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Abstract

The adoption of mandatory gender quotas in party lists has been a subject of discussion in many countries. Since any reform obviously requires the approval of a (sometimes qualified) majority of incumbent legislators' votes, keeping an eye on incumbents' interests and incentives in different systems seems a natural thing to do if we want to understand different prospects for reforms in different countries. Such differences in the cost-benefit analysis of incumbents may well depend on the electoral system. We argue that if male candidates have a higher probability of being elected when running against a female candidate than when running against a male of similar characteristics (*male advantage*), then single member district majority rule and closed list proportional representation are opposite extremes in terms of incentives for incumbents to pass parity laws. We validate the above argument using a formal model of constitutional design as well as an empirical analysis of the legislative elections in France, since France offers a natural experiment for both electoral systems. Given the male advantage, increasing the number of female new candidates made the incumbents' probability of reelection higher and thus male incumbent members of the Assembly have actually benefited from the parity law. We also show that parity may have Assembly composition effects and policy effects that vary with the electoral system.

1 Introduction

In June 2000, the French National Assembly, in spite of the opposition of the Senate, passed a law – the so called “parity law” – that requires parties to choose roughly equal numbers of men and women as candidates in their lists. Such a parity law is the only case of strong gender quotas for chambers using single member district elections.¹ However, the law also prescribes that parties failing to present an equal number of men and women on their lists will not be eliminated from the competition but will pay per-violation fines.

In the first legislative elections that followed, in 2002, the fraction of female candidates elected for the Assembly surprisingly stayed almost constant (12.3 % instead of 10.9 %), well below that in countries where quotas are voluntarily introduced by parties² or where legal quotas are lower.^{3, 4} What can motivate the members of a male dominated Parliament to make such a strong kind of gender representation reform? Why were deputies almost unanimously in favor of the reform while the senators were mostly opposed? Why was the law so unsuccessful at achieving its purported aim of gender equity at the Assembly level (whereas it was much more successful, for instance, at the municipal level)? This paper aims to provide a consistent set of answers to these questions, by means of a simple formal model of constitutional reform incentives as well as empirical analysis.

Our explanation relates to the special incentives created by the French Assembly electoral system, the Single Member District system, when deputies expect the voters to be biased on average in favor of male candidates. Assuming that male candidates perform better when running against female candidates, we prove that

¹The French Assembly is formed using single-member-district majority rule. The Senate is elected using plurality rule in small districts and closed-list proportional representation in large ones. The two chambers are called by the Constitution to vote together on constitutional reforms like the one discussed here. Since the Assembly is much larger than the Senate, explaining the almost unanimous support of the reform in the Assembly is sufficient to understand the approval of the reform. The parity law takes different forms in the different types of elections, and in the case of the Assembly it means that each party should have between 48% and 52% of candidates of each gender across districts. For closed list elections, the parity law requires the parties to alternate men and women in the lists.

²Norwegian parties were the first ones to introduce such quotas, which are now widespread in Northern Europe and elsewhere.

³Lower legal quotas have been introduced for example in Argentina, Costa Rica and Belgium.

⁴A summary of the legislations and effects of gender quotas across countries and electoral systems can be found in table 1 of Jones [11].

parity in an SMD electoral system favours the male incumbents by increasing their probability of running against a woman. Given the importance of the male advantage assumption for the main theoretical point of the paper, our complementary empirical analysis will be devoted to carefully establish the existence of a male advantage in the data from all the most recent French elections.⁵

By proving that the self interest of a majority can suffice to explain the introduction of laws that *prima facie* protect or foster minority interests,⁶ and by insisting on the role of the electoral system in creating such incentives, we introduce a new look at demand and supply side explanations of affirmative action policies. This paper also opens a new door in the analysis of the relationship between electoral systems and women representation. It has of course long been observed that electoral rules have a huge impact on the fraction of women elected (see Duverger [9]). There is a long literature on this topic, trying in particular to explain why the fraction of female legislators is larger and increases more rapidly under Proportional Representation than under SMD (see, e. g., Matland and Studlar [15], Rosenthal [19], Siaroff [20]). A common feature of that literature is that the electoral rules are viewed as exogenous variables. That is, the possibility that identical factors determine both the electoral rules and the representation of women (or the effectiveness of some affirmative action policies) is ignored. Our contribution precisely consists of showing that electoral rules (in our case, the parity law) and the resulting low number of women elected are both explained by the same factors.

Our main empirical result, i.e., the evidence that there existed a significant male bias among voters during the legislative elections after the introduction of parity, is fully documented in section 2. In section 3, we present the model with which we prove that a male bias among voters gives male incumbents the incentive, under an SMD electoral system, to pass a parity law. In section 4, we concentrate on the opposition to the law by Senators, linking it again to the electoral system. The Senate, indeed, uses a PR system (in sufficiently large districts) and parity requires placing women in alternating positions on the party list. While such a

⁵To be precise, the “male advantage” empirical finding shown in Section 2 is that, controlling for observables, when a new (or incumbent) male candidate runs against a woman, he does better than male and female new (or incumbent) candidates running against an opponent of the same sex. Similarly, females running against males do worse than females running against females.

⁶Our theoretical and empirical analysis relate to the incumbents’ interests vis a vis legal candidacy quotas. The analysis of the incentives of party members to pass voluntary quotas at the individual party level is beyond the scope of this paper.

system should eventually achieve gender equality (hence the opposition of male incumbent senators), we will show how the voters' very low willingness to punish parties circumventing the law was strategically exploited by male incumbent senators to maintain their seat. In section 5, we will offer some concluding comments.

In the remainder of the introduction, we would like (1) to present in greater detail our theory and its empirical foundations, (2) to argue why alternative explanations find less support in the data, and finally, (3) to discuss the possible reconciliation between this paper and the existing literature.

Let us first give more details about the theory. Our formal model suggests that passing parity with the provision of possible fees dominates all other options (namely the status quo and pure parity without violations allowed) if the re-election of incumbents matters more to party leaders than the election of new candidates. The argument goes as follows: Given the voters' bias in favor of men candidates, parties are in favor of a gender quota because it increases the incumbents' probability (conditional on running) of running against a woman and being re-elected. On the other hand, pure parity (with no violations allowed) decreases the probability for the male incumbents of a large party to run again. Therefore, fees are rationalizable as they constitute a direct way to make more incumbents run than the strict application of parity would allow. The *ex-ante* drawback of parity with fees is that if one party pays fees, this obviously decreases the other party's incumbents' chances of running against a woman. Therefore, it is not always true that parity with fees *ex-ante* dominates both strict parity and no-parity. We prove in Section 3 that there exist values of the fees and the preference by party leaders for incumbents over new candidates that guarantee that, in equilibrium, parties are willing to pay fees only in order to allow incumbents to run. Parity with fees, then, has the two attractive properties (for the incumbents) that (1) it increases the probability for incumbents to run against women, and (2) it does not prevent incumbents from large parties to run. Finally, the presence of male advantage and the access to (costly) violations of the quota also explain why the percentage of women elected did not increase very much in the two Assembly elections that occurred after the introduction of parity.

Coming to the relationship between our account of parity and alternative potential explanations, our first caveat is that we do not claim to have a complete story for the adoption of the law. For instance, we completely disregard the surely essential role of feminist movements.⁷ French feminists and other progressive movements

⁷Greater feminist activism has been shown to affect women representation (see, e.g., Caul [1]).

in the years before the parity law were certainly a factor forcing the members of Parliament to take the issue seriously, and such a pressure may well belong to the list of explanatory variables for the timing of the reform.⁸ However, a theory only based on lobbying and social movements does not explain why the French deputies supported almost unanimously a parity law at a time in which the French Senators almost unanimously objected against it and no other European Parliament was ready to approve even lower quotas, in the presence of similar pressures by similar movements.

The most common explanation of the French passing of the law followed by its low success (explanation defended by the official “Observatoire de la parité entre les femmes et les hommes” in their report to the Prime Minister following the elections, see Zimmerman [22]) is the following one: deputies passed a parity law because the French people wanted it, that is, parity was a symbolic gesture associated to a demand of parity from the electorate, but it was rather ineffective because of the power of incumbents to force the party to circumvent the law (by paying fees) and be able to run. There are three logical difficulties or shortcomings associated to this explanation. First, if deputies passed the law to meet the will of the people, why were the Senators so forcefully against it? We describe at length, in Section 4, how the Senators tried to amend the law and how the electoral system changed in the subsequent years to decrease its impact. We also explain why the impact of parity has been so limited in spite of the theoretically favourable electoral system. We view that as a clear proof that Senators tried to defend their seats, which the parity law threatened given the PR system. Consequently, the reason why the symbolic gesture only came from deputies must be related to the lower threat on their incumbency.

Second, the law was not voted by parties but by deputies themselves. The same politicians (from both main parties) who passed the law and proudly claimed to have brought French democracy to a new era, a few months later heavily lobbied

⁸Any attempt to explain the timing of the reform should take into account the pressure by the parity movements as well as the particular incentive structure for incumbents identified here for Assembly deputies. An example about how these two elements may have been complementary in the explanation of the reform is the following: the parity movement had an impact also through internal pressures within the socialist party, which was expecting to lose support; introducing parity was perhaps viewed by the socialist party leaders as a way to introduce a topic that *ceteris paribus* was expected to be in their favor and that would also temporarily raise incumbency advantage to maintain their seat; the others voted for it because as incumbents they were not going to be affected for awhile, and going against would have been unpopular and would have made the issue more salient.

the party leaders to obtain the right to run again. Were they unable in 2000 to anticipate that they would have huge incentives to circumvent the law in 2002? On the contrary, we view this as a proof that they correctly anticipated that their inconsistency would not be punished by voters. More precisely, it is quite likely, in our opinion, that most politicians anticipated that they would benefit, at least in the next elections, from a larger incumbent advantage due to the increased probability of competing against a woman.

