

# Counting Votes Right: Strategic Voters versus Strategic Parties

by

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M.Sc. Economics and Social Sciences, Bocconi University (2010)

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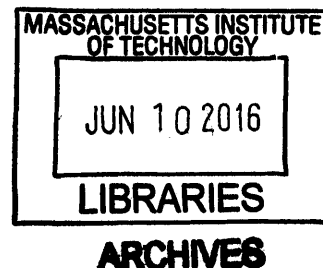
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## Abstract

This thesis, joint with F. Mezzanotti, provides a lower bound for the extent of strategic voting. Voters are strategic if they switch their vote from their favorite candidate to one of the main contenders in a tossup election. High levels of strategic voting are a concern for the representativity of democracy and the allocation efficiency of government goods and services. Recent work in economics has estimated that up to 80% of voters are strategic. We use a clean quasi experiment to highlight the shortcomings of previous identification strategies, which fail to fully account for the strategic behavior of parties. In an ideal experiment we would like to observe two identical votes with exogenous variation in the party victory probability. Among world parliamentary democracies 104 have a unique Chamber, 78 have two Chambers with different functions, and only one nation has two Chambers with the same identical functions: Italy. This allows us to observe two identical votes and therefore a valid counterfactual. In addition, the majority premia are calculated at the national level for the Congress ballot and at the regional level for the Senate ballot. This provides exogenous variation in the probability of victory. Because the two Chambers have identical functions, a sincere voter should vote for the same coalition in the two ballots. A strategic voter would instead respond to regions' specific victory probabilities. We combine this intuition with a geographical Regression Discontinuity approach, which allows us to compare voters across multiple Regional boundaries. We find much smaller estimates (5%) that we interpret as a lower bound but argue that it is a credible estimate. We also reconcile our result with the literature larger estimates (35% to 80%) showing how previous estimates could have confounded strategic parties and strategic voters due to the use of a non identical vote as counterfactual.

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## Chapter 1

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## 1.1 Introduction

In the political economy literature, strategic voters are defined as citizens that would switch to their preferred contender party from their ideologically favorite one to avoid wasting their vote when a district is pivotal and too close to call. A careful estimation of the extent of strategic voting is the main objective of this paper.

A high fraction of strategic voters would be detrimental both for the representativity of the political system and for the level of competition among parties. Consider the case of a fully strategic population of voters uniformly distributed between a radically left and right parties. The great majority of these voters would prefer a centrist party to be in power but none of them would switch their vote from their preferred extremist party to the centrist because they would anticipate that this would give victory to the opposite wing. In this example we see how strategic voting can prevent external competition against status quo parties, and therefore limit moderating political competition as well as the candidates quality enhancement. It could well be that the majority of the population is exasperated with the extremism of the two main parties but yet, because of their strategic behavior, refuses to vote for a third centrist party that better represents their views (Duverger (1959)).

It's important to note that the representativeness of the elected parties is not a philosophical concern about Democracy, rather an economic one. Governments are responsible for the level, allocation, and quality of public goods, transfers and services for a share of between 30% to 50% of GDP in developed democracies. Therefore if, due to strategic voting, representative democracy is not an effective way to convey the preferences of the citizens, the efficiency of the allocation of government spending is a first order economic concern as both parties that receive votes in equilibrium could make decisions inconsistent with citizens' preferences.

Because of these concerns, understanding the extent of strategic voting is a central question to evaluate the functioning of modern democracy. Recent work in economics has estimated the fraction of strategic voters to be 70% (Kawai and Watanabe (2013a)). If a majority of voters are indeed strategic, there is no easy fix with a change of electoral rules, Satterthwaite (1975) showed that for electoral systems to be strategy proof they need to be either dictatorial or non deterministic. In the present work, we apply a new geographical RD methodology (Pinkovskiy (2013)) and a conceptual insight on the importance of comparing two identical votes to derive much smaller estimates (5%) that reassure us on the fact that strategic voting is not a first order concern for democracy and for the economic efficiency of government services.

We argue that previous larger estimates are due to the use of non identical votes which makes controlling for strategic behavior by parties increasingly difficult. Indeed, the main parties also have incentives to behave strategically in a tossup district; via enhanced allocation of resources to the district, selection of more appealing candidates, or shaping policy towards the constituents of such district. As a result even sincere supporters for minority parties may vote for one of the two main contenders not because they are

strategic but because the strategic behavior of parties has accommodated their preferences.

Our identification strategy exploits the uniqueness of the perfect Italian bicameralism and a recent temporary change in the electoral law, which asymmetrically assigned the majority premium between the Congress and the Senate, to observe two identical votes and to have variation in the pivotality and significance of the vote. We consider the difference in the share of votes of the top two Coalitions across the two Chambers in each municipality as the outcome variable. These two Coalitions are the only true contenders for the electoral victory and therefore the only two that could be positively affected by strategic voting. By considering the within Municipality difference in votes across the two Chambers we remove any factor that affects voters actions symmetrically in the two Chambers. We then test whether our outcome variable is affected by the regional changes in electoral strategic incentives. If we consider the municipalities on the border, we can exploit multiple geographical discontinuities with different treatments by using a two-step geographic RD estimator recently developed by Pinkovskiy (2013). In light of this new approach and the two identical votes setup, we find significant but very small estimates, consistent with the important contribution of strategic parties to total misaligned voters.

To understand the role and necessity of each part of our empirical strategy let us think about the ideal test we would like to run. In an ideal randomized controlled trial, we would like to observe how the vote of the same individual changes when we change her beliefs about the probability of being pivotal. We argue that our empirical strategy is as close as possible to this ideal benchmark. The Italian Constitution perfect bicameralism, i.e. the fact that the two Chambers perform the same functions, allows us to observe two identical votes. The fact that the majority premiums are determined at the Regional level (Senate) and the National level (Congress) allows us to have exogenous variation in the probability of being pivotal. In addition, the difference between the outcome variable in Senate and Congress allows us to absorb district fixed effects such as higher campaigning by national leaders or advertisement, and the difference across regions allows us to use variation in the pivotality beliefs of voters. The regression discontinuity helps to guarantee that the distribution of costs for voters is similar and to mitigate possible ecological fallacies (see model). Lastly, the fact that electoral lists are closed and long - impeding the knowability of the candidates - allows us to attenuate the concern of strategic parties driving the results through candidate selection. This is discussed more in detail in section §1.5.

Our contribution is twofold; we conceptually highlight the importance of the distinction between strategic voters and strategic parties providing theoretical and empirical arguments on its importance, and we provide estimates on the extent of strategic voting that are much lower than those previously suggested (5% versus more than 30% Spenkuch (2012) and 75% Kawai and Watanabe (2013a)). We discuss in section §1.6 these works, their identification assumptions and how their much larger estimates might be due to a joint estimation of strategic parties and strategic voters. We prudently interpret our results themselves as a lower bound. We believe that the unique institutional setting (see section 1.2.1) and lower estimates are consistent with a

lower bound close to the true value.

In the next section we provide the institutional details relevant for our strategy, and in section §1.3 we present a simple model of our empirical framework. In section §1.4 we illustrate the data, the empirical strategy, and why we should use geographical RD to properly test the predictions of our model. In section 1.4.5 we present results from the two step estimator and in section 1.4.4 we study the case of Lombardy and Emilia Romagna where the starkest incentives were at play. We discuss possible concerns and the meaning of our estimates in section §1.5. Finally, before concluding we discuss the previous literature on strategic voting, previous estimates, and the discrepancy between our estimates and previous results.

## 1.2 Background Information

### 1.2.1 The Parliament

After the end of the Second World War, and the experience of Fascism, the authors of the Italian Constitution chose a *perfect bicameralism* to prevent future dictatorships. They prescribed the existence of two chambers (Congress and Senate) with identical powers and functions. Any law needs to be initiated by one of the two Chambers and approved by both with no exceptions. Similarly, the executive needs to have the approval of both chambers to remain in power. The only difference between the two Chambers is their size and active and passive electorate. Citizens need to be 18 to vote for Congress and 25 to vote for Senate, while citizens need to be 25 to run for Congress and 40 to run for Senate; Congress has 630 members and the Senate has 315 members.

### 1.2.2 Electoral Law

Akin to gerrymandering in the Anglo-Saxon world, changes in electoral laws have been a constant of Italian politics. Parties in power change rules to improve their odds or make government harder for their opponents. In this section we explain the Italian electoral law, why it has recently been ruled unconstitutional, and how it facilitates our test. The law n. 270 approved on the 21<sup>st</sup> December of 2005 has been the Italian electoral law for the elections of 2006, 2008 and 2013. It was ruled unconstitutional by the constitutional court on December 4<sup>th</sup> 2013. The electoral law has not been known as n.270, but rather as “Pig Crap” (“Porcellum”) ever since its writer used such a nickname in an interview to define his own work. <sup>1</sup> Historically seats have been assigned at the national level. The new electoral law kept the majority premium at the national level

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<sup>1</sup>Silvio Berlusconi was in power in 2005 and was fairs badly in survey polls. He expected to lose to the center left under the previous electoral law. The opposition party argued that Silvio Berlusconi requested to write an electoral law that would make harder the creation of a Government for the Center-Left. “Pig crap” is an expression used sometimes in Italian to indicate a dirty trick, and hence the law’s nickname. The dirty trick is easily explained. Historically, the center left and Berlusconi are very closed in the nationwide support but their geographical distribution is quite different. Most of the support for the center left is concentrated in the regions in center Italy (Emilia, Tuscany and Umbria) where it usually wins with extremely high margins; Berlusconi instead usually wins the remaining regions though with smaller margins.

for congress and made it region-based for the Senate. The electoral law is fully proportional with majority premiums for both chambers. Parties need to select themselves into coalitions and indicate the name of the coalition leader as well as subscribe a program. The coalition that gets most votes at the national level in the Congress ballot receives a full house majority regardless of its electoral weight. For the Senate there is a hefty premium Region by Region to the coalition with a plurality of votes in each region<sup>2</sup>. The “Pig Crap” law also abolished preference votes: parties choose their candidates and people vote closed lists without ranking their preferences. This gave enormous power to parties and more leverage to their whips that could use threats of future blacklisting to bargain with members of parliament.

These two provisions were the explicit motivation for the Supreme court ruling the law as unconstitutional. But, as we have already hinted in the introduction, these two features are the foundation of our identification strategy.

