Cooptation:

Meritocracy vs. Homophily in Organizations

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Abstract

The paper investigates factors that undermine meritocracy and policies that may restore it. To this purpose, it analyzes the Markovian dynamics, the entrenchment and the welfare properties of an organization whose members' cooptation decisions are driven by two motives: quality and homophily. It investigates policy interventions (affirmative action, quality assessment exercises, overruling of majority decisions) and analyzes when these have unintended consequences. The paper also generates a rich set of testable implications.

Keywords: Cooptation, organizations, Markov games, meritocracy, affirmative action, glass ceiling, assessment exercises.

JEL Codes: D7, C73, D02, M5.

1 Introduction

The selection of new members of a board of directors, a corporation, a cooperative, a trade or monetary union, an academic department or a polity, underlies institutional dynamics and determines whether the organization succeeds or is consigned to oblivion. New members most often are coopted[1], occasionally under constraints imposed by internal rules or external intervention.

In coopting new members, existing members are safely predicted to pursue their own agenda, raising the question of whether the organization takes on a life of its own or fulfills its primary mission. The process of cooptation indeed gives rise to three types of externalities: onto minority members, whose voice may not be heard; onto potential members, who may not benefit from equal opportunity; and onto society/third parties whom the organization is meant to serve. Will the organization go astray by reveling in clubishness and contravening meritocracy? If so, can we think of interventions that serve better either its members or its mission?

The paper analyzes the Markovian dynamics, the discrimination in hiring and promotion, and the welfare properties of an organization whose members' cooptation decisions are driven by two motives: quality and homophily. A preference for in-group membership (along gender, religion, ethnicity, politics, scientific field or approach, values, family, friendship, class loyalty or another dimension) creates a benefit from control and leads to various degrees of violation of meritocracy.

We consider the normative implications of our analysis. To be certain, entrenchment is not always bad. For instance, friendship circles for example are often based on homophily in tastes. But meritocracy seems to be violated in many other environments. Accordingly, the paper investigates policy interventions such as affirmative action, quality assessment exercises, or the overruling of majority decisions.

The paper's contribution is four-fold. First, for organizations of arbitrary size and with binary or continuous talent, it fully characterizes dynamic-game equilibria within a reasonable class and shows that these equilibria, when not unique, are Pareto-ranked. Second, and using if needed the Pareto criterion as an equilibrium selection device, it provides an analysis (the first to the best of our knowledge) of common policy interventions to promote meritocracy. The external overruling of hiring decisions requires constant monitoring of their rationale;

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[1]We focus on "cooptation" in the sense of "periodic selection of new members to join the group". A second and equally important acception of "cooptation", associated with Selznick (1948, 1949), argues that absorbing new elements in an organization can be a means of averting threats to its stability or existence. We refer to the literature building on Acemoglu and Robinson (2000)'s celebrated analysis on the extension of the franchise to avoid upheaval (threat-averting cooptation involves the entire threatening group in Acemoglu-Robinson, and only a sub-group in Bertocchi-Spagat 2001). We briefly discuss the link between the two meanings of "cooptation" in the conclusion.

occasional overruling backfires by increasing the majority's entrenchment, as the majority builds a larger buffer to reduce the probability of a shift in control. Financial rewards for quality (for example through research assessment exercises and research councils' grants) do not generate such super-entrenchment, but they must be targeted to where they have the most impact, that is organizations that are neither naturally entrenched nor naturally merito-cratic. Affirmative action reduces entrenchment but is welfare-reducing for organizations that are naturally meritocratic, and when candidates' talents are strongly correlated, for naturally entrenched organizations as well.

Third, the paper unveils multiple reasons why meritocracy is fragile, even under laissez-faire. In the basic model, a small increase in the relative homophily benefit can generate entrenchment, and even super- or full entrenchment if there is uncertainty about the ability to identify new hires' allegiance or about the future voting turnout. Furthermore, an inability to accurately assess the merits of out-group candidates (in technical domains) often leads to not considering them and to full entrenchment.

Fourth and relatedly, the analysis generates a rich set of testable implications. (a) Appointments are less likely to be meritocratic (i) when homophily benefits are large and members do not benefit much from their peers' quality, or quality is not much rewarded by the organization's governance; (ii) when members are more patient/have a longer time horizon; (iii) when policy interventions are occasional and induce the majority to build a buffer against a potential loss of control; (iv) when members can only assess the quality of candidates from their own group; (v) when uncertainty on voting participation or group allegiance induces the majority to shield itself from the risk of losing control by building a buffer; (vi) when unselected candidates can be recalled by the organization in the future. (b) In hierarchical organizations, meritocracy is more often violated at the senior than at the junior level, re-flecting the observation that minorities experience difficulties in rising beyond a certain level in the hierarchy. Even if in-group favoritism contributes to discrimination against minorities, it is not a priori obvious that it implies a lower rate of promotion for the latter and therefore a glass ceiling. We show nonetheless that a glass ceiling results from control being located at the senior level.

