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A Theory of Organizational Dynamics: Internal Politics and Efficiency†

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We consider a three-member organization in which one member retires in each period and the incumbent members vote to admit a candidate to fill the vacancy. Candidates differ in quality and belong to one of two types, and majority-type members share the total rent of that period. We characterize the symmetric Markov equilibria with undominated strategies and compare the long-term welfare among them. Unanimity voting is better than majority voting at promoting long-term welfare. In addition, organizations with a certain degree of incongruity perform better in the long run than either harmonious or very divided organizations. (*JEL* D23, D71, D72)

The long-term health and survival of an organization depend crucially on its ability to attract high caliber new members. However, internal politics, whereby different groups of incumbent members vie for control over the decision-making power of the organization, often interferes with admission of new members.[1] In the process of admitting a candidate into an organization, incumbent members will look not only at his qualifications, but also at how his admission affects the future power structure of the organization. In this paper, we develop an infinite-horizon dynamic model to study how internal politics affect an organization's admission of new members. We also investigate how the dynamic interactions between internal politics and admission of new members affect the organization's long-term welfare.

We consider a three-member organization (club) in which one of the incumbent members is chosen randomly to exit in each period and, before knowing who will exit, the incumbent members vote to admit a candidate to fill the vacancy. Each player has two characteristics: *quality* and *type*. The uniformly-drawn *quality* represents a player's skills, prestige, or resources, which are valuable to every member

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[1] See March (1962) and Pfeffer (1981) for discussions of internal politics. Other related discussions can be found in Milgrom and Roberts (1988, 1990) and Meyer, Milgrom, and Roberts (1992).

of the organization. However, internal politics are often anchored on things other than quality, such as race, gender, ideology, or personality. While the political structure of many organizations is often quite complicated, for simplicity we suppose that every player belongs to one of two *types*: left or right. Type matters in the sense that there is a fixed amount of rent (e.g., research funds, perks, prestigious positions) in each period and the majority type controls the rent allocation and distributes it equally among members of its type.

Because the amount of rent is fixed, the club's per period welfare is simply the sum of the quality of the club members minus the total search costs, and thus is independent of its power structure. In the first best solution, the founder or social planner of the club optimally trades off the search costs and the benefits of setting a high standard. In another benchmark, we suppose that there is no rent to grab and hence no internal politics in the club, so all incumbent members have identical preferences and will choose the same admission standard for both types of candidates. In this case, the equilibrium (called the "harmonious equilibrium") admission policy is inefficient because there is an "intertemporal free-riding" problem in that incumbent members do not take into account the effects of their admission decisions on future generations of club members. Consequently, all incumbent members set inefficiently low admission standards and search less relative to the efficient level.

In the presence of internal politics, we focus on symmetric Markov equilibria with undominated strategies in which incumbent members' strategies depend only on the current period type profile (state) of the club. We solve the most efficient equilibrium in terms of long-term welfare under both majority and unanimity voting rules in selecting new members. Under either voting rule, the solution crucially depends on the value of a variable interpreted as the *degree of incongruity* of the club. This variable is a function of the model's primitive parameters. It is smaller (the club is more *congruous*) when the available rent (and therefore the potential gain from internal politics) is smaller, or when the uncertainty over candidate quality is greater (so searching for good candidates is more important), or when the delay cost is higher (so the cost of internal politics is greater).

It turns out that the most efficient equilibria can be divided into two categories: "power-switching" equilibria, in which both types of candidates are admitted with positive probabilities in every state so power switches back and forth between the two types over time; and "glass-ceiling" equilibria, in which candidates of the minority type are never admitted in contentious states (when both types of incumbents are present), and hence the club will never experience power switches. Not surprisingly, under either voting rule, "power-switching" equilibria arise when the club is relatively congruous while "glass-ceiling" equilibria arise when the club is relatively incongruous. The most efficient equilibria under the two voting rules are different in the following two scenarios. In one scenario, when the degree of incongruity is intermediate, the only equilibrium under majority voting is glass-ceiling while unanimity rule still allows a power-switching equilibrium. This is because majority voting is more exclusive than unanimity voting, as under majority rule the majority-type incumbents can easily set a glass ceiling for the opposite type and keep control of the organization forever, but doing so is very costly under unanimity rule. In the other scenario, when the degree of incongruity is sufficiently low, the power-switching equilibria under these two voting rules are different. Under majority rule, candidates of the minority type are discriminated against and face higher admission standards than those of the majority type in contentious states. Such an equilibrium is labeled "pro-majority power-switching." However, under unanimity rule, the opposite happens: candidates of the majority type are discriminated against in contentious states. This is because the majority-type incumbents have weaker incentives to fight with the minority-type incumbent so the minority-type incumbent can insist on admitting his favored candidate. Such an equilibrium is labeled "pro-minority power-switching."

Comparison of organization welfare for long-term equilibrium outcomes yields two main findings. First, the long-term welfare under unanimity voting is always greater than or equal to that under majority voting. Unanimity voting outperforms majority voting in the two scenarios described above. In the first scenario, unanimity rule still allows a power-switching equilibrium, but under majority rule only the less efficient glass-ceiling equilibrium exists. In the second scenario, the pro-minority power-switching equilibrium under unanimity rule achieves greater long-term welfare than the pro-majority power-switching equilibrium under majority rule. In the latter equilibrium, the majority-type incumbents set admission standards for their own type low enough to keep control of the club, exacerbating the intertemporal free-riding problem; while in the former equilibrium, both types of candidates face admission standards that are quite stringent, which helps overcome the intertemporal free-riding problem and improves long-term welfare. Second, when the club is relatively congruous, unanimity voting allows both types of incumbent members in a contentious state to raise the admission standards for candidates of the opposite type, but the admission standards are not high enough to cause stalemates. Thus, compared with the inefficiently low admission standards in the harmonious equilibrium, politicking by incumbent members can result in more efficient admission standards and thus greater long-term welfare.