Even if the same electoral law was in place since 2006, the 2013 election was the only one valid for our identification. Up until 2013, the Italian political landscape has been dominated by two coalitions: Center-Right and the Center-Left. In 2006 there were only two coalitions: the Center-Left, led by Prodi, that spanned from the very far left to the center, and the Center-Right, headed by Berlusconi, that spanned from the very far right to the center. Together they got more than 99% of the votes so there were no third coalitions. Without a third coalition there cannot be strategic incentives. In 2008, there were two additional small coalitions<sup>3</sup>. However, Berlusconi was widely expected to win everywhere (both Congress and Senate) and no important regions were actually toss-up nor pivotal. So again there were no incentives to vote strategically. In 2013 instead, many big regions (Lombardy, Veneto, Sicily and to a lesser degree Campania and Puglia) were tossups for the first time. The Congress was thought to be won safely by the Center-Left but the Senate was uncertain. There were two other parties - Monti and 5Stars - that could not win the majority premium in any region nor the national congress but whose voters could potentially affect the regional vote and therefore the final outcome in the Senate. The 2013 elections provided a unique case of varying expectations at the national and regional level for big pivotal, tossups regions.

### 1.3 A Simplified Framework

In this section we consider a simplified theoretical representation of the Italian Elections in 2013, the purpose of this section is to clarify why we use as an outcome variable the difference between the two chambers of the sum of the percentage votes of the two main parties and to explain why RD is necessary to obtain correct estimates.

Our model will follow the following abstraction:

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<sup>2</sup>But no further premium if the coalition would have already reached the super majority

<sup>3</sup>One on the very far left and one in the center. Both ended up below 6%, and only one made his way into the Parliament

- Each individual casts two votes, one for each Chamber;
- The majority premium is given at the National level for Congress and at the regional level for the Senate.
- There are three parties: A,B,C. Parties A and B are likely contenders in some regions. Party C is never a contender for victory.

This parsimonious setting will be enough to characterize the prediction that we will test. Parties A, B should receive relative more votes in Senate than in Congress when we compare tossup regions to non tossup regions.

### 1.3.1 A numerical Example:

Let each individual have a party ranking denoted by the vector  $r$ . She casts two votes, has utility 0.1 from voting her favorite candidate and utility of 0.5 if she is the pivotal voter and gets a less disliked candidate elected. Assume that there is no uncertainty about turnout and preferences and only two regions: Emilia and Lombardia. Table 1.1 presents voters types per region. Remember that one premium is determined at

Table 1.1: Numerical Example Ranking Types per Region

types of voters	1	2	3	4
Rank1	A	B	C	C
Rank2	C	C	A	B
Rank3	B	A	B	A
Lombardy	4	4	0	1
Emilia	8	1	1	1
Total	12	5	1	2

the regional level (Lombardy and Emilia in the above example) and one at the national level. Under common knowledge, we solve this example by considering the only possible equilibrium if all voters are strategic.

Each voter supporting either Party A or B will cast both votes for her favorite party. Types 3 and 4 instead may face a strategic dilemma. Their favorite party (C) cannot win so they may be tempted to cast a strategic vote. First, consider the Congress vote: since they know that the election is not close their dominant strategy is to cast the vote for C irrespective of their region of residence. In the case of Senate, the premium is given at the Regional level, so incentives are different for voters in different regions. The type 4 voter in Lombardy knows that she will be pivotal. Therefore her optimal strategy is to vote for B in the Senate election. Type 3 and 4 in Emilia instead know they will not be pivotal in the Senate election so they will vote C as they did in the congress ballot. Therefore the electoral outcome would be:

Table 1.2: Summary of Results for Numerical Example

	Congress L	Senate L	Congress E	Senate E
Party A	4	4	8	8
Party B	4	5	1	1
Party C	1	0	1	1
A+B	8	9	9	9
$\Delta(A+B)$	-1		0	

Denote by  $\Delta(A+B) = (Votes_A^{Congress} + Votes_B^{Congress}) - (Votes_A^{Senate} + Votes_B^{Senate})$ . In this specific example we have  $\Delta(A+B)_{Lombardy} < 0$  and  $\Delta(A+B)_{Emilia} = 0$ . More generally the prediction that we will be testing is:  $\Delta(A+B)_{Lombardy} - \Delta(A+B)_{Emilia} < 0$ . Here, we see that  $\Delta(A+B)_{Lombardy} - \Delta(A+B)_{Emilia} = -1$ .

This negative sign reflects the fact that strategic voters are relatively more likely to switch to one of the top two parties in toss-up regions versus non toss-up regions. This simple prediction is generalized in the following Section and is at the core of our empirical specification.

### 1.3.2 A general set up

There are three parties (A,B,C) and two ballots (Senate and Congress). The majority premium is at the national level for Congress and at the Regional level for the Senate. C is never a likely winner neither in the national election nor in any region. We assume that there is common knowledge of the probability of being a pivotal voter at the national level  $\pi(\alpha, \beta)$  and at the regional level  $\pi^j(\alpha_j, \beta_j)$ .<sup>4</sup> These probabilities are derived from the distance in polls ( $\alpha$ ) and the size of the electorate in the region ( $\beta$ ).<sup>5</sup>

Each voter  $\iota$  is characterized by a vector ranking her preferences  $r$  over the three parties (e.g. A,C,B or B,C,A etc), and a region  $j$  to which she belongs. We summarize the characteristics of voter  $\iota$  with a tuple  $(r, j, \delta_\iota)$ . Each voter casts two votes  $a_c$  and  $a_s$ , one for the Chamber and one for the Senate. She has “warm glow” utility  $\delta_\iota$  from choosing her first ranked party and a different utility value for the various possible rankings of parties (to simplify we assume she only cares about the winner of that ballot). Therefore the utility when choosing  $a_c$  for the congress elections and  $a_s$  for the senate elections is:

$$U_\iota^C = \delta_\iota \mathbb{I}(a_c = r(1)) + \sum_{z=A,B,C} \nu_\iota^z \mathbb{I}(Chamberwinner = j)$$

<sup>4</sup>Allowing these probabilities to depend on individuals' priors  $\pi_\iota(\alpha, \beta)$  would not change our results (as long as we assume common priors) but would introduce unnecessary complication.

<sup>5</sup>Notice that it is obvious that lower alpha (more contested elections) means higher probability of being pivotal all else constant, while the same is not true for  $\beta$ . On one side lower population means that there are fewer seats awarded in the senate and so the overall probability of being pivotal in the senate goes down, but the fact that there are fewer voters also makes it more likely to be precisely the pivotal voter for constant  $\alpha$ .

$$U_i^S = \delta_i \mathbb{I}(a_s = r(1)) + \sum_{z=A,B,C} \nu_z^i \mathbb{I}(\text{Senatewinner} = j)$$

Each agent has a different taste for his utilitarian pleasure from coherence ( $\delta_i$ )<sup>6</sup> We assume that it is distributed across regions with region-dependent distribution  $F_j$  over support  $[0, K]$ . We also assume that the ranking types ( $r$ ) are identically distributed across regions and that  $\nu_i$  is the same for voters with the same ranking. That is  $\nu_k^l = \nu_z^l \forall l \in \{A, B, C\}$  as long as  $r_k(m) = r_z(m) \forall m \in \{1, 2, 3\}$ <sup>7</sup>

We now show how the optimal strategies of such rational (strategic) voters would depend on the poll distance and the population of the region.

*Remark 1.* Voters whose favorite candidate is A or B, will cast a ballot for such candidate in both the Senate and the Congress irrespective of public information and their regional residence ( $j$ ).

*Proof.* See Proof. □

It remains to show how the C supporters vote.

**Proposition 2.** *In every region  $j$ , and election ballot  $M$  - where  $N$  stands for national ballot and  $r$  for regional ballot from region  $r$  - there exists a cutoff  $\bar{\delta}^{M,j}$  such that all C supporters s.t.  $\delta_i \leq \bar{\delta}^{M,j}$  vote strategically  $a_M = r(2)$  and all C supporters such that  $\delta_i > \bar{\delta}^{M,j}$  will vote sincerely  $a_M = C$ .*

*Proof.* See Proof. □

Now remember that in our initial discussion we highlighted how smaller  $\alpha_j$ s correspond to region  $j$  being more tossup. The effects of  $\beta$  instead depend on the underlying model used to describe  $\pi(\alpha, \beta)$ .

**Proposition 3.** *Under identical benefits distribution  $F$  across regions, if a region  $l$  is relatively more tossup than a region  $j$  ( $\alpha_l < \alpha_j$ ) there will be relatively more misaligned voters, i.e.:*

$$\left( F_l \left( \bar{\delta}^{N,l} \right) - F_l \left( \bar{\delta}^{l,l} \right) \right) - \left( F_j \left( \bar{\delta}^{N,j} \right) - F_j \left( \bar{\delta}^{j,j} \right) \right) < 0 \quad (1.1)$$

*Proof.* See Proof. □

*Remark 4.* Note that this result depends on assuming identical distributions ( $F$ ) across regions. An easy counterexample to the above theorem would be letting region  $j$  be more tossup than region  $l$  but assuming that the distribution of the benefits ( $\delta$ ) is a Dirac measure concentrated on  $K$  while the distribution of  $F_j$  is uniform.

<sup>6</sup>We do not actually need to have a behavioral assumption. Given that the system is proportional, it is enough that voters prefer to be a larger minority rather than a smaller minority.

<sup>7</sup>Again this assumption is not necessary but simplifies the argument.

From this little formal set up we can be pretty clear about what we should observe in the data:

- We should observe that the parties A,B receive more votes in the Senate relative to the Congress for the tossup regions relative to non tossup
- We should observe that A,B receive more votes when  $\alpha$  is lower.
- Unclear predictions for comparative statics on  $\beta$ .

Our model predicts that all voters playing strategically will be supporters of party C. These are not the total strategic voters but just the misaligned voters. Strategic voters' estimates should be adjusted for the size of party C.

As highlighted before, our results might not hold if  $F$  differs across regions. It is reasonable to think that  $F$  is not constant across the country, but it is reasonable to believe that  $F$  is constant in municipalities within few km. In this case, geographic Regression Discontinuity would consistently estimate strategic voting.