Third, if parity was demanded by voters, why didn't they punish the parties that did not comply with the parity requirement, or more precisely, how can we explain the negative correlation between the fraction of female candidates and the success of the party?⁹

The literature on women's low representation in parliaments has concentrated on two main sets of explanations: those based on the electoral rules, and those based on the functioning of and/or the competition between parties. On the other hand, it has almost disregarded explanations based on voters' preferences. The common wisdom in the literature is that voters' antipathy towards female candidates is not supported by the data (at least in Western democracies; see, e.g., Darcy and Schramm [5], Rasmussen [18], Hunter and Denton [10], Kelley and McAllister [13]).^{10, 11} The French case makes us stand in contrast with this literature, given our empirical finding of male advantage and given the explanatory power of our constitutional design model based on such a finding. However, the contrast is less sharp than it may seem at first glance, since there is a simple story that could at the

⁹The main right wing party (UMP), winner of the 2002 election, presented only 19.93% of women and paid EUR 4M, representing 15.8% of its government funding, while the main left wing party (a coalition led by the Socialist Party), second main group at the Assembly, presented 36.13% of women and lost 9.1% of its funding (see Jourdain [12]). The third party, UDF, also presented less than 50 % of women and paid fees, whereas all other parties complied with the parity requirement. Note that in France campaign financing is very restricted, so that these reductions in party funds have non trivial consequences.

¹⁰In closed party list systems it is obviously impossible to directly test the existence of a male bias among voters, since voters vote for parties, not candidates. Hence the only systems in which voters' bias can be empirically tested on field data against party bias are plurality systems or open list systems. Survey data can be collected of course for both systems, but the reliability remains intuitively higher for systems in which voters cast their ballot for individual candidates.

¹¹By antipathy, hostility or preference towards male or female candidates, we clearly mean those revealed by actual votes. We do not explore the reasons why voters would claim in interviews to be willing to vote for this or that candidate. Evidences like the ones given by Converse and Pierce [4], for instance, is hardly related to our undertaking.

same time make sense of our theory and serve as reconciliation with the findings for other countries in other studies: the parity law itself, by forcing parties to rapidly increase the number of female candidates, may have brought about an asymmetry in the perceived quality of male and female candidates. Our data analysis shows that female new candidates at the 2002 elections were easier to defeat than male new candidates. Given that France is the only country with such a parity law, this evidence is the only one we need to support our model, and for the very same reason, it does not contradict any of the previous studies necessarily. Moreover, we also estimated the same bias with data from the 2007 elections (see table 3 below), and the male bias looks smaller, in line with the above hypothesis that parity may create just a short run advantage to male incumbents.

We need to add, however, that two other findings (documented below) question the common wisdom about absence of voters' gender bias beyond the effect of parity itself just mentioned. First, we estimated the possible male bias using the data from the elections before the parity law was passed (see table 3), and, even if missing data prevent us from giving the same credit to those estimations, we find a significant male bias of similar magnitude. Second, we estimated the possible male bias using 2002 data about all male and female incumbents. We surprisingly find a significant, though smaller, male bias. Clearly, this cannot be due to the injection in the system of new and inexperienced female candidates. More work needs to be done in order to conclude whether the male bias is induced by parity or associated to a persistent feature of the French electorate.¹² This puzzle is important per se and will be decisive for the long run impact of parity on women representation.¹³

One may argue that the male bias we find does not reflect voters' but parties' hostility against women. We call this hypothesis "party bias", and it is obviously related to the "male conspiracy theory" proposed in Duverger [9]. By systematically

¹²We remark that by voters' persistent bias we do not refer necessarily to discriminating preferences, but to whatever reasons may make voters have a net preference for men when all the other observable variables are kept constant. For instance, a voters' bias can arise from a wide-spread belief that men bring more pork to the district, whereas women are more concerned about global public goods, and the electorate of a district may prefer a focus on the former type of policies.

¹³The indications that the male bias may be persistent in the population, should not be considered once again in contradiction to the literature: Our estimations focus on the Assembly elections, where competition is head-to-head. That the willingness to vote for female candidates is lower in this type of elections compared to elections where women are part of a larger ticket is, after all, the implicit assumption of the literature on the relationship between electoral systems and women representation and on the superiority of PR over SMD.

sending female new candidates to less favourable districts than male candidates, indeed, parties can create the type of bias we have found. After Lovenduski and Norris [14], the literature on the low representation of women in Parliaments has highlighted the responsibilities of parties, and in particular of their organizational and ideological barriers (see e.g. Caul [1, 2]). A first challenge to that view comes from the fact that all French parties supported the law (as far as the Assembly is concerned, and Senators from all parties criticised it). Most important, the main challenge comes from the data. Estimating the party bias is a difficult task, as it should be carefully distinguished from the strategic use of the (male) incumbents' advantage.¹⁴ The tests we present in Section 2 show that new male candidates have not been placed in 2002 in districts more favorable to their party than new female candidates. Also, the latter have not received a lower financial support from the parties than the former.

2 Male Advantage and Voters' Bias

This empirical section is divided in two parts. Section 2.1 shows that in the last three elections for the French National Assembly there has been a significant *male advantage* among candidates of otherwise similar characteristics. Let us recall that for the main point of the paper to hold, and for the theoretical model to be meaningful, proving the existence of such a male advantage is all that matters.

However, in Section 2.2, we will provide some interesting side results about the potential *sources* of the observed male advantage.

Our data is mainly based on information collected from the website of the French National Assembly.¹⁵ The website provides, among other things, biographical information on candidates in 2002 elections, their party affiliation and incumbency status, and the district-by-district first- and second-round results in both the 1997 and 2002 elections, together with abstention rate of each district. We have then collected the same data from the 2007 Assembly elections, in order to verify whether

¹⁴Note that some authors (for instance Murray ([17])) consider as a form of party bias the fact that party leaders are not willing to de-select incumbents to replace them with female candidates. That is not the form of bias we are investigating as we condition our analysis on the incumbency status of the candidates and we assume that parties, which are a collection of incumbents, favor the re-election of incumbents (of any gender). Thus, if a party does not display any bias in favor of new men against new women in the allocation of the districts where the party does not have an incumbent, then such a party is not biased in our sense, even if it does not de-select any incumbent.

¹⁵<http://www.assemblee-nationale.fr/elections>

	M vs M	F vs F	M vs F	F vs M	Total
New vs New	16	12	16	16	60
New vs 97 Loser	30	4	2	2	38
New vs Mover	14	0	4	4	22
New vs Incumbent	186	22	73	73	354
97 Loser vs Mover	8	2	1	1	12
97 Loser vs Incumbent	67	2	14	20	103
Mover vs Mover	2	0	0	0	2
Mover vs Incumbent	2	0	1	1	4
Total	325	42	111	117	595

Table 1: Types of run-offs

the findings from the 2002 data are robust or if there are significant changes.¹⁶ We have also obtained age data from <http://www.fluctuat.net/>. Finally, some of the data was given to us by the Centre de Données Socio-Politiques.

In order to avoid difficulties associated with variable number of parties and the resulting strategic voting behavior, we focus on those districts where election went to the second-round and where the two second-round candidates were from the two main party coalitions of the 2002 elections, PS and UMP.¹⁷ Table 1 gives some descriptive statistics for 2002 in terms of the frequency of the various “types” of run-offs.¹⁸

2.1 Male advantage

The goal here is to establish the presence of male advantage in the 2002 elections. We will then see that some degree of male advantage remains also in 2007, but to a lower extent.

For observation/candidate j , we assume a linear model of the form $y_j = \beta X_j + \varepsilon_j$. Different specifications are estimated, but in the basic one y_j is candidate j 's percentage of votes (henceforth score) in the second round of the 2002 (resp. 2007)

¹⁶We have complemented this with party contributions data for each candidate's campaign from *Publication Simplifiée des Comptes de Campagnes*.

¹⁷Only 10 percent of the districts assigned a seat in the first round.