Real-world organizations that fit our stylized model include academic departments, social clubs, professional societies, condominium associations, and partnership firms, etc. Our paper has two interesting implications about organizational design for such organizations. First, we provide a new rationale for the optimality of unanimity voting rule and for consensus-based decision-making requirements. Although unanimity voting may involve long decision processes, these processes result in a relatively balanced power structure and reasonably high admission standards for candidates of both types, which are good for the long-term welfare of the organization. Second, our finding suggests that there is an optimal degree of organizational incongruity. In a homogeneous organization, it is easy to make decisions but people tend to shirk in searching for high quality candidates. However, in a highly divided organization, internal politicking is so intense that decision-making processes are long and costly. A good organizational design should avoid these two extremes by trying to achieve the right degree of incongruity.

The rest of the paper is organized as follows. The next section reviews the literature. Section II presents the model and the solution concept, and Section III solves for two benchmarks: the first best solution of the model and the harmonious equilibrium in a politics-free club. In Section IV, we solve for the symmetric Markov equilibria under both majority and unanimity voting rules. Section V derives the optimal voting rule and other implications for organizational design, and Section VI contains discussions and concluding remarks.

I. Related Literature

To model dynamic interactions between internal politics and admission of new members, we draw on both collective search literature and dynamic club formation literature.

The dynamic club formation literature stems from the seminal work of Roberts (2015), who studies a dynamic model of club formation in which current members of the club vote by majority rule on whether to admit new members from a fixed population of potential members.[2] Roberts defines Markov Voting Equilibrium (MVE) in this setting, and develops techniques to show the uniqueness of MVE and analyze the steady state of MVE. The theoretical analysis has been widely applied to investigate how distribution of political power evolves over time in contexts such as immigration law, suffrage, and constitutional rules (e.g., Jehiel and Scotchmer 2001; Lizzeri and Persico 2004; Jack and Lagunoff 2006; and Acemoglu, Egorov, and Sonin 2010, 2012, 2015). Our paper differs from this literature in several aspects. First, the existing literature focuses on how the club size is determined and who will be included in the club or excluded from it, while we study a dynamic club formation problem with a fixed club size. We are interested in the long-term power structure of the club, not the identities of the club members. Second, the existing literature is mostly abstract regarding what the club actually does besides voting on membership changes, while we embed a collective search problem in the dynamic club formation process to study how internal politics affects the search incentives of club members. Third, the existing literature emphasizes positive analysis of the evolution of club formation, while we develop a model with more payoff structures to allow for normative analysis of the optimal voting rule and of other issues of organizational design.[3]

In the collective search literature (see, e.g., Albrecht, Anderson, and Vroman 2010; Compte and Jehiel 2010; Moldovanu and Shi 2013), researchers consider a search problem where a *once-and-for-all* decision to stop searching is made by a voting committee that sequentially examines each available option. Committee members have different fixed preferences over the options, and collective decisions are made according to a prespecified voting rule. A main focus of this literature is to compare collective search with single-agent search, and to examine how committee composition and decision rules affect search outcomes. Differing from this literature, our paper studies an *infinitely repeated* problem of collective search in which the formation of the voting committee endogenously changes over time. In our model, the value of admitting a candidate to an incumbent member is endogenous, in the

[2] Models with other voting rules are considered in Barberà, Maschler, and Shalev (2001) and Granot, Maschler, and Shalev (2003).

[3] Acemoglu, Egorov, and Sonin (2010) also present a normative investigation of how the degree of incumbency veto power affects the quality of government, which is a very different question from ours.

sense that the change in power structure brought about by admitting him affects how members make future admission decisions and hence affects future payoffs.

In the literature, Schmeiser (2012) is most closely related to our paper. Schmeiser also considers a model in which existing board members vote to admit a new member to replace a randomly retired member. But unlike our model, in each period, two candidates are simultaneously observed: one insider and one outsider, and the organization must hire one of them. Therefore, there is no collective search, which is essential to our analysis and drives the intertemporal free-riding problem.

II. The Game

A. *Model Setup*

We consider an infinite-horizon game in discrete time indexed by $t = 0, 1, 2, \ldots$. There is a club of fixed size $N = 3$.[4] In each period t, one of the incumbent members is chosen randomly to exit the club, and before this exit occurs, the three members must select one new member from a large pool of outside candidates who want to join the club. All of the players are risk-neutral and maximize their expected utility. For simplicity, we assume there is no discounting.[5] We also normalize the outside option for each player to zero.

A player, either an incumbent member or a candidate, is characterized by his quality and his type. A player's quality, denoted by v, represents the skills, prestige, or resources that he can bring to the club and is valuable to the whole club. We suppose that a player of quality v brings a common value of v per period to *every member* of the club including himself, so his total contribution to the club value per period is $3v$. Players in the population differ in quality. For the population, suppose v is distributed according to a uniform distribution function $F(v)$ on $[\underline{v}, \overline{v}]$, where $0 \leq \underline{v} < \overline{v}$. When, in a given period, the club's members have qualities v_k, $k \in \{1, 2, 3\}$, each member's benefit from club membership in that period is $V = \sum_{k=1}^{3} v_k$.

Aside from quality heterogeneity, players belong to one of two types, "left" type and "right" type, and each type is equally represented in the population. Players' types are exogenously given and cannot be changed afterwards.[6] Type is important because club politics are centered on such characteristics. We consider a situation with distributive politics in the following sense. In each period, there is a fixed amount of total rent B in the club to be distributed to its members. We suppose for simplicity that members of the majority type share the rent equally among themselves.[7]

[4] The collective search model with heterogeneous committee member types and multidimensional candidates is in general very complicated to solve analytically. For example, Compte and Jehiel (2010) focuses on the limiting

advantage of this to admit his favored candidate with higher probability. It can be shown that the "pro-minority power-switching" equilibrium is the unique (hence trivially the most efficient) equilibrium when c is small, as stated in Proposition 4(i).