## 1.4 Data and Empirical strategy

### 1.4.1 Data

We merge three municipalities data-sets on voting, social-economic background, and geographic coordinates. Furthermore, we use the most recent electoral polls, published by television broadcast Sky, to measure the level of strategic incentives at the regional level.

Voting data are provided by the Historical Office of the Italian Department of State ("Ministero degli Interni") and contain municipality level votes by party for both Senate and Congress. We aggregate the party votes into coalitions because this is the level at which the strategic incentives operate. We use electoral documents to classify parties into coalitions. Coalitions are the same for Senate and Congress across Italy and they are officially defined before the election. The parties within a coalition can vary across regions, but for any Region they are the same between Senate and Congress. For instance, the Center-Right coalition contains some regional parties that appeal to local pride. Since our identification looks at the shift of votes across coalitions between Congress and Senate at the Municipality level, this heterogeneity is not a concern.

Italy is divided in 20 Regions and 8092 Municipalities. It is worth stressing that municipalities do not correspond to electoral districts, meaning that all the municipalities within a Region face exactly the same type of voting process. We drop from our analysis two regions: Valle d'Aosta and Trentino-Alto Adige. The reason for this choice is that the electoral rule in these regions is different from the standard one<sup>8</sup> and

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<sup>8</sup>Valle d'Aosta (VA) and Trentino Alto Adige (TA) are two autonomous regions with a special statute. Therefore, the Constitution allows them higher legislative flexibility.



that local parties representing the interests of linguistic minorities play an important role in these regions. Dropping these two regions brings the number of municipalities used in the analysis to around 7700.

We collect various demographic and economic data from the last issue of the “Atlante dei Comuni”. This is published by ISTAT, the national Bureau of Statistics, and contains information at municipal level. ISTAT also provides us with cartographic information for all the Italian municipalities. We measure the distance of a municipality to the local regional borders using geo-coded information. The procedure we employ is the following. First, we use the coordinates of the border of each municipality to determine its centroid. Then, for each municipality, we define as the distance of the municipality to the border as the airline distance to the closest point of the border. We also compile manually a list of municipalities right at the border.

For poll data, we resume to official sources. The Italian government established a web-site<sup>9</sup> where every media company is required to publish any public electoral poll. Using the web-site, we identified the poll that: (a) was closest in time to the election date; (b) had data on the intention to vote at regional level for the Senate ballot. While there are many polls in the period before the election, very few cover something different than the national result or a small subset of regions. The previous criteria led us to select the poll produced by the marketing company Tecne’ for the TV broadcast Sky, one of the 3 biggest Italian TV group and subsidiary of the multinational group News Corporation<sup>10</sup>. The results of the poll are provided in the appendix. Using this data, we construct an index to capture how tossup Region  $j$  was before the election:

$$Tossup_j = -|CenterLeft_j - CenterRight_j|$$

Where  $CenterLeft_j$  and  $CenterRight_j$  are the expected share of votes at the regional level for the two main coalitions in the Senate ballot. In other words, this measures how close the top-two coalitions are expected to be right before the election. The closest the index is to zero, the more toss-up a region is and therefore the more we should expect voters to engage in strategic voting, as predicted by the model. Notice that the index is always negative, therefore the higher the index, the more tossup the region.

#### 1.4.2 Introduction to the Empirical Strategy

In an ideal randomized experiment on strategic voting, we would observe how the vote of the same individual changes under different beliefs about the probability of being pivotal. While not quite identical to an actual randomized experiment, the Italian Electoral system in 2013 had some features that made it very well suited to answer this question. First of all, Italy is a rare example of perfect bicameralism, where the two elected Chambers have exactly the same institutional role and they differ only on their size and the rules governing

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<sup>9</sup><http://www.sondaggipoliticoelettorali.it/>

<sup>10</sup>The poll is based on surveys run around February 11th, each poll is stratified at the regional level by the socioeconomic and geographical residence. Since two Regions had missing info, we fill the gap with the equivalent poll produced the week before by the same company, Tecne’, for Sky.

active and passive electorate. A consequence of this perfect bicameralism is that any voter should have the same exact preference ranking across coalitions in the two Chambers. Comparing the share of votes going to each of the two Chambers we difference out the true underlying preference of the voters. More generally, the difference between the two reflects only factors that have an asymmetric effect across the two Chambers. Secondly, the “Pig Crap” law is characterized by a wide level of heterogeneity in strategic incentives across the two Chambers. While the seats in the Congress are assigned at national level, the seats in the Senate are assigned based on the electoral results at the regional level. We focus here on the incentives generated by the large majority premium assigned to the coalition receiving the largest share of vote in each region<sup>11</sup>. While the strategic incentive for the Congress is constant across the whole country, the incentive for Senate changes region by region, depending on the level of closeness of the two-contenders coalitions, which is measured by our *Tossup<sub>j</sub>* index. We exploit this geographical heterogeneity in our empirical strategy.

A simple model of strategic voting predicts that supporters of non contenders in toss-up Regions, will be relatively more likely to switch to one of the top two coalitions in the Senate ballot. This is the prediction of Proposition 3 of our model. The condition in Proposition 3 translates into the following linear equation, where we would expect the parameter  $\delta$  to be negative:

$$\Delta_{\%ij}^{C-S} = \alpha + \delta (TossUp_j) + \beta X_{ij} + \epsilon_{ij}$$

$\Delta_{\%ij}^{C-S}$  is the difference in the sum of votes for the two main coalitions between Congress and Senate, *TossUp<sub>j</sub>* is an index that measures the level of closeness of the parties in the pre-electoral poll, higher values of the index imply more closeness, and  $X_{ij}$  is a set of covariates at the municipality level. Under the assumption of no heterogeneity in preferences, the parameter  $\delta$  is a consistent estimator for the the share of misaligned voters for a given level of closeness in the electoral race. However, the assumption of no heterogeneity in preferences is very strong. If it fails, the least squares estimator for  $\delta$  is consistent if and only if the set of covariates  $X_{ij}$  controls for all the observables and unobservables heterogeneity across municipalities. Here, we employ a geographical Regression Discontinuity setting to relax the identification assumption and provide evidence on strategic voting with high internal validity.

The intuition behind the Regression Discontinuity framework is the following. Consider comparing two adjacent cities, call them A and B, that are separated by a Regional border. Given that the population lives just a few minutes apart and given that there is full mobility of factors and people across Regions, we expect these two cities to be identical, both in observables and unobservable characteristics. However, the two cities crucially differ in the expectation regarding the results for the Senate race at regional level. Our test looks at how the difference in votes for the contenders’ coalitions change as a function of the ex-ante perception on regional tossupness.

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<sup>11</sup>For Congress, the (same) majority premium is assigned at national level

While we show that municipalities close to the border are similar in observables characteristics, Regional borders could be associated with discontinuity in other relevant dimensions not captured by our set of covariates. For instance, Municipalities across the border differ in the identity of the belonging Region. Italian Regions have an important role in public good provision and more broadly in the local economy. It follows that Regional institutions may be an important determinant of political orientation. However, this is not a concern for us: since both Chambers have exactly the same role in the political decision making and given that we focus on the difference in voting across the two, local specific fixed effects would not be a concern for our results<sup>12</sup>. The only threat to our identification comes from factors that affect the votes across the two Chambers and that are correlated with the Toss-up index presented above. Strategic behavior by parties is the main confounding factor we have in mind. In the last part of the paper, we argue that this concern is very unlikely to be first-order here, because of the electoral institutional features. Our estimates could be interpreted as a lower bound because the function that relates the number of strategic voters to the tossupness of the election could be non linear. By estimating the average effect over treatments of differing intensity the non linearity could lead to an underestimation of the percentage of strategic voters.

In the next Section, we discuss more in detail the empirical framework. After that, we focus on the most relevant case of difference in strategic incentives, the border between Lombardy and Emilia-Romagna. This example will help build intuition about the empirical framework as well as providing a plausible bound for our estimates. In the end, we present our main results and discuss robustness tests.

### 1.4.3 The Regression Discontinuity test at the National Level

In the setting of our analysis, there are a total of 27 Regional borders, for a total of 54 border-sides. Our empirical framework differs from the standard Regression Discontinuity framework because we have different boundaries where the treatment changes discontinuously but in potentially border specific ways. In the basic case, a forcing variable (distance from the border here) defines one relevant discontinuity and the test focuses on studying how the outcome of interest discontinuously changes across it. Here, we need to develop a test that is generalizable to the 27 borders. A notable example in the literature is Black (1999). She is interested in studying the effect of school quality on house prices, using school district boundaries in Massachusetts to identify the relevant causal effect. While her framework is particularly valuable because of its simplicity, it may lack in flexibility for a case where it is not possible to use observations exactly on the discontinuity. We therefore use a more general two-step framework, developed by Pinkovskiy (2013). As a robustness, we present our results also using a framework equivalent to Black (1999) and Dube et al. (2010), and we show that the results are unchanged and, if anything, statistically stronger.<sup>13</sup>

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<sup>12</sup>Two people with the same underlying preferences might have different political tastes at the national level in two regions or even just two municipalities that have different policies, but such preference would be reflected in the same (potentially different between the two people) party vote at the Congress and Senate.

<sup>13</sup>A strategy similar to Dube et al. (2010) has been recently used in Naidu (2012), where fixed effects per pairs of counties are added to isolate the effect of state level law changes.

The intuition behind the Pinkovskiy’s procedure is simple. Different borders may differ in their size, density of municipalities and dependence of the outcome on the forcing variable. Therefore pooling together the whole set of municipalities at the border may not be the cleanest procedure. One way to look into this is to aggregate at border-side level the information. This is what we do here. In a first stage, we estimate the conditional expectation at the border of our outcome variable  $\Delta_{\%ij}^{C-S}$  separately for each border-sides set of municipalities. In the second stage, we use these estimates as outcomes in a cross-sectional regression on the level of closeness in the regional race,  $Tossip_j$ . In practice, we start by estimating the following equation for each border-side separately:

$$\Delta_{\%ij}^{C-S} = \tilde{\Delta}_{\%j}^{C-S} + \rho(d_{ij}) + \epsilon_{ij}$$

This is estimated over the set of all municipalities that are within a bandwidth of  $B$  km from the relevant border, assuming  $\rho$  as linear. Notice that  $\tilde{\Delta}_{\%j}^{C-S}$  is simply the constant of the least-squares estimator and it estimates the conditional expectation of the outcome variable at the border ( $d = 0$ ). Since we estimate a different function per each border-side, we allow total flexibility on the conditional expectation across border-sides. Then we use these estimates in a second stage as outcome. In particular we estimate:

$$\tilde{\Delta}_{\%j}^{C-S} = \alpha + \delta Tossip_j + \beta \tilde{X}_j + \epsilon_j$$

where  $\tilde{X}_j$  are the conditional expectation of the standard covariates at the border<sup>14</sup>. The observations are weighted by the number of voters at the border-side. Given the definition of the variables, the theory predicts that  $\delta$  should be negative in presence of strategic voting. The standard errors in this model are clustered at the border level. In the result section, we discuss some relevant specification robustness, such as allowing for border specific fixed effects.