¹⁸The letters M and F refer to the gender of the candidates; the term 97 loser clearly indicates a candidate who had been a candidate before but was not an incumbent; the term mover refers to a candidate who was elected in 1997 but in another district.

elections. Besides a variable measuring the male advantage, which we describe next, the vector X_j of controls includes the score in the second-round of the 1997 (resp. 2002) election obtained by the candidate of the same district and same party as candidate j .¹⁹ This party-district-specific variable accounts for the aggregate preference toward a specific party within each district. It also serves the purpose of controlling for the fact that women might be sent to “worst” districts than men. A second control is age difference between opponents in the same district, since a candidate’s age is plausibly correlated with his(her) perceived quality or experience (we deal with other indirect tests of the role of experience below). We also control for the difference of the square of their age.²⁰ Finally, we control for party affiliations, since they could be correlated to the gender bias. This is done by including an indicator variable that takes value 1 if the candidate is from UMP and 0 if he or she is from PS. A constant term is also included, which represents the average score of a candidate in 2002 (resp. 2007) when all other regressors were zero.²¹ Error terms (ε_j) follow standard assumptions imposed by the ordinary least squares estimation method.²²

The key regressor is the male advantage. It can be measured by a variable that takes value 1 if a male has a female opponent, 0 if the two candidates are of the same gender, and -1 if a female has a male opponent. We will also show, although it is not crucial to our argument, that the implicit symmetry assumption – namely that woman vs woman is just like man vs man and that the advantage of a man incumbent (respectively, new man candidate) over a woman is equivalent to

¹⁹Thus we also eliminate some observations that have no such correspondence in 1997, e.g. when no PS, RPR or UDF candidates ran in that district in 1997 or if they were eliminated in the first round. (Since the UMP did not exist in 1997 we use the score from the RPR or UDF.)

²⁰Both are divided by 100 to make results easier to present.

²¹We also considered controlling for the difference in campaign expenditures between the candidates in the same district. Out of the eight specifications reported in Tables 2 and 4, adding this regressor had no qualitative impact on the male advantage estimates, probably because most candidates received amounts close to their legal upper bound. Given this, and given that we do not have this data for 2007, this regressor has not been included.

²²The fact that the dependent variable lies between 0 and 1 could be problematic in an OLS regression if we had regressors with values in a large range. Here it is not a problem because the right hand side is composed mostly of regressors between 0 and 1. Nonetheless, we have also estimated the standard transformed equation $\ln\left(\frac{y_j}{1-y_j}\right) = \beta X_j + \varepsilon_j$. The conclusions are unchanged (in particular the sign and statistical significance of our measure of male advantage), thus we prefer to report the more familiar and easier to interpret case where the dependent variable is not transformed.

Candidates:	New		Incumbent	
	(1)	(2)	(3)	(4)
Own Party Score in 1997	0.550*** (0.052)	0.618*** (0.049)	0.508*** (0.044)	0.516*** (0.044)
Male Advantage	0.009* (0.005)	0.017*** (0.005)	0.013*** (0.004)	0.013*** (0.004)
Age Difference /100	0.360* (0.187)	0.350* (0.191)	0.105 (0.169)	0.144 (0.167)
Difference of Square of Age /100	-0.004** (0.002)	-0.004** (0.002)	-0.001 (0.002)	-0.002 (0.002)
Party Right of Center	0.084*** (0.007)	0.079*** (0.007)	0.082*** (0.006)	0.081*** (0.006)
Opponent is a New Candidate	0.033*** (0.010)			
Opponent is a 1997 Loser	0.036*** (0.012)		-0.007 (0.005)	
Opponent was Moved	-0.008 (0.014)		-0.026 (0.029)	
Constant	0.166*** (0.025)	0.147*** (0.024)	0.233*** (0.025)	0.226*** (0.024)
Observations	237	237	282	282

Standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 2: 2002 scores: significant male advantage

the disadvantage of a woman incumbent (respectively, new woman candidate) with respect to a man – is actually supported by the data.

Table 2 reports estimation results for 2002. Specifications (1) and (2) only use new candidates while specifications (3) and (4) use incumbents.²³ Specifications

²³In specifications (1) and (2), since we limit attention to new candidates, and since in each second round of each district election the race is 91% of the time between a new candidate and someone who is not a new candidate, only about 4% of the new candidates need to be dropped in order to avoid having two candidates from the same district (which would determine correlation between the error terms). However, the results are basically identical with or without such a restriction of the sample. When more than one new candidate ran in the same district, the selection rule was to select male candidates if they ran against a woman, otherwise to select the candidate whose first

(1) and (3) control for the type of the opponent (either a new candidate, a 1997 loser, or a 1997 winner that was moved to a different district): for (1) the excluded category is an incumbent opponent and for (3) it is a new candidate opponent. These dummies are jointly statistically significant (p-value < 0.1) in specification (1) but not in specification (3) (p-value > 0.1) and thus we also report (2) and (4) where those dummies are excluded. Own party score in 1997 and the party position are statistically significant in every specification. Not surprisingly, the effect of own party score in 1997 is positive.²⁴ Age difference has a positive impact on score for both new candidates and incumbents, but is statistically significant only for new candidates.

The *main finding* is a statistically significant male advantage, which is observed for both new candidates and incumbents irrespective of the specification.²⁵ Table 5 in appendix 2 shows how this effect differs when a woman faces a woman, a woman faces a man, and a man faces a woman, from the baseline where a man faces a man. We show that the hypothesis that woman vs. woman is not different from man vs. man and that the advantage of a man vs a woman equals the disadvantage of a woman against a man cannot be rejected (this is termed the symmetry hypothesis in the table). In the same table, one can notice from columns 3b and 4b that female incumbents suffered a statistically significant disadvantage.

One question to ask is to what extent the male advantage is a stable phenomenon or to what extent it was simply a transient one, perhaps determined by the sudden influx of less experienced female candidates due to the introduction of parity. Table 3 presents results for the 1997 and 2007 data. For 1997 we cannot separate new candidates and incumbents and many regressors are missing. Table 6 presents regressions that helps us to assess the bias in the estimate of male advantage in the 1997 data due to the confounding of incumbency and male advantage as well as the impact of the other missing regressors. Specifications 10 and 11 divide the data by party, and include a dummy regressor for incumbency. This allows us to see that the

name start with the earliest letter in the alphabet.

²⁴One effect of the male bias could be to affect party allegiance as a function of the gender of the candidates, which would suggest interacting own party score in 1997 with gender. We cannot reject the null hypothesis that the effect of score in 1997 is the same for males and females in specification 1 through 4.

²⁵Interacting “Male Advantage” with “Party Right of Center” indicates that there are either no differences in terms of the impact of the male advantage on score across parties (specifications 2 and 3) or that it is more severe for the PS (statistically significant at the 10% level for specifications 1 and 4).

male advantage is about two thirds of the incumbency advantage. Specification 5b mimics the 1997 specification using the 2002 data. This gives an estimate of male advantage about 25% higher than the estimate in 1997 and thus suggest that the male advantage prior to the 2002 election might have been slightly weaker. Clearly, the data from 1997 and 2007 do not allow us to reject the hypothesis of a *stable* presence of male advantage.

Coming back to the 2002 data, one interesting question is to what extent the male advantage mattered, looking for the impact of gender on the probability of winning. Table 4 presents logit estimates of the determinants of a win (win equals one and lose equals zero) using the same regressors as for the specifications presented in Table 2. In both specifications (6) and (8) the joint hypothesis that the effect of the type of opponent (new, 1997 loser, or was moved district) is equal to zero cannot be rejected (p-value > 0.1). For both new candidates and incumbents, all other regressors have the expected sign and are statistically significant. For a male, having an opponent of opposite gender increases the probability of winning – and for a woman it decreases it. The popularity of a candidate’s party in 1997 has a significant positive effect. The older the candidate with respect to (her)his opponent, the more likely (s)he is to win, but this effect is decreasing as the age difference increases. Finally, everything else being equal, the UMP candidates were more likely to win in 2002.

To summarize, men have a statistically higher score when they face a female candidate. A man facing a woman gets between 1 and 2 percentage points boost in his score compared to a case where he faces a man. Although this advantage may seem small in magnitude, it had an important impact for the candidates’ probability of winning in 2002. Using specification (7) we compute the probability of winning for a new male candidate who runs against a female to be 22 percentage points higher than against a male (this is computed setting all other regressors at their sample mean values).²⁶ Similar computations using specification (9) reveal that the equivalent gain for incumbent males is 10 percentage points.

²⁶To see how the roughly 1 to 2 percentage point difference can be consistent with the 22 percent probability difference, note that more than 10 percent of the run-offs have a victory margin of less than 2 percentage points, and roughly 25 percent of run-offs yield more than 47.5 percent of votes to the loser.

Candidates:	1997	2007			
		New		Incumbent	
	(5)	(1c)	(2c)	(3c)	(4c)
Own Party Score in 2002		0.666*** (0.065)	0.786*** (0.059)	0.730*** (0.069)	0.732*** (0.068)
Male Advantage	0.029*** (0.008)	0.008** (0.004)	0.011*** (0.004)	0.007* (0.004)	0.007* (0.004)
Age Difference /100		-0.062** (0.025)	-0.044* (0.025)	0.206 (0.149)	0.208 (0.148)
Difference of Square of Age /100		0.000** 0.000	0.000* 0.000	-0.002* (0.001)	-0.003* (0.001)
Party Right of Center	-0.032*** (0.008)	-0.050*** (0.006)	-0.048*** (0.006)	-0.048*** (0.005)	-0.047*** (0.005)
Opponent is a New Candidate		0.024*** (0.009)			
Opponent is a 2002 Loser		0.043*** (0.012)		-0.001 (0.005)	
Opponent was Moved		0.003 (0.023)		-0.007 (0.035)	
Constant	0.515*** (0.006)	0.171*** (0.030)	0.123*** (0.028)	0.177*** (0.038)	0.175*** (0.037)
Observations	346	204	204	229	229

Standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 3: Male advantage before and after 2002

Candidate:	New		Incumbent	
	(6)	(7)	(8)	(9)
Own Party Score in 1997	14.949*** (3.484)	16.653*** (3.215)	24.430*** (4.117)	24.497*** (4.067)
Male Advantage	0.729** (0.320)	0.962*** (0.299)	0.761** (0.326)	0.856*** (0.318)
Age Difference /100	17.314 (12.985)	14.504 (12.818)	26.715* (15.074)	30.371** (14.942)
Difference of Square of Age /100	-0.190 (0.127)	-0.156 (0.125)	-0.282* (0.145)	-0.314** (0.144)
Party Right of Center	3.617*** (0.673)	3.076*** (0.550)	5.336*** (0.899)	5.206*** (0.891)
Opponent is a New Candidate	1.116* (0.666)			
Opponent is a 1997 Loser	1.528* (0.836)		-0.623* (0.374)	
Opponent was Moved	-0.722 (0.879)		-0.240 (1.489)	
Constant	-10.380*** (1.879)	-10.451*** (1.731)	-13.080*** (2.240)	-13.351*** (2.216)
Observations	237	237	282	282

Standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 4: Male Advantage on probability of winning (Logit)

2.2 Causes of male advantage: experience, voters' bias, party bias

In this section we highlight what our data analysis can yield in terms of the likelihood of the various sources of male advantage that one could intuitively refer to.