Proposition 4(ii) gives the range of c in which the pro-majority power-switching equilibrium is the most efficient, by combining the ranges of c in which it dominates either the pro-minority power-switching equilibrium or the glass-ceiling equilibrium, or both.[21] Both pro-majority and pro-minority power-switching equilibria exist when the degree of incongruity c falls into an intermediate range $(10/29 < c < 2/3)$. This coexistence is like a Game of Chicken. In contentious states, the minority-type incumbent will be tough on majority candidates if he expects the majority-type incumbents to be soft on minority ones, which leads to the pro-minority power-switching equilibrium, and vice versa. When both exist, the efficiency comparison of the two equilibria depends on the degree of incongruity. For a small range of c $(10/29 < c < 0.47)$, both equilibria exist, but the pro-minority power-switching equilibrium dominates in efficiency. This case is included in Proposition 4(i). As c increases, in the pro-minority power-switching equilibrium, the minority-type incumbent keeps raising the admission standard for the majority-type candidates in contentious states (see Figure 1), resulting in greater and greater welfare loss. On the contrary, in the pro-majority power-switching equilibrium, when c increases, the distortion of admission standards by the majority-type incumbents does not increase as fast as the distortion by minority-type incumbents in the pro-minority power-switching equilibrium, because it is less likely that the majority-type incumbents will lose power than that the minority-type incumbent will gain power in contentious states. Therefore, for $c > 0.47$, when both exist, the pro-majority power-switching equilibrium dominates the pro-minority power-switching equilibrium in efficiency.

As in the case of majority voting (Proposition 3), the welfare comparison between the pro-majority power-switching equilibrium and the glass-ceiling equilibrium favors the former for relatively small c $(c < 1.97)$. The intuition is exactly the same as in the case of majority voting, but this region is much larger in the case of unanimity voting. Under majority rule, the pro-majority power-switching equilibrium ceases to exist when c is larger than 0.43, but under unanimity rule, this equilibrium exists for a much wider range of c.

The pro-majority power-switching equilibrium continues to exist even when c is very large. But Proposition 4(iii) says that for sufficiently large c, the most efficient equilibrium is the glass-ceiling equilibrium, which can be viewed as an extreme of the pro-majority power-switching equilibrium. Intuitively, when internal politics are very important, in contentious states, the majority-type incumbents are reluctant to admit candidates of the opposite type because they expect that power will be difficult to regain once they lose it, and the minority-type incumbent wants to insist on high standards for candidates of the majority type because control over rent allocation is too important to give up. Thus, there will be large political costs in contentious states. And this will make incumbents in homogeneous states hesitant to admit

[21] For some range of c, there exist other types of equilibria that are easily dominated. Proposition A.1 in the online Appendix provides a complete equilibrium characterization under unanimity voting.

candidates of the opposite type. Therefore, as the club becomes very incongruous, candidates will face very stringent admission standards (except those of the same type as the incumbents in homogeneous states), and hence the club experiences inefficiently long delays in selecting new members. As a result, for sufficiently large c, the most efficient equilibrium switches to the glass-ceiling equilibrium, which mitigates internal politics by eliminating the chance of the minorities having a say.

V. Optimal Voting Rule and Organizational Design

Using the equilibrium characterization results of the preceding section, in this section we investigate the optimal voting rule and other organizational design issues. Naturally, we suppose that the founder or social planner of the club adopts the voting rule that yields the greatest long-term welfare for the club.

Equation (A.5) in the online Appendix gives the definition of long-term welfare for the club. It can be shown that the welfare function in the cases we are interested in can be expressed as

$$U = 3Ev + \frac{3}{2}a + \tau - 2\sqrt{a\tau}\,\gamma,$$

where γ summarizes the total long-term expected welfare of the club in each case. Aside from the model's parameters, the welfare function of the club depends only on γ: the smaller γ is, the more efficient it is for the club. This greatly simplifies our welfare caparison.

It can be calculated that in the first best solution $\gamma^* = \sqrt{6}/2$, and in the harmonious equilibrium $\hat{\gamma} = \sqrt{2} > \gamma^*$. In the case of majority voting,

$$\gamma^m \equiv 4q_3/\left(y_3^r + y_3^l\right) + 4q_2/\left(y_2^r + y_2^l\right),$$

where q_3 (q_2) is the long-term stationary probability of the club being in the right-homogeneous (majority) state, and $y_i^{b'} = x_i^{b'}\sqrt{a/\tau}/2$ is the normalized admission probability of a candidate of type $b' = l, r$ in state i.

In the unanimity voting case, we have

$$\gamma^u \equiv 4q_3/\left(y_3^r + y_3^l\right) + q_2\left(1 + 3\left(y_1^l\right)^2 + 3\left(y_2^l\right)^2\right)/\left(y_1^l + y_2^l\right).$$

From the above expressions, we can calculate the expected welfare loss in each case and obtain the following result.

