The Causal Impact of Electoral Rules on Corruption *

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Abstract

The effect of electoral rules on political corruption has long been debated in the literature. While theoretical predictions are indecisive, empirical investigations overwhelmingly rest on cross-country comparisons or correlations, and therefore lack causal interpretations. In this paper, we address these issues by exploiting a specificity of the French electoral law which conditions the electoral rules for the election of municipal councils on municipalities' population size. Specifically, below 1,000 inhabitants, the system is a two-round individual majority system whereas above the threshold, the system is a two-round proportional list system. We leverage that discontinuity in a regression discontinuity design to measure the causal impact of switching from one voting system to another on the level of corruption of local representatives. Using survey and actual corruption data, we find that the proportional list system leads to higher levels of perceived and actual corruption.

Key Words: Perceived corruption, voting system.
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1 Introduction

Whereas honest and corrupt elected officials likely differ in many respects, they have all been elected, and some of them even re-elected, which implies that although elections are supposed to be a way to monitor and discipline officials (Ferejohn, 1986), they remain an imperfect device. Voters can therefore not perfectly monitor and discipline officials, some of whom may thus find misconduct attractive. However, whereas perfect monitoring likely is an unrealistic goal, there are many ways in which voting systems can affect the propensity of officials to behave more or less honestly.

The literature has essentially contrasted majoritarian representation with party-list proportional representation, be it on closed or open lists. From a theoretical point of view, how the two systems rank in terms of corruption is ambiguous. On the one hand, majoritarian representation emphasizes individual responsibility because voters vote for individual candidates and therefore incentivize candidates not only to campaign more actively but also to behave honestly (Persson and Tabellini (2002), chapter 9). By contrast, with a proportional representation system, voters can only vote for lists of candidates, which results in looser monitoring and weaker incentives for individual candidates.

On the other hand, political parties better control candidates under proportional representation than under a majority system, because they control the composition of lists, which reduces corruption opportunities for individual elected officials (Kunicova and Rose-Ackerman, 2005). Moreover, Myerson (1993) recalls that voters sometimes have to choose between a corrupt candidate with a program that they like and an honest candidate with a program that they dislike. In such a situation, proportional representation always gives voters an incentive to vote for honest candidates who support their favourite policies because, by doing so, they increase the share of honest elected officials without affecting the share of officials who support their favourite policies. On the contrary, majoritarian representation can present pivotal voters with a tough decision, and they may end up preferring to vote for the corrupt candidate. Under the plurality rule, there may be situations where voters face a drastic trade-off. Imagine for instance that voters are evenly split across two candidates who are both corrupt but support opposite policies and that each corrupt candidate has a challenger supporting the same policy while being honest. Considering that there is a tie between the two corrupt candidates, each individual voter's dominant strategy is to vote for the corrupt candidate who endorses her favourite policy. Any individual deviation from that strategy to vote for an honest candidate would result in the election of the corrupt candidate supporting the policy that the voter dislikes, which would be the worst outcome for the voter. Accordingly, there may be configurations under the plurality rule where voting for corrupt candidates is each voter's dominant strategy. Myerson (1993) moreover points out that such a configuration is particularly likely when corrupt candidates are established candidates while honest candidates are newcomers, making the status quo a focal point. Proportional representation avoids those coordination problems and may thus impose more discipline on candidates that the plurality rule.

As the theoretical literature is indecisive, the question becomes empirical. Previous empirical studies broadly support the view that proportional representation systems result in more corruption (Kunicova and Rose-Ackerman, 2005, Persson and Tabellini, 2002, Persson et al., 2003), although the effect may be conditioned by other features of the political system, such as the district magnitude (Chang and Golden, 2007) or the number of political parties (Charron, 2011). However, those findings overwhelmingly rest on the comparison of countries, be it in cross-section or panel settings, and on simple correlations. The reported correlations between electoral systems and corruption therefore lack causal interpretation, as they are subject to both an omitted-variable bias and reverse causality.

In this paper, we address causality thanks to a discontinuity in the French electoral system for the election of municipal councils. Specifically, we exploit the fact that the electoral law conditions the electoral system on the population of a municipality, with a threshold at 1,000 inhabitants: Below 1,000 inhabitants, the system is a two-round individual majority system. Above 1,000 inhabitants, the voting system is a is a two-round proportional list system. This means that below the threshold, voters choose their municipal representatives individually, while above the threshold, they must vote for a list of candidates.

We leverage that discontinuity in a regression discontinuity design to measure the causal impact of switching from one voting system to another on the level of corruption of municipal representatives. In doing so, we emulate the identification strategy used by Eggers (2015) to measure the effect of the electoral system on turnout in French municipalities and update it to take into account the reduction of the threshold from 3,500 to 1,000 inhabitants implemented in 2013. To do so, we use a recent large-scale national survey ($N > 10,000$) in which we asked respondents to assess the corruption level of their municipal government. We show that around the threshold, the move from an individual majority system to a proportional list system leads to an increase in perceived corruption ranging from 9.7% to 10.6%. Using the same empirical strategy, we complement the analysis of perception with an analysis of actual corruption, as measured by hand-collected newspaper reports of corruption cases involving the municipal government. We find that the municipal government of municipalities located just above the cutoff – and thus elected under proportional representation – is 0.4 percentage points more likely to be involved in a corruption case than the municipal government of municipalities just below the cutoff – where the system is majoritarian. Overall, those results show that collective representation, as measured by voters voting for lists rather than for individual candidates, entails higher levels of corruption.

Importantly, we report a vast array of evidence showing that our findings are not driven by confounding factors at the threshold, such as other institutional changes, or by sorting in population sizes, thus making our results immune to Eggers et al.'s (2018) criticism of population-threshold RDDs. Additionally, our results stand up to a series of robustness checks, including using different regression discontinuity approaches and an instrumental variable strategy. Our findings can therefore be interpreted as causal.

The main contribution of the paper is straightforward. It provides the first unambiguous evidence of a causal effect of electoral rules on corruption. In doing so, it confirms previous non causal evidence of an association between proportional representation and higher corruption (Chang and Golden, 2007, Kunicova and Rose-Ackerman, 2005, Persson and Tabellini, 2002, Persson et al., 2003). An innovation is that we provide that evidence using within-country cross-municipality data, as opposed to cross-country (Chang and Golden, 2007, Kunicova and Rose-Ackerman, 2005, Persson and Tabellini, 2002, Persson et al., 2003) or cross-district data (Chang and Golden, 2007). This therefore allows us to also contribute to the literature on the effect of electoral rules on municipal outcomes (Chin, 2023, Sieg and Yoon, 2022) by reporting evidence of an additional local outcome that responds to voting rules, specifically the corruption of local representatives. Finally, whereas the existing literature on the relation between voting systems and corruption focuses on subjective corruption indexes, we can complement the results pertaining to perceptions with results on actual corruption.

The remainder of the paper is organized as follows. Section 2 provides background information on the French electoral system for municipal elections. Section 3 presents the data and describes our identification strategy. Section 4 reports the baseline results using survey data on perceived corruption and rules out potential threats to identification. Section 5 replicates our baseline analyses with data on actual corruption. Section 6 concludes.

2 The French Municipal Electoral System

Municipalities are the lowest and smallest administrative division in France. Each one is run by a municipal council (*conseil municipal*), which appoints the executive branch consisting of the mayor (*maire*) and the specialized deputies (*adjoints au maire*). Because the French political system is highly centralized, the municipal council is in charge of very local public policies, which are the same irrespective of the size of the municipality. Thus, the municipal council mainly manages urban, land, and real estate policies, as well as urban public transport.

In 2020 – the year of the last municipal elections – there were 34,868 municipalities in mainland France. Of these, 9,879 (28.3 %) had less than 1,000 inhabitants, which is the threshold at which the voting system changes. In what follows, we first describe how electoral rules change around the threshold before turning to the factors that can confound our estimates around the threshold.

2.1 The 1,000-Inhabitant Threshold

The voting system has remained unchanged for many years. The municipal council is elected every six years in a two-round election by the voters registered in the municipality. The voting system is determined by the municipality's population, with a unique threshold at 1,000 inhabitants.

Specifically, in municipalities below the 1,000-inhabitant threshold, the system is a majority individual two-round election allowing for split votes. Candidates may run on their own or together with a group of candidates on a list. If a list is set, the ballot paper contains the names of several candidates and voters may cross out names on the ballot paper. Independently from the candidature form, votes are counted by individual. A declaration of candidacy is mandatory. In the first round, candidates obtaining an absolute majority of the votes cast and at least a quarter of the votes cast by registered voters are elected to the municipal council. A second round is organized to allocate the remaining seats and the required majority of votes becomes relative, meaning that the candidates with the most votes are elected. If several candidates obtain the same number of votes, the oldest is elected.