As already pointed out in the Introduction, the male advantage we have identified among incumbents tends to prove that differential experience cannot be the only source of the male bias. Moreover, we estimated specifications 1 and 2 on a subsample of young candidates (more specifically, using the subsample of candidates who are younger than the youngest incumbent in our sample). The estimates of the male advantage are still statistically significant (and the coefficient estimate is actually larger at about 0.028 and 0.023 in each specification), in spite of the fact that in that subsample the office holding experience must be minimal for any gender (although of course there could still be some unobservable systematic differences at local or regional levels).

Next, we reject the hypothesis that the male bias in 2002 comes from a *party bias*. This hypothesis consists of asserting that the difference in the score of female candidates can be due to females being sent by biased party leaders to less favourable districts. Note first that our regressions control for the score of the party in the candidate's district in the previous election, and hence, unless there are important changes in between elections in terms of which districts are difficult to win, the regressions themselves are already basically separating the male advantage from the party and district specific characteristics. A party bias would take the form of a correlation between gender and the expected score of candidates. In Figure 1, we divide the range of 1997 scores into intervals of 2.5% and present the ratio of new men candidates in districts falling in each interval. It turns out that women are sent to districts where the average 1997 score is equal to 44.7% while men average is 45.5%. Both a t-test (p-value = 0.31) and a Wilcoxon/Mann-Whitney test (p-value = 0.17) cannot reject that the two are equal.²⁷ In other words, no party has shown a biased preference for men over women in "good" districts where it did not have an incumbent.

²⁷In a previous version of the paper, available at http://homepages.nyu.edu/~gf35/print/fmm_2006.pdf, we consider other ways to determine the presence of party bias. We also explore the possibility of party strategic behavior given the existence of a male advantage (which would suggest a tendency for parties to place men in close races and women in uncontested races, but without assigning disproportionately the good districts to men). We concluded from that analysis that there is little to no evidence of party bias or of strategic behavior, and in relative terms strategic behavior is slightly more likely.

In contrast with the 2002 elections, in 2007 we find some evidence of party bias: The 2002 score of the districts where women were sent as candidates in 2007 averaged 45.8%, and for men it is 47.9%. These are statistically different using both the t-test (p-value = 0.005) and the Wilcoxon/Mann-Whitney test (p-value = 0.017).

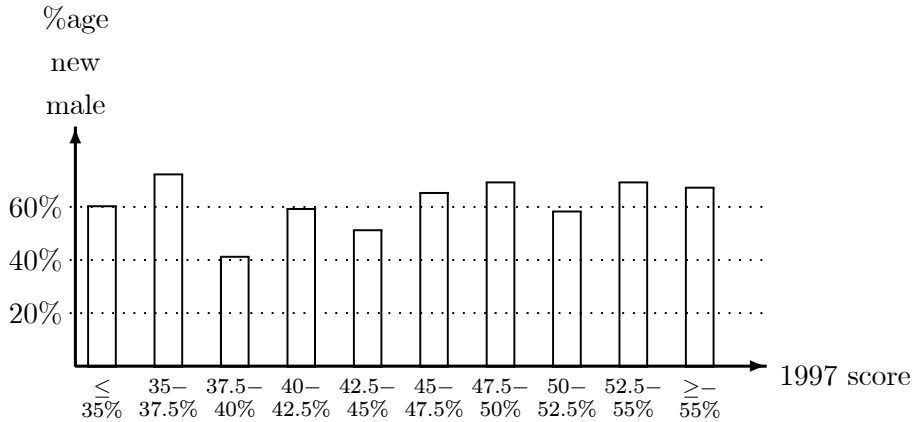


Figure 1: Percentage of new male 2002 candidates as a function of 1997 score of own party

Another way parties could treat woman differently is by giving them less funding for the campaign. There doesn't seem to be any evidence of this in 2002. In fact, one party gave on average more to its female candidates. There is, however, a big difference across parties. The UMP gave 10000 Euros to many of its candidate (the median of what it gave is 10000 Euros) while the PS gave nothing to a majority of them (its median is 0). The UMP gave on average 9443 Euros to its female and 9423 Euros to its male candidates. The PS gave 1496 Euros and 1730 Euros to its female and male candidates respectively. Using a t-test, for neither party are these numbers statistically different, while using the Wilcoxon/M-W test it is at the 10% level for the UMP (in which case women were treated more favorably than man).

Given the conclusion that the experience factor and party bias were not relevant nor present in 2002, it leaves *voters' bias* as the most likely explanation for the male advantage.

3 A Model of Constitutional Design Incentives for Assembly Incumbents

The Assembly deputies are elected with a two-ballot majority rule. In order to avoid having to deal with strategic voting, in our model we assume that there are only two parties, so that the system is equivalent to one-ballot plurality.

Downs [7] defines a political party as “a coalition of men seeking to control the governing apparatus by legal means,” where by coalition he means “a group of individuals who have certain ends in common and cooperate with each other to achieve them.” A simple way to operationalize this definition in a theoretical framework is to view a party as a “coalition of incumbents seeking re-election.” Given the importance of incumbent politicians in any party hierarchy, it is clear that any party leader will have at least two objectives in mind when choosing the composition of the party candidate list: the maximization of the number of seats the party will obtain and the maximization of the chances of re-election of the party’s incumbent politicians.²⁸ For simplicity we will also assume that all incumbents are men.

The crucial simplifying assumption of the theoretical model is that if a man candidate runs against a woman he is elected no matter what the voters of that district think of the candidates’ policy platforms. This very strong form of male bias is assumed in order to make computations manageable, but the qualitative results do not change if a weaker form of male bias is considered.

Before turning to the more general model, it is important to illustrate the basic intuition. Suppose that we just needed to explain why men incumbents can prefer a “pure” parity law to the status quo without parity. We could give the explanation by means of a simple example: suppose that the country is divided into two districts, so that the Assembly is composed of two incumbents, i.e., the previously elected deputies of those two districts; suppose also that the two incumbents are of the two major parties and that they must run in the district where they were elected (either because it would be illegal or because voters would punish such a switch). If no parity law is passed, the chances of re-election of an incumbent depend on the

²⁸The assumption that parties care about the number of seats obtained by their policy platform as well as about the probability of re-electing incumbents will be kept in order to make the model solvable. After proving our formal proposition using this simplified party objective, we will discuss the implications of extending the model to more complex but perhaps more realistic assumptions about the internal hierarchy of parties.

realization of voters' policy preferences in his district, whereas if a pure parity law is passed, each incumbent is sure to run against a woman (as the men quota will be used by the other incumbent running in his own district), and hence there is an additional advantage, inducing a higher probability of re-election (probability 1 in the case of the extreme gender bias mentioned above). However, explaining why they passed a law that allows parties to pay fees to violate parity is not possible by means of a simple example, and requires a more explicit analysis of all the politicians' incentives.

Let the two parties be denoted by L and S . There is a set $[0, 1]$ of districts. The current Assembly is composed by the candidates who were elected in the previous elections and are still in office. Districts in $[0, \lambda)$ have an incumbent of party L , whereas districts in $[\lambda, 1]$ have an incumbent of party S . We assume without loss of generality that $\lambda \geq 0.5$ (party L is the large party).

At time 0, the deputies vote for a value of $c \in [0, \infty]$, the fee a party needs to pay to circumvent parity in a district. If $c = 0$, there is no limit to the number of men running in the country for the same party, that is, there is no parity requirement (the status quo). If $c = \infty$, it is illegal to have more than fifty percent of men running, the pure parity case. If $0 < c < \infty$, the law allows parties to send men to any extra measure of districts beyond fifty percent provided the party pays fees equal to c times that extra measure. We need to prove that the vote outcome can be a positive and finite c , such that fees are paid in equilibrium under some realization of policy preferences.

At time 1, lists are composed. That is, each party decides whom to run in each district. Incumbents are assumed to re-run in their district if their party decides to run a man in that district. Also, we assume that incumbents cannot shift from their home district to another one. Consequently, if a man runs in a district where the party did not win the previous election, then this man is a new candidate.²⁹

At time 2, voting takes place. In each district, voters vote for the candidate they prefer. There are only two candidates in each district, hence no strategic voting takes place.

