1 Introduction

Competent politicians are key for government and democracy to function well. In most democracies, political parties select the candidates who can run for o¢ ce. Parties' decision on which candidates to let run under their banner is therefore of fundamental importance. When they select candidates, parties have to worry not only about the competence of candidates but also about incentives, about their candidates' motivation to engage with voters and work hard for their party's electoral success.

Under closed-list proportional representation (PR),[1] the legislative seats a party wins are allocated to its candidates following the order of its electoral list. In this context, the parties' selection decisions become even more complex as they need not only decide which candidates to let run under their banner, but also how to rank them on their electoral list. As shown in Crutzen, Flamand, and Sahuguet (2020), each position on the list generates distinct incentives for candidates.

In this paper, we develop a formal model to analyze the conditions under which parties rank their candidates in decreasing order of competence. This orderreas

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to adopt a ranking that mirrors these incentives when their candidates differ in competence.

This finding does not change when candidates are also driven by ideology, as the impact of ideology on effort is independent of the position on the list. That ideology has no impact on the way parties rank their candidates to maximize electoral success also has the following, surprising additional effect. Ideological polarization only impacts candidates' objective function via the payoff linked to ideology. As ideology impact on incentives does not depend on the rank on the party list, changes in the ideological polarization do not influence how parties rank candidates.

Post-electoral high offices (typically linked to the control of the executive) offer a possible avenue to explain why we observe parties rank candidates in decreasing order of competence. If candidates ranked at the top of the list can get access to a high office, candidates get an additional motivation to exert effort to get their party win a majority of seats. If these additional incentives are strong enough, they can overturn the bell-shaped incentives coming from the prospect of winning a seat in parliament. Parties may then find it optimal to rank candidates in order of decreasing competence.

The presence of media effects adds to the above findings. Indeed, it is well documented that the media coverage of candidates differs based on their position on the list. Existing evidence suggests that candidates at the top of the list receive more attention than those lower on the list, with candidates who sit in hopeless positions receiving no attention at all (see for example Tresch (2009); Van Aelst, Sehata, and Van Dalen (2010); or Vos and Van Aelst (2018)). Indeed, whenever parties have to comment on a policy issue or need to send in a representative to participate in a debate, the media want their top candidates. In particular, the candidate who is at the top of the list receives the bulk of all media attention.

2 Related Literature

Candidate ranking strategies are not well understood in closed-list proportional representation systems, especially when both incentive and competence considerations play a role. Our paper thus adds to a small but growing literature, both empirical and theoretical, that position on the list and an individual payo¤ – linked to post-electoral high o¢ ces – that varies according to the position on the list. Finally, we introduce media weights in the party output production function. These weights are decreasing with rank. Tresch (2009); Van Aelst et al. (2010); or Vos and Van Aelst (2018) report evidence that corroborates this assumption.

Buisseret et al. (2019) also propose a formal model of list composition and then test their predictions on Swedish municipal election data. Their model focuses on competence and leaves aside incentive e¤ects. Candidates di¤er in competence and are passive participants in the electoral contest.[4] The outcome of the election is determined by a complex calculus of voting. As in our model, parties that want to maximize their electoral success place their best candidates on marginal ranks. Yet, this is not due to incentive reasons, but to the fact that “a voter recognizes that her vote is likely to be inconsequential for the election prospects of candidates located within safe ranks" (Buisseret et al., 2019, p. 2). If parties also care about electing their best candidates and voters “recognize that high-quality leaders are the primary drivers of good policy outcomes" (p. 14), then placing the best candidates at the top of the list can be optimal.

Our theoretical predictions also help re…ne the empirical studies in the …eld. Indeed, we are not aware of any theoretical prediction on the e¤ect of the media and the importance of post-electoral high o¢ ces on candidates' ranking strategies of parties. For example, some contributions focus on the role of gender (Baltrunaite, Bello, Casarico and Profeta, 2014; Esteve-Volart and Bagues, 2012; Besley, Folke, Persson and Rickne, 2017). Others show that party loyalty matters, as Galasso and Nannicini (2015) do for the 2015 Italian elections (and especially for safe seats). Matakos, Savolainen, Troumpounis, Tukiainen and Xefteris and Svitakova and Soltes (2020), for the Czech republic, find that candidate competence (as measured by earnings score or years of education) correlates positively with list rank, implying that parties put their best candidates at the top of their list. But in none of these works the role of media coverage and post-electoral job opportunities are taken into explicit consideration.