In municipalities above the 1,000-inhabitant threshold, the system is a two-round proportional list system. A declaration of candidacy is mandatory for each round. A candidate cannot compete in more than one municipality and one list. Each list must contain a number of candidates at least equivalent to the number of seats to be allocated, plus one or two candidates at the list's discretion. In addition, each list must respect gender parity, that is, it must feature as many women as men, with compulsory alternation. In the first round, the list with the absolute majority of votes obtains half of the seats. The remaining seats are distributed between the lists that have reached 5% of the votes according to a proportional rule based on the highest average. If no competing list secures 50% of the votes in the first round, a second round is organized, during which only the lists that have obtained at least 10% of the votes in the first round are allowed to run. In the second round, lists having obtained at least 5% of the votes in the first round may merge with a list having obtained 10% of the votes, and the procedure for allocating seats is similar to that of the first round.

The key differences in the voting system around the 1,000-inhabitant threshold are summarized in Table 1 and can be synthesized as follows. Above the threshold, voters vote for lists, the voting system is proportional representation, and a gender parity rule is applied. Under the threshold, voters choose a unique set of individuals, the system is majoritarian, and there is no gender parity rule. Importantly, we show in Section 4.2 that the change in the gender parity rule at the threshold does not drive our results.

2.2 Potential Confounding Factors

In addition to the voting system, the municipality's population also determines a number of other institutional rules and features, as shown in Table 1. We describe them below and show that they do not confound our local-to-threshold estimates of the change in electoral rules on corruption.

First, the size of the municipal council is determined by several population thresholds, but none of them is set at 1,000 inhabitants. The nearest thresholds are set at 500, below which the number of councilors is 11, and 1,499 inhabitants, above which the number of councilors is 19. Between those two thresholds the number of councilors is 15. Consequently, the size of the municipal council does not change around the 1,000-inhabitant threshold and is therefore unlikely to bias our results.

Table 1: Institutional Rules Determined by Municipality Population Size

Characteristics	The municipality stands... below the threshold	above the threshold
Voting System	vote for individuals majority rule no gender parity rule	vote for a list proportional rule strict parity rule
Municipal council size	No change: from 500 to 1499 inhab., 15 councillors	
Mayor and mayor deputy compensation	500-999 inhab.: 1,622 €*	1,000-3499 inhab.: 2,077 €*
Councillors compensation	No change: only for municipalities >100,000 inhab.	
Public policy	No change	
Budget process	No change: 3 thresholds: 3,500, 10,000 and 50,000 inhab.	

Notes: The threshold at which the voting system changes is 1,000 inhabitants. *: the reported amount is a maximum cap imposed by the law, but the council can freely decide the compensation within the cap.

Second, the compensation of councillors also varies according to population thresholds, but not in a systematic way. Specifically, the council *can* determine by a vote the compensation of the mayor and of the deputy mayors, but only within the limits set by the regulations that are based on the size of the municipality. One of the population thresholds around which the compensation limit for mayors and deputies changes is the

1,000-inhabitant threshold, for which compensation increases by 28 %, as shown by Table 1. This means that the change in the compensation of mayors and deputy mayors may confound the change of the voting system around the 1,000 threshold. We address this concern in Section 4.2 and show that it is unlikely to happen. By contrast, rank and file councillors receive no compensation in municipalities with less than 100,000 inhabitants. They are therefore unaffected by the 1,000-inhabitant threshold.

Finally, the array of public policies a municipality can implement is the same, regardless of its population size. The difference lies in the use of the budget, which is admittedly less constraining for smaller municipalities. However, there is no discontinuity in the budget process at the 1,000-inhabitant threshold, which means that the municipality's budget does not bias our results.

3 Empirical Framework

In this section, we first introduce the survey that measures perceived corruption and then describe our empirical strategy to causally identify the relationship between electoral rules and perceived corruption.

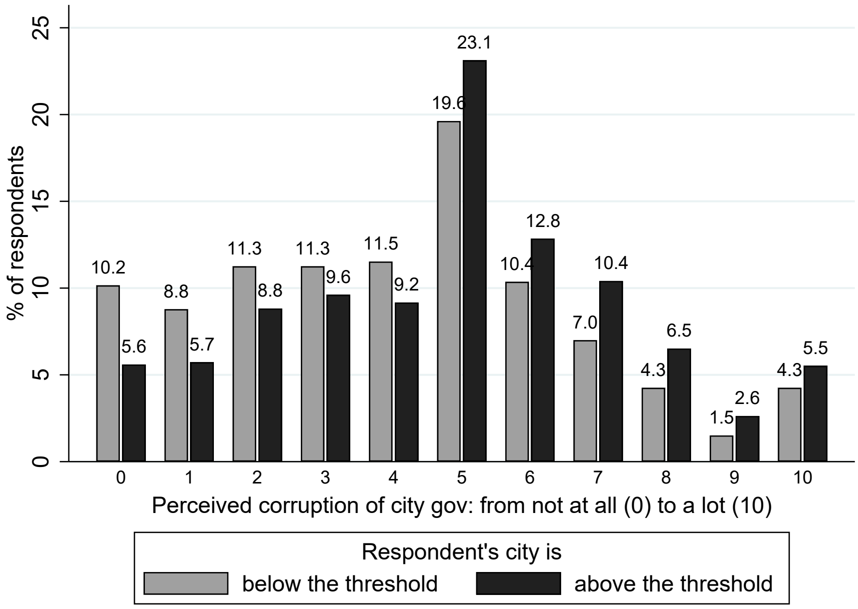
3.1 The Survey

The survey was carried out online from July 7 to 11, 2021, as part of the Ipsos Access Online Panel. It consisted of a representative sample of the French population aged 18 and over and registered on the electoral roll. The survey featured 10,105 respondents and was constructed using the quota sampling method applied to gender, age, profession of the interviewee, region, and urban area. Importantly, the municipality of each respondent can be identified, which allows us to match her with information on her municipality, including the population size and the voting system for the municipal elections.

In our sample, respondents live in 4,980 of the 34,868 municipalities that existed at the time. Those municipalities are located in each of the 12 metropolitan regions, excluding Corsica, and in 94 out of the 94 metropolitan departments, again excluding Corsica. On average, a municipality included in the survey features 24.23 interviewed respondents. The most represented municipality has 413 respondents and the least represented only one.

In addition to usual socio-demographic and political information, the survey specifically deals with corruption. In particular, respondents were asked to evaluate the degree of corruption they perceive of their municipal government. They could reply on a 10-point scale, from “no corruption at all” (0) to “a lot of corruption” (10).

Figure 1: Perceived Corruption of Municipal Governments



Notes: Perceived corruption is measured through the question: “Do you think that the municipal government is involved in corruption?” A 10-ladder scale is proposed from 0 “no corruption at all” to 10 “a lot of corruption”. $N = 10,080$. The threshold is 1,000 inhabitants and corresponds to the change in voting system: Municipalities located below the threshold use majoritarian representation while municipalities above the threshold rely on a proportional representation list system.

Figure 1 gives a first look at the relation between the voting system and perceived corruption by displaying the distribution of answers separately for respondents living in municipalities below and above the 1,000-inhabitant threshold. If the two answer distributions look similar, with a mode on the fifth point of the ladder, they still display meaningful differences. Specifically, there are more answers below 5 from people living in a municipality below the threshold than from those above it. More precisely, 53% of the residents living in municipalities below the threshold gave an answer below 5, while 43.3% gave an answer above 5. For residents of municipalities above the threshold, the distribution of answers is more even, as 38.8% of them chose an answer under 5 and 37.7% above 5.

The descriptive statistics presented in Table 2 confirm this difference in the distribution of responses on both sides of the threshold. Specifically, in municipalities below the threshold, the average response is 4.1, while in those above it is 4.9. As the difference between the two means is statistically significant, this provides preliminary evidence that people who vote for individuals in municipal elections perceive their municipal government to be less corrupt than people who vote for lists.

Table 2 further shows the distribution of respondents according to the population threshold. 14% of respondents live in a municipality below the 1,000-inhabitant threshold, and 86% above. The former are spread over 1,352 different municipalities while the latter live in 3,628 municipalities. Finally, the average population size of a municipality below and above the threshold is 515 and 15,507, respectively.

Table 2: Descriptive Statistics according to the city threshold

	The respondent lives in a municipality...	
	below the threshold	above the threshold
Nb of respondents	1,457 (14%)	8,623 (86%)
Nb of cities	1,352	3,628
Average size of the cities (inhab)	515	15,507
Perception of the municipal government corruption		
Mean	4.107	4.856*
Sd	2.608	2.550

Notes: The threshold is 1,000 inhabitants and corresponds to the change in voting system: Municipalities located below the threshold use majoritarian representation while municipalities above the threshold rely on a proportional representation list system. Perceived corruption is measured through the question: "Do you think that the municipal government is involved in corruption?" A 10-ladder scale is proposed from 0 "no corruption at all" to 10 "a lot of corruption". * the spread between the two means is significantly different from zero at $p = 0.0001$ (bilateral test).