Voters differ in their platform preferences, which can change over time, but they

²⁹The implicit assumption is that incumbency is local, and does not constitute an advantage if one switches district. The little evidence of incumbents running in different districts from the one where they had been elected confirms that this assumption is realistic, but the qualitative results of our model hold even when we allow incumbents to do this kind of shift, but with useless additional computation complexity.

also have very strong gender preferences: Being in favor of the platform of one party translates in a vote for that party unless that party's candidate is a woman running against a man. In the time elapsing between time 0 and time 2, voters' platform preferences may change. At time 2, districts $[0, z)$ prefer the platform of party L , and $[z, 1]$ are in favor of the platform of S . The implicit assumption here is that in any possible new realization of voters' platform preferences it cannot happen that district i has a majority of S platform supporters and a district $i' > i$ has a majority of L supporters. This order assumption allows us to simplify the treatment of uncertainty at time 0, since in this way the uncertainty is just about the parameter z . The uncertainty about z is greater at time 0 than at time 1. For simplicity, we assume that it is known at time 1, whereas only the probability distribution is known at time 0.³⁰

The utility of an incumbent of party p , $p \in \{L, S\}$, depends on the fraction of seats obtained by his party in the time 2 election, denoted by N_p ; on whether or not he is re-elected; and on the budget of the party, which is affected by the total cost paid by the party to circumvent parity, denoted by C_p . Formally, for all $i \in [0, \lambda)$

$$U_i = U(N_L) + aI_i - \frac{C_L}{\lambda} \quad (1)$$

where a is the utility of being re-elected, I_i is the indicator taking value 1 if i is re-elected and 0 otherwise, and $U(N)$ denotes the utility that i derives from the fact that his party obtains a fraction N of the seats. Even though the result could be proved with any $U(N)$ weakly convex for all $N \in [0, 0.5)$ and weakly concave for all $N \in (0.5, 1]$, the following functional form is the simplest to consider (letting b be a real number in $[0, 1)$):

$$U(N) = \begin{cases} bN & \text{if } N < 0.5 \\ 0.5 & \text{if } N = 0.5 \\ 1 + bN & \text{if } N > 0.5. \end{cases}$$

For all $i \in [\lambda, 1]$

$$U_i = U(N_S) + aI_i - \frac{C_S}{1 - \lambda}. \quad (2)$$

Consistent with the Downsian view of a party discussed at the beginning of this section, we define a party as the aggregation of its incumbents. Consequently, we

³⁰No result depends on the simplifying assumption that z is known at time 1. Everything would go through in a similar manner if at time 1 there were a less precise update.

assume that the utility of a party is the sum of the utilities of its incumbents:

$$U_L = \lambda U(N_L) + aI_L - C_L, \quad (3)$$

and

$$U_S = (1 - \lambda) U(N_S) + aI_S - C_S \quad (4)$$

where I_p stands for the number of re-elected incumbents of party p , $p \in \{L, S\}$.

Parity means that there needs to be fifty percent of candidates of each gender for each party. Any deviation from that gender distribution entails a marginal cost of c , so that

$$C_p = c|M_p - 0.5|, \quad p \in \{L, S\}$$

where M_p is the fraction of men candidates of party p selected at time 1.

Given all the assumptions above, we have our main theoretical finding:

Proposition 1: *If b is small and a is large (i.e., re-electing an incumbent is important for a party but the marginal utility of a new seat is small unless it allows the party to obtain the majority), then there exist well behaved probability distributions of voters' platform preferences such that, at the constitutional choice stage (at time 0), a "parity with fees" system is unanimously preferred to the no parity system, and is preferred by a majority to the pure parity system.*

The formal proof is in appendix 1. The intuition is similar to the one given for the two-district case as far as the reason for preferring pure parity to the status quo. The intuition for the additional result that parity with fees can dominate even pure parity is as follows: given that a party is a coalition of incumbents and hence re-electing incumbents has priority over electing new candidates, the larger party wants a parity law in order to protect its incumbents in the states of the world in which platform preferences happen to favor party S , but given that L 's incumbents are more than fifty percent, pure parity is dominated by a system where even the other $\lambda - 0.5$ incumbents can be protected (with some probability) by paying fees. A small b and a relatively large a are needed so that there exist values of c for which parties are ready to pay the fee only if it allows an incumbent to run: indeed, if no such value of c exists, parity with fees cannot be optimal as either the party would refuse to pay to allow one more incumbent to run, or, if the party pays, the opponent party also pays and the incumbent runs against a man, thereby losing his seat anyway. There are restrictions on the class of admissible distribution functions

because the uncertainty to be re-elected needs to be sufficiently large: if a large fraction of incumbents are sure to be re-elected, they may have no incentive to pass the law as it doesn't increase the probability that their party wins the election and it is likely to impose a cut in the budget of the party. However, as one can verify in the appendix, the conditions on a , b and on the skewness of the probability distribution to obtain consensus on parity with fees are very reasonable.

As a corollary of proposition 1, one could easily check from its formal proof that the expected number of women elected given parity law (with fees allowed) is zero. The result is thus very sharp: not only is the parity law as it passed in France perfectly consistent with the self interest of the male incumbents, as proved by proposition 1, but it is also completely ineffective in terms of the official goals. Of course, using a less extreme type of gender bias than that of this simple model, we could determine a positive (but small) number of expected women elected. In fact, the model could be easily extended relaxing the assumption that a male candidate *always wins* against a female candidate. We could assume instead that, when voters prefer the political platform of his opponent's party, a male candidate's probability of winning is some interior $g > 1/2$ if the opponent is a woman. Leaving probability 1 of victory in the easier case in which platform preferences are also in his favor, the only change would then be that the expected utility for the party at time 1 of having one additional incumbent running in a district where the voters' preferences have switched decreases. Consequently, the optimal parity with fees system would become one associated with a lower c . The equilibrium number of women elected would be strictly positive (but small) in this simple extension.

Another (more interesting) extension could be to assume that parties are "more" than a simple coalition of incumbents. There may well be other potential candidates, besides the incumbents, whose election would increase the party utility by $b + a$, and who come from districts where the other party has an incumbent. Such an extension is particularly relevant for France, as many right wing deputies elected in 1995 lost their seats in 1997 due to the huge (unexpected) victory of the socialist party, and ran again in 2002.³¹ Given the marginal utility for a party to have those candidates running, the equilibrium number of fees paid by the parties increases for most values of z , with the possible outcome that both parties pay fees simultaneously, in accordance with what has been observed. This would not affect, however, our main result. Indeed, even if the probability of having to run against a man increases

³¹In 129 districts out of the 361 we analyse, there was a candidate who had lost in 1997.

(as the opponent party is more likely to pay the fee and have a male candidate), it is still optimal to have a parity with fees system as it both guarantees that incumbents are still allowed to run, and it increases their probability of running against a woman, in the case where no opponent party member looks for election in that district.

An important corollary of our proposition is that parity may affect the party composition of the Assembly (and hence policies) when voters' platform preferences change with respect to the status quo. The number of seats won by the large party that is losing support in terms of platform preferences is (weakly) larger than if parity was not applied. Thus, the introduction of parity reduces the variance of party composition.

4 The *ex ante* and *ex post* incentives of Senators

In the previous sections we have first proved empirically the existence of male bias in the electorate, and then we have shown how the *ex ante* incentives of Deputies and the *ex post* results were both consistent with a simple rational choice explanation based on male bias itself. In this section we aim to show the corresponding incentives of Senators, although no formal model nor empirical tests are necessary for this chamber.

A senator's term is six years, and a fraction of the Senate is recomposed every three years. The country is divided into a few large districts, and, depending on the population of the district, a number of senators, ranging from 1 to 12, are elected in each district. If the number of seats to be allocated is equal to or below a threshold, then a two-round plurality system is in order and parity does not apply. If the number is above the threshold, then the system is CPR. In this case, parity means that in a party list there cannot be two consecutive candidates of the same gender. The threshold was equal to two in 2001 and to three in 2004.

An essential feature of the senatorial elections is that the set of voters is composed of *grands électeurs* only, and about 95% of them are municipality deputies. They had no say in the passing of the parity law, but they tried to influence it through their senators. Municipal elections are two round list elections. A list can run in the second round if it obtains 10% or more in the first round. The seat allocation rule is proportional with a 50% seat bonus to the winner. For instance, if a party wins the second round elections with 40% of the votes and 60 seats are to be allocated, then it will get $30+(0.40*30)=42$ seats and the remaining 18 seats are allocated among

the other parties proportionally to their second round score. The implementation of the Parity law at the municipal level has this property: out of each set of subsequent six candidates in a party list, three have to be women. The only freedom which is left to the parties is the position of the women within each set of six candidates. Given the electoral rule and the amounts of seats allocated in each municipality (varying between 29 and 67), the Parity Law is bound to have a huge effect on the gender composition of the municipal assemblies, and a lot of incumbents must lose their seat. A fraction of them must be thrown out of the list.³² Under the pressure of their grands électeurs, Senators obtained the amendment that parity would not apply in municipalities with less than 3500 inhabitants, whereas Assembly deputies first proposed it to apply to all municipalities with more than 2000 inhabitants. Senators also proposed to remove the three women out of six candidate rule, but it was maintained. The percentage of women elected in the municipalities with more than 3500 inhabitants went up from 25.7% to 47.5% (thereby making the fraction of women elected in municipal councils rise from 21.7% to 33%).