The paper concludes by discussing the related literature and alleys for future theoretical and empirical research. Omitted proofs can be found in the Online Appendix.

2   Model

There is an infinite time horizon with periods $t \in (-\infty, +\infty)$. The organization is com-posed of $N = 2k$ members. At the beginning of each period, one member of the organization, drawn randomly from the uniform distribution, departs. We denote by δ the "life-adjusted dis-
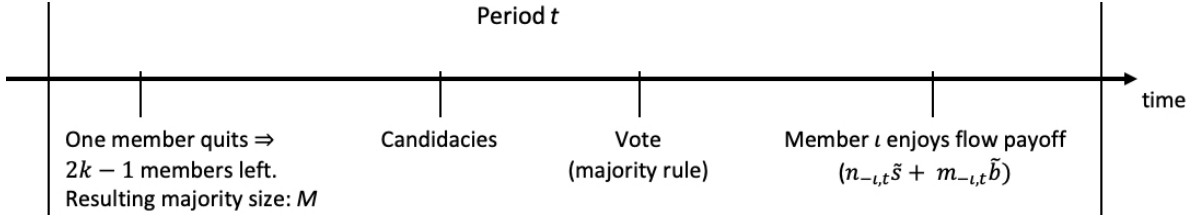
Figure 1: Timing.

count factor", i.e. the pure-time discount factor times the probability of being still a member of the organization in the following period: letting $\delta_0 \in (0,1)$ denote the pure-time discount factor, then $\delta \equiv \delta_0(1 - 1/N)$. The departure is immediately followed by a recruitment. The intra-period timing is summarized in Figure 1.

Each individual has a two-dimensional type. The vertical type captures ability or talent and takes one of two possible values $\{0, \tilde{s}\}$, where $\tilde{s} > 0$ is the incremental per-period contribution of a talented individual to each other member's payoff. The horizontal type stands for race/gender/tastes/opinions and can take two values $\{A, B\}$. A member of a given horizontal type exerts per-period externality $\tilde{b} > 0$ on members of the same type, but not on members of the opposite type, and this regardless of their talent.[2,3,4]

We thus assume that each member derives utility from:

(i) colleagues' ability, i.e. the vertical attributes of members of the organization,

(ii) homophily over tastes: ceteris paribus, each member prefers colleagues who share their horizontal type.

In each period, there are two candidates for the opening, one with the same horizontal type as the organization's majority, the other with the same horizontal type as the organization's minority. Candidates apply to become members only once[5]. The candidates' types are observable prior to the vote[6]. The two-candidate assumption involves no loss of generality as all

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[2]We refer to a majority member as "he", to a minority member as "she", to a generic organization member as "they" (using the classic form of the epicene singular pronoun), and to the principal – whenever there is one – as "it".

[3] The case $\tilde{b} < 0$, corresponding to *negative homophily* – e.g. envy towards the likes, or extreme preference for diversity, etc. (see for instance Bagues and Esteve-Volart 2010) – can be accommodated in our model. See Online Appendix P.

[4]Members may enjoy direct homophily benefits, associated with the desire of sharing identity (political or other) or interests (say, similar leisure activities) with fellow members. Homophily benefits may be more instrumental/ indirect. Having like-minded members on board allows one to weigh on organizational decisions and the sharing of private benefits: more committees are filled by in-group members and more suggestions favorable to the group are made. As an illustration, suppose that each member looks for a project and that search is optimally directed towards projects that favor the in-group more than the out-group (but are nonetheless rubberstamped by the out-group). Then homophily benefits are linear if projects are unrelated, and concave if there is rivalry among them (see remark below).

[5]We relax this "non-storability" assumption in Section 4.3.1. It is made in the baseline model for the sake of exposition, as we thereby avoid the introduction of a second state variable.

[6]We relax this assumption in Section 4.2.1.

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members of the organization always prefer the best candidate of a given horizontal type to any candidate of the same type but with lesser talent, and are indifferent if there are multiple "best" candidates of a given horizontal type.

Let $s \equiv \tilde{s}/[1 - \delta_0(1 - 2/N)]$ denote the expected incremental lifetime contribution of a new talented (relative to mediocre) addition to each current member of the organization[7]. We similarly denote by $b \equiv \tilde{b}/[1 - \delta_0(1 - 2/N)]$ the expected lifetime homophily utility for an incumbent member generated by a new in-group member. So, member ι receives date-t flow payoff

$$u_{\iota,t} = n_{-\iota,t}\tilde{s} + m_{-\iota,t}\tilde{b}$$

where $n_{-\iota,t} \leq N - 1$ is the number of talented colleagues and $m_{-\iota,t} \leq N - 1$ is the number of in-group colleagues at date t.[8]

The decision rule is the majority rule, with each of the $2k-1$ members of the organization at the time of the vote having one vote. We denote in the following the size of (number of individuals in) the majority by $M \in \