3.2 Identification Strategy

To identify the causal impact of electoral rules on perceived corruption, we leverage the change in voting system that occurs in municipalities of more than one thousand inhabitants. Specifically, we perform a regression discontinuity design (RDD) analysis where the running variable is population size and the treatment consists in switching from a majoritarian representation system to a proportional representation list system. This boils down to estimating the following equation:

$$\begin{aligned} Corruption_{i,m,r} = \beta_0 + \tau Proportional_m + \beta_1 \widetilde{Population}_m \\ + \beta_2 Proportional_m \times \widetilde{Population}_m + \boldsymbol{\beta}_3' \mathbf{X}_i + \lambda_r + \epsilon_{i,m,r}, \end{aligned} \tag{1}$$

where

$Corruption_{i,m}$ is the level of corruption that respondent i living in municipality m and region r perceives in her municipality;

$Proportional_m$ is a dummy equal to one if municipality m's voting system is a proportional representation list system (as opposed to majoritarian representation), and zero otherwise;

$\widetilde{Population}_m = Population_m - 1,000$ is the normalized population of municipality m;

$\mathbf{X}_i$ is a vector of individual characteristics. The set of characteristics includes respondents' gender, age, living arrangement, education, income, work status, and political orientation;[1]

λ_r are dummies coding respondents' region, which are 12 in number;

$\epsilon_{i,m,r}$ is the error term.

The parameter of interest is τ. Under the assumption that the expected potential outcomes are continuous in the running variable at the cutoff, τ is equal to the local-to-cutoff average treatment effect and reflects the causal effect of the electoral formula (majoritarian versus proportional representation) on perceived corruption (Lee and Lemieux, 2010).

Drawing from Gelman and Imbens (2019), we estimate Equation 1 using a local linear regression where we focus only on observations located within a small neighborhood around the cutoff. As $\widetilde{Population}$ is discrete (Eggers et al., 2018) while the standard local RD framework assumes a continuous running variable, special attention should be devoted to the construction of the confidence intervals (CIs). Specifically, when there are mass points in the running variable, the selected bandwidth may be too large for the specification bias of the local linear regression estimator to be negligible, which can result in conventional CIs that undercover (Kolesár and Rothe, 2018, Lee and Card, 2008). We address that concern

[1] In RDDs, the inclusion of covariates is not mandatory for identification if they vary smoothly at the cutoff; including them has however the main advantage of increasing the precision of the estimates. In Figure A.3 of Appendix B, we show that covariates are continuous at the cutoff. In Table A.5, we show that our results are insensitive to the omission of covariates.

by reporting "honest" CIs, as considered in Armstrong and Kolesár (2018) and Kolesár and Rothe (2018). Because they make no assumptions on the nature of the running variable and explicitly take into account the specification bias that may arise in non-continuous settings, those "honest" CIs achieve correct coverage even when the running variable is discrete. We construct them by implementing the bounded second derivative (BSD) approach which requires choosing a constant K that bounds in absolute value the second derivative of the conditional expectation function (Kolesár and Rothe, 2018).

Finally, to account for the nested structure of our data and allow for arbitrary dependence across respondents living in the same municipality, we cluster standard errors at the level of municipalities.[2]

4 Baseline Results

The objectives of this section are twofold. In the first sub-section, we report our baseline RD estimates on the effect of electoral rules on perceived corruption. In the second and third sub-sections, we provide a series of evidence showing that our RD framework is valid and that our results can therefore be interpreted as causal.

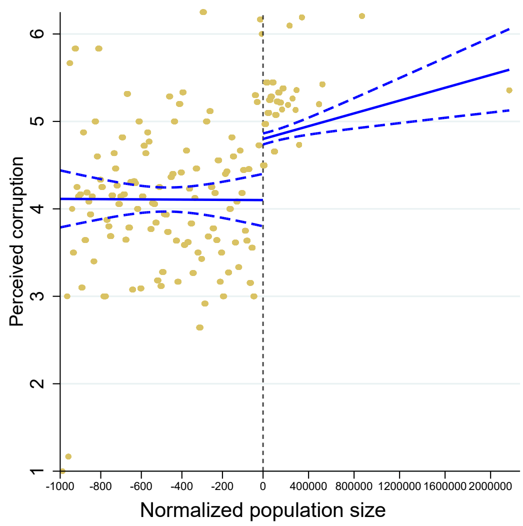
4.1 RD estimates

Before turning to the RD estimates, we illustrate the effect of electoral rules on perceived corruption by plotting the relationship between population size and perceived corruption on either side of the cutoff. To reduce noise, we present a smoothed plot where the running variable is divided into bins and perceived corruption is averaged within each bin. The bin width is determined following Calonico et al.'s (2015) data-driven procedure.

The results are depicted in Figure 2. They show a clear jump in the neighborhood of the cutoff, which indicates that perceived corruption is higher in municipalities that use party-list proportional representation to elect their municipal government (above the cutoff) than in municipalities that rely on majoritarian representation (below the cutoff). This provides the first evidence of the effect of electoral rules on corruption, and more precisely of the effect of a change from majoritarian to proportional representation.

[2] More precisely, we compute the cluster-robust variance estimator by using the covariate-adjustment approach proposed in Calonico et al. (2019b).

Figure 2: Discontinuity Effect of the Voting System on Perceived Corruption



Notes: RD plot of the effect of voting system on perceived corruption. Municipalities located below the cutoff use majoritarian representation while municipalities above the cutoff rely on a proportional representation list system. Population size is normalized by subtracting the cutoff (1,000) for each municipality. Observations are averaged within bins following Calonico et al.'s (2015) data-driven procedure. The dashed lines indicate 95% confidence intervals based on standard errors clustered at the municipal level.

Table 3 reports the results of the RDD analysis for different values of the smoothness constant K, along with the associated BSD "honest" confidence intervals that provide valid inference when the running variable is discrete. The model specification follows Equation 1. In Column (1) of the table, we estimate a lower bound of K by following the method described in the online supplements to Armstrong and Kolesár (2018) and Kolesár and Rothe (2018). In Columns (2) and (3), we consider a K two and three times larger than the lower bound, bearing in mind that the higher K, the more conservative the approach and hence the resulting confidence intervals. For each value of K a new optimal bandwidth is computed, which allows us to assess the sensitivity of our results to both K and the bandwidth choice, as recommended by Kolesár and Rothe (2018).

Regardless of the smoothness constant and the resulting bandwidth, the estimated discontinuity is positive and significant beyond the one-percent level. In addition, the BSD confidence intervals lead to similar inference, suggesting that the significance of our baseline findings are not driven by a specification bias. Table 3 therefore sketches a robust and consistent picture: switching from a system where representatives are elected under majoritarian representation to a system where they are elected under a party-list proportional representation increases the perception of their corruption. As the average perceived corruption in a municipality below the cutoff is equal to 4.1 and the estimated discontinuities range from 0.435 to 0.398, the change from majoritarian to party-list proportional representation increases the perception of corruption by 9.7% to 10.6%.

Table 3: RD Estimates of The Impact of Voting System on Perceived Corruption

	Outcome: Perceived corruption		
	(1)	(2)	(3)
Discontinuity estimate	0.435***	0.423***	0.398**
	(0.154)	(0.154)	(0.155)
BSD 95% CIs	[0.133, 0.738]	[0.120, 0.726]	[0.0939, 0.702]
K	1.116e-11	2.232e-11	3.348e-11
Bandwidth	177,745	120,583	97,828
Observations	9,119	8,735	8,532

Notes: Local linear RD estimates with uniform kernel. The unit of analysis is a survey respondent. The model specification follows Equation 1. The dependent variable is respondents' perception of the corruption of their municipal government, which is measured through the question: "Do you think that the municipal government is involved in corruption?" A 10-ladder scale is proposed from 0 "no corruption at all" to 10 "a lot of corruption". The treatment consists of switching from a majoritarian representation system to a proportional representation list system. BSD refers to the bounded second derivative approach which is used to construct "honest" confidence intervals, as considered in Armstrong and Kolesár (2018) and Kolesár and Rothe (2018). The approach requires choosing a constant K that bounds the second derivative of the conditional expectation function. In Column (1), we use the lower bound value of K that we estimate following the method described in the online supplements to Armstrong and Kolesár (2018) and Kolesár and Rothe (2018). In Columns (2) and (3), we use a K two and three times larger than the lower bound. For each K, the optimal bandwidth is computed following Kolesár and Rothe (2018) and minimizes the mean square error of the local linear estimator. In each specification, we control for respondents' gender, age, living arrangement, education, income, work status, political orientation, and region dummies. Standard errors clustered at the municipal level are reported in parentheses. ***Significant at 1% level; **significant at 5% level; *significant at 10% level.

4.2 Validity of the RD Design

The key identifying assumption of our approach is that, conditional on controls, the discontinuity in corruption that we observe at the cutoff is solely caused by the treatment – that is the change in electoral rule – and by no any other confounding factors. In this sub-section, we provide a series of pieces of evidence supporting this assumption. We begin by ruling out the possibility that other institutional changes occurring at the 1,000 population threshold drive perceived corruption. We then show that our results are not caused by a decrease in trust and perform several placebo tests. Finally, we show that covariates smoothly vary at the cutoff and that there is no selective sorting around the cutoff.