Protecting their electorate was not the only concern of the senators: They also had to protect their own seats.³³ Out of the 74 (resp., 72) incumbent senators looking for re-election in 2001 (resp., 2004) in districts where CPR applies, only 5 (resp., 8) were women. Before the law was passed, senators tried to obtain the amendment that no alternating gender rule apply for the senatorial elections, but failed.³⁴ Nevertheless, only 20 seats - 28% - (resp., 26 - 32.9% -) went to female candidates. Given the number of districts where parity does not apply and the low effectiveness where it applies, the percentage of women is 16.6%.

What did senators resort to, in order to circumvent the law? The answer is what

³²The intuitive reason for the effectiveness of parity with a two-round PR system with majority bonus is that with this system most municipalities ended up with one party holding a large majority of the seats, and if –say – the elected members of such a party are 30, the law described in the text makes sure that 15 of them are women.

³³The simple computations contained in this section use the electoral outcomes presented on the website of the French senate, <http://www.senat.fr/>. The details of the computation are available upon request.

³⁴Senators have a weaker role in France relative to many other countries. “The Senate’s legislative powers are limited; the National Assembly has the last word in the event of a disagreement between the two houses.” (US Department of State (2004)) This is clearly visible in Title V Article 45 of the Constitution “If the joint committee does not succeed in adopting a common text, or if the text is not adopted as provided in the preceding paragraph, the Government may, after a further reading by the National Assembly and by the Senate, ask the National Assembly to make a final decision.”

we call *party proliferation*.³⁵ Out of the 29 districts where proportional elections were held in 2001 or 2004, party proliferation (incumbents previously elected under the same flag now running under different ones) took place in 11 of them. In 8 other cases candidates elected on different lists registered as members of the same senatorial group after the election.³⁶ Finally, in several other districts, candidates previously active in the same party, though new in the senatorial race, ran on different lists, with two examples of such lists obtaining more than 10 percent. Party proliferation has clearly been a wide phenomenon in both elections, which explains the low effectiveness of parity.³⁷

Let us now analyze more closely the phenomenon of strategic party proliferation in CPR. We first describe the conditions under which party proliferation is most likely to happen. Then we study its effect on the party composition of the Assembly.

4.1 Party proliferation

The cost of creating a party is relatively low for the senators. Given the grands électeurs system and the size of the districts, the actual number of votes needed to obtain a seat varies between 260 and 892. Moreover, those are councillors themselves and senators have regular opportunities to meet them. Let us consider a party likely to obtain a score of s and an associated number of k seats, with k male incumbents. Let k be an even number. It seems reasonable to assume that the incumbent's advantage is decreasing among candidates from the leader of the list to the k th elected: popularity decreases with rank. Given parity, only $\frac{k}{2}$ incumbents can be given positions among the first k positions, those leading to a seat with some likelihood. Therefore, the $(\frac{k}{2} + 1)$ th incumbent is pivotal in the proliferation process. His only chance of being elected is in creating his own list and diverting at least $\frac{s}{k+1}$ voters from the main party. This score is necessary, as the score of the

³⁵This is illustrated by the Meurthe-et-Moselle district, where 4 seats had to be allocated. Two right-wing incumbents had been elected under the same party flag before. They split the list, created two new parties, ran on the top of their respective list (followed, as required by the law, by a woman) and got re-elected.

³⁶Even though by definition those examples involve new candidates to the senatorial elections, these candidates do typically have incumbent-type advantages, as they are former ministers, deputies, region presidents, etc.

³⁷Proliferation of party lists has probably been made easier by the fact that senators have a unique type of (small) electorate, the grands électeurs. However, Jones [11] (table 2) shows, among other things, that some kind of list proliferation also took place in Costa Rica after the introduction of gender quotas (excluding the main two parties).

main party, down to $\frac{ks}{k+1}$, is otherwise still superior to k times that of the dissident list. This may not be sufficient, however, since other parties may have a larger d'Hondt score for the last seat and obtain the formerly k th seat of that party. To illustrate this fact, let us consider a district where three parties compete for 8 seats and the distribution of scores is $(45,27.5,27.5)$, so that the allocation of seats is $(4,2,2)$. After the parity reform, incumbent 3 of the first party is ejected from the first positions on the list. By running on his own and obtaining 10 percent of the votes, which corresponds to scores $(35,10,27.5,27.5)$, he would keep his seat. If we compare that result with the situation where there is only one opponent party and the scores are $(45,55)$ before parity and $(35,10,55)$ after proliferation by incumbent 3, we now have a distribution of seats going from $(4,4)$ to $(3,0,5)$. The lower bound in the second situation is now 11 and the scores $(33.9,11.1,55)$ then lead to $(3,1,4)$. Let us also note that any two incumbents ejected from the main party list have no incentive to create a joint list, as, given parity, their joint list would have to win three seats for them both to be elected.

Let us assume that the $(\frac{k}{2} + 1)$ th incumbent is sure to keep his seat if he creates his own list. Then the probability that the $\frac{k}{2}$ th incumbent be elected on the main list decreases, as the new score of the main party may no longer be sufficient to obtain $k - 2$ seats. Moreover, if the $(\frac{k}{2} + 1)$ th incumbent is able to be elected by running on his own, then so is the $\frac{k}{2}$ th incumbent, given the assumption that individual popularity decreases with the rank. The prudent strategy by candidate $\frac{k}{2}$ is therefore to create his own list too, which, in turn, decreases the probability of the $(\frac{k}{2} - 1)$ th incumbent to be elected.

From this simple argument we can infer that proliferation is the more likely the more popular is the $(\frac{k}{2} + 1)$ th incumbent, but the unravelling may determine a situation in which the incumbents who actually are observed making the split are higher in the rank. If k is large, it may be impossible to have a sufficiently large popularity for the $(k/2 + 1)$ -th incumbent and, at the same time, a decreasing order of popularity. This leads to the following:

Remark: Party proliferation is more likely when (1) the incumbency advantage is more equal among candidates and (2) the number of incumbents on the list, and/or the number of seats expected by a list, is lower.

The example and the reasoning above all assume that the scores are perfectly expected. Proliferation is also more likely when the uncertainty of being elected by running on one's own is lower. When the number of seats to be allocated in a

district and the number of relevant parties are larger, then the competition for the last seats to allocate is larger, which increases the uncertainty.

This explains why, given that districts have on average a relatively small number of seats, parity had low effect in the senatorial elections.

4.2 Assembly composition effect

Parity may also affect the Assembly composition under CPR. There are two different effects. One is the large party effect, which plays in a similar way as under SMD: if a party has more incumbents than half the total number of seats, then it has to lose the votes associated with the incumbency advantage of the incumbents it ejects from the list. Clearly, this may affect the score of the party, and, therefore, the number of seats it expects.

The second effect is directly associated to party proliferation. In the example above, proliferation by incumbent 3 led to a change in the Assembly composition from (4,4) to (3,0,5) which means a shift of one seat from left to right. The example may look extreme, as the proliferation was a failure. However, other examples may be given of successful proliferation affecting the Assembly composition. Consider a district where two parties compete for 6 seats. The expected scores are (43,57), which would lead to a (3,3) allocation of seats. Assume that, indeed, there are three incumbents out of each platform. Again, we may think that incumbent 3 of the left party can profitably create his own list, thereby preventing incumbent 2 from keeping his own seat. The equilibrium list composition is therefore one where the left party has split into two lists, led by incumbents 1 and 2 respectively. Let us assume that the resulting distribution of votes is (24,19,57), the resulting seat allocation is (1,1,4): proliferation by left incumbent 2 is successful, but increases the number of seats obtained by the right party.

The composition effect arising from the conflicting interests of an incumbent seeking to keep his seat and a party seeking to maximize the number of seats obtained by candidates sharing its platform is likely to affect both large and small parties. It is well known that under the d'Hondt system a party can never gain by splitting, as the d'Hondt coefficients cannot rise as a result of a split. On the other hand, as it is clear from the example, proliferation is more likely to result in a loss of seats when the d'Hondt coefficient of the party as a whole is the lowest among all parties.

4.3 Other implications

The above characterization of party proliferation has some implications for the advocates of gender quota legislations. Given that the probability of success after the creation of a new list is obviously lower when there is a minimum threshold necessary to obtain seats, one can conjecture that a system with PR, large districts and a minimum threshold is the most desirable for the representation purposes, although in a closed list system the details of the law in terms of placement rules are crucial. Another way to create barriers to party proliferation is by enlarging the districts and, correspondingly, the number of seats to allocate in the districts. First, this reduces the expected incumbent's advantage of the pivotal incumbent. Second, as the number of competing parties is larger in larger districts, the competition for the last seats to allocate is larger, thereby increasing the sensitivity of the total number of seats obtained by a platform to the way the total number of votes is divided between the lists obtained by proliferation from one party.

5 Concluding Remarks

The common criterion used to evaluate representation reforms is the effectiveness of the reform. In the literature on descriptive representation the objective to increase the number of women in politics finds many justifications.³⁸ Among the countries where voluntary or mandatory gender quotas have been attempted, it is clear that the highest effectiveness has been achieved in countries using PR with large districts (see e.g. Jones [11], table 1). It is, therefore, tempting to advocate for changes in the electoral systems towards more proportionality, larger districts, and closed lists.³⁹ Our paper moderates this conclusion.

