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Abstract

We employ bootstrap methods (Efron (1979)) to test the effect of an important electoral reform implemented in Italy from 1993 to 2001, that moved the system for electing the Parliament from purely proportional to plurality rule (for 75% of the seats). We do not find any effect on either the number of parties or the stability of governments (the two main objectives of the reform) that remained unchanged at their pre-reform level.

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Keywords: electoral system, plurality rule, Duverger's law, bootstrap.

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1 Introduction

Among political institutions, the most widely studied is certainly the electoral rule. This reflects the crucial importance that both political scientists and economists assign to the rules governing the ballot box in shaping the characteristics of the political system, the behaviour of voters, the selection of politicians, the policies chosen by governments and finally, the economic outcomes. For instance, among political scientists, Duverger (1954) analysis has spanned an enormous literature attempting to connect the features of the electoral rule with the equilibrium number of parties and candidates (e.g. Cox (1997)). On their side, economists have developed several models explaining policy and economic outcomes as the result of the contrasting incentives generated by the different electoral systems (for a survey, see Persson and Tabellini (2001)). This focus seems also to be justified on empirical grounds. According to Persson and Tabellini (2005) extensive empirical analysis, for example, the electoral rule is indeed the "key" political institution: ceteris paribus, a switch from proportional voting to plurality rule should generate an impressing 5% GDP decrease in public spending[1]. But this analysis, as many others addressing similar relationships between the electoral system and economic outcomes (see for instance, Alesina and Drazen (1991), Alesina and Perotti (1994); Persson et al. (2003)), is based on comparison across countries that differ along many other dimensions beyond the electoral rule. And however clever devices one can imagine for trying to identify a causal effect, there always remains the doubt that the relationship between the electoral rule and the outcome of interest may be generated by some other uncontrolled factor that "cause" both the electoral rule and the outcome[2]. Besides, reforms of the electoral system are in reality rare events[3], so that we generally lack the kind of variation that could help us in identifying casual effects.

This suggests that to get more convincing evidence one should rather try to concentrate on the few existing examples of electoral reform inside a single country, where the ceteris paribus assumption is more reasonable. On these grounds, we discuss here the effects of an important reform introduced in Italy in 1993 (and then repealed again in 2005). This reform changed the electoral rule for the national parliament, moving it from a pure proportional system to a mixed electoral one, where 75% of the seats were assigned through plurality rule in single candidate districts and the rest by proportional voting (e.g. Soberg Shugart and Wattenberg (2001); see below for further details). The reform, somewhat imposed on the Italian parliament by the results of a national referendum (D'Alimonte (2001)), had, according to his advocates, several objectives. The first and foremost was to increase the accountability of parties and politicians, forcing them to form pre-electoral coalitions on well defined policy platforms. But it was also expected that the reform would solve some long term problems of the Italian party systems, such as the excessive fragmentation of the political landscape and the short duration of governments and legislatures. The majoritarian prize in the single district would force the different parties to merge together and eliminate the smaller and more extreme parties from the political arena. The stability of governments and legislatures would raise as the electoral cost for parties to dissolve existing coalitions (once they were formed) would increase. Accordingly, we compare here before and after reform values of several variables capturing these expectations, such as the number of parties represented in Parliament, the number of parties in the ruling coalition, the duration of governments and of legislatures and the seats of the major party in the ruling coalition.

[1] See also Persson and Tabellini (2004). For a contrary view, see Iversen and Soskice (2006) and Ticchi and Vindigni (2010).

[2] For a criticism along these lines see for instance the Acemoglu (2005) review of Persson and Tabellini (2005).

[3] Indeed, in the sample of 60 democracies studied by Persson and Tabellini (2003) only two enacted important reforms of their electoral system between 1960 and 1990 (Cyprus and France).