PROPOSITION 5:

(*i*) *For every c, the club can achieve greater or equal long-term welfare under unanimity voting than under majority voting.*

(*ii*) *Under majority voting, the club cannot achieve greater long-term welfare than it can in the harmonious equilibrium.*

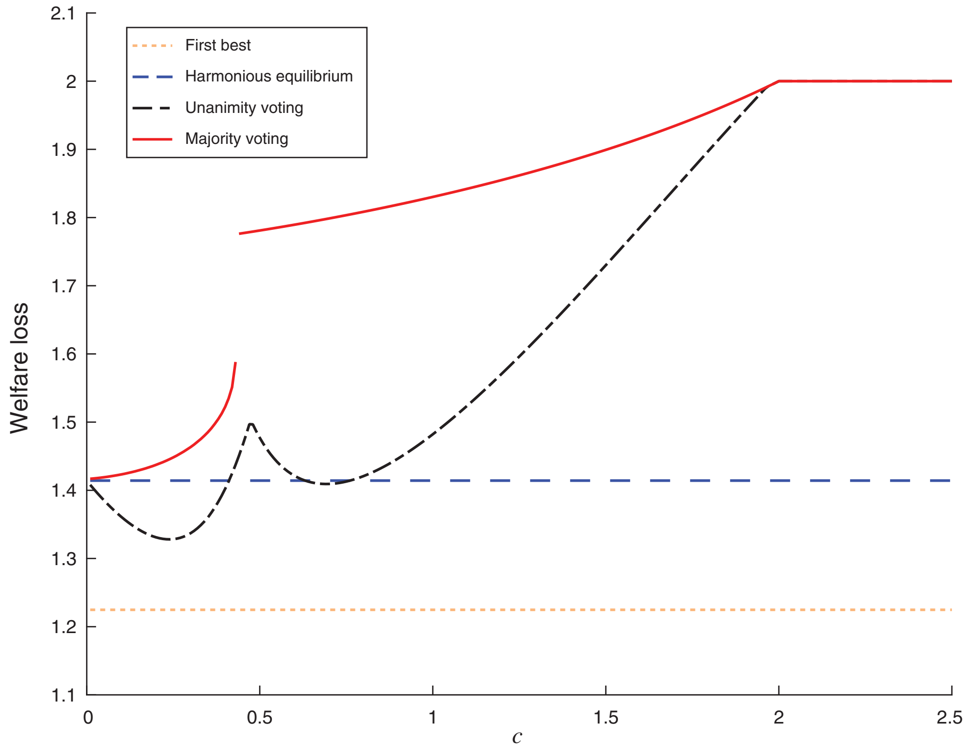

Figure 2. Long-Term Welfare Loss in the Most Efficient Equilibrium

(*iii*) *For* $c < 0.42$, *under unanimity voting the club can achieve higher long-term welfare than in the harmonious equilibrium. At* $c = 0.24$, *the club achieves the greatest long-term welfare under unanimity voting.*

Figure 2 illustrates the comparison of welfare losses γ in different cases. Evidently, welfare loss is never lower under majority voting than under unanimity voting. Thus, Proposition 5(i) says that unanimity voting is better than majority voting when the club's admission of new members is influenced by internal politics. As can be seen in Figure 2, unanimity voting outperforms majority voting in two scenarios. First, when $c < 0.43$, the pro-minority power-switching equilibrium under unanimity rule achieves greater long-term welfare than the pro-majority power-switching equilibrium under majority rule. As shown in Figure 1, candidates of both types face stringent admission standards in the pro-minority power-switching equilibrium under unanimity voting, while candidates of the majority type are admitted with a much lower standard in the pro-majority power-switching equilibrium under majority voting. As a result, by giving both types of incumbent members more balanced power in admitting new members, unanimity voting can avoid straightforward favoritism by the majority-type incumbents and motivate all members to search for high quality candidates. Secondly, for $c \in (0.43, 1.97)$, the most efficient equilibrium under unanimity voting is the power-switching one, but majority rule only allows the glass-ceiling equilibrium, which is much less efficient. Intuitively, majority voting gives the majority-type incumbent members unlimited power to exclude the opposite type candidates. Thus, as the stake of internal politics becomes large, they will simply set a glass ceiling to exclude the opposite type and keep control of the club firmly in their own hands.

Proposition 5(ii) says that majority voting always yields lower long-term welfare than the harmonious equilibrium. As shown in Corollary 1, in either the pro-majority power-switching or the glass-ceiling equilibrium, admission standards are biased relative to those in the harmonious equilibrium in that candidates of one type face a much lower standard than that applied to candidates of the other type. Thus, as the welfare loss function is convex in admission standards, the divergence of admission standards for the two types of candidates (relative to that in the harmonious equilibrium) leads to lower long-term welfare under majority voting than does the harmonious equilibrium.

As is also evident from Figure 2, Proposition 5(iii) says that for $c < 0.42$, the pro-minority power-switching equilibrium under unanimity voting yields greater long-term welfare than does the harmonious equilibrium. The reason can be clearly seen in Figure 1, as the admission standards for both types of candidates are higher in the pro-minority power-switching equilibrium than in the harmonious equilibrium. When internal politics are mild, under unanimity voting both types of incumbent members will set stringent standards to admit candidates of the opposite type, which helps offset the intertemporal free-riding problem in the harmonious equilibrium.

We should point out that the superiority of unanimity voting in our model crucially depends on our focus on the most efficient equilibria. Unanimity voting is more likely to have multiple equilibria than majority voting because coordination between different members in the same generation and across generations is more important. Thus, whether a unanimity voting rule is good for the club depends on whether the club members can manage to select the best equilibrium. If they fail to do so, unanimity voting can lead to worse outcomes than majority voting.[22]

By showing that unanimity rule dominates majority rule, Proposition 5 provides a new rationale for unanimity voting. In the common-value voting literature, unanimity voting is found to be an inferior collective decision mechanism (see, e.g., Feddersen and Pesendorfer 1998). These different results should not be viewed as contradictory because the contexts are quite different. In our model, voting is used to aggregate preferences in a collective search situation, while the common-value voting literature considers information aggregation in collective decisions.[23] Another common criticism of committee decision making is that it causes inefficiently long delays in reaching agreements,[24] and clearly delays will be the longest under unanimity voting. Our analysis shows that in the presence of internal politics, unanimity

[22] In the online Appendix, we characterize all different kinds of equilibria under unanimity voting. For $c > 1.97$, there still exists a power-switching equilibrium under unanimity voting, in which incumbents of the two types engage in intensive politicking and create very long delays in the admission of a new member. It is shown that such an equilibrium is worse than the glass-ceiling equilibrium under majority voting.