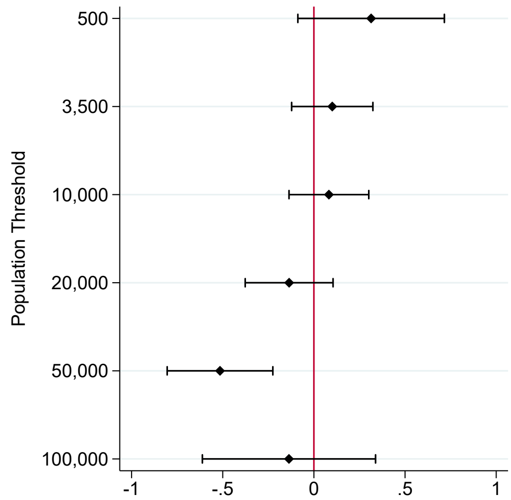
Ruling Out Other Changes Around the Population Threshold

Table 1 documents that, in addition to a change in the voting system, the 1,000 population threshold also entails a change in the compensation of mayors and in the gender parity rule. Specifically, municipalities above the cutoff allow for higher remuneration caps and impose a strict parity rule on candidate lists during municipal elections. This means that if higher compensation and gender parity are associated with more corruption, our RD estimates could be biased and not reflect the change in voting system.

We show that the change in compensation at the cutoff does not drive perceived corruption by exploiting the fact that the compensation cap also changes at six other population thresholds than 1,000.[3] This allows us to perform a series of RDDs where we in turn use each alternative threshold as a cutoff. For nearly all thresholds, we find no evidence of discontinuity, as presented in Figure 3. The only discontinuity we observe is at 50,000 and is negative, which is a result that goes in the opposite direction of our baseline findings and could therefore not drive them.

[3]The six other population thresholds at which the compensation of mayors changes are: 500, 3,500, 10,000, 20,000, 50,000, 100,000.

Figure 3: Discontinuity Effect of Remuneration Caps on Perceived Corruption



Notes: Local linear RD estimates with uniform kernel. The unit of analysis is a survey respondent. The model specification follows Equation 1. The dependent variable is respondents' perception of the corruption of their municipal government, which is measured by answers to the question: "Do you think that the municipal government is involved in corruption?" A 10-point scale is proposed from 0 "no corruption at all" to 10 "a lot of corruption". Each specification uses a different cutoff which corresponds to the population threshold indicated on the vertical axis. The optimal bandwidth is computed following Kolesár and Rothe (2018) and minimizes the mean square error of the local linear estimator. In each specification, we control for respondents' gender, age, living arrangement, education, income, work status, political orientation, and region dummies. The horizontal solid lines indicate 95% confidence intervals based on standard errors clustered at the municipal level.

To provide evidence that the change in the gender parity rule at the cutoff does not bias our results, we show in Table 4 that controlling for the share of women on the electoral lists of the first round does not alter our baseline RD estimates. In Appendix B, we further show that our findings remain similar when we control for the gender of the elected mayor (Table A.1) and the share of women that have been elected in the municipal council (Table A.2). Taken together, those results suggest that neither the compensation cap nor the gender parity obligation is driving our findings.

Table 4: RD Estimates of The Impact of Voting System on Perceived Corruption – Controlling for the Share of Women on the Electoral List

	Outcome: Perceived corruption		
	(1)	(2)	(3)
Discontinuity estimate	0.335**	0.327**	0.303**
	(0.153)	(0.154)	(0.154)
BSD 95% CIs	[0.0348, 0.636]	[0.0252, 0.629]	[0.000141, 0.606]
K	1.116e-11	2.232e-11	3.348e-11
Bandwidth	177,745	120,583	97,828
Observations	9,117	8,733	8,530

Notes: Local linear RD estimates with uniform kernel. The unit of analysis is a survey respondent. The model specification follows Equation 1. The dependent variable is respondents' perception of the corruption of their municipal government, which is measured by answers to the question: "Do you think that the municipal government is involved in corruption?" A 10-point scale is proposed from 0 "no corruption at all" to 10 "a lot of corruption". The treatment consists of switching from a majoritarian representation system to a proportional representation list system. BSD refers to the bounded second derivative approach which is used to construct "honest" confidence intervals, as considered in Armstrong and Kolesár (2018) and Kolesár and Rothe (2018). The approach requires choosing a constant K that bounds the second derivative of the conditional expectation function. In Column (1), we use the lower bound value of K that we estimate following the method described in the online supplements to Armstrong and Kolesár (2018) and Kolesár and Rothe (2018). In Columns (2) and (3), we use a K two and three times larger than the lower bound. For each K, the optimal bandwidth is computed following Kolesár and Rothe (2018) and minimizes the mean square error of the local linear estimator. In each specification, we control for the share of women on the electoral list of the first round and respondents' gender, age, living arrangement, education, income, work status, political orientation, and region dummies. Standard errors clustered at the municipal level are reported in parentheses. ***Significant at 1% level; **significant at 5% level; *significant at 10% level.

A Matter of Trust instead of Corruption?

François and Méon (2021) and François et al. (2023) show that individuals' trust in their mayor correlates with how corrupt they perceive their municipal government to be. To rule out the possibility that our results capture the effect of electoral rules on trust rather than on corruption, we take advantage of a question in our survey in which respondents were asked to indicate their level of trust in their mayor: "Could you tell me to what extent you trust the mayor of your municipality?" Respondents could choose between the following options: "not at all", "a little", "some", or "totally".[4] Our RD analyses indicate that trust is continuous at the cutoff (Table A.3 in Appendix B) and that controlling for it in our

[4]Admittedly, the trust question in the survey refers to the "mayor" while the corruption question pertains to the "municipal government". Since mayors are at the helm of municipal administrations, the difference is negligible.

baseline regressions (Table A.4) does not impact our baseline findings.

Placebo Tests

If our identification hypotheses hold true, the only discontinuity we should observe is in the perception of corruption at the 1,000-inhabitant threshold. To test this, we begin by running a series of RDDs where we use as dependent variable respondents' perception of corruption at other levels of government (e.g., the regional government, deputies, etc.). Because the voting system at those other levels does not depend on the 1,000-inhabitant threshold, we should find no discontinuity. The outcome of those regressions is reported in Figure A.1 of Appendix B and is in line with our expectation, as we observe no discontinuity. These findings also suggest that respondents do not conflate the various levels of government when assessing their degrees of corruption. Accordingly, they seem to correctly perceive that the voting system of municipal election may affect the incentives of municipal governments but not those of other governments.

Second, we investigate the presence of discontinuities at other cutoffs. To do so, we split our sample into two sub-samples – consisting respectively of the observations at the left and those at the right of the cutoff – and perform an RDD in both sub-samples using the median of the running variable as cutoff.[5] The results are plotted in Figure A.2 and show no evidence of discontinuity.

Covariate Balance and Absence of Sorting

For our RDD estimates to capture the causal effect of the voting system on corruption, we need to make sure that covariates are balanced at the cutoff and that municipalities do not strategically manipulate their official population figures to fall on either side of the cutoff (Eggers et al., 2018). Figure A.3 in Appendix B precisely shows that respondents' characteristics smoothly vary around the cutoff, which suggests that there is no systematic difference between treated and untreated respondents in terms of observables. In addition, Figure A.4 shows that the density of population is smooth at the cutoff. Accordingly, there

[5]Using the median of the running variable as cutoff increases the RDD power to detect a discontinuity (Imbens and Lemieux, 2008).

no evidence of sorting in population numbers.[6]

Taken together, those results suggest that the jump we observe at the cutoff is unlikely to be driven by anything other than the change in the electoral formula, which bolsters our confidence regarding the causal interpretation of our RD result.

4.3 Robustness Checks

We now consider and discuss a series of robustness tests to investigate the strength of our baseline findings.

Alternative RD Approaches. Our baseline RD approach relies on local linear estimates. To show that our results are not driven by the choice of method, we implement two alternative RD strategies: a global parametric approach and a local randomization approach (see Appendix C for more details on each approach). The global parametric approach takes advantage of all the observations in the sample to identify a discontinuity at the cutoff. It therefore comes with the main advantage of not having to select an optimal bandwidth. The local randomization approach formalizes, under some additional assumptions that we describe in Appendix C.2, the idea that the treatment assignment is as good as randomly assigned in a small window around the cutoff (Cattaneo et al., 2017). This, in turn, allows the use of randomization methods. Reassuringly, both approaches lead to results that are quantitatively and qualitatively similar to the baseline ones.

Alternative Bandwidth Selection Procedures. Our current strategy to compute the optimal bandwidth follows Kolesár and Rothe's (2018) approach, which is tailored for discrete settings. Specifically, for each value of K, we calculate a bandwidth that minimizes the mean square error of the local linear estimator and that is the same on both sides of the cutoff. In Appendix D, we compute the optimal bandwidth in a more flexible way, as we allow it to differ below and above the cutoff. In particular, we use the mean square error and the coverage error probability optimal bandwidth selectors proposed by Calonico et al. (2019a). The findings remain unchanged, suggesting that our baseline results are robust to the bandwidth choice.