Concerning the empirical analysis, our statistical inference will be based on the bootstrap. Traditionally, statistical inference is based on the asymptotic theory. However, first-order asymptotic theory often gives a poor approximation to the distributions of test statistics with the sample sizes available in our analysis. As a result, the nominal levels of tests based on asymptotic critical values can be very different from the true levels. But advances in computing have made an alternative approach increasingly attractive. This approach is to generate a large number of simulated values of the test statistic and compare the statistic obtained with the original sample with the empirical distribution function of the simulated ones. This procedure, proposed by Efron (1979), is called bootstrap. More interesting, as shown in Hall (1992), bootstrap methods deliver more accurate inference in finite samples than first-order asymptotic approximations while in large sample is at least as accurate as the approximation obtained from first-order asymptotic theory[4].

Concerning our empirical results, we do not find *any* effects of the reform on the stability of government or on the number of parties. In other words, looking at both the average duration of Italian governments and the number of parties represented in Parliament time series we do not find any structural change in spite of the changed electoral rule. Concerning the other analysed variables, the number of seats of the major party fell, whereas the number of parties inside the ruling coalitions increased, meaning that if anything the reform had the effect of increasing the instability of the ruling coalitions, contrary to the expectations.

In our view, these results raise considerable doubts on the trust that economists and other social scientists have on the importance of the electoral rule for political behaviour or on their ability to predict the effect of a reform. Electoral rules are just one component of the general structure of the political system, which is the result of the sedimentation of long run historical process. As such, this cannot be changed that easily.

The rest of the paper is organized as follows. Section 2 provides further information on the 1993 Italian reform. Section 3 present our data and empirical analysis. Section 4 concludes by discussing our results more extensively.

2 The Italian reform

In 1993, Italy adopted a mixed electoral system for the election of both branches of its bicameral legislature, abandoning the proportional electoral rule that had characterized the country for 48 years. The reform was not based on the result of an extensive discussion in the country or in the Parliament on the shortcomings of the former electoral system (as it happened, for instance, in New Zeland in the same year), but it was rather the result of a somewhat random process[5], involving (in order): 1) the results of a 1992 judicial investigation ("clean hands") that had revealed the extent and depth of political corruption, undermining popular consensus in the old political parties and creating support for radical reforms; 3) the results of a national referendum[6] on the electoral system for the upper house, that given the constraints imposed in Italy on this legislative tool[7], could only change that system in the direction of introducing plurality rule for 75% of the seats; 4) the subsequent decision by the Parliament to uniform the

[4]The idea to use the bootstrap in empirical analysis related to electoral system is not new. Fredriksson and Millimet (2004) investigate the effect of electoral rules on environmental policymaking and their inference is based on the bootstrap.

[5]See Katz (2001) for a detailed account.

[6]Held in April 1993 and approved by 83% of voters.

[7]Popular referenda in Italy can only erase some existing pieces of legislation but cannot propose new one.

system for electing the Chamber as much as possible to the new one for the Senate[8], in order to guarantee political congruence between the two houses (deemed necessary in the perfect Italian bicameralism system). Some differences however remained (due to constitutional constraints), as the rules employed to elect the Chamber allowed voters to cast two separate ballots, one for each tier, while in the election of the Senate the proportional and majoritarian votes were fused into one[9]. The seats not allocated through plurality rule were assigned on the basis of the votes received by the different lists at the national level, through a mechanism (called scorporo) that was meant to protect the best losers, with again some small differences between the two houses[10]. A threshold was also imposed, so that only lists that had gained at least 4% of votes at the national level could participate to the proportional distribution of seats.