[23] It would be an interesting empirical question to distinguish preference aggregation from information aggregation in collective decisions, and to test the different predictions from the two theoretical perspectives.

[24] Such as "A committee is a thing which takes a week to do what one good man can do in an hour" by Elbert Hubbard.

voting is effective in motivating members to engage in costly search and thus increases the club's long-term welfare. Indeed, it takes longer to reach a decision under unanimity voting than under majority voting in our model, but this is actually good for the organization (although not necessarily for individual members who have to incur personal delay costs).[25]

Our analysis suggests that organizations may benefit from requiring important decisions to be made by consensus. For example, university administrations quite often approve senior hiring proposals by academic departments only if those proposals have had super-majority or even unanimous support from the departments; a mere majority support is usually perceived as a weak signal by university administrations. Similarly, in many partnership firms, new partners may only be admitted by unanimous vote of the existing partners. A casual argument for such requirements is that even though decision-making processes may take a long time in organizations that emphasize consensus building, they tend to make better decisions as all members are involved in decision making and tend to be more balanced as no group of members can dominate by forming a majority coalition. Our analysis provides conditions under which such requirements are indeed optimal.[26]

Our results also suggest that there is an optimal degree of organizational incongruity. In a homogeneous organization, it is easy to reach agreements but members tend to shirk in their efforts at making important decisions for the organization due to the intertemporal free-riding problem. However, in a highly divided organization, internal politicking is so intense that decision-making processes are exceedingly long and costly, and the organization eventually becomes perpetually dominated by one type. A good organizational design should avoid these two extremes by trying to achieve the right degree of incongruity.[27] In other words, internal politics, whereby members of an organization compete for discretionary rents, if designed properly, can be a useful incentive instrument. In such cases, the organization will remain balanced over time and members of different types will be engaged in making the important decisions of the organization, resulting in better decisions and better long-term outcomes for the organization.[28]

[25] Albrecht, Anderson, and Vroman (2010) also show that unanimity voting is optimal in a collective search model, but in a limiting sense when search cost per round goes to zero (in their model the discounting factor between search rounds goes to one).

[26] For another example, due to cultural influences, firms in Japan, Korea, and other East Asian countries tend to emphasize consensus building as a distinct trait of corporate culture. In some Japanese companies, agreement is normally obtained by circulating a document that must first be signed by the lowest level manager, and then upward, and may need to be revised, and the process may have to start over again (Verma 2009). As argued by Ouchi (1981), the consensus-based decision-making style in Japan improves firm performance, which is supported by several empirical studies (see, e.g., Dess 1987). However, other factors not considered here can be important in optimal corporate decision-making structures. For instance, consensus decision-making tends to be more conservative and less likely to take risks, which may or may not be an advantage depending on the environment.

[27] In an interesting study, Milliken and Martins (1996) finds that diversity has negative effects on group outcomes early in a group's life, but after this stage, once a certain level of behavioral integration has been achieved, groups may be able to obtain benefits from diversity.

[28] Consider, for example, an academic department that is recruiting new faculty members. Our analysis suggests that in order to achieve the right degree of incongruity, the department can change the minimum requirement for a candidate to qualify for consideration (corresponding to a), the number of profiles that must be read by the recruiting members (corresponding to τ), and the amount of discretionary resources (corresponding to B).

VI. Discussions and Concluding Remarks

In this paper, we build an infinite-horizon dynamic model to study the interactions between an organization's internal politics and its admission decisions. Among other things, we find that it is beneficial for organizations to build consensus in the presence of internal politics, that is, unanimity voting does a better job than majority voting in terms of long-term welfare. In addition, internal politics can be a useful incentive instrument in organizational design: organizations with a certain degree of incongruity perform better in the long run than either harmonious or very divided organizations under unanimity voting.

To simplify the welfare comparison, we consider a model with distributive politics, in which the total rent in each period is constant and is shared by the majority-type incumbents, so that the type profile of the club does not affect welfare directly. This naturally raises the concern about whether our main results are driven by rent dilution in homogeneous states. In the online Appendix, we study extensions where each incumbent majority member receives a fixed amount of rent. One such example is where the two most senior members share the rent in homogeneous states. This example also addresses the concern that within-type equal sharing rule is not incentive-compatible in homogeneous states because two members have incentives to form a coalition and exclude the other one from sharing the rent. We show that in these extensions, most of the findings regarding long-term welfare are similar to the baseline model.

In the online Appendix, we consider another extension where rent is distributed via Nash bargaining. In homogeneous states, each member has equal bargaining power $1/3$, implying that rent is shared equally among them; in contentious states, majority members have equal bargaining power $\nu \in \left(1/3,\, 1/2\right]$, while the minority member has bargaining power $1 - 2\nu$. We assume that $\nu > 1/3$ to capture the benefits of internal politics. It turns out that this extension is exactly isomorphic to our baseline model if we redefine $c = \frac{\left(\nu - \frac{1}{3}\right)B}{2\sqrt{a\tau}}$ (in our model, $\nu = 1/2$ and this coincides with our expression of the degree of incongruity). Therefore, our main findings regarding long-term welfare are also robust to this extension. This extension has another interesting implication on organizational design: even when the parameters a, τ, and B are all exogenous, the organization can still achieve the right degree of incongruity by adjusting the value of ν. In particular, Proposition 5(iii) implies that the optimal ν is $1/2$ when $\frac{B}{12\sqrt{a\tau}} < 0.24$, and is $\frac{0.48\sqrt{a\tau}}{B} + \frac{1}{3}$ otherwise. These robustness analyses indicate that our main results are not driven by rent dilution in homogeneous states. Instead, they are mainly built on the fact that majority and minority members receive different amounts of rent in contentious states.