Alternative Identification Strategy. Finally, to show that our results are not driven by

[6]The test proposed by Frandsen (2017), which is similar to the traditional McCrary's (2008) test but tailored for discrete settings, further confirms the absence of manipulation of the running variable ($p = 0.815$, where the null is the absence of manipulation).

the bandwidth choice or by violations of the RD assumptions, we move away from our RD design and implement an instrumental variable (IV) approach where we generate internal instruments by leveraging the heteroskedasticity of the errors (Lewbel, 2012). We provide in Appendix E a description of the assumptions under which this approach leads to correct identification. The resulting IV estimates are in line with the RD ones.

5 What About Objective Corruption?

We have so far used survey answers to measure the corruption level of municipal governments. While this approach provides a consistent measure of corruption for a vast and representative number of municipalities, it relies by definition on perceptions rather than on an objective assessment of corruption. In this section, we instead construct an objective measure of corruption for every French municipality. This allows us to determine whether our baseline findings can be read in terms of objective corruption, as well as to assess the relationship between objective and perceived corruption.

To construct our measure of objective corruption, we hand-collected newspaper reports of corruption cases involving municipal governments that were handed down by the courts. We describe the sources of our data in Appendix F.1. We could identify 65 cases of corruption. Figure A.5 in Appendix F.2 shows the distribution of corruption cases around the cutoff.

Relationship between Objective and Perceived Corruption

We begin by exploring the relationship between objective and perceived corruption by running the following equation:

$$Corruption_{i,m,r} = \beta_0 + \beta_1 CorruptionCase_m + \boldsymbol{\beta}_3^{'}\mathbf{X}_i + \lambda_r + \epsilon_{i,m,r}, \tag{2}$$

where $CorruptionCase_m$ is our measure of objective corruption and is defined as an indicator equal to one if the municipal government of municipality m was involved in a corruption case. The other variables are defined as in baseline Equation 1.

The results are depicted in Table 5 and show that our measure of objective corruption positively correlates with respondents' perception of corruption, meaning that respondents perceive more corruption when their municipal government has been publicly involved in a corruption case. The coefficient is positive and statistically significant at the one-percent level. The point estimate shows that, everything else equal, respondents living in a municipality where a corruption case was made public reports a level of corruption that is half a point larger on a 10-point scale. This suggests that perceived corruption reacts to actual corruption.

Table 5: Correlation between Objective and Perceived Corruption

	Outcome: Perceived corruption	
	(1)	(2)
	Coef.	SE
Municipal government involved in a corruption case	0.535***	0.194
Observations	10,105	

Notes: The unit of analysis is a survey respondent. The model specification follows Equation 2. The dependent variable is respondents' perception of the corruption of their municipal government, which is measured through the question: "Do you think that the municipal government is involved in corruption?" A 10-ladder scale is proposed from 0 "no corruption at all" to 10 "a lot of corruption". The variable *Municipal government involved in a corruption case* is defined as an indicator equal to one if the municipal government of the municipality has been involved in a corruption case. We control for respondents' gender, age, living arrangement, education, income, work status, political orientation, and region dummies. Standard errors clustered at the municipal level are reported in parentheses. ***Significant at 1% level; **significant at 5% level; *significant at 10% level.

The Impact of the Voting System on Actual Corruption

We then explore the impact of electoral rules on actual corruption. Specifically, we follow a strategy similar to our baseline approach and estimate an RDD where the dependent variable is our measure of actual corruption. That is, we estimate the following logistic regression:

$$\begin{aligned}\Pr(CorruptionCase_m = 1) = F\Big[\beta_0 + \tau Proportional_m + \sum_{j=1}^{p} \beta_j \widetilde{Population}_m^{j} \\ + \sum_{j=1}^{p} \gamma_j Proportional_m \times \widetilde{Population}_m^{j} + \epsilon_m\Big],\end{aligned} \tag{3}$$

where p is the degree of the polynomial up to third order, $CorruptionCase_m$ is an indicator set to one if the municipal government of municipality m was involved in a corruption case, $Proportional_m$ is an indicator equal to one if municipality m's voting system is a party-list proportional system (as opposed to majoritarian), and $\widetilde{Population}_m$ is the normalized population size of municipality m.[7] Given the very small number of corruption cases in our dataset, we estimate Equation 3 using the penalized maximum likelihood estimator proposed by Firth (1993). This method has been shown to provide unbiased estimates with rare event data (Leitgöb, 2013).[8]

Table 6 present the results. We observe that the municipal government of municipalities located just above the cutoff are more likely to be involved in a corruption case than the municipal government of municipalities just below the cutoff. Although the effect amount to an increase in the probability of observing a case of corruption is small, between a third and a half of a percentage point, it is statistically significant at the one-percent level. Consequently, the voting system seems to affect not only perceptions of corruption but also the propensity of local officials to be involved in a corruption case.

Table 6: Average Marginal Effect of The Impact of Voting System on the Probability that the Municipal Government is Involved in a Corruption Case

	Outcome: Probability that the municipal government is involved in a corruption case		
	(1)	(2)	(3)
Discontinuity estimate (AME)	0.00402***	0.00338***	0.00296***
	(0.000634)	(0.000558)	(0.00114)
Degree of the polynomial	Linear	Quadratic	Cubic
Observations	34,376	34,376	34,376

Notes: Logit RD estimates using the penalized maximum likelihood estimation proposed by Firth (1993). The unit of observation is a municipality. The table reports average marginal effects. The model specification follows Equation 3. The dependent variable is an indicator equal to one if the municipal government of the municipality has been involved in a corruption case. The treatment consists of switching from a majoritarian representation system to a proportional representation list system. ***Significant at 1% level; **significant at 5% level; *significant at 10% level.

[7]Since our data cover several years, we use the average population of each municipality between 2014 and 2020 as running variable.

[8]Appendix F.3 shows that using the same local linear estimator as in the baseline leads to very similar results. However, given the extreme skewness of the outcome, as well as its binary nature, we favour the parametric penalized maximum likelihood estimator over the local linear estimator as OLS and traditional bandwidth selection procedures are likely inadequate in our setting.

6 Conclusion

Whereas voting systems likely affect the incentives of voters, candidates, and elected officials, causal evidence on their effect on corruption is scant. By conditioning the voting system in municipal elections on an *a priori* threshold of 1,000 inhabitants, the French electoral law provides a natural experiment to measure the effect of moving from a majority individual system to a two-round proportional list system. The resulting RDD estimates show a robust effect of the voting system, whereby switching from a majority individual system to a proportional representation list system increases the perception of corruption by approximately ten percent of a 10-point scale. This finding is consistent with previous cross-country correlations (Kunicova and Rose-Ackerman, 2005, Persson and Tabellini, 2002, Persson et al., 2003). Moreover, we also report suggestive first-time evidence that the proportional representation system results in a higher probability of local officials being involved in a corruption case. The effect of the voting system is therefore not only a matter of perception, especially as we observe that perceptions correlate with actual cases.

Those findings suggest that voting systems emphasizing individual, as opposed to list-, responsibility may contribute to reducing the propensity of elected officials to indulge in corrupt or dishonest practices. However, jumping to policy implications is likely premature. One should beforehand make sure that our findings would apply to other contexts. The focus on a single country and on a local-to-cutoff effect that allowed us to establish causality came at the cost of generalizability. We should therefore try to document the effect of the voting system in other countries and at other levels of government. Also, because voting rules are many, complex, and often subtle, one should try to gather evidence of the effect of a wider range of rules. Finally, although we can claim that our findings are causal, they still remain silent on the mechanisms that underpin them. In particular, we do not know how they rest on the reaction of candidates, elected officials, voters, and political parties. Determining the contribution of each of those agents therefore ought to be investigated.

Appendix

A Data description

B Validity of the RD Design

Table A.1: RD Estimates of the Impact of the Voting System on Perveived Corruption – Controlling for the Gender of the Elected Mayor

	Outcome: Perceived corruption		
	(1)	(2)	(3)
Discontinuity estimate	0.417***	0.405***	0.381**
	(0.154)	(0.155)	(0.155)
BSD 95% CIs	[0.115, 0.720]	[0.101, 0.709]	[0.0760, 0.686]
K	1.116e-11	2.232e-11	3.348e-11
Bandwidth	177,745	120,583	97,828
Observations	9,095	8,711	8,508

Notes: Local linear RD estimates with uniform kernel. The unit of analysis is a survey respondent. The model specification follows Equation 1. The dependent variable is respondents' perception of the corruption of their municipal government, which is measured through the question: "Do you think that the municipal government is involved in corruption?" A 10-ladder scale is proposed from 0 "no corruption at all" to 10 "a lot of corruption". The treatment consists of switching from a majoritarian representation system to a proportional representation list system. BSD refers to the bounded second derivative approach which is used to construct "honest" confidence intervals, as considered in Armstrong and Kolesár (2018) and Kolesár and Rothe (2018). The approach requires choosing a constant K that bounds the second derivative of the conditional expectation function. In Column (1), we use the lower bound value of K that we estimate following the method described in the online supplements to Armstrong and Kolesár (2018) and Kolesár and Rothe (2018). In Columns (2) and (3), we use a K two and three times larger than the lower bound. For each K, the optimal bandwidth is computed following Kolesár and Rothe (2018) and minimizes the mean square error of the local linear estimator. In each specification, we control for gender of the elected mayor and respondents' gender, age, living arrangement, education, income, work status, political orientation, and region dummies. Standard errors clustered at the municipal level are reported in parentheses. ***Significant at 1% level; **significant at 5% level; *significant at 10% level.