The incumbents were interested in not losing their positions, and deputies knew they were the least challenged by the reform. Had they passed a pure parity system without allowing for per violation fees, and had there been a demand among voters for new female candidates, then of course the law would have been effective. On the other hand, had the reform been more likely to be effective, then deputies would have shown the same opposition to the law as senators have.

³⁸On the problem of under representation of women in Parliaments and Cabinets see Siaroff [20] and Rosenthal [19].

³⁹We focus here on women representation, whereas a reform of the electoral system clearly involves multiple considerations. See, for instance, Morelli [16] for a suggestive welfare comparison of electoral systems.

Our analysis thus highlights the following trade-off: when voters are not ready to favour parties promoting female candidates, reforms are more likely to be passed in contexts where they won't be effective.⁴⁰

A final set of remarks can be made on the comparison between France and other countries that use single member district elections for their members of Parliament. A natural question is why has parity law come up in France and not in other countries with similar electoral systems for their deputies. Our conjecture is that this may have to do with the perceived gender preferences of the electorate. In the US states there seems to be no evidence of voters' hostility against women, nor much evidence in favor of the male conspiracy theory. Thus, there is no "demand side" clear explanation for the low number of women in politics (see e.g. Darcy et al. [6] and Welch et al. [21]). Implicitly this implies a mostly "supply side" story for the U.S. The sharp contrast between our study on the French case and the earlier studies on the U.S.⁴¹ suggests an intriguing hypothesis to be tested in future research: Countries where voters' gender bias exists have fewer women than men because of a "demand" bias, and are more likely to endogenously generate affirmative action laws; on the other hand, countries like the U.S. where no voters' demand bias exists, and where therefore the shortage of women in politics is a "supply" issue, are unlikely to have the necessary conditions for the approval of a parity law.

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⁴⁰SMD is not the only system where parity is unlikely to be effective: in an *open list* electoral system, the strong and well established incumbents have no worries because the order in the lists does not matter (see the case of Belgium).

⁴¹Note that our empirical analysis is based on field data, whereas the studies just mentioned on the U.S. are based on survey data, and we have no way to say to what extent these sharp differences could be due to this.

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Appendix 1: Proof of proposition 1

Once z is known, the country is conceptually divided into three regions: $[0, \min\{z, \lambda\}]$; $[\min\{z, \lambda\}, \max\{z, \lambda\}]$; and $[\max\{z, \lambda\}, 1]$. Parties L and S play a list composition game, and a strategy is an assignment of a man or a woman in each district. Formally, a strategy is an element of $\{0, 1\}^{[0,1]}$ where 0 (resp. 1) means that a woman (respectively, a man) is sent to that district. Denote by $m_p^j \in [0, 1]$ the fraction of men candidates running for party p , $p \in \{L, S\}$, in region j , $j \in \{[0, \min\{z, \lambda\}], [\min\{z, \lambda\}, \max\{z, \lambda\}], [\max\{z, \lambda\}, 1]\}$.

Given our assumptions on voters’ platform preferences and gender preferences, each party wants to send men where the other party sends men if the platform preference of the voters is favorable, or send men where the opponent sends women if the opposite is true. This leads to the following lemma:

Lemma 1 *In any Nash equilibrium of the list composition game played at time 1 by the two parties, each party uses the same mixed strategy in every district of the same region, and hence an equilibrium strategy of party p can be summarized by the triplet (m_p^j) .*

Proof. Suppose instead that party S puts a man running in district i with probability $m_S(i) < m_S(i')$, where i and i' are in the same region j .

Then if j is a region in which L wins the man-man races the best response is to have $m_L(i') > m_L(i)$; but this could not be compatible in equilibrium with the hypothesis, since the best response to the latter inequality for party S must have the feature $m_S(i) > m_S(i')$.

A similar contradiction arises if j is a region in which S wins the man-to-man races: In this case the best response by L would have to satisfy $m_L(i) > m_L(i')$, but this in turn cannot be compatible in equilibrium with the hypothesis, since the best response to the latter inequality by party S would be $m_S(i) > m_S(i')$. **QED.**

The list composition game is, therefore, equivalent to a game where parties have to decide on proportions of men in each of the three regions. Suppose for example that $z < \lambda$ (the voters' support of the L platform has decreased since the last election). Then parties have to decide on $m_p^{0z}, m_p^{z\lambda}, m_p^{\lambda 1}$. The result is that a fraction $m_L^{0z} + (1 - m_L^{0z})(1 - m_S^{0z})$ of L candidates are elected in region $[0, z)$, as all the men are elected, and, among the women who run (in proportion $(1 - m_L^{0z})$), all those who end up running against a woman also win the election, and the probability of running against a woman is $(1 - m_S^{0z})$.

Having explained the strategies for any probability distribution over z , let us now choose a specific probability distribution that will allow us to prove the result. Assume that z can take values in $\{0, 1 - \lambda, \lambda, 1\}$, with corresponding probabilities equal to $0.5 - f, f, f, 0.5 - f$, for some $f \in (0.25, 0.5)$. (Thus f measures the skewness of the distribution.)

Assume that b is infinitesimally small, so that it justifies a seat maximizing behavior *ceteris paribus* but it can be ignored in the computations. Given this assumption, the utility of party L is

$$U_L = \int_{i \leq \lambda} U_i di = \begin{array}{ll} \lambda + aI_L - C_L & \text{if } N_L > 0.5 \\ 0.5\lambda + aI_L - C_L & \text{if } N_L = 0.5 \\ aI_L - C_L & \text{if } N_L < 0.5 \end{array}$$

and

$$U_S = \int_{i \geq \lambda} U_i di = \begin{array}{ll} (1 - \lambda) + aI_S - C_S & \text{if } N_S > 0.5 \\ 0.5(1 - \lambda) + aI_S - C_S & \text{if } N_S = 0.5 \\ aI_S - C_S & \text{if } N_S < 0.5. \end{array}$$

Consider first the status quo ($c = 0$). At time 1, it is a dominant strategy for both parties to have only male candidates. the expected utility is then:

$$\begin{aligned}
\forall i \in [0, 1 - \lambda) : \quad U_i^e &= af + (1 + a)f + (0.5 - f)(1 + a) \\
&= (0.5 + f)a + 0.5; \\
\forall i \in [1 - \lambda, \lambda) : \quad U_i^e &= (1 + a)f + (0.5 - f)(1 + a) \\
&= 0.5(1 + a); \\
\forall i \in [\lambda, 1] : \quad U_i^e &= (0.5 + f)a + 0.5.
\end{aligned}$$

Consider next the pure parity case ($c = \infty$). We first analyse the equilibrium of the list composition subgames in the four possible cases, and then we deduce the expected utility of each incumbent.

Case 1: $z = 0$; the 0.5 men candidates sent by S will be elected, and necessarily at least some women will be elected too, so that S will win the election. It is optimal for S to have all its incumbents running. Therefore, in region $[0, \lambda)$, by lemma 1, the equilibrium strategies are $m_L^{0\lambda} = \frac{0.5}{\lambda}$ and $m_S^{0\lambda} = \frac{\lambda - 0.5}{\lambda}$ in every district of that region. Consequently, each L incumbent has a probability $\frac{0.5}{\lambda}$ of running, and, if he runs, a probability $\frac{0.5}{\lambda}$ of being elected. All S incumbents are sure to be re-elected.

Case 2: $z = 1 - \lambda$. Sending all its 0.5 men to districts in $[1 - \lambda, 1]$ guarantees 0.5 seats, and S is sure to have more than that, so, again, S is sure to win the election. The equilibrium strategies are $m_L^{0z} = 1, m_L^{z\lambda} = \frac{1}{2}, m_L^{\lambda 1} = 0$ and $m_S^{0z} = 0, m_S^{z\lambda} = \frac{1}{2}, m_S^{\lambda 1} = 1$. Incumbents in $[0, z)$ and $[\lambda, 1]$ are sure to be re-elected, whereas incumbents in $[z, \lambda)$ run with probability $\frac{1}{2}$ and, if they run, are elected with probability $\frac{1}{2}$.

Cases 3 and 4: $z = \lambda$ or $z = 1$. L wins the election. In this case party L tries to send men where S sends men, and S tries to send men where L sends women. Equilibrium strategies are $m_L^{0\lambda} = \frac{0.5}{\lambda}, m_L^{\lambda 1} = 0$ and $m_S^{0\lambda} = \frac{\lambda - 0.5}{\lambda}, m_S^{\lambda 1} = 1$. Incumbents from region $[0, \lambda)$ run with probability $\frac{0.5}{\lambda}$ and are sure to be re-elected if they run.