Our model can be extended in various directions. In the online Appendix, we present several extensions, including models with different quality distributions, different discounting factors, and a larger club size. The main results of the baseline model are mostly robust in these extensions. It would also be interesting to consider other extensions in future research, such as the case where candidates can endogenously choose qualities by making human capital investments as in Athey, Avery, and Zemsky (2000) and Sobel (2000, 2001). Given the admission biases in the equilibria of the model, candidates of the two types will have different incentives to make human capital investments. An investigation of this setting may provide insight into when candidates of the types that are discriminated against will make greater (or smaller) human capital investments than candidates of the other type. Another possible extension would consider a model in which the benefits of club membership have two components, as in Esteban and Ray (2001). Besides the value that his quality provides to every member, a candidate may also bring an additional common value *only* to incumbent members of his type (e.g., a new theorist benefits incumbent theorists in a department). Finally, our model can be also extended to add other interesting factors such as competition among organizations for members as in Prüfer and Walz (2013) or learning about the members' preferences as in Strulovici (2010).

Appendix

A. *Equilibrium Analysis under Majority Voting*

Under majority voting, consider a right-type incumbent member A. The left-type incumbent's expected search payoff can be calculated similarly to that of member A. From Section IIB, we only need to solve A's search payoff where the subscript i denotes the current state, the superscript R denotes A's type, and the admission policy σ is suppressed to simplify notation.

In state $i = 2$, if the club admits a right-type candidate with quality v^r in the first selection round, A's expected search payoff is

$$\pi_2^R(v^r, yes) = \frac{2}{3}\left[v^r + \frac{1}{2}\left(\frac{B}{2} + \frac{1}{2}v^r + \pi_2^R\right) + \frac{1}{2}\left(\frac{B}{3} + \frac{1}{2}v^r + \pi_3^R\right)\right]. \tag{A.1}$$

Equation (A.1) can be further simplified as

$$\pi_2^R(v^r, yes) = v^r + \frac{5B}{18} + \frac{1}{3}\pi_2^R + \frac{1}{3}\pi_3^R,$$

which again implies that the expected value to incumbent member A if a candidate with quality v^r is admitted is v^r.

Similarly, in state $i = 2$, if a left-type candidate with quality v^l is admitted, a right-type incumbent member A's expected π_2^R is

$$\pi_2^R(v^l, \text{yes}) = v^l + \frac{1}{3}\pi_1^R + \frac{1}{3}\left(\frac{B}{2} + \pi_2^R\right). \tag{A.2}$$

In state $i = 3$, member A's expected search payoff from admitting a left-type candidate with quality v^l or a right-type candidate with quality v^r can be calculated as follows:

$$\text{(A.3)} \qquad \pi_3^R\left(v^l, yes\right) = v^l + \frac{B}{3} + \frac{2}{3}\pi_2^R, \quad \pi_3^R(v^r, yes) = v^r + \frac{2B}{9} + \frac{2}{3}\pi_3^R.$$

If a candidate is rejected by the club, no matter what the type or quality of the candidate is, a type $b \in \{L, R\}$ incumbent member's search payoff simply becomes $\pi_i^b - \tau$.

Notice that under majority voting, the block of right-type incumbents decide the admission policy (v_i^l, v_i^r) in state $i = 2, 3$. As a result, equation (5) implies:

$$\text{(A.4)} \quad \pi_i^R = E\left[\frac{1}{2}\max\left\{\pi_i^R(v^r, yes), \pi_i^R - \tau\right\} + \frac{1}{2}\max\left\{\pi_i^R\left(v^l, yes\right), \pi_i^R - \tau\right\}\right],$$

where $\pi_i^R(\cdot, yes)$ is defined by equations (A.1) through (A.3).

Given the equilibrium admission policy (v_i^l, v_i^r), we can now calculate the expected search payoff of a type $b \in \{R, L\}$ incumbent member in state i as follows:

$$\text{(A.5)} \qquad \pi_i^b = 0.5\left[\int_{v_i^r}^{\overline{v}} \pi_i^b(v_i^r, yes)\, dF(v_i^r) + F(v_i^r)\left(\pi_i^b - \tau\right)\right.$$
$$\left. + \int_{v_i^l}^{\overline{v}} \pi_i^b\left(v_i^l, yes\right) dF\left(v_i^l\right) + F\left(v_i^l\right)\left(\pi_i^b - \tau\right)\right].$$

PROOF OF PROPOSITION 3 STEP (i): Characterizing the Power-Switching Equilibrium

Under majority voting rule, the first possibility is that both types of candidates are admitted in state 2. Then condition (4) is satisfied with equality for $i = 2, 3$ and $b' = l, r$. After some algebra calculation, we have

$$\text{(A.6)} \qquad \frac{2}{3}\left[\frac{3}{2}\, v_3^r + \frac{B}{3} + \pi_3^R\right] = \pi_3^R - \tau;$$

$$\text{(A.7)} \qquad \frac{2}{3}\left[\frac{3}{2}\, v_3^l + \frac{B}{2} + \pi_2^R\right] = \pi_3^R - \tau;$$

$$\text{(A.8)} \qquad \frac{2}{3}\left[\frac{3}{2}\, v_2^r + \frac{5B}{12} + \frac{1}{2}\, \pi_2^R + \frac{1}{2}\, \pi_3^R\right] = \pi_2^R - \tau;$$

$$\text{(A.9)} \qquad \frac{2}{3}\left[\frac{3}{2}\, v_2^l + \frac{B}{4} + \frac{1}{2}\, \pi_1^R + \frac{1}{2}\, \pi_2^R\right] = \pi_2^R - \tau.$$