Table A.2: RD Estimates of the Impact of the Voting System on Perceived Corruption – Controlling for the Share of Women Elected in the Municipal Government

	Outcome: Perceived corruption		
	(1)	(2)	(3)
Discontinuity estimate	0.361**	0.351**	0.326**
	(0.153)	(0.153)	(0.154)
BSD 95% CIs	[0.0600, 0.661]	[0.0496, 0.653]	[0.0232, 0.628]
K	1.116e-11	2.232e-11	3.348e-11
Bandwidth	177,745	120,583	97,828
Observations	9,119	8,735	8,532

Notes: Local linear RD estimates with uniform kernel. The unit of analysis is a survey respondent. The model specification follows Equation 1. The dependent variable is respondents' perception of the corruption of their municipal government, which is measured through the question: "Do you think that the municipal government is involved in corruption?" A 10-ladder scale is proposed from 0 "no corruption at all" to 10 "a lot of corruption". The treatment consists of switching from a majoritarian representation system to a proportional representation list system. BSD refers to the bounded second derivative approach which is used to construct "honest" confidence intervals, as considered in Armstrong and Kolesár (2018) and Kolesár and Rothe (2018). The approach requires choosing a constant K that bounds the second derivative of the conditional expectation function. In Column (1), we use the lower bound value of K that we estimate following the method described in the online supplements to Armstrong and Kolesár (2018) and Kolesár and Rothe (2018). In Columns (2) and (3), we use a K two and three times larger than the lower bound. For each K, the optimal bandwidth is computed following Kolesár and Rothe (2018) and minimizes the mean square error of the local linear estimator. In each specification, we control for the share of women elected in the municipal government and respondents' gender, age, living arrangement, education, income, work status, political orientation, and region dummies. Standard errors clustered at the municipal level are reported in parentheses. ***Significant at 1% level; **significant at 5% level; *significant at 10% level.

Table A.3: RD Estimates of the Impact of the Voting System on Trust

	Outcome: Trust in mayor		
	(1)	(2)	(3)
Discontinuity estimate	-0.0296	-0.0240	-0.0218
	(0.0483)	(0.0485)	(0.0486)
BSD 95% CIs	[-0.109, 0.0501]	[-0.1034, 0.0559]	[-0.102, 0.0583]
K	3.307e-12	6.615e-12	9.922e-12
Bandwidth	180,194	120,583	97,828
Observations	9,140	8,735	8,532

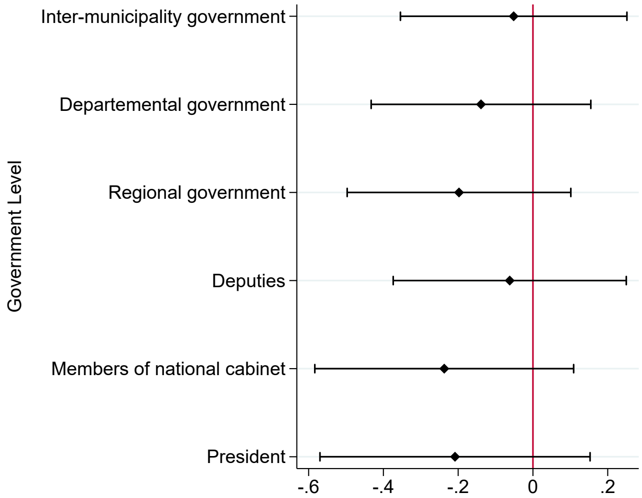
Notes: Local linear RD estimates with uniform kernel. The unit of analysis is a survey respondent. The model specification follows Equation 1. The dependent variable is respondents' trust in their mayor, which is measured through the question: "Could you tell me to what extent you trust the mayor of your municipality?" Respondents could choose between the following options: "not at all", "a little", "some", and "totally". The treatment consists of switching from a majoritarian representation system to a proportional representation list system. BSD refers to the bounded second derivative approach which is used to construct "honest" confidence intervals, as considered in Armstrong and Kolesár (2018) and Kolesár and Rothe (2018). The approach requires choosing a constant K that bounds the second derivative of the conditional expectation function. In Column (1), we use the lower bound value of K that we estimate following the method described in the online supplements to Armstrong and Kolesár (2018) and Kolesár and Rothe (2018). In Columns (2) and (3), we use a K two and three times larger than the lower bound. For each K, the optimal bandwidth is computed following Kolesár and Rothe (2018) and minimizes the mean square error of the local linear estimator. In each specification, we control for the share of women elected in the municipal government and respondents' gender, age, living arrangement, education, income, work status, political orientation, and region dummies. Standard errors clustered at the municipal level are reported in parentheses. ***Significant at 1% level; **significant at 5% level; *significant at 10% level.

Table A.4: RD Estimates of the Impact of the Voting System on Perveived Corruption – Controlling for trust in mayor

	Outcome: Perceived corruption		
	(1)	(2)	(3)
Discontinuity estimate	0.404***	0.396***	0.374***
	(0.142)	(0.143)	(0.143)
BSD 95% CIs	[0.170, 0.639]	[0.161, 0.631]	[0.138, 0.610]
K	1.116e-11	2.232e-11	3.348e-11
Bandwidth	177,745	120,583	97,828
Observations	9,119	8,735	8,532

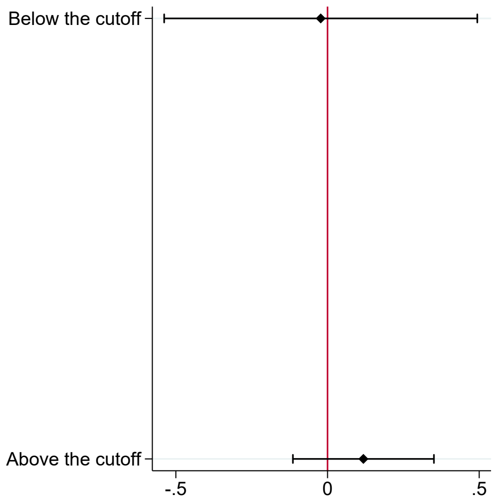
Notes: Local linear RD estimates with uniform kernel. The unit of analysis is a survey respondent. The model specification follows Equation 1. The dependent variable is respondents' perception of the corruption of their municipal government, which is measured through the question: "Do you think that the municipal government is involved in corruption?" A 10-ladder scale is proposed from 0 "no corruption at all" to 10 "a lot of corruption". The treatment consists of switching from a majoritarian representation system to a proportional representation list system. BSD refers to the bounded second derivative approach which is used to construct "honest" confidence intervals, as considered in Armstrong and Kolesár (2018) and Kolesár and Rothe (2018). The approach requires choosing a constant K that bounds the second derivative of the conditional expectation function. In Column (1), we use the lower bound value of K that we estimate following the method described in the online supplements to Armstrong and Kolesár (2018) and Kolesár and Rothe (2018). In Columns (2) and (3), we use a K two and three times larger than the lower bound. For each K, the optimal bandwidth is computed following Kolesár and Rothe (2018) and minimizes the mean square error of the local linear estimator. In each specification, we control for respondents' trust in mayor, gender, age, living arrangement, education, income, work status, political orientation, and region dummies. Standard errors clustered at the municipal level are reported in parentheses. ***Significant at 1% level; **significant at 5% level; *significant at 10% level.

Figure A.1: Discontinuity Effect of the 1,000-Population Threshold on Perceived Corruption at Other Levels of Government



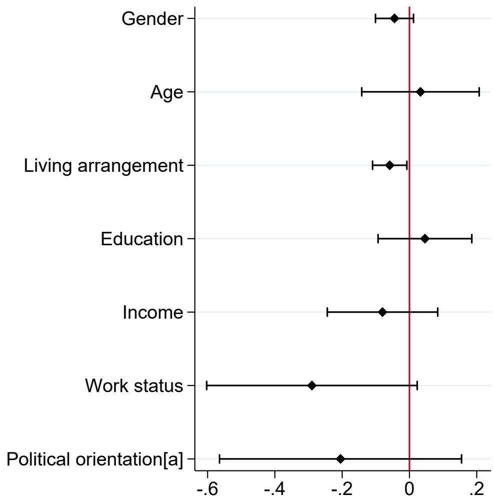
Notes: Local linear RD estimates with uniform kernel. The unit of analysis is a survey respondent. The model specification follows Equation 1. Each specification uses a different dependent variable which corresponds to respondents' perceived corruption for the level of government indicated on the left. The treatment consists of switching from a majoritarian representation system to a proportional representation list system. The optimal bandwidth is computed following Kolesár and Rothe (2018) and minimizes the mean square error of the local linear estimator. In each specification, we control for respondents' gender, age, living arrangement, education, income, work status, political orientation, and region dummies. The horizontal solid lines indicate 95% confidence intervals based on standard errors clustered at the municipal level.