This framework as any other Regression Discontinuity requires two important assumptions. First, we need that every relevant factor different from the main outcome is a smooth function of distance across the discontinuity. In the result section, we show this is actually the case for a set of important covariates. This is not surprising, since the sets of municipalities that are compared are usually very close and regional border do not determine any relevant change in labor markets institutions, credit or infrastructures.

Second, we need to make sure that our results are not simply driven by sorting of citizens across the border. Lee and Lemieux (2009) argues that sorting is probably the first order concern around geographical Regression Discontinuity. People can choose where to live based on their own preferences and characteristics. If the endogeneity of the choice is related to the mechanism we are testing, then our estimates could be biased. Luckily, we can strongly reject this criticism. In this context, it is highly implausible that the location choice

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<sup>14</sup>We have simply run the same exact first stage procedure on the covariates

can be related to voting behavior as described in our model. In Italy, voters need to vote in the Municipality where they are resident. Changing the Municipality of residence is costly and time consuming<sup>15</sup> and therefore it is highly unlikely that anyone would undertake this process for the small and uncertain gains from strategic voting.

It is important to make the following point about inferences. Pinkovskiy (2013) argues that the standard type of asymptotic, where data are independently generated with the number of observations going to infinite, may not be particularly well suited for the case of geographical Regression Discontinuity. He proposes a new estimator for the variance under infill asymptotic. In the standard asymptotic, the domain from where observations are drawn is thought to go to infinite: with infill asymptotic instead we have that resolution of our data increases to infinity. In our setting, this would be equivalent to have data on votes for infinitely smaller municipalities. He shows that, when infill data are used and errors are correlated, the standard variance estimator is too conservative. While we believe the analysis presented by Pinkovskiy (2013) is of great interest and deserves more exploration in the future, in our work we decided to use the standard White estimator for the variance. There are two, related reasons why we make this choice. First, the typical standard errors are overly conservative and therefore they would prudently bias us against finding any statistical significance. Secondly, the actual properties of the estimator of the variance proposed by Pinkovskiy (2013) are not well known in finite sample.<sup>16</sup>

#### 1.4.4 A case study example: Lombardy vs. Emilia-Romagna

We start the presentation of the results, by looking at the border between Lombardy and Emilia-Romagna. This case study is important for multiple reasons.

First of all, it helps exemplifying the intuition behind the Regression Discontinuity approach. Secondly, this border represents the cleanest example of discontinuity in strategic incentives, because it compares one almost perfectly toss-up Region (Lombardy) with one where the electoral result was completely uncontested (Emilia-Romagna). According to the most recent polls before the election, in Lombardy Center-Left and Center-Right were expected to be tied. Elections were expected to be decided by thousands of votes and the strategic importance of this area was particularly stressed by media and politicians. Instead, Emilia-Romagna was, together with Tuscany, the least contested Region in Italy. The Center-Left was expected to lead the race by at least 20 percentage points. Historically, the communist party first and the center-left coalition afterwards had always won the election in this area post World War II. Lombardy was not only more contested, but, because larger than Emilia-Romagna in population, its victory was more determinant

<sup>15</sup>Voters need to apply to the new Municipality much in advance than the Election, providing a proof of residence in the new Municipality. Local police then need to validate the information provided by inspecting the new residence. The whole process may take weeks, if not months, and it requires filing multiple forms and paying some fees

<sup>16</sup>In applying its theoretical framework to his empirical problem, Pinkovskiy (2013) develops a routine where he uses either the White or its own variance estimator depending which one is smaller. The idea is that the variance he develops is always smaller than the standard White estimator in asymptotic, but this may not be in finite sample. That's why choosing White standard errors is more conservative in our setting.

for the final outcome. All in all, the expected value of voting strategically was characterized by a large jump across the border. In the end, this case is particularly interesting because it provides an upper bound for the size of strategic voting.

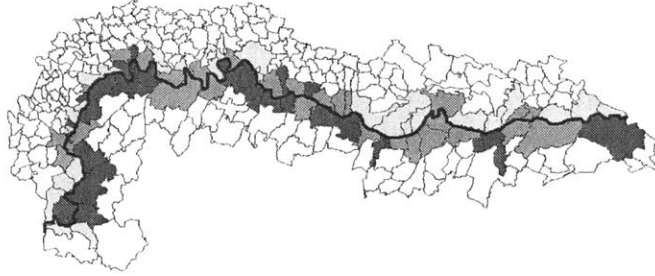
Since we are comparing the most contested with the least contested Region, the probability of being pivotal is characterized by a sharp discontinuity at this border. However on other dimensions the two Regions appear to be quite similar at the border. Lombardy and Emilia-Romagna are the two richest Regions of Italy, among the richest in Europe. While quite different in many instances, along the border their differences shrink. Consider for instance, the subset of Municipalities which are exactly on the border between Lombardy and Emilia-Romagna. This set of 83 Municipalities is the closest you can get to an ideal Regression Discontinuity (figure -4). By construction, every Municipality at one side of the border is contiguous with at least another Municipality in the (counter-factual) Region. Consider the heat map presented in figure -5, where the running variable is income per person. Income does not appear to be characterized by any discontinuity across the border. In fact, if anything, the spatial distribution of income seems to be characterized by clusters along the border, with Municipalities with similar income grouping together across the border. This pattern is not unique of the Municipalities along the border, but the results do not change when considering wider bandwidth around the border line (look figure figure -6 for same with a 10km bandwidth). Furthermore, results are qualitative similar when considering other outcomes.

Figure 1-1: Distribution of Income by Municipality, Lombardy vs. Emilia-Romagna



Notes: this map contains all the Municipalities in Lombardy or Emilia-Romagna, that are within 10km from the other Region border. Colored are the Municipalities that are on the border. A darker color signal higher level of income per capita in that Municipality. Data on income are provided by ISTAT. The black line is the border between the two Regions.

Figure 1-2: Distribution of the outcome by Municipality, Lombardy vs. Emilia-Romagna



Notes: this map contains all the Municipalities in Lombardy or Emilia-Romagna, that are within 10km from the other Region border. Colored are the Municipalities that are on the border. A darker color signal higher level of the outcome variable, which is the difference in the share of votes going to one of the top-two Coalitions between Congress and Senate at Municipality level. Data on income are provided by Italian Department of State. The black line is the border between the two Regions.

However, the story is different when we look at our outcome variable  $\Delta_{\%ij}^{C-S}$  as input in the heat map (figure -6). Here instead, the discontinuity is quite evident. The Municipalities in the north side of the border appear to have on average a larger share of voters voting for the two contenders coalitions in Senate than in Congress. The result is confirmed when looking at different bandwidths.

The story at this point is clear: Municipalities at the two borders differ by the level of incentives for being strategic, but they tend to be very homogenous along other dimensions. While the case of Lombardy versus Emilia-Romagna cannot be generalized further, the bottom line is confirmed by further tests in the national sample. As we will show, in fact, the level of pivotality of regions does not appear to be correlated with values of covariates at the discontinuity.

The results presented graphically can also be confirmed in a formal specification. We consider four samples. We start considering what we think is the closest to the ideal RD setting, which is the case where we analyze only the behavior of Municipalities right at the border. We then consider the set of Municipalities whose centroids are at 10,15, and 20 km from the border. Results will be both qualitative and quantitative similar across the different samples. We run a simple linear local regression, where we study how being in the more toss-up Region (Lombardy) affects the behavior of voters in close-by Municipalities<sup>17</sup>.

The results can be found in table 5. Crossing the border of Emilia-Romagna and Lombardy implies a drop in the outcome variable of about 1.5%. Later we discuss how to recover the extent of strategic voting from these estimates, under quite mild assumptions. In this case, it is only worthy to point out that these estimates imply a maximum extent of strategic voting around 5% once we correct for misaligned voters. While still substantial and potentially relevant, this is very far from previous work. In Column (1) we present the

<sup>17</sup>The equation of interest is the following:

$$\Delta_{\%ij}^{C-S} = \alpha + \delta Lombardy + \rho(d_{ijk}) + \epsilon_{ij}$$

where  $d_{ijk}$  is the distance of Municipality  $i$  to the border between  $j$  and  $k$ , and  $\rho$  is assumed to be linear and different at the two sides of the border. Observations are weighted by number of voters.

simple coefficient with the border regression, where no correction for distance and covariates is applied. In Column (2) to (4), we subsequently add controls and distance functions<sup>18</sup>. Results are stable. Notice that in Regression Discontinuity, adding controls is not required for identification. We add them here mostly for robustness and to gauge the precision of our estimates. In the end, between Columns (5) to (7), we present the results for the different distances, and in particular for all the Municipalities within 10,15, and 20 km from the border. Again, the results are not statistically different from each other and in line with what expected. In the end, in the appendix we present a formal test for the conjecture of balancing of the covariates (see table 6). For all the sub-set of data, we do not find any statistical differences across the border in relevant outcome variables.

### 1.4.5 Results and Robustness

We now generalize our previous test to the whole country, by employing the two-step procedure developed by Pinkovskiy (2013) and presented above. We start by showing that our  $Toss - up_j$  index does not systematically predict differences in other covariates at the border - the extension of the test we already performed for Emilia Romagna and Lombardy. Results in this direction can be found in the appendix (see table 8). In particular, we test whether the conditional mean at the border of the covariates appears to be correlated with the toss-up score. Of all variables, only the size of the population appears to be significantly correlated; only when considering a bandwidth of 20km and only at the 10% level. So the test confirms the balancing assumption for the national sample.