By equation (A.5), we can obtain, for $i = 2, 3$ and $b = r$,

$$\text{(A.10)} \qquad \pi_3^R = \frac{\bar{v} - v_3^r}{3a}\left[\frac{B}{3} + \pi_3^R\right] + \frac{\left[\bar{v}^2 - (v_3^r)^2\right]}{4a} + \frac{v_3^r - \underline{v}}{2a}\left[\pi_3^R - \tau\right]$$
$$+ \frac{\bar{v} - v_3^l}{3a}\left[\frac{B}{2} + \pi_2^R\right] + \frac{\left[\bar{v}^2 - \left(v_3^l\right)^2\right]}{4a} + \frac{v_3^l - \underline{v}}{2a}\left[\pi_3^R - \tau\right];$$

$$\text{(A.11)} \quad \pi_2^R = \frac{\bar{v} - v_2^r}{3a}\left[\frac{5B}{12} + \frac{1}{2}\pi_2^R + \frac{1}{2}\pi_3^R\right] + \frac{\left[\bar{v}^2 - (v_2^r)^2\right]}{4a} + \frac{v_2^r - \underline{v}}{2a}\left[\pi_2^R - \tau\right]$$
$$+ \frac{\bar{v} - v_2^l}{3a}\left[\frac{B}{4} + \frac{1}{2}\pi_1^R + \frac{1}{2}\pi_2^R\right] + \frac{\left[\bar{v}^2 - \left(v_2^l\right)^2\right]}{4a} + \frac{v_2^l - \underline{v}}{2a}\left[\pi_2^R - \tau\right].$$

Also by equation (A.5), and using the fact that $\pi_2^L = \pi_1^R$, we have

$$\text{(A.12)} \qquad \pi_1^R = \frac{\bar{v} - v_2^r}{3a}\pi_1^R + \frac{\left[\bar{v}^2 - (v_2^r)^2\right]}{4a} + \frac{v_2^r - \underline{v}}{2a}\left[\pi_1^R - \tau\right]$$
$$+ \frac{\bar{v} - v_2^l}{3a}\left[\frac{B}{2} + \pi_2^R\right] + \frac{\left[\bar{v}^2 - \left(v_2^l\right)^2\right]}{4a} + \frac{v_2^l - \underline{v}}{2a}\left[\pi_1^R - \tau\right].$$

Thus, we have a system of seven equations (A.6)–(A.12) with seven unknowns:

$$v_2^r,\ v_2^l,\ v_3^r,\ v_3^l,\ \pi_1^R,\ \pi_2^R,\ \pi_3^R.$$

Substituting (A.6) and (A.7) into (A.10) and simplifying, we can get $4a\tau = (\bar{v} - v_3^r)^2 + (\bar{v} - v_3^l)^2$. Using our variable transformation $x_i^{b'} \equiv (\bar{v} - v_i^{b'})/a$, we have

$$\text{(A.13)} \qquad (x_3^r)^2 + \left(x_3^l\right)^2 = 4\tau/a.$$

Similarly, substituting equations (A.8) and (A.9) into (A.11) and simplifying, we can get $4a\tau = (\bar{v} - v_2^r)^2 + (\bar{v} - v_2^l)^2$, or

$$\text{(A.14)} \qquad (x_2^r)^2 + \left(x_2^l\right)^2 = 4\tau/a.$$

From equations (A.6), (A.7), and (A.9), we can get

$$\pi_3^R = \frac{2B}{3} + 3\tau + 3v_3^r;$$

$$\pi_2^R = \frac{B}{2} + 3\tau + \frac{9}{2}v_3^r - \frac{3}{2}v_3^l;$$

$$\pi_1^R = \frac{B}{2} + 3\tau + 9v_3^r - 3v_3^l - 3v_2^l.$$

Substituting π_3^R and π_2^R into (A.8) gives $B/6 = 2v_3^r - v_3^l - v_2^r = (\bar{v} - v_2^r) + (\bar{v} - v_3^l) - 2(\bar{v} - v_3^r)$. Thus,

$$x_2^r + x_3^l - 2x_3^r = \frac{B}{6a}. \tag{A.15}$$

Substituting π_1^R, π_2^R into (A.12) and manipulating terms, we can obtain

$$\left(x_2^r + x_2^l\right)B/a = 3x_2^r x_3^r + 3x_2^l x_3^l + 6x_2^l x_2^r - 12\left(x_2^l\right)^2. \tag{A.16}$$

Thus, we have four equations (A.13)–(A.16) and four unknowns: x_3^r, x_3^l, x_2^r, and x_2^l. To further simplify things, let $y_i^{b'} = x_i^{b'}\sqrt{a/\tau}/2$, for $i = 1, 2, 3, 4$ and $b' = l, r$. Define $c = B/(12\sqrt{a\tau})$. Then (A.13)–(A.16) become

$$\begin{aligned} (y_3^r)^2 + \left(y_3^l\right)^2 &= 1; \\ (y_2^r)^2 + \left(y_2^l\right)^2 &= 1; \\ y_2^r + y_3^l - 2y_3^r &= c; \\ y_2^r y_3^r + y_2^l y_3^l + 2y_2^l y_2^r - 4\left(y_2^l\right)^2 &= 2c\left(y_2^r + y_2^l\right). \end{aligned} \tag{A.17}$$

By the first two equations of (A.17), all $y_i^{b'}$ must be in $(0,\ 1)$. A solution to (A.17) must also have the following properties:

CLAIM 1: *If* $c = 0$, *then* $y_i^{b'} = \sqrt{2}/2$ *is a solution that coincides with the harmonious equilibrium.*

PROOF:

It is easy to check that $y_i^{b'} = \sqrt{2}/2$ is a solution to (A.17) when $c = 0$. Then $x_i^{b'} = 2y_i^{b'}\sqrt{\tau/a} = \sqrt{2\tau/a}$

than the other four $\hat{x}_i^{b'}$. Noting that at least one $\hat{x}_2^{b'}$ should be positive (otherwise in state 2 the club will not hire any candidate and will receive an expected utility of $-\infty$), we see that $\hat{x}_3^r$ and $\hat{x}_3^l$ must be positive. Then we have $x_3^r = \hat{x}_3^r$, $x_3^l = \hat{x}_3^l$ and $\max\{x_1^r, x_2^l, x_2^r, x_1^l\} = \max\{\hat{x}_1^r, \hat{x}_2^l, \hat{x}_2^r, \hat{x}_1^l\} < \min\{\hat{x}_3^r, \hat{x}_3^l\} = \min\{x_3^r, x_3^l\}$. Also notice that equation (A.26) is always valid whether the standard is greater than $\bar{v}$ or not. So we have the same contradiction as in part (c) above. ∎

PROOF OF PROPOSITION 4:

Using Lemma A.2 and Proposition A.1, we can easily get the following results:

$$(x_2^r)^2 + \left(x_2^l\right)^2 = \frac{4\tau}{a} + \left(x_2^r - x_1^l\right)^2; \tag{A.30}$$

$$(x_1^r)^2 + \left(x_1^l\right)^2 = \frac{4\tau}{a} + \left(x_1^r - x_2^l\right)^2. \tag{A.31}$$

So for solutions with quality standards lower than $\bar{v}$, we have six equations (A.13), (A.23)–(A.25), and (A.30)–(A.31), and six unknowns $x_3^r, x_3^l, x_2^r, x_2^l, x_1^r, x_1^l$. Let

$$y_i^j = \sqrt{\frac{a}{4\tau}}\, x_i^j, \quad c = \frac{B}{12\sqrt{a\tau}}.$$

Then we can get a system of equations concerning $y_3^r, y_3^l, y_2^r, y_2^l, y_1^r, y_1^l$:

$$\begin{aligned}
(y_3^r)^2 + \left(y_3^l\right)^2 &= 1;\\
y_2^r + y_3^l - 2y_3^r &= c;\\
y_3^r - y_2^l + y_2^r - y_1^l &= 2c;\\
y_2^l + y_1^r - 2y_1^l &= 3c;\\
(y_2^r)^2 + \left(y_2^l\right)^2 &= 1 + \left(y_2^r - y_1^l\right)^2;\\
(y_1^r)^2 + \left(y_1^l\right)^2 &= 1 + \left(y_1^r - y_2^l\right)^2.
\end{aligned}$$

Unlike the majority voting case, some of the y_i^b can be higher than one. There may be multiple solutions to the system of equations. The first possibility is the pro-minority power-switching equilibrium such that $y_1^l < y_2^l$. In particular, as y_1^l goes to zero, both y_2^l and y_1^r go to one from the last two equations of the above system of equations. Then, $y_2^l + y_1^r - 2y_1^l = 3c$ implies that c has to be smaller than $2/3$ to guarantee that such an equilibrium exists. For $c \leq 2/3$, we can solve the system of equations numerically. The second possibility is the pro-majority power-switching equilibrium such that $y_1^l > y_2^l$. In particular, as y_2^l goes to zero, both y_1^l and y_2^r go to one from the last two equations of the above system of equations. Note that c has to be larger than $10/29$ to guarantee that such an equilibrium exists. For $c \geq 10/29$, we can also solve the system of equations numerically.

There can also be an equilibrium such that the equilibrium quality standards are $\bar{v}$. In particular, consider the glass-ceiling equilibrium where $\tilde{v}_2^l = v_2^l = \bar{v}$. Then the following inequality must be satisfied:

$$\text{(A.32)} \qquad \frac{2}{3}\left[\frac{3}{2}\bar{v} + \frac{B}{4} + \frac{1}{2}\pi_1^R + \frac{1}{2}\pi_2^R\right] \leq \pi_2^R - \tau.$$

By the fact that $x_2^l = 0$ and equations (A.30)–(A.31), we can easily derive

$$x_2^r = x_1^l = \sqrt{\frac{4\tau}{a}} \quad \text{or} \quad y_2^r = y_1^l = 1.$$

Therefore, the admission criterion in contentious states is exactly the same as the one in the majority voting case. Hence, we obtain the same expressions for values π_3^R, π_2^R, and π_1^R, and the admission criterion in homogeneous states is also exactly the same as the one in the majority voting case:

$$y_3^r = \frac{1}{5}\left(\sqrt{4 + 2c - c^2} - 2c + 2\right);$$

$$y_3^l = \frac{1}{5}\left(2\sqrt{4 + 2c - c^2} + c - 1\right).$$

Similar to the argument in step (ii) of the proof of Proposition 3, we need $c > 10/29$ to guarantee inequality (A.32). Other types of equilibria may also exist under unanimity voting. For example, there may be an equilibrium such that in contentious states, only candidates of the minority type are admitted. But since the welfare of these equilibria cannot exceed that in the glass-ceiling equilibrium, we omit the discussion of these equilibria. (See the online Appendix for a complete equilibrium characterization.)

Finally, the long-term welfare under unanimity voting rule is given by

$$U^u = 3Ev + \frac{3}{2}a + \tau - 2\sqrt{a\tau}\,\gamma^u,$$

where $\gamma^u \equiv \frac{4q_3}{y_3^r + y_3^l} + \frac{q_2}{y_1^l + y_2^l}\left(1 + 3(y_1^l)^2 + 3(y_2^l)^2\right)$. Comparing the welfare of different equilibria gives us the proposition. In particular, we numerically find that the pro-minority power-switching equilibrium dominates the pro-majority power-switching equilibrium in efficiency when $c < 0.47$, and vice versa; the pro-majority power-switching equilibrium dominates the glass-ceiling equilibrium in efficiency when $c < 1.97$, and vice versa. ∎

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