Despite the confuse path of the reform, the introduction of the new electoral laws was accompanied by a lively debate, inside and outside the Parliament, to which all main Italian political scientists participated (see Katz (2001) and D'Alimonte (2001) for a detailed review of the main positions). And while reservations were raised by many analysts on pieces and bits of the reform, there was also a widespread consensus on its ability to bring about its main objectives. The most cited one was to (1) "secure the stability of parliamentary majorities and hence a greater capacity to govern". A second was for a (2) "simplification ("aggregation") of the party system, at the minimum by encouraging the formation of stable governing coalitions, if not simply the merger of many parties into larger formation" (Katz (2001, p. 102))[11]. Related objectives were 3) to create the possibility of alternation in government[12] and 4) to increase the direct accountability of individual members of Parliament to their electors. Objective 3) was certainly reached as the parliamentary majority shifted from the center right to the center left and back in the three national elections held with the new system (1994, 1996, 2001). There is also some evidence that objective 4) was also reached, at least in competitive districts (Galasso and Nannicini (2011)). What about objectives (1) and (2)?

3 Data set and Empirical Analysis

To answer the question, we collect data for all Italian political elections in the time span going from 1948:04:18 to 2001:05:13. Over this period, there were eleven general elections under proportional representation, and three general elections under the mixed electoral system described above. During the period, 55 governments were in office: 47 before the 1993 electoral rule reform.

To test the impact of the 1993 electoral reform, we estimate five regressions of the following form

$$y_t = c + \beta D_t + \epsilon_t \tag{3.1}$$

[8]Law n.276 and Law n.277, both approved in August 1993.

[9]See Ferrara (2006) for a detailed analysis of the consequences of this difference for strategic entry by candidates.

[10]See again Katz (2001) for details. Basically, the votes used to elect the candidates in the single district by plurality rule were subtracted by the total votes received at the national level by the lists supporting the winning candidates and the remaining votes were used to allocate the remaining seats of both the Chamber and the Senate.

[11]As Mario Segni, the proponent of the 1993 referendum put it "governability cannot be assured unless there is also a simplification and homogenization of the political stage"

[12]It should be recalled that in the aftermath of the second world war Italy had basically the same government majority for all the years preceding the reform, due to the dominant role played by the Christian Democratic Party and the exclusion to power of the Italian Comunist Party, the largest comunist party in the western world.

where $t = 1, ...N$, where N is the sample size, and D_t is a $0, 1$ dummy variable which is equal to 1 after the 1993 electoral reform and zero otherwise. y_t represent the way we capture the expectations (1) and (2) above[13]. Specifically, we use a) the number of days the parliament is in office and b) the number days the government is in office as alternative measures for the stability of government or government coalitions, prediction (1) above. We use c) the number of parties in the Parliament, d) the number of seats of the majority party, and e) the number of parties in the coalition government as alternative measures of the fragmentation of the political system. The error term $\epsilon_t \sim i.i.d.(0, \sigma_t^2)$ with possibly $\sigma_t^2 \neq \sigma_s^2$ for $t \neq s$.

To obtain consistent empirical evidence there are two issues to consider: the small sample size, and the short period during which the dummy variable is equal to one.

One way to attack the first issue is to use bootstrap methods. These were originally proposed by Efron (1979) and have become the standard approach to obtain robust inference when the sample size is small. Davidson and Mackinnon (2004) (p. 171) show very good performance of the bootstrap using a sample size of 10 observations (see also Davidson and Flachaire (2008) for further experimental evidence). For these reasons, the standard errors (and the p-values) for the OLS point estimates are obtained by employing the bootstrap. To be more specific, when the time series is homoscedastic the appropriate bootstrap is the regular bootstrap, while if the time series displays heteroscedasticity, the appropriate bootstrap method is the so-called wild bootstrap (see for details Davidson et al. (2007) and Davidson and Flachaire (2008)). In brief, we pre-test for homoscedasticity, and if we reject the null hypothesis, we compute the standard errors and the p-values by the wild bootstrap.

To attack the second issue we perform some Monte Carlo experiments (reported in the Appendix). In the experiments, we compute the power function for the same t-test used in the empirical analysis. We re-create exactly the same conditions used in the empirical analysis: the same sample size and the same dummy variable. As shown and explained in the Appendix, the results confirm that indeed our inference is consistent[14] .

For completeness, we report the Ljung-Box autocorrelation test, and the adjusted $\bar{R}^2$.