Figure A.2: Discontinuity Effect at Placebo Cutoffs



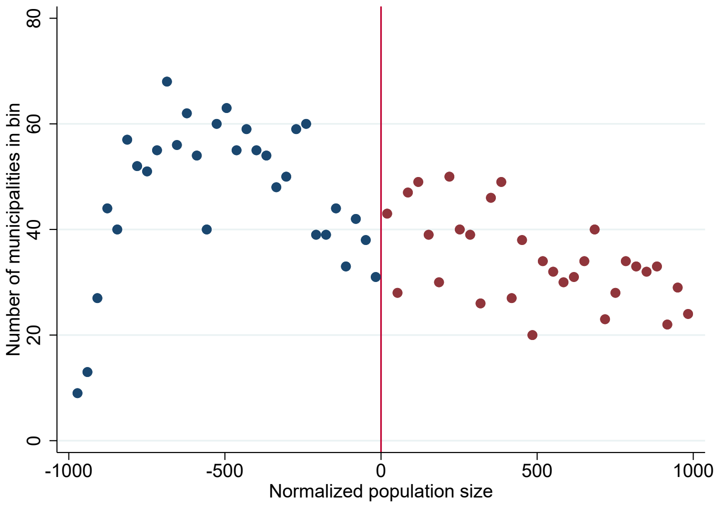
Notes: Local linear RD estimates with uniform kernel. The unit of analysis is a survey respondent. The model specification follows Equation 1. The dependent variable is respondents' perception of the corruption of their municipal government, which is measured through the question: "Do you think that the municipal government is involved in corruption?" A 10-ladder scale is proposed from 0 "no corruption at all" to 10 "a lot of corruption". The *Below the cutoff* specification implements an RDD on the observations below the one thousand cutoff using as cutoff the median of the running variable. The *Above the cutoff* specification does the same but for the observations above the cutoff. The optimal bandwidth is computed following Kolesár and Rothe (2018) and minimizes the mean square error of the local linear estimator. In each specification, we control for respondents' gender, age, living arrangement, education, income, work status, political orientation, and region dummies. The horizontal solid lines indicate 95% confidence intervals based on standard errors clustered at the municipal level.

Figure A.3: Covariates Balance



Notes: Local linear RD estimates with uniform kernel. The unit of analysis is a survey respondent. The model specification follows Equation 1. Each specification uses a different dependent variable which corresponds to the variable indicated on the left. The treatment consists of switching from a majoritarian representation system to a proportional representation list system. The optimal bandwidth is computed following Kolesár and Rothe (2018) and minimizes the mean square error of the local linear estimator. In each specification, we control for respondents' region dummies. [a] Political orientation is scaled by 10. The horizontal solid lines indicate 95% confidence intervals based on standard errors clustered at the municipal level.

Figure A.4: Frequency of Population Size around the Cutoff



Notes: The y-axis represents the frequency and the x-axis the population size. Population size is normalized by subtracting the cutoff (1,000) for each municipality. Municipalities located below the cutoff use majoritarian representation while municipalities above the cutoff rely on a proportional representation list system.

Table A.5: RD Estimates of the Impact of the Voting System on Perceived Corruption – Without Covariates

	Outcome: Perceived corruption		
	(1)	(2)	(3)
Discontinuity estimate	0.384**	0.370**	0.341**
	(0.156)	(0.156)	(0.156)
BSD 95% CIs	[0.0781, 0.689]	[0.0634, 0.677]	[0.0332, 0.648]
K	1.116e-11	2.232e-11	3.348e-11
Bandwidth	177,745	120,583	97,828
Observations	9,119	8,735	8,532

Notes: Local linear RD estimates with uniform kernel. The unit of analysis is a survey respondent. The model specification follows Equation 1. The dependent variable is respondents' perception of the corruption of their municipal government, which is measured through the question: "Do you think that the municipal government is involved in corruption?" A 10-ladder scale is proposed from 0 "no corruption at all" to 10 "a lot of corruption". The treatment consists of switching from a majoritarian representation system to a proportional representation list system. BSD refers to the bounded second derivative approach which is used to construct "honest" confidence intervals, as considered in Armstrong and Kolesár (2018) and Kolesár and Rothe (2018). The approach requires choosing a constant K that bounds the second derivative of the conditional expectation function. In Column (1), we use the lower bound value of K that we estimate following the method described in the online supplements to Armstrong and Kolesár (2018) and Kolesár and Rothe (2018). In Columns (2) and (3), we use a K two and three times larger than the lower bound. For each K, the optimal bandwidth is computed following Kolesár and Rothe (2018) and minimizes the mean square error of the local linear estimator. In each specification, we control for region dummies. Standard errors clustered at the municipal level are reported in parentheses. ***Significant at 1% level; **significant at 5% level; *significant at 10% level.

C Alternative RD Approaches

C.1 Global Parametric Approach

As first alternative to the local linear approach used in baseline estimations, we implement a global parametric RDD where we use all the observations available instead of focusing on the observations located within a window around the cutoff. The main advantage of paremetric RDDs is that they do not require the selection of a bandwidth around the cutoff, which is an appealing feature when the running variable is discrete.

Table A.6 presents the results of the parametric approach. In Column (1), we assume a linear relationship between perceived corruption and population. In Columns (2) and (3), we assume a quadratic and cubic relationship, respectively. Reassuringly, the results are both qualitatively and quantitatively similar to the baseline and are little sensitive to the degree of the polynomial.

Table A.6: RD Estimates of the Impact of the Voting System on Perceived Corruption – Parametric RDD

	Outcome: Perceived corruption		
	(1)	(2)	(3)
Discontinuity estimate	0.587***	0.507***	0.461***
	(0.155)	(0.155)	(0.156)
Degree of the polynomial	Linear	Quadratic	Cubic
Observations	10,080	10,080	10,080

Notes: Parametric RD estimates. The unit of analysis is a survey respondent. The dependent variable is respondents' perception of the corruption of their municipal government. The treatment consists of switching from a majoritarian representation system to a proportional representation list system. In each specification, we control for respondents' gender, age, living arrangement, education, income, work status, political orientation, and region dummies. Standard errors clustered at the municipal level are reported in parentheses. ***Significant at 1% level; **significant at 5% level; *significant at 10% level.

C.2 Local Randomization Approach

In this section, we implement a local randomization approach by taking into account the randomization nature of RDDs around the cutoff, which allows the use of randomization methods. Specifically, the idea is to assume that there exists a window W around the cutoff in which the RDD is as good as a random experiment. In other terms, this boils down to assuming that, inside W, the placement of respondents below or above the cutoff is as-if random and the potential outcomes do not depend on the running variable, except through the treatment assignment (Cattaneo et al., 2015, 2017).

To select a window in which the local randomization assumption is the most plausible, we follow the data-driven procedure developed in Cattaneo et al. (2015) and Cattaneo et al. (2017) and that leverages the information provided by predetermined covariates (see Cattaneo et al. [2023] for an intuitive description of the method). We obtained the window $W = [-97, 97]$.

Table A.7 reports the results of the local randomization analysis for the observations located within W. The estimate is obtained using difference-in-means with a uniform kernel while the p-value is computed using 10,000 random permutations. The results are similar to the baseline estimates, hence showing the robustness of our main findings.

Table A.7: RD Estimates of the Impact of the Voting System on Perceived Corruption – Local Randomization RDD

	Outcome: Perceived corruption	
	(1)	(2)
	Coef.	P-val.
Discontinuity estimate	0.737	0.0464
Window	[-97, 97]	
Observations	453	

Notes: Local randomization RD estimates. The unit of analysis is a survey respondent. The estimate is obtained using difference-in-means with a uniform kernel and the p-value is computed using 10,000 random permutations. The dependent variable is respondents' perception of the corruption of their municipal government, which is measured through the question: "Do you think that the municipal government is involved in corruption?" A 10-ladder scale is proposed from 0 "no corruption at all" to 10 "a lot of corruption". The treatment consists of switching from a majoritarian representation system to a proportional representation list system. We control for respondents' gender, age, living arrangement, education, income, work status, political orientation, and region dummies. ***Significant at 1% level; **significant at 5% level; *significant at 10% level.

D Alternative Bandwidth Selection Procedures

In Table A.8, we compute the optimal bandwidth around the cutoff using the mean square error and the coverage error probability bandwidth selectors proposed by Calonico et al. (2019a). The findings are in line with the baseline, both quantitatively and qualitatively.