We estimate our two-step estimator in three sub-samples, looking at bandwidth of 10,15, and 20 km from the border. We show these results in table 7, where we report every specification both with and without controls. As expected, the introduction of the controls does not substantially change the value of the estimated  $\delta$  but it reduces standard errors. The specification confirms the results provided for Lombardy, where the more toss-up sides of the borders tend to have a larger share of voters acting strategic than their counterparts. In the next Section, we discuss more in detail the interpretation of the magnitude of these coefficients.

One concern with this procedure is that, the density of Municipalities close to the border may be particularly low in some specific borders. While this is not a big concern when considering a 20km mile bandwidth, it can be a problem with the 10km border. For instance, with the 10km bandwidth we were forced to drop two borders (Emilia-Romagna vs. Piemonte and Marche vs. Lazio) in the first-stage. We try to address this concern in two ways. We start by expanding the bandwidth in our first stage up to 30km from the border, in order to test the sensitivity of the model to number of observation in the first-stage. Our results are always in line with our main specification. Then, we implement a non-parametric bootstrap, in order to test

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<sup>18</sup>Notice that the border regression is the closest you can get to the ideal RD. Here controlling for distance makes little sense, since the function of distance do not really discriminate between Municipalities that are closest or further from the border-since they all are on the border but rather between Municipalities whose centroid is closest or further from the border. Since we do not know the population distribution within the Municipality territory, this type of discrimination would be arbitrary.



whether our conclusions may be somehow driven by small sample bias. For every iteration  $i$ , we randomly draw with replacement  $N$  observations from the sample of  $N$  Municipalities within  $B$  km from the border. This is done completely independently for each of the 54 border-sides. Then, we use this sample to estimate the  $\delta^{(i)}$  following the usual procedure. Using the empirical distribution of  $\{\delta^{(i)}\}_{i=1}^{1000}$ , we estimate confidence interval for the parameter. Again, all results are confirmed. All these tests can be found, as well as other robustness, in the appendix of the paper (see table 11).

Our estimates  $\delta$  exploits the cross-sectional variation in the level of the toss-up index and  $\Delta_{\%ij}^{C-S}$ , while creating a balance sample of homogenous areas. Alternatively, we may instead consider a different estimator, where we exploit only within border variation through the introduction of a border-specific fixed effect<sup>19</sup>. This estimator compares how, within the same border, differences in the tossup level affect the share of misaligned voters. If our primary specification is correctly specified, then we would expect this test to substantially confirm our previous results. This is what we find in the data. In the new fixed effects specification, the magnitude of  $\delta$  is around 20% larger, and still highly significant. While larger, a formal test reveals that the two parameters are not statistically different between each other.

As a concluding robustness to our results, we present a simple one-step equivalent of our two step estimator. In particular, we pool together all the Municipalities that are within a distance  $B$  to the border for the whole 27 borders and we test whether being in a more toss-up Region affects the voters' strategic behavior. This is very similar to the methodology used by Black (1999) and Dube et al. (2010)<sup>20</sup>. While our two-step estimator is more flexible in controlling for the differential effect of distance across different borders, their estimator is more parsimonious. If the relationship between distance and outcomes is not particularly heterogeneous across border-sides, we expect this specification to produce estimates close to the one in the two-step estimator. The results presented in table table 11 confirm our previous findings. If anything, these estimates seem to be even smaller than the one with the two-step estimator.

## 1.5 Discussion

In this section we show how we can recover from our previous estimates the extent of strategic voters. Furthermore, we discuss the role of strategic parties in our setting and in the interpretation of the results.

So far we estimated the effect of the level of electoral contestability on the size of misaligned voters<sup>21</sup>. Because citizens from the main parties face no strategic incentives, the total misaligned voters represents the amount of strategic voters within secondary coalitions. To get back an estimate for the total strategic

<sup>19</sup>The specification is  $\bar{\Delta}_{\%j}^{C-S} = \alpha_{b(j)} + \delta Tossup_j + \beta \bar{X}_j + \epsilon_j$ , where  $\alpha_{b(j)}$  is a border fixed effect, which is the same level of clustering of our standard errors.

<sup>20</sup>We estimate  $\Delta_{\%ij}^{C-S} = \alpha + \delta Toss - up_j + \rho(d_{ij}) + \epsilon_{ij}$  over the whole set of Municipalities within a bandwidth  $B$  to the border

<sup>21</sup>Voters that voted for a different Coalition in Senate relative to Congress

voters we need to scale back those estimates by the total fraction of votes obtained in the congress ballot by secondary coalitions. For instance, across the border between Emilia-Romagna and Lombardy we found a jump of around 1.5% of misaligned voters across the borders. Since the voters of non-top two Coalitions were only around one third of total voters in this area, this translates into an upper bound of voters that are strategic in the area slightly below 5%<sup>22</sup>. When considering the nationally pooled Regression Discontinuity, the intuition behind the result is the same, while the procedure to obtain them is slightly different. Consider a point estimate of our parameter  $\delta$  of 5, which is coherent with the results in the border with 15km bandwidth. This is telling us that an increase of 1 percentage point in the closeness between the two parties implies an increase in misaligned votes of about 0.05 percentage points. Comparing a situation where we expect to have no voters being strategic (one of the contender Coalition is expected to lead the race by 20 percentage points), with one where the incentive is maximum (the two Coalitions are perfectly tied), we obtain an estimate of voters that are misaligned of about 1%. This again translates in a share of voters that are strategic of about 3%. Using the whole distribution of the coefficients estimated across all the specifications, our results are coherent with a share of strategic voters between 1% and 5%. The maximum estimate of total strategic voting is found in the regression discontinuity between Lombardy and Emilia Romagna. This is not at all surprising as these were the Regions where the relative electoral distance was greatest. Our pooled national regression is nevertheless robust to the exclusion of the Lombardy and Emilia Romagna border.

In section §1.6, we discuss how previous tests could potentially be estimating the joint equilibrium of strategic parties and strategic voters. Obviously such a critique could be turned against our estimates as well. Strategic parties and strategic voters go in the same direction: more tossup regions are more subject to strategicity. We argue that the natural experiment we use is less likely to suffer from this problem. In our setting, we can compare two equivalent votes. Both Chambers have the exact same institutional role, and the electoral system for the two is identical, with exactly the same choice set of coalitions available. Keeping the actions of political parties constant, a sincere voter would always vote for the same coalition in both Chambers. However, political parties can take actions to influence voters' behavior. In particular, a party chooses how to optimally distribute resources (advertisement, campaign funds,...) and how to allocate candidates across districts.

By looking at the difference in votes across the two Chambers at Municipal level, we implicitly impose a fixed effect at the municipal level. Therefore, all the actions that can be taken by parties to influence voters at city level, such as advertising or campaigning by one of the top coalition leaders, will influence both Chambers in equal extent and therefore its effect will be differentiated out by our estimator.

The only concern left for strategic parties is the assignment of candidates across Regions and across the two Chambers. In particular, the top two coalitions could place the highest quality candidates asymmetrically across Chambers and Regions, with the highest quality politicians being systematically placed in the Senate

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<sup>22</sup>This is of course under the assumption that the share of potentially strategic voters is uniformly distributed across parties. A common assumption in the literature.

in toss-up Regions. It is worth stressing that differences in quality across Regions is not a threat to our identification, but rather differences in relative quality between the two Chambers across Regions. We argue that this is not a concern in our setting. In Italy's 2013 election voters choose a party, each of which presents a long, closed list of candidates, rather than a specific politician, like in uni-nominal systems. In order to be influenced by the actual quality of politicians, voters should both be able to understand the identity of the marginal candidates for each party and care about the relative quality of the elected officials in the difference across the two regions between the chamber and senate lists. We argue that the ability of assessing the marginal candidate was greatly impaired with the "Pig Crap" electoral system. This is not a mere matter of scholar judgment but is also certified by the official motivation of the the Italian Constitutional Court. In fact, in December 2013 the Italian Constitutional Court ruled unconstitutional the "Pig Crap" law precisely because of the "unknowability"<sup>23</sup> of the candidates. According to their ruling, it was impossible for a voter to understand who was the candidate they were voting for. In particular, some features are particular relevant, such as : (1) Candidates are presented in very long closed lists with no possibility of preference selection; (2) same top candidates were in multiple districts with ex post party selection of the seat 3) large premiums. <sup>24</sup>

One could still argue that voters would not vote fully rationally for their unknowable marginal candidate but rather for the top few on the list or a weighted average of the first candidates. These cases do not worry us as the same people are top candidates in neighboring regions or in all regions (e.g. Berlusconi for the center right both in Emilia and Lombardy's Senate), and because we collect and show observable quality metrics across regions and parties in the two main tossup regions (Emilia-Romagna and Lombardia). In a separate technical appendix we detail the behavioral rules that would be necessary for strategic parties to still be the driver of the estimated 5%.

## 1.6 Strategic parties or strategic voters?

We have shown how our methodology gives us very low estimates for strategic voting. This is in contrast with recent literature on the extent of strategic voting. In this section we review such literature and discuss

<sup>23</sup>"né con altri caratterizzati da circoscrizioni elettorali di dimensioni territorialmente ridotte, nelle quali il numero dei candidati da eleggere sia talmente esiguo da garantire l'effettiva conoscibilità degli stessi e con essa l'effettività della scelta e la libertà del voto (al pari di quanto accade nel caso dei collegi uninominali)". Authors' translation "[t]he unconstitutional law cannot be defended by comparing it with other ] systems characterized by electoral seats that are small, in which the number of candidates is so limited in the short list to warranty the effective Knowability of the candidates and with it the freedom of choice and vote."

<sup>24</sup>Understanding who is the marginal candidate is not a trivial exercise. First, you must know the total number of Senators elected in the Region. This number is updated overtime by the Government to reflect changes in population. In particular, the number of Senators elected in Lombardy and Emilia-Romagna changed in 2013 for the first time in more than ten years, increasing for both by about 5%. Once you know the total number of seats assigned, you need to form expectations about the shares of votes received by each coalition and also about the shares of votes received by each party within each coalition (e.g. Center-Right has more than five parties in the coalition). Any party presents his own list of candidates and seats are first assigned to coalitions, and then parties split the seats of the coalition. Two factors make the problem even more complex: (a) The problem is naturally discrete and there are relatively small parties. Therefore even a small changes in vote by a small parties may determine a jump in the number of elected officer by the party; (b) It is not uncommon that some elected officers reject the election because of incompatibility with other roles or because the same candidate was elected in another electoral district: this creates all another level of uncertainty in the problem. On top of all this for tossup regions it is effectively impossible to determine who the marginal candidate is.. precisely because they are tossups. So the premium could go to any of the coalitions.

the discrepancy.