The estimation results are shown in table 1 [15]. As shown, the β is highly statistical significant in only two out of five regressions. In particular, the number of seats of the majority party decreased by 94 seats and the number of parties in the coalition government increased by 2 after the reform. This means that, contrary to its main objectives, the reform did not affect either the stability of governments (legislatures) or the fragmentation of the political system. It had, however, the effect of making the ruling coalitions more unstable, increasing the number of parties inside it and reducing the role and the importance of the major party. This was again against expectations.

4 Conclusion and discussion

Our results may be interpreted in different ways. Possibly, the Italian reform was ill designed to reach its objectives, and possibly, Italian politicians and parties were smart enough to find ways

[13]For simplicity, we only concentrate here on the Chamber. However, we repeated the exercise for the Senate too, obtaining basically the same results (available by the authors on request).

[14]The Ox (Doornik (2001)) code to compute the power functions reported in the appendix is available on the Monticini's webpage

[15]As a further check, the null hypothesis of equal means is rejected for all the dependent variables by the non-parametric Wilcoxon rank sum test at the 1% level

to circumvent the constraints introduced by the reform [16]. But it is still surprising that none of the expected and plausible effects of the reform did actually take place and what happened, if happened, went in the opposite direction to expectations. It is also true that the reform has been in place only briefly. One could argue that the time period was indeed too short to affect the behaviour of voters, who did not have the time to learn and understand the new rules. But this argument is not entirely convincing. First, in a longer time span many other things also change, making in fact more difficult to identify the effect of a reform. Second, the point is that even in our limited time span, we could not find any tendency for our variables to move in the direction expected by the reform. Contrary to the main flavour of the literature surveyed above, the Italian experience then suggests caution in predicting the effects of a reform of the electoral rule, even on the political variables that are directly influenced by the electoral system.

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[16] For instance, a possible explanation for the survival of small parties in spite of the first-past-the-post rule for 3/4 of seats is based on voters's loyalty to small and ideological parties (e.g D'Alimonte (2001)). Small parties could not possibly win in single candidate districts. But by presenting their own candidates, they could cause the defeat of the ideologically close larger parties. This threat forced the larger parties to find an agreement with the smaller ones, supporting their candidates in some districts and hence guaranteeing their survival. For an analysis that develops this intuition to compare single versus dual ballot elections at the municipal level in Italy, see Bordignon et al. (2010).

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Dep. Var.	c	β	LM Het.	Ljung-Box	Norm. Res.	R^2_{adj}	N
N. of parties $p-value$	9.63^{***} (0)	2.03 (0.52)	3.30^{*} (0.06)	0.684 (0.62)	1.11 0.57	0.115	14
N. of seats maj. party $p-value$	256.54^{***} (0)	-94.21^{***} (0)	0.20 (0.65)	5.11 (0.4)	0.66 (0.71)	0.658	14
Days Parliam. in office $p-value$	1503.45^{***} (0)	-128.78 (0.85)	0.77 (0.7)	3.22 (0.78)	5.54^{*} (0.06)	-0.06	14
Days Gov. in office $p-value$	322.42^{***} (0)	216.82 (0.46)	3.95^{**} (0.04)	1.84 (0.11)	13.04^{***} (0)	0.06	55
N. parties coal. gov. $p-value$	2.82^{***} (0)	2.04^{***} (0)	4.1^{**} (0.04)	1.45 (0.19)	7.72^{**} (0.02)	0.198	55

Table 1: (*), (**), and (***) denote 10%, 5%, 1% significance level respectively, based on HC standard errors (shown in parenthesis). N is the sample size.