3 The model

Candidates and parties. Two parties are competing for n (odd) legislative seats.[5] Party j fields a list of n candidates who exert effort to contribute to their party electoral success. Candidate i in party j exerts effort e_{ij} at quadratic cost $K_{ij}(e_{ij}) = \frac{1}{2}c_{ij}e_{ij}^2$. Candidates thus differ in their cost of effort. We interpret this heterogeneity in costs as heterogeneity in the competence of candidates. A list for party j is a mapping $\sigma_j : \{1, ..., n\} \to \{1, ..., n\}$ that assigns position m on the list to candidate i

parameter of the distribution is determined in a generalized Tullock contest among the parties based on the ratios of parties' electoral outputs. Party j's probability of winning each seat follows a binomial distribution described by each seat's winning probability p_j:[7]

$$p_j \qquad \frac{E_j}{E_j \qquad E_{-j}};$$

where is a return to scale parameter, and j denotes the other party. Values of lower than make the allocation of prizes among teams more noisy and less responsive to parties' outputs. Lower values of also make the objective functions of team members more concave; thus plays an important role to ensure equilibrium existence.

We assume that the probabilities of winning seats are independent. Thus, the probability of party j's winning k seats is given by:

$$P_j^k \quad C_k^n p_j^k \qquad p_j \;^{n-k}:$$

Payo¤s. On the cost side, we already mentioned that candidate i's individual e¤ort cost is $K\ e_{mj} \qquad \frac{1}{2} c_{mj} e_{mj}^2$. There is a bene…t to be elected to the legislature, equal to V. Candidate in position m on the list gets elected if the party wins at least m seats, which happens with probability $\sum_{k=m}^{n} P_j^k$.

Each candidate also enjoys a purely ideological bene…t W when their party wins a majority of legislative seats, as it then controls the executive and can implement its platform. The party wins such a majority of $k^{maj} \qquad \frac{n+1}{2}$ seats with probability $\sum_{k=k^{maj}}^{n} P_j^k$.

When the party wins the election, the top candidates of each party may gain access to an executive position or some other high o¢ ce, such as the position of House Speaker. We assume that there are $k^C \qquad \frac{n+1}{2}$ such executive positions and high o¢ ces and that these positions go to the candidates ranked in the top k^C slots on the party list, with the candidate in position $m < k^C$ receiving the o¢ ce with m^{th} highest value. Thus, these o¢ ces each have value w_m and $w_1 \quad w_2 \quad :: \quad w_{k^C} \quad w_{k^C+1} \quad ::: \quad w_n \quad :$ Let $W_m \quad W \quad w_m$.

[7] Our modelling strategy allows for the inclusion of a weight > 1 multiplying party j's output . These weights introduce a bias in the contest as one party is advantaged, possibly due to voters' ideology leaning towards that party. The probability p_j then becomes $p_j = \frac{(\ E_j)}{(\ E_j) \ +(E \ \ _j)}$. For the sake of expositional clarity, we do not add these weights in what follows.

Candidate mj in position m on party j's list has thus the following benefit function:

$$B_{mj} = V \sum_{k=m} P_j^k + W_m \sum_{k=k^{maj}} P_j^k$$

Timing

The timing of the game is as follows.

1- Nomination stage: Party leadership designs the list of candidates.

2- Campaign stage: Given party lists, candidates exert effort.

3- Election stage: Given perceived party outputs, seats are allocated to parties.

4 Solving the model

4.1 Campaign stage: equilibrium efforts

In this subsection, we solve for the equilibrium of the campaign stage in which candidates choose effort given the party lists and their position on their party list. Candidates exert effort to increase the probability they get elected (simply to parliament or to parliament and a higher office) through an increase in p_j. Candidate in position m in party j chooses effort e_{mj} to maximize:

$$\begin{aligned} B_{mj}(K_{mj}, e_{mj}) = {} & V \sum_{k=m} P^k(p_j) + W_m \sum_{k=k^{maj}} P^k(p_j) - c_{mj}(e_{mj})^2 : \end{aligned}$$

Let $M_j^m = m C_m^n p_j^m (1 - p_j)^{n-m+1}$ and $M_j^{maj} = k^{maj} C_{k^{maj}}^n p_j^{k^{maj}} (1 - p_j)^{n-k^{maj}+1}$: We then have:

Proposition 1. *In the Nash equilibrium of the game, candidate in position* m *on the list of* *party j exerts e¤ort e^*_{mj} and party j's electoral output is given by E^*_j, where:*

$$e^*_{mj} \qquad \frac{a_m}{c_{mj} E^*_j} \; M_j^m V \quad M_j^{maj} W_m \;\; , \tag{1}$$

$$E^*_j \qquad \sqrt{\sum_{m=1} \frac{a_m^2}{c_{mj}} \; M_j^m V \quad M_j^{maj} W_m} \; : \tag{2}$$

Proof. See appendix □

We characterize the equilibrium by taking the …rst-order conditions of candidates' maximization problems. In the appendix, we also check the second-order conditions and derive a su¢ cient condition under which the solution of the system of …rst-order conditions indeed maximizes candidates' expected payo¤.

If all candidates were of equal competence, the distribution of equilibrium e¤orts would follow the distribution of $a_m^2 \;\; M_j^m V \quad M_j^{maj} W_m$. As the distribution of binomial coe¢ cients is bell-shaped, the distribution of e¤ort inherits similar features (see Crutzen et al., 2020 for more details on the case with no media e¤ect and W_m). When candidates are heterogeneous in competence, equilibrium e¤orts also depend on how competence maps into parties' candidate ranking strategy.

4.2 Nomination stage

Given the above optimal choices of candidates, parties order candidates on their list to maximize their electoral success. In doing so, parties take into account the equilibrium e¤orts de…ned in Eq.(2) and (3) as well as the associated probabilities of winning seats. Party j's equilibrium electoral output $E^*_j \quad \sqrt{\sum_{m=1}^{n} \frac{a_m}{c_{mj}} \; M_j^m V \quad M_j^{maj} W_m}$ depends on the weights M_j^m and M_j^{maj}, which are themselves a function of p_j. The party thus assigns candidates with marginal costs of e¤ort c_{mj} to a position in which the incentive to exert e¤ort is proportional to $\;_j^m \; p_j \quad a_m^2 \;\; M_j^m V \quad M_j^{maj} W_m$. To maximize party output, the list should assign the highest quality candidates to the position with the highest value of $\;_m$, the second highest quality candidate to the the position with the second highest value of $\;_j^m$, and so on and so forth.

To maximize their party's electoral success, the leadership assigns the most competent candidate to the position with the highest value of M_j^m: As the distribution of weights M_j^m is hump-shaped and single-peaked, the distribution of competence across ranks needs to replicate this hump-shape, with the most competent candidate in position np_j, if we ignore integer constraints. Indeed, if the party expects to win np_j seats, then the marginal benefit of exerting effort is highest for the candidate who is exactly at np_j. More generally, other candidates are allocated in positions around the peak in decreasing order of competence following the values of M_j^m. We thus have:

Proposition 3. *When candidates only care about getting a seat in parliament and the media treat all candidates equally, parties assign positions on the list so that the distribution of competence across ranks is hump-shaped, with the most competent candidate in position* $\lfloor np_j \rfloor$*, the position corresponding to party* j*'s equilibrium expected seat share.*

Proof. See appendix. □

The intuition behind Proposition 3 is simple. Candidates at the bottom and at the top of the party's list are respectively in hopeless and safe spots and face weak incentives to

Proposition 4. *The ideological benefit W has no effect on parties' optimal list strategies.*

An increase in ideological motivation, caused for example by an increase in the polarization of party platforms, makes the stakes of the election higher. Intuition would then suggest that parties have stronger incentives to put their best candidates on top of the list. This intuition turns out to be incorrect. The benefit W impacts party output through $M_j^{maj}W$. Therefore, as M_j^{maj} is the same for all candidates, a change in W does not affect the ranking of the $M_j^{m}V \quad M_j^{maj}W$, and thus the optimal list order does not depend on W. The recent candidate at the top of the list, the second largest boost to the second candidate on the

Building on these facts, we now show [illegible]

5.4 Party's popularity and list order

In most countries relying on proportional representation, a wide array of parties compete for seats. Some of them are major parties looking to win control of or at least participate in government, while other smaller parties are trying to push their agenda and get a few seats without a real chance to control the executive. Does the party's popularity and expected seat share influence the way they organize their list and rank their candidates? In the model, p_j corresponds to party j's popularity. Of course, the vector of p_j's is endogenous and determined in equilibrium, but these probabilities also reflect the competence of parties' candidates. We now discuss how the ranking of candidates on the list and the popularity of the party go together.

