarante (158224), explain (157495), separ (157117), suppos (155994), reflect (155682), solut (155141), there-

for (153316), approxim (153140), reconsid (152094), awar (150328), lack (148360), conclud (147358), knowledg (135247), consequ (135203), notic (134641), co (134457), find (130911), learn (129408), fundament (125855), memori (125222), comprehens (123900), definit (123806), recal (121730), appar (120181), except (119867), sort (118103), enabl (117326), knew (115074), inquiri (113517), justifi (112215), outstand (112129), solv (110669), admit (110174), prefer (109665), prove (109630), option (109237), adjust (108298), wherea (106107), lead (106051), led (106022), influenc (105120), recognit (100592), choos (99132), understood (98323), interpret (97950), convinc (95973), factor (95157), imposs (93453), identifi (92723), analysi (86745), deduct (84541), compel (84538), defin (80636), sought (80527), complex (79829), belief (77852), imagin (76409), distinct (74160), confus (71847), acknowledg (70748), accur (66839), pick (66365), precis (65464), compli (65285), explan (64995), guess (63745), secret (63732), obviou (63621), evalu (63367), exclus (62630), clarifi (62492), explor (62169), inquir (58884), found (58023), theori (56178), contempl (56175), exclud (56141), reorgan (55585), meant (55510), motiv (54743), meaning (52878), complic (52703), discov (52639), logic (51732), concentr (50730), complianc (49955), allot (49457), implic (48476), stimul (46919), reconcili (46340), choic (45473), notwithstand (45307), exact (44792), reveal (44639), presum (44214), clear (43681), margin (43680), disclosur (42753), ration (42251), pure (42013), unlik (41637), unusu (41338), suspect (40708), justif (39569), conting (39371), perspect (38698), wa (38684), proof (38331), lesson (38176), disclos (37981), inevit (36621), reconstruct (36155), experi (34507), feasibl (32401), inequ (31903), noth (30223), genuin (29781), vari (29051), attribut (28514), analyz (28415), indefinit (27774), impli (27588), reaction (26944), arbitrari (26563), persuad (25104), recollect (22977), induc (22678), mislead (22580), lot (22477), trigger (21731), discoveri (21559), manipul (21150), confess (19843), enlighten (19069), persuas (18563), differenti (18121), clarif (17929), pretend (17280), unknown (17268), other (16435), percept (16030), perceiv (15798), assumpt (15064), insight (15023), split (14899), accuraci (14713), indirect (14691), bet (14407), identif (14289), occasion (13361), presumpt (13113), rational (12770), react (12659), unrel (12591), infer (12515), heed (12500), factual (12298), reconcil (12227), vagu (11915), explicit (11723), grasp (11110), diagnos (11073), ambigu (10810), categor (10645), odd (10638), entireti (9822), curiou (9669), unquestion (9586), meaningless (9535), mysteri (9391), theoret (9374), consciou (9316), misunderstood (9250),

obscur (8954), undo (8613), induct (8048), henc (7852), provok (7362), unawar (6937), reconsider (6813), diagnosi (6629), conscious (6413), invari (6407), blatant (6377), hypothet (6042), incomplet (5992), random (5966), unclear (5735), correl (5676), dubiou (5635), root (5590), variabl (5372), memor (5254), abnorm (5194), coher (5152), unwant (5006), implicit (4947), undeni (4627), somehow (4519), anyth (4513), discern (4390), referenc (4375), linkag (3937), diagnost (3716), analyt (3677), unresolv (3634), obedi (3613), ha (3612), rethink (3495), puriti (3332), elicit (3318), curios (3113), explanatori (3056), reactionari (2987), thinker (2972), reactiv (2592), undon (2437), rearrang (2358), unambigu (2297), made (2271), exploratori (2212), clue (2203), somewher (1995), blur (1939), supposit (1777), infal (1700), undecid (1643), fuzzi (1459), proverbi (1430), recogniz (1403), consequenti (1397), evidentiari (1367), hypothesi (1250), dissimilar (1210), fundamentalist (1152), afterthought (1075), causal (962), have (949), learner (946), deduc (788), borderlin (702), becom (696), unknow (540), inferenti (495), becam (495), seem (453), theoriz (418), anyhow (308), everytim (300), felt (161), methink (142), kinda (119), alot (117), knowabl (94), perceptu (76), evidenti (60), choosi (40), sorta (31), were (30), coz (29), probabilist (18), dunno (17), is (11), intention (10), cuz (8), referenti (4), did (2), obei (1), somedai (0), try (0), everydai (0)

A.9 Dictionaries for Sentiment

We start from two short dictionaries used by Demszky et al. (2019) for positive and negative language.

Positive: donat, heart, thought, strength

Negative: hatr, hate, griev, grief, wrong

We exclude the word "solidar" from the original positive dictionary, because in our embedding model it is strongly related to Solidarity, the Polish trade union movement. Most related words to "solidar" are indeed "polish", "ukranian" and "lithuanian". The words "love" and "vless" are alse excluded as they are not part of the model vocabulary. We en-

large those dictionaries by including the 10 closest words in our model lexicon. We stem them and eliminate those stems that appear in our emotion or cognition dictionaries. The final unique stems are used to construct our positive and negative dictionaries.

Positive: almighti, benedict, bequest, bit, bosom, bounteou, capabl, charit, chariti, comrad, contribut, donor, etern, fortun, frankli, gift, gladden, god, inmost, moment, moral, nonprofit, philanthrop, prestig, pulsat, resili, solac, solicit, son, soul, spiritu, statur, subscript, superpow, tenderest, thee, thing, throb, touch, wonder

Negative: animos, bigot, bigotri, despic, detest, fanatic, heartach, heartbroken, heinou, inconsol, intoler, mistak, mistaken, racism, racist, sadden, someth, strife, vile

A.10 List of Stopwords

Stopwords include:

- Names of all US States, Cities and Counties
- Names of all US Members of Congress
- Ordinal and cardinal numbers from 0 to 1000
- Names of months and days of the week
- NLTK English language stopwords
- The following procedural words: 'house', 'senate', 'congress', 'speaker', 'chairman', 'member', 'committee', 'gentleman', 'gentlelady', 'gentlemen', 'floor', 'senator', 'congressmen', 'congressman', 'congresswomen', 'congresswoman', 'yield', 'democrat', 'republican', 'chair', 'state'