Two recent papers try to move beyond indirect tests on the existence of strategic voting to provide estimates of its relevance. Kawai and Watanabe (2013b) use a structural model to conclude that as much as 85%, and at least 60% of voters are strategic. A result that we find quite big compared to previous surveys. Spenkuch (2012) estimates the number of strategic voting somewhere above 30%. Relative to this literature our contribution is to show both theoretically and numerically how these high estimates might easily be due to incorrect identification due to parties acting strategically and provide much lower estimates from a cleaner natural experiment (5%). Besides these two very recent works that test the extent of strategic voting, the richness of the empirical literature confirms the importance of the topic. Laboratory experiments support tactical behavior (Duffy and Tavits (2008a)) and pivotal voter models (Levine and Palfrey (2007a)), but it remains to be seen whether this is something relevant in big scale elections and when people are casting real votes. Alvarez and Nagler (2000) and Ganser and Veuger (2012) use surveys to argue that strategic voting occurs also in real elections, but their estimates vary depending on the type of surveys used. Indirect tests of strategic voting that do not estimate its extent are provided by Coate et al. (2008a) and Fujiwara (2011). Coate et al. (2008a), observe very big winning margins that are inconsistent with a positive cost of voting and the pivotal model. Indeed with positive cost of voting and pivotal behavior some voters should abstain from going to the polls in equilibrium. This evidence is inconsistent with a large proportion of voters being strategic, if we assume that the cost of voting is substantial. Fujiwara (2011) instead finds indirect support for the existence of strategic voting by testing Duverger's law (Duverger (1959)).

Strategic voters vote differently when subject to different pivotality likelihoods (Myerson and Weber (1993b)). Instead, parties behave strategically when in tossup districts they choose candidates that are more appealing to marginal voters or otherwise alter their behavior (marketing and campaigning) in response to the likelihood that the district will be contested. It is clear that strategic parties and strategic voters go hand in hand. When a district is too close to call, the main parties have incentives to candidate their more appealing public figures and voters are more likely to be pivotal and therefore behave strategically. In this context and without further identification refinement, an estimate of the extent of strategic voting combines together the strategicity effect of both voters and parties. We show that controlling for all unobservable and observable district and candidate characteristics does not help isolating the effect of strategic voters. In particular, we construct a very simple example where an identification strategy comparing candidates' votes with lists' votes would overestimate strategic voters by 25 percentage points<sup>25</sup>. We also show how failing to explicitly model and account for strategic parties in a structural estimate can lead to even larger overestimates.<sup>26</sup> Through this analysis, we highlight that a test isolating the extent of strategic voting needs to (a) compare two identical votes; and (b) control that other strategic players are not able to take actions that are asymmetric across the two ballots.

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<sup>25</sup>Precisely the difference between our estimates and Spenkuch (2012)

<sup>26</sup>The difference between our estimates and Kawai and Watanabe (2013a) is 60-78 percentage points.

Spenkuch (2012) compares “list votes” awarded in a proportional way nationally with “uninominal votes” awarded in a “first past the post” way at the same administrative unit. Because the two votes have different electoral rules (proportional and uni-nominal), big parties have an extra incentive to place the best candidates in the uni-nominal ballot and the opposite incentives hold for small parties. Therefore even fully sincere voters that care about candidates characteristics would desert the small parties for the big ones. Importantly, controlling for observable or unobservable characteristics of candidates or districts would not eliminate this concern. Consider comparing two different votes across different units of observation, where the sets of candidates or characteristics of the district are constant. In particular, Spenkuch (2012)’s specification is:

$$v_{k,r}^C = \chi_k + \lambda v_{k,r}^L + \varepsilon_{k,r}$$

Where  $v_{k,r}^C$  is the percentage votes for the candidate in the uninominal election in district  $k$  and precinct  $r$ ,  $v_{k,r}^L$  the percentage votes for the list of the candidate in the national election and  $\chi_k$  a fixed effect for the district-candidate.

If the two votes are not identical, regressing one vote against the other will attribute proportional variation across units of observations within a district to strategic voters and only absolute average changes to fixed effects (candidate or districts). In other words, it assumes that better candidates will be rewarded for their superior quality with the same percentage points effects within district, rather than proportionally. This is a very strong assumption that is probably implausible as the following example will clarify.

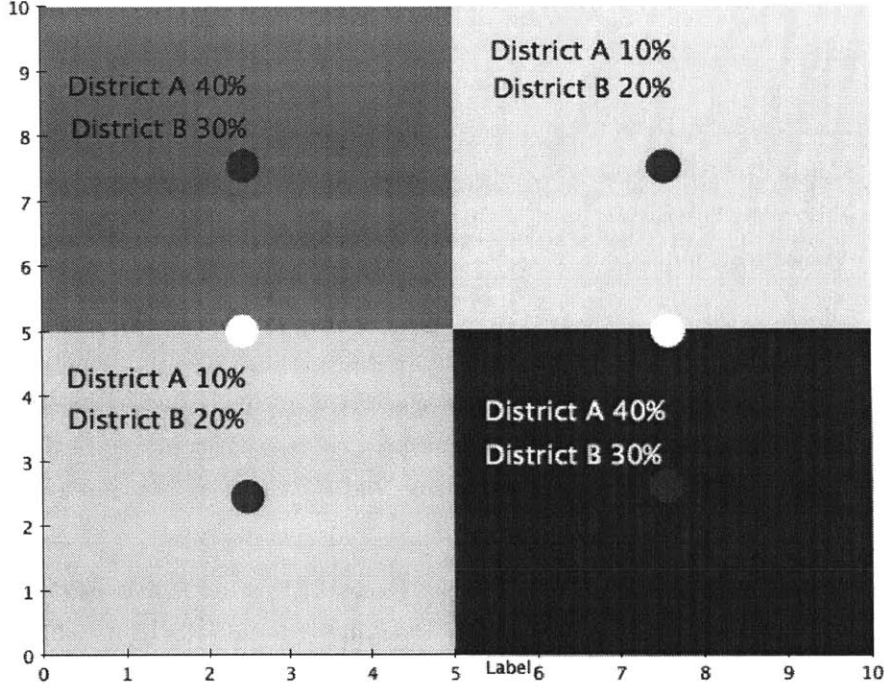


Figure 1-3: Counter example

**Example 5.** Assume that all voters are sincere, so that there are no strategic voters at all, and that their preferences can be represented on a bi-dimensional ideological plane as in Figure 1-3.<sup>27</sup> The voters are sincere and vote whomever party (for the list election) or candidate (for the uninominal first past the post mandate) is closer to their ideology. The ideology of each voter is represented by her  $(x, y)$  coordinates in the plane. The density of voters is uniform over each square and the total mass of voters in each square is as represented in Figure 1-3. We have only two types of districts  $\{1, 2\}$  and within the districts two types of sub-districts  $\{A, B\}$  with some small measurement noise. Now let us assume that for the uni-nominal elections the NE and the SW parties strategically choose their candidates to be in the white dots position. Then the electoral support would be as represented in Table 1.3. Now for simplicity assume that there are a total 100 sub-districts of type  $A$  and 100 sub-districts of type  $B$ , with 50 of each type in each district  $\{1, 2\}$ . Creating a simulated data, with the same averages per groups as previously specified, and running the same regression as Spenkuch (2012)<sup>28</sup> gives right away a 0.75 as the statistically significant estimate of sincere voters. Obviously by choosing arbitrarily the numbers we can construct examples of any magnitude.<sup>29</sup>

<sup>27</sup>Say that the x axis represents economic ideology and the y axis social ideology

<sup>28</sup>Spenkuch's specification is:

$$v_{k,r}^C = \chi_k + \lambda v_{k,r}^L + \varepsilon_{k,r}$$

Where  $v_{k,r}^C$  are the votes for the candidate in the uni-nominal election in district  $k$  and precinct  $r$ ,  $v_{k,r}^L$  the votes for the list of the candidate in the national election and  $\chi_k$  a fixed effect for the district.

<sup>29</sup>In particular the 25% estimate of strategic voting does not depend on the initial values chosen (that can be arbitrary) for the sub-district nor the districts. It only depends on the fact that the distribution of voters within the quadrant implies

Table 1.3: Votes in each Election and district when all voters are sincere

	Red	Yellow	Green	Black
List Votes Sub-District A	40%	10%	10%	40%
Uninominal Sub-District A	42.5%	7.5%	7.5%	42.5%
List Votes Sub-District B	30%	20%	20%	30%
Uninominal Sub-District B	35%	15%	15%	35%

Nevertheless, structural estimates that do not fully model the strategic incentives of parties may still produce biased estimates. For instance, Kawai and Watanabe (2013a) model structurally the preferences of voters as depending on a set of ideological and candidates' quality parameters, but they do not directly model parties' incentive problem. Then, they use data on uninominal vote from the last Japanese election to estimate the parameter of interest.<sup>30</sup>

The implicit assumption behind not modeling the strategic incentives of parties is that parties are not strategic in their choice of candidates - conditional on a few observable characteristics (party affiliation, an indicator for the home municipality of the candidate, and whether the candidate has held an office before). After having estimated the structural parameters of the model conditional on the candidates' and district characteristics, they infer the level of strategic voting by observing the degree of variation on predicted close (ideally identical) Municipalities. Under the assumption of parties not being strategic, there is a unique equilibrium for a set of parameters' values if voters are fully sincere. To the extent that similar districts have different result such multiplicity can be attributed to strategic voters. Their size is then backed up by considering extreme values beliefs potentially different across districts and identical within. The problem is twofold: if parties are truly strategic, they are likely to place their candidates based on many more observable and unobservable characteristics. More importantly, strategic parties can generate disparate outcomes for identical districts even under fully sincere voters and unique equilibrium. For instance, if there are substitution forces that lead parties to strategically choose their candidates to exploit initial advantages or disregard lost battle grounds. Therefore, even under fully sincere voters the inequality estimator would load the multiplicity in outcomes generated by diverse single equilibrium due to strategic parties as strategic voters induced multiple equilibria.<sup>31</sup>

Our identification strategy does not suffer from the same problems. In our setting we can compare two equivalent votes. Both Chambers have the exact same institutional role, and the electoral system for the two is identical, with exactly the same choice set of coalitions available. Keeping the actions of political parties

that 25% of them would vote sincerely for a candidate with a closer ideology. Strategic parties get fully attributed to strategic voting.