In proposition 3, we saw that a party would place their most competent candidate around the position corresponding to the expected number of seats. Thus, on average, under the conditions of proposition 3, small parties will place their best candidates earlier on their list than more popular parties. For instance, a party that expects to send only one candidate to the parliament will place its best candidate at the top of the list.

The effects of high offices discussed above depend on the value of $M^{maj}(p_j)$. The condition in proposition 5 is more easily met for higher values of p_j, that is for strong parties that are expected to win a large number of seats in parliament. Indeed, the effects of high offices are proportional to the probability that the party wins a majority. Thus, it is in large parties that the effects of high offices on incentives play an important role. As in the case analyzed above, electorally strong parties are thus more likely than weak parties to rank candidates in decreasing order of competence.

Media effect also have a different impact depending on the electoral strength of the party. The condition from proposition 6, $a_m \geq \sqrt{\frac{(n-m)}{m}\frac{p_j}{1-p_j}}\,a_{m+1}$, depends on the ratio $\frac{p_j}{1-p_j}$ which is increasing in p_j. This means that the media effect needs to be stronger in electoral strong parties.

6 Conclusion

We develop a model of electoral competition between parties under closed list proportional representation. Parties care about competence and incentives. A party orders its candidates

7 References

4): 387-399.

Galasso, Vincenzo, and Tommaso Nannicini, (2015). "So closed: Political selection in proportional systems." *European Journal of Political Economy,* 40: 260-273.

8 Appendix

Proof of proposition 1

Candidate m_j exerts e¤ort to increase the probability he gets elected through an increase in p_j.

The impact of an increase in that candidate m_j's e¤ort on party j's aggregate e¤ort is:

$$\frac{\partial E_j}{\partial e_{mj}} \quad a_m:$$

thus, the impact of an increase in e_{mj} on p_j is:

$$\begin{aligned} \frac{\partial p_j}{\partial e_{mj}} \quad & a_m \frac{E_{-j} \quad ^{-1}}{E_{-j} \quad E_j \quad ^{2}} \\ & \frac{a_m}{E_j} p_j \quad p_j \quad : \end{aligned}$$

Di¤erentiating $P^k \; p_j$, we obtain:

$$\begin{aligned} \frac{dP^k}{dp_j} \quad & C_k^n \quad k p_j^{k-1} \quad p_j \; ^{n-k} \quad n \quad k \; p_j^k \quad p_j \; ^{n-k-1} \\ & C_k^n p_j^{k-1} \quad p_j \; ^{n-k-1} \; k \quad n p_j \; : \end{aligned}$$

Notice that the sign of the above is not always positive. This can be seen by noting the special case of k . If p_j increases, it is obvious that $P^0 \; p_j$ is decreasing. As the above formula shows, $\frac{dP^k}{dp_j} \gtreqless$ if and only if $k \gtreqless np_j$.

So we get:

$$\frac{dP^k}{de_{mj}} \quad \frac{a_m}{E_j} C_k^n p_j^k \quad p_j \; ^{=}$$

We obtain

$$\frac{\partial B_{mj}}{\partial e_{mj}} \quad \frac{\partial K \quad e_{mj}}{\partial e_{mj}} \quad \frac{a_m}{E_j} \; V \sum_{k=m} {}^{k}_{j} \quad W_m \sum_{k=k^{Maj}} {}^{k}_{j} \quad c_{mj} e_{mj} \quad :$$

$$E_j \quad \sum_{m=1} a_m e_{mj} \quad \sum_{m=1} a_m \frac{a_m}{c_{mj} E_j} \quad V \sum_{k=m} {}^{k}_{j} \quad W_m \sum_{k=k^{Maj}} {}^{k}_{j} \quad :$$

Let $\sum_{k=m}^{n} \; {}^{k} \quad M_j^m:$ We have

$$M_j^m \quad m C_m^n p^m \quad p^{\; n-m+1}:$$

where [redacted]

The sign of $_{mj}$ f [redacted]

Rewriting the above, we obtain

$$\boldsymbol{E_j}^{-1}\boldsymbol{E_{-j}}^{@\boldsymbol{E}_j}$$

To finish the proof of theorem 2, we consider a comparative static. The parameter corresponds to the increase or decrease in the cost parameter of a candidate. We want to see what happens when we change the cost parameter of one candidate. The direct effect is to change E_1, but that also changes p_1; which leads to further changes in E_1 and E_2. We want to consider the general equilibrium effect.

Equilibrium is defined by:

$$p_1 \quad E_1$$