Appendix

In order to investigate the properties of the t test employed in our analysis we perform some Monte Carlo experiments. In the experiments, we create exactly the same conditions as of the equation 3. The true Data Generation Process (DGP) is

$$y_t = c + \beta D_t + \epsilon_t \tag{4.1}$$

where $t = 1...14$, c is a constant D_t is a $0, 1$ dummy variable which is equal to 1 in the last three observations, and zero otherwise. The error term $\epsilon_t \sim N(0, \sigma^2)$. In the experiments, we set $\beta = 0$ and $\sigma^2 = 1$. For this model, we compute the power functions (see Davidson and Mackinnon (2004, p. 170)) in figure 1 for the t statistics based on both the bootstrap and the t distribution at the .05 level. The results are based on 100,000 Monte Carlo replications and 9,999 bootstrap sample. Both tests are exact, as can be seen from the fact that, in both cases, power equals .05 when $\beta = 0$. For all $\beta \neq 0$, there is a clear ordering of the two curves. The highest curve is for the t test based on the bootstrap. The bootstrap has higher power than the test based on the t-distribution. Moreover, the two curves are smooth and pretty close confirming the consistency of our inference.

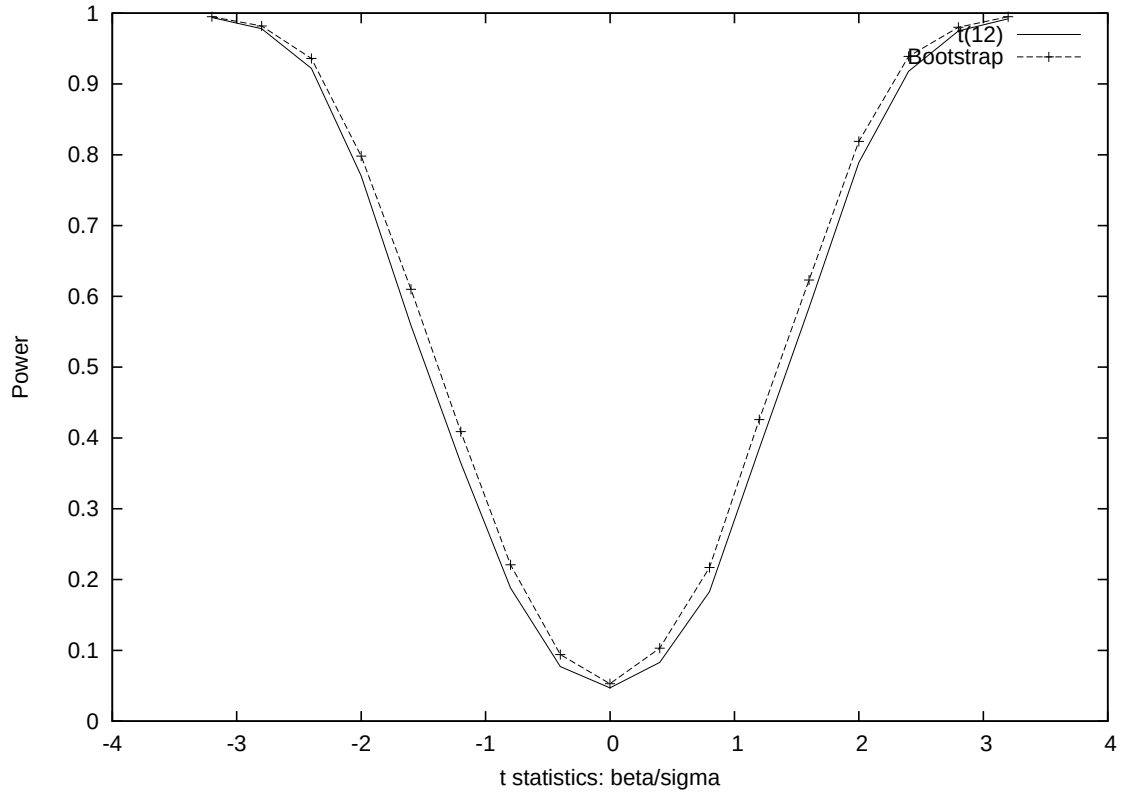

Figure 1: Power functions for t test at the .05 level based on 100,000 Monte Carlo replications and 9,999 Bootstrap samples