The expected utilities computed at time 0 are as follows.

$$\begin{aligned}
\forall i \in [0, 1 - \lambda) : U_i^e &= (0.5 - f) \frac{0.5^2}{\lambda^2} a + af + 0.5 \left(1 + \frac{0.5}{\lambda} a \right) \\
&= \left(\frac{0.5^2}{\lambda^2} (\lambda + 0.5 - f) + f \right) a + 0.5; \\
\forall i \in [1 - \lambda, \lambda) : U_i^e &= (0.5 - f) \frac{0.5^2}{\lambda^2} a + 0.5^2 af + 0.5 \left(1 + \frac{0.5}{\lambda} a \right) \\
&= \frac{0.5^2}{\lambda^2} (\lambda + 0.5 - (1 - \lambda^2) f) a + 0.5; \\
\forall i \in [\lambda, 1] : U_i^e &= 0.5(1 + a) + 0.5a \\
&= a + 0.5.
\end{aligned}$$

It is easy to see that S incumbents strictly prefer pure parity to no parity, as it guarantees their re-election.

Let us now consider the case of parity with fees ($c = c^* \in (0, \infty)$). Take in particular any value of c^* such that

Assumption a: $a/2 > c^* > b \approx 0$.

Case 1: $z = 0$. At equilibrium, S must win the election. Indeed, it has at least 0.5 seats (all its men are elected), and, if it is not sufficient to win, then it is worth paying the fee for one male candidate. So we can consider that S wins the election with 0.5 men running. S tries to maximize the number of seats obtained, so that the equilibrium will be mixed, with M_S (the number of men running for S in $[0, \lambda)$) equal to $\lambda - 0.5$. The utility of party L is $U_L = a \frac{0.5}{\lambda} M_L - c^* (M_L - 0.5)$ where M_L stands for the number of men running in $[0, \lambda)$. Rearranging, we get $U_L = \left(\frac{0.5}{\lambda} a - c^* \right) M_L + 0.5c^*$, so that L pays the fees for all its incumbents whenever $\frac{0.5}{\lambda} a - c^* > 0$, that is, $a > 2c^*\lambda$, which holds given assumption a. Therefore, all the incumbents run, and 0.5 of them are elected. The average utility among them is $\frac{0.5}{\lambda} a - \frac{c^*(\lambda - 0.5)}{\lambda}$, whereas the utility of each S incumbent is $1 + a$.

Case 2: $z = 1 - \lambda$. As above, S is sure to win, provided it runs all incumbents from λ to 1 and the remaining men ($\lambda - 0.5$) randomly in the interval $[z, \lambda]$. It has no incentive to take a man from $[\lambda, 1]$ to $[z, \lambda)$, given that $c^* > b$, nor to $[0, z)$, as the probability for a man to be elected in that region is 0. If a man from party L runs in $[z, \lambda]$, then his probability of being elected is 0.5. Utility of party L is $U_L = (1 - \lambda)a + 0.5(M_L - (\lambda - 0.5))a - c^*(M_L - 0.5)$. So party L will pay the fees, given assumption a. For each incumbent in $[0, 1 - \lambda)$, $U_i = a - \frac{c^*}{\lambda} (\lambda - 0.5)$, and the average utility of those from $[1 - \lambda, \lambda)$ is $0.5a - \frac{c^*}{\lambda} (\lambda - 0.5)$. The utility of

incumbents of S is $1 + a$.

Case 3: $z = \lambda$. For a similar reason as above, L is sure to win. Party S sends all its incumbents, and sends men uniformly in $[0, \lambda)$. We have $U_L = 1 + aM_L - c^*(M_L - 0.5)$, so that $M_L = \lambda$, all to be re-elected. The utility of each L incumbent is $1 + a - \frac{c^*}{\lambda}(\lambda - 0.5)$, and that of S incumbents is a .

Case 4: $z = 1$. The fact that L men are sure to be elected even if they run in $[\lambda, 1]$ does not change the strategy from the previous case, as paying the fee for having one more male candidate elected is not profitable if he is not an incumbent. The equilibrium utilities are, therefore, identical to what they are in case 3.

The expected utility of the incumbents can be computed as follows (letting C^* stand for $\frac{c^*}{\lambda}(\lambda - 0.5)$):

$$\begin{aligned} \forall i \in [0, 1 - \lambda) : \quad U_i^e &= (0.5 - f) \left(\frac{0.5}{\lambda} a - C^* \right) + f(a - C^*) + 0.5(1 + a - C^*) \\ &= \left((0.5 - f) \frac{0.5}{\lambda} + f + 0.5 \right) a + 0.5 - C^*; \\ \forall i \in [1 - \lambda, \lambda) : \quad U_i^e &= (0.5 - f) \left(\frac{0.5}{\lambda} a - C^* \right) + f(0.5a - C^*) + 0.5(1 + a - C^*) \\ &= \left((0.5 - f) \frac{0.5}{\lambda} + 0.5f + 0.5 \right) a + 0.5 - C^*; \\ \forall i \in [\lambda, 1] : \quad U_i^e &= 0.5(1 + a) + 0.5a \\ &= a + 0.5. \end{aligned}$$

At time 0:

Let us now compare the expected utility of each incumbent across the different possible values of c .

1) For incumbents in $[0, 1 - \lambda)$: it is clear that parity with fees is the system which maximizes their probability of being re-elected. But the other consequence is that fees have to be paid. We have that parity with fees is better than no parity iff $a \geq 2c^* \frac{\lambda - 0.5}{0.5 - f}$, which can only be satisfied if $0.5 - f$ is not too small. Let us note that a very low $0.5 - f$ means that those incumbents are almost sure to be re-elected even without parity, so that it is intuitive that no parity is the best system for them. Given our assumptions, it is sufficient to have $0.5 - f > \lambda - 0.5$, which is reasonable, in order to have the incumbents in this region strictly prefer parity with fees to no parity. Strict parity is better than no parity iff $0.5 - f > 2\lambda(\lambda - 0.5)$, which again means that the probability to be in a bad state is sufficiently large; but observe that the threshold is more difficult to satisfy than in the previous case (it is more

likely to have parity with fees better than no parity than strict parity better than no parity). Parity with fees is better than pure parity iff $a \geq \frac{2\lambda c^*(\lambda-0.5)}{\lambda(\lambda-f)-0.5(0.5-f)}$, which is satisfied if the condition above for parity with fees to dominate no parity holds. Thus, parity with fees is the best for those incumbents if $0.5 - f$ is sufficiently large.

2) For incumbents in $[1 - \lambda, \lambda)$: parity with fees is preferred to no parity iff $a > 2c^* \frac{\lambda-0.5}{0.5-(1-\lambda)f}$. But we have already assumed that $a > 2c^*$, and the fraction is always lower than 1. Parity with fees is preferred to strict parity iff $a > 2c^* \frac{\lambda(\lambda-0.5)}{(1-\lambda)f+\lambda^2+0.5^2}$, and again the fraction is always smaller than 1. Consequently, parity with fees is always the strictly most preferred solution in this region.

3) The incumbents in $[\lambda, 1]$ all strictly prefer a parity law, with whatever $c > 0$, to the status quo.

Consequently, given assumption a, there are many probability distributions with many possible skewness levels such that parity with fees is strictly preferred by the majority (the L incumbents) to any other system. Given the strict preference by the S incumbents for any type of parity law over the status quo, the parity with fees reform could win against the status quo even if the voting rule was unanimity. **QED.**

Appendix 2

Candidate:	New		Incumbent	
	(1b)	(2b)	(3b)	(4b)
Own Party Score in 1997	0.548*** (0.052)	0.620*** (0.049)	0.501*** (0.045)	0.508*** (0.044)
Male candidate with Female Opponent	0.011 (0.010)	0.023** (0.009)	0.012** (0.006)	0.013** (0.006)
Female candidate with Male Opponent	-0.009 (0.007)	-0.013* (0.007)	-0.015* (0.008)	-0.016* (0.008)
Female candidate with Female Opponent	-0.010 (0.011)	-0.003 (0.011)	0.013 (0.012)	0.014 (0.012)
Age Difference /100	0.373** (0.187)	0.359* (0.192)	0.113 (0.169)	0.149 (0.167)
Difference of Square of Age /100	-0.004** (0.002)	-0.004** (0.002)	-0.001 (0.002)	-0.002 (0.002)
Party Right of Center	0.083*** (0.007)	0.079*** (0.007)	0.082*** (0.006)	0.081*** (0.006)
Opponent is a New Candidate	0.034*** (0.011)			
Opponent is a 1997 Loser	0.037*** (0.012)		-0.007 (0.005)	
Opponent was Moved	-0.009 (0.014)		-0.026 (0.029)	
Constant	0.168*** (0.025)	0.145*** (0.025)	0.236*** (0.025)	0.230*** (0.024)
Observations	237	237	282	282
F-Test of Symmetry Hypothesis (p-values)	0.610	0.708	0.496	0.425

Standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5: The Effect of Male Bias on Scores

	Candidate:		
	PS	UMP	Pooled
	(10) ^a	(11) ^a	(5b)
Own Party Score in 1997	0.650*** (0.044)	0.541*** (0.053)	
Incumbent Advantage	0.022*** (0.007)	0.030*** (0.010)	
Male Advantage	0.015*** (0.005)	0.020*** (0.006)	0.040*** (0.005)
Age Difference /100	0.386** (0.169)	0.040 (0.210)	
Difference of Square of Age /100	-0.004** (0.002)	-0.001 (0.002)	
Party Right of Center			0.051*** (0.007)
Constant	0.134*** (0.021)	0.259*** (0.024)	0.457*** (0.005)
Observations	207	207	349

Standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

^a Only includes incumbents and new candidates.

Table 6: The Incumbency Advantage in 2002