<sup>30</sup>In particular the utility function they assume is:  $u(x_k, z_{il}, \theta^{PREF}) = -(\theta^{ID} x_k - \theta^{POS} z_i^{POS})^2 + \theta^{QLTY} z_{il}^{QLTY}$ . The  $z_i$  characteristics of candidates include the party affiliation, an indicator for the home municipality of the candidate, and whether the candidate has held an office before.

<sup>31</sup>As a side-note, there would be another conceptual issue if one were to explicitly model strategic parties. Because there are complementarity in beliefs over a district and the choice of good candidates, the resulting bounds would be even larger.

constant, in this context a sincere voter would always vote for the same coalition in both Chambers. By looking at the difference in votes across the two Chambers at Municipal level, we implicitly impose a fixed effect at Municipal level. Therefore, all the actions that can be taken by parties to influence voters at city level, such as advertising or campaigning by one of the top coalition leaders, will influence both Chambers in equal extent and therefore its effect will be differentiated out by our estimator. On the other hand, one could argue that the average of polls is only a noise measure of the underlying beliefs of voters. If voters' beliefs are dispersed around the electoral poll mean as they probably are, then it would be more conservative to interpret our estimates as a lower bound. In fact, strategic voters whose beliefs are far away from the mean will not behave strategically leading to an underestimation of the true effect.

## 1.7 Conclusions

We showed that at most 1.5% of voters were misaligned during the 2013 Italian Elections. This corresponds to a total of under 5% of strategic voters across the whole population. In the context of the recent literature on the extent of strategic voting, our estimate is considerably lower than the share determined by other works (at least 30% and up to 85%), but still substantial and statistically significant. We discussed how our lower estimates can be reconciled with the previous literature. In particular, we believe that our lower estimates reflect a neater separation of strategic parties from strategic voters. We built simple examples to show numerically how previous identification strategies would confound these two concepts and therefore exaggerate the extent of strategic voting. In contrast, we use the peculiar features of the Italian electoral law and institutional system to better separate the two in reduced form.

We also build a model to justify our empirical strategy and the use of regression discontinuity. To build our geographical regression discontinuity estimates we use novel techniques (Pinkovskiy (2013)) to pool together multiple geographical regression discontinuities and assess its robustness with bootstrap methods. As a further robustness we also try alternative methods used in the literature to pool together cross border RD (Dube et al. (2010)). Lastly, we discussed why it is prudent to interpret our estimates as a lower bound since the underlying function relating the closeness of parties in percentage points to the percent of strategic voters could well be non linear. Future avenues of research would ideally assess the external validity of our results and provide an even cleaner separation of strategic parties and strategic voters. Our contribution in the debate has been to highlight the difference between strategic voting and strategic parties, while ascertaining much lower effects, and showing how easily these two different concepts can be confounded even in apparently sound identification strategies.



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# Appendix

# Proof

Remark 1

*Proof.* Given that by assumption C is never a likely contender, if a voter can be pivotal it has to be that she is pivotal between her favorite candidate and another. It is therefore a dominant strategy ( $\delta_l$  is also positive) to choose  $r(1)$ .  $\square$

Proposition 2

*Proof.* If a C supporter is pivotal this means that the total votes for his  $r(2)$ , denoted as  $n_{r(2)}$  are either:  $n_{r(2)} = n_{r(3)}$  or  $n_{r(2)} = n_{r(3)} - 1$ . In either case, assuming that ties are broken by the flip of a fair coin, the marginal benefit of switching vote from C to  $r(2)$  in ballot  $M$ , is given by

$$\frac{1}{2} \left( \nu_{r(2)}^z - \nu_{r(3)}^z \right) \pi^M (\alpha_M, \beta_M)$$

and the marginal cost of doing so is  $\delta_l$ .

Therefore for voter of type  $z$ <sup>32</sup>  $\bar{\delta}^{M,j} = \frac{1}{2} \left( \nu_{r(2)}^z - \nu_{r(3)}^z \right) \pi^M (\alpha_j, \beta_j)$ .  $\square$

Proposition 3

*Proof.* From Proposition 2, we know that  $\bar{\delta}^{N,j} = \frac{1}{2} \left( \nu_{r(2)}^z - \nu_{r(3)}^z \right) \pi^N (\alpha, \beta) = \bar{\delta}^{N,l}$ . Then equation (1.1) becomes  $\left( F \left( \bar{\delta}^{j,j} \right) - F \left( \bar{\delta}^{l,l} \right) \right)$  and because  $\alpha_j > \alpha_l$ , and because  $\pi()$  is decreasing in  $\alpha$ . We have  $\bar{\delta}^{l,l} > \bar{\delta}^{j,j}$ . And because F is the same across regions the result follows.  $\square$

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<sup>32</sup>Remember that the types here are just one per possible preference ranking.

## Tables:

Table 4: Poll Results

Region	Center-Left	Center-Right	Region	Center-Left	Center-Right
ABRUZZO	37.4%	27.9%	MARCHE	40.8	21.8%
BASILICATA	38.5%	23.1%	MOLISE	34.6%	26.7%
CALABRIA	35.4%	24.8%	PIEMONTE	31.2%	29%
CAMPANIA	30%	29.6%	PUGLIA	30.4%	27.2%
EMILIA-ROMAGNA	44.1%	22.1%	SARDEGNA	41.9%	28.5%
FRIULI	32.4%	31.8%	SICILIA	24.3%	31.8%
LAZIO	34.6%	27.8%	TOSCANA	48.4%	26.9%
LIGURIA	36.1%	25.6%	UMBRIA	41.6%	24%
LOMBARDIA	31.7%	31.7%	VENETO	27.1%	38.8%

Notes: The Table presents the share of votes that were expected to go to each of the top two Coalitions according to the Regional poll run by Tecne' for Sky. The paper presents more information about the nature of the poll and the source of this information.

Table 6: Controls Lombardy vs. Emilia-Romagna

		<i>Border</i>	10km	15km	20km
		(1)	(2)	(3)	(4)
Outcomes					
Diff. Voters %	<i>Toss – up Region</i>	-0.213 (0.233)	-0.279 (0.269)	-0.254 (0.233)	-0.309 (0.245)
Income P.C.		-0.599 (0.872)	-0.949 (1.217)	-0.661 (1.069)	-0.415 (1.085)
Pop.		-0.0961 (0.244)	-0.236 (0.351)	-0.129 (0.313)	0.0912 (0.340)
Retired %		-0.529 (0.787)	-0.912 (1.255)	-0.0477 (1.066)	-0.905 (1.037)
	Obs.	83	181	264	347

Notes: This Table present the result of a linear local regression model around the border of Lombardy and Emilia-Romagna. Column (1) uses only Municipalities at the border. Between Column (2) and (4) we use a bandwidth of 5, 7.5 and 10 miles respectively. The outcomes are reported in the first Column, and in particular they are difference in votes, Income per Capita, Population, Retired pop. %, as previously described. The main variable *Toss – up Region* is a dummy equal to one for Municipalities in Lombardy, which is the most Toss-up and pivotal Region in Italy. The regression is weighted by the total number of votes in the Congress at the border. All regressions include a constant and standard errors are clustered at level of the border. \*\*\* denotes significance at the 1% level, \*\* at the 5%, and \* at the 10%.

Table 5: Border Regressions

	$\Delta_{\%ij}^{C-S}$						
	<i>Border Municipalities</i>				10km	15km	20km
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Toss - up Region</i>	-1.447*** (0.147)	-1.557*** (0.126)	-1.215*** (0.314)	-1.508*** (0.364)	-1.552*** (0.190)	-1.599*** (0.141)	-1.632*** (0.128)
<i>f(Distance)</i>			Y	Y	Y	Y	Y
<i>Controls</i>		Y		Y	Y	Y	Y
Observations	83	83	83	83	181	264	347

Notes: Each column presents a different city-level regression, where the outcome is the difference in votes between the Congress and the Senate for the two major coalitions (center-right and center-left), scaled by the total votes in the Senate. The first four Columns is using only Municipalities exactly at the border between Emilia-Romagna and Lombardy. Columns (5) to (7) uses Municipalities between 10km, 15km, 20km respectively. The outcome variable is constructed from electoral data, provided by the Archive of the Italian Department of State ("Ministero dell'Interno"). The main variable *Toss - up Region* is a dummy equal to one for Municipalities in Lombardy, which is the most Toss-up and pivotal Region in Italy. In Column (1) we do not add any control. In Column (2) we add a linear function of the distance to the relevant border, with different slope per side. In Column (3) and (4), we repeat the previous two adding also controls. In (5) to (7) we add both controls and distance. For controls, we mean a set of standard covariates (Income per Capita, Population, Retired pop. %, and difference in votes). Variable description is in the Appendix. The regression is weighted by the total number of votes in the Congress. All regressions include a constant and standard errors are heteroskedasticity robust. \*\*\* denotes significance at the 1% level, \*\* at the 5%, and \* at the 10%.