Table A.8: RD Estimates of the Impact of the Voting System on Perceived Corruption – Alternative Bandwidth Selection Procedures

	Outcome: Perceived corruption	
	(1)	(2)
Discontinuity estimate	0.394***	0.390**
	(0.151)	(0.175)
Bandwidth	[988, 246,000]	[645.499, 160,000]
Observations	9,219	8,596

Notes: Local linear RD estimates with uniform kernel. The unit of analysis is a survey respondent. The model specification follows Equation 1. The dependent variable is respondents' perception of the corruption of their municipal government, which is measured through the question: "Do you think that the municipal government is involved in corruption?" A 10-ladder scale is proposed from 0 "no corruption at all" to 10 "a lot of corruption". The treatment consists of switching from a majoritarian representation system to a proportional representation list system. The optimal bandwidth is computed following Calonico et al. (2014) and Calonico et al. (2019a). Column (1) implements the the mean square error optimal bandwidth selector on each side of the cutoff while Column (2) implements the coverage error probability optimal bandwidth selector. In each specification, we control for respondents' gender, age, living arrangement, education, income, work status, political orientation, and region dummies. Standard errors clustered at the municipal level are reported in parentheses. ***Significant at 1% level; **significant at 5% level; *significant at 10% level.

E Instrumental Variable

As alternative to our RD design, we use an instrumental variable approach to assess the impact of voting system on perceived corruption. In particular, we follow the identification strategy proposed by Lewbel (2012) and leverage the presence of heteroskedasticity in the error term of the first stage to construct valid internal instruments from the covariates. In the first subsection, we describe the assumptions needed to achieve correct identification. In the second subsection, we present the two-stage least squares (2SLS) estimates.

E.1 Identification Assumptions

Let Y_1 be the outcome variable, Y_2 the endogenous variable, and X a vector of control variables, then our IV system can be defined as

$$Y_1 = X'\beta + Y_2\gamma + \epsilon_1$$

$$Y_2 = X'\alpha + \epsilon_2$$

Lewbel's (2012) 2SLS estimator identifies γ under the assumptions $Cov(Z, \epsilon_1 \epsilon_2) = 0$ and $Cov(Z, \epsilon_2^2) \neq 0$, where $Z = X$ in our case (following Mishra and Smyth [2015], we use all covariates to generate the instruments).

To gauge the plausibility of these two assumptions, we follow the recommendations of Baum and Lewbel (2019). Specifically, we investigate below a set of conditions that are sufficient – but, importantly, not necessary – to validate our identification strategy.

Condition 1. The errors ϵ_1 and ϵ_2 have the factor structure

$$\epsilon_1 = cU + V_1$$

$$\epsilon_2 = U + V_2$$

where c is a constant and U, V_1, and V_2 are unobserved error terms that are mutually independent conditional on Z. As Baum and Lewbel (2019) argue, this condition holds if endogeneity arises from an omitted variable, which is likely to be the case in our setup since the same variables arguably drive both respondents' perception of corruption and decisions to settle in a given municipality. This therefore supports Condition 1.

Condition 2. U^2 is not correlated with Z, meaning that U should be homoscedastic. This condition can be tested by performing a Pagan and Hall (1983) test on the second stage of the IV system. The results, reported in Panel A of Table A.9, show that we reject the null hypothesis of homoskedastic disturbance. However, as specified by Baum and Lewbel (2019), "A limitation of this test is that it tests homoskedasticity of ϵ_1, so if we reject homoskedasticity, we cannot know whether the rejection is due to violating [Condition 2] or due to harmless heteroskedasticity of V_1." Rejecting the null hypothesis of homoskedasticity does therefore not imply that Condition 2 is necessarily violated.

Condition 3. ϵ_2^2 is correlated with Z, which is equivalent to say that V_2 should be heteroskedastic relative to Z. We assess this condition with a Breusch and Pagan (1979) test on the first stage of the IV system. The results are presented in Panel B of Table A.9 and show that we reject the null hypothesis of homoskedastic disturbance, which lends credence to Condition 3.

Condition 4. All instruments yield the same coefficient estimates. Testing this condition with the Sargan (1958) J-test, we show that this condition holds as we fail to reject the overidentification test (see Panel C of Table A.9).

Overall, those results support the validity of our identification strategy based on Lewbel's (2012) approach.

Table A.9: Results of Lewbel's (2012) Conditions

	p-value
Panel A. Pagan and Hall (1983) test (Condition 2)	0
Panel B. Breusch-Pagan (1979) test (Condition 3)	0
Panel C. Sargan (1958) *J*-test (Condition 4)	0.105

E.2 2SLS Estimates

Table A.10 reports the 2SLS estimates. The results are similar to the baselines estimates and the instruments are strong, as shown by the F Statistics.

Table A.10: Estimates of the Impact of the Voting System on Perceived Corruption – Instrumental Variable

	Outcome: Perceived corruption	
	(1)	(2)
	Coef.	SE
Proportional	0.674***	0.125
F Statistics	18.552	
Observations	10,080	

Notes: 2SLS estimates. The unit of analysis is a survey respondent. The dependent variable is respondents' perception of the corruption of their municipal government, which is measured through the question: "Do you think that the municipal government is involved in corruption?" A 10-ladder scale is proposed from 0 "no corruption at all" to 10 "a lot of corruption". *Propotional* is a dummy equal to one if the municipality's voting system is a proportional representation list system (as opposed to majoritarian representation), and zero otherwise. The variable is instrumented by a set of internal instruments generated following the identification strategy of Lewbel (2012), which leverage the presence of heteroskedasticity in the error term of the first stage to generate valid internal instruments. We control for respondents' gender, age, living arrangement, education, income, work status, political orientation, and region dummies. ***Significant at 1% level; **significant at 5% level; *significant at 10% level.

F Perceived vs. Objective Corruption

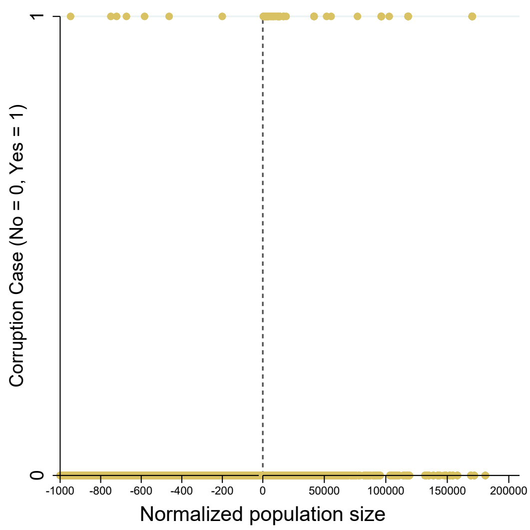
F.1 Data Source

We construct our measure of objective corruption by merging several sources. First, we use the corruption cases reported by "France Corruption", a website edited by the members of the French anti-corruption association "Anticor" and that aims at compiling news items related to corruption in France.[9] Second, we leverage the dataset created by the French section of Transparency International and that lists the convictions handed down by French courts and reported in the press.[10] Third, we use the cases reported by the "Observatoire des Politiques", which is an independent website aiming at recording all the convictions and indictments of French politicians related to corruption.[11]. Finally, to complete our database with the most recent cases, we collected on Google all the news articles that were published within a year and that contained the expression "maire condamné" (convicted mayor).

[9]https://francecorruption.fr/.
[10]https://transparency-france.org/.
[11]https://odp2017.wordpress.com/.

F.2 Descriptive Statistics

Figure A.5: Corruption Cases Probability as a Function of a Population Size



Notes: The y-axis represents the probability that the municipal government is involved in a corruption case; the x-axis represents the population size. Population size is normalized by subtracting the cutoff (1,000) for each municipality. Municipalities located below the cutoff use majoritarian representation while municipalities above the cutoff rely on a proportional representation list system.

F.3 Local Linear Regression

Table A.11: RD Estimates of the Impact of the Voting System on the Probability that the Municipal Government is Involved in a Corruption Case

	Outcome: Probability that the municipal government is involved in a corruption case		
	(1)	(2)	(3)
Discontinuity estimate	0.00285***	0.00283***	0.00279***
	(0.000820)	(0.000770)	(0.000710)
BSD 95% CIs	[0.00123, 0.00447]	[0.00129, 0.00437]	[0.00135, 0.00424]
K	2.886e-12	5.772e-12	8.658e-12
Bandwidth	68,434	43,459.5	33,041.5
Observations	34,305	34,219	34,152

Notes: Local linear RD estimates with uniform kernel. The unit of analysis is a survey respondent. The model specification follows Equation 1. The dependent variable is an indicator that takes value one if the municipal government of the municipality was sentenced by the court in a corruption case. The treatment consists of switching from a majoritarian representation system to a proportional representation list system. BSD refers to the bounded second derivative approach which is used to construct "honest" confidence intervals, as considered in Armstrong and Kolesár (2018) and Kolesár and Rothe (2018). The approach requires choosing a constant K that bounds the second derivative of the conditional expectation function. In Column (1), we use the lower bound value of K that we estimate following the method described in the online supplements to Armstrong and Kolesár (2018) and Kolesár and Rothe (2018). In Columns (2) and (3), we use a K two and three times larger than the lower bound. For each K, the optimal bandwidth is computed following Kolesár and Rothe (2018) and minimizes the mean square error of the local linear estimator. Robust standard errors are reported in parentheses. ***Significant at 1% level; **significant at 5% level; *significant at 10% level.

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