Table 7: National Regression Discontinuity

	$\Delta_{\%k}^{C-S}$					
	10km		15km		20km	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Toss – up</i>	6.560***	7.055***	6.376***	6.273***	4.399**	3.880**
	(1.172)	(1.591)	(1.072)	(1.635)	(1.752)	(1.537)
<i>Controls</i>		Y		Y		Y
<i>Border F.E.</i>	Y	Y	Y	Y	Y	Y
<i>Obs.</i>	50	50	54	54	54	54

Notes: This Table present the result of the second-stage of the Regression Discontinuity model, as in Pinkovskiy(2014), discussed in the paper. The outcome is the estimate of the conditional expectation at the border of the difference in votes between the Congress and the Senate for the two major coalitions (center-right and center-left), scaled by the total votes in the Senate. The standard errors are clustered at the regional level and the second stage has a border FE as discussed in the paper. Therefore every observation is measured at border-side level, and it is estimated in a first stage, as described in the paper. Given that there are 27 regional border under analysis, the total number of observation is in general 54. The variable Toss-up is a score equal to the absolute value of the difference between the top two Coalitions, measured at Regional level, according to the latest pool available before the election (Sky). In Columns (1), (3) and (5) we report the simple regression. In Columns (2), (4) and (6) we augment it with the controls. The controls are obtained from a first stage equivalent to the outcome variable, and in particular we consider the usual set of standard covariates (Income per Capita, Population, Retired pop. %, and difference in votes). The outcome variable is constructed from electoral data, provided by the Archive of the Italian Department of State (“Ministero dell’Interno”). The regression is weighted by the total number of votes in the Congress at the border. All regressions include a constant and standard errors are clustered at level of the region. \*\*\* denotes significance at the 1% level, \*\* at the 5%, and \* at the 10%.

Table 8: Balancing Controls in National RD

Outcomes		10km	15km	20km
		(1)	(2)	(3)
Diff. Voters %	<i>Toss - up</i>	-1.551	-1.941	-0.230
		(3.333)	(2.169)	(1.760)
Income P.C.		1.810	2.472**	2.564***
		(1.524)	(0.974)	(0.770)
Pop.		0.138	0.255***	0.187*
		(0.148)	(0.0617)	(0.0889)
Retired %		6.105	6.389	6.864
		(5.740)	(5.627)	(5.166)
Pop. 18-24%		0.00163	-0.00294	0.0162*
		(0.0140)	(0.0111)	(0.00919)
<i>Congress<sub>Top2</sub>%</i>		-9.759	-12.06*	-13.94**
		(5.618)	(6.592)	(5.152)
<i>Senate<sub>Top2</sub>%</i>		-16.32**	-18.44**	-18.34**
		(5.822)	(6.912)	(6.265)
Obs.		54	54	54

Notes: This Table present the result of the second-stage of the Regression Discontinuity model, as in Pinkovskiy(2014), discussed in the paper, but estimated on other outcomes, as a control, with fixed effect at border. The outcomes are reported in the first Column, and in particular they are difference in votes, Income per Capita, Population, Retired pop. %, Share of population between 18-24 over total population (2012), Votes for top 2 parties in the Congress, votes for top 2 parties in Senate. The two-stage estimation is completely identical to the one used for the main specification. As before every observation is measured at border-side level. Given that there are 27 regional border under analysis, the total number of observation is in general 54. When considering a bandwidth from the border in the first stage of 5 miles only, we had to drop 2 borders because of lack of observations in the first stage (in particular, the border between Emilia-Romagna and Piemonte and the border between Lazio and Marche. The variable Toss-up is a score equal to the absolute value of the difference between the top two Coalitions, measured at Regional level, according to the latest pool available before the election (Sky). The regression is weighted by the total number of votes in the Congress at the region. All regressions include a constant and standard errors are clustered at level of the border. \*\*\* denotes significance at the 1% level, \*\* at the 5%, and \* at the 10%.



Table 9: Border Regressions EL Placebo

	$\Delta_{\%ij}^{C-S}$				10km	15km	20km
	<i>Border Municipalities</i>						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Toss - up Region</i>	-0.258*	-0.295**	-0.0197	-0.320	-0.314	-0.233*	0.174
	(0.151)	(0.117)	(0.316)	(0.313)	(0.192)	(0.141)	(0.401)
<i>f(Distance)</i>			Y	Y	Y	Y	Y
<i>Controls</i>		Y		Y	Y	Y	Y
Observations	83	83	83	83	181	264	347

Notes: Each column presents a different city-level regression, where the outcome is the difference in votes between the Congress and the Senate for the two major coalitions (center-right and center-left), scaled by the total votes in the Chamber. The first four Columns is using only Municipalities exactly at the border between Emilia-Romagna and Lombardy. Columns (5) to (7) uses Municipalities between 10km, 15km, 20km respectively. The outcome variable is constructed from electoral data, provided by the Archive of the Italian Department of State ("Ministero dell'Interno") for the 2008 elections. The main variable *Toss - up Region* is a dummy equal to one for Municipalities in Lombardy, which is the most Toss-up and pivotal Region in Italy both for 2013 and 2008 but much less so in 2008. In Column (1) we do not add any control. In Column (2) we add a linear function of the distance to the relevant border, with different slope per side. In Column (3) and (4), we repeat the previous two adding also controls. In (5) to (7) we add both controls and distance. For controls, we mean a set of standard covariates (Income per Capita, Population, Retired pop. %, and difference in votes). Variable description is in the Appendix. The regression is weighted by the total number of votes in the Congress. All regressions include a constant and standard errors are heteroskedasticity robust. \*\*\* denotes significance at the 1% level, \*\* at the 5%, and \* at the 10%.

Table 10: National Regression Discontinuity Placebo Test

	$\Delta_{\%k}^{C-S}$					
	10km		15km		20km	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Toss – up</i>	-0.857	-0.490	-0.588	-0.318	-0.336	-0.521
	(2.192)	(2.193)	(1.480)	(1.368)	(1.439)	(1.244)
<i>Controls</i>		Y		Y		Y
<i>Obs.</i>	50	50	54	54	54	54

Notes: This Table present the result of the second-stage of the Regression Discontinuity model, as in Pinkovskiy(2014), discussed in the paper. The outcome is the estimate of the conditional expectation at the border of the difference in votes between the Congress and the Senate for the two major coalitions (center-right and center-left) in the 2008 elections, scaled by the total votes in the Senate. The standard errors are clustered at the regional level and the second stage has a border FE as discussed in the paper. Therefore every observation is measured at border-side level, and it is estimated in a first stage, as described in the paper. Given that there are 27 regional border under analysis, the total number of observation is in general 54. The variable Toss-up is a score equal to the absolute value of the difference between the top two Coalitions in 2013, measured at Regional level, according to the latest pool available before the election (Sky). In Columns (1), (3) and (5) we report the simple regression. In Columns (2), (4) and (6) we augment it with the controls. The controls are obtained from a first stage equivalent to the outcome variable, and in particular we consider the usual set of standard covariates (Income per Capita, Population, Retired pop. %, and difference in votes). The outcome variable is constructed from electoral data, provided by the Archive of the Italian Department of State (“Ministero dell’Interno”). The regression is weighted by the total number of votes in the Congress at the border. All regressions include a constant and standard errors are clustered at level of the region. \*\*\* denotes significance at the 1% level, \*\* at the 5%, and \* at the 10%.

Table 11: Robustness

	$\Delta_{\%k}^{C-S}$					
	<i>Standard -20km</i>			<i>Bootstrap -20km</i>		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Toss – up</i>	-3.36*	-3.89***	-4.71**	-2.56***	-3.02***	-4.54**
	(1.87)	(0.86)	(2.260)	(0.77)	(0.93)	(2.24)
<i>Controls</i>		Y	Y		Y	Y
<i>Border F.E.</i>			Y			Y
<i>Obs.</i>	54	54	54	54	54	54

Notes: This Table presents two Robustness to our main result, using the two step methodology discussed above. a national Regression, where only Municipalities within a certain bandwidth from the border are employed. The outcome is the estimate of the conditional expectation at the border of the difference in votes between the Congress and the Senate for the two major coalitions (center-right and center-left), scaled by the total votes in the Senate. Therefore every observation is measured at border-side level, and it is estimated in a first stage, as described in the paper. Given that there are 27 regional border under analysis, the total number of observation is in general 54. Results are here presented at a 20km bandwidth. In Column (1) and (2), we present the usual results using a 10 mile bandwidth. We report this here for sake of clarity in the comparison with the robustness. In Column (3), we add a border F.E. to the specification in Column (2). We therefore have a total of 27 F.E.. In Column (4)-(6), we repeat exactly the same procedure as in (1)-(3), but the estimates are obtained using the two-stage bootstrap procedure, which is described in detail in the paper. All regressions include a constant and standard errors are clustered at level of the border. \*\*\* denotes significance at the 1% level, \*\* at the 5%, and \* at the 10%.



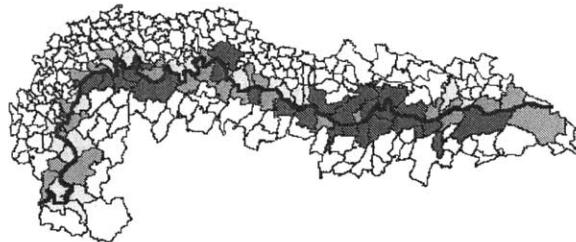
## Figures

Figure -4: Municipalities at the border between Lombardy and Emilia-Romagna



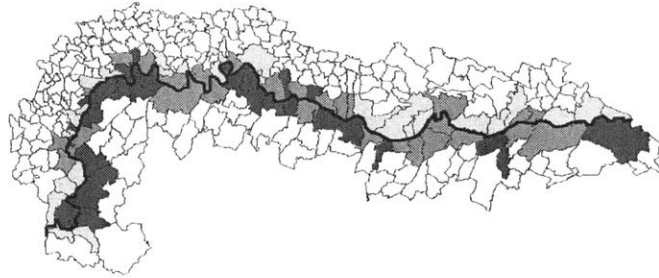
Notes: this map contains all the Municipalities in Lombardy (north) and Emilia-Romagna (south). The border of each Municipality is defined by the black lines. Furthermore, we highlight with red color the sub-set of Municipalities that are at the border between the two.

Figure -5: Distribution of Income by Municipality, Lombardy vs. Emilia-Romagna



Notes: this map contains all the Municipalities in Lombardy or Emilia-Romagna, that are within 10km from the other Region border. Colored are the Municipalities that are on the border. A darker color signal higher level of income per capita in that Municipality. Data on income are provided by ISTAT. The black line is the border between the two Regions.

Figure -6: Distribution of the outcome by Municipality, Lombardy vs. Emilia-Romagna



Notes: this map contains all the Municipalities in Lombardy or Emilia-Romagna, that are within 10km from the other Region border. Colored are the Municipalities that are on the border. A darker color signal higher level of the outcome variable, which is the difference in the share of votes going to one of the top-two Coalitions between Congress and Senate at Municipality level. Data on income are provided by Italian Department of State. The black line is the border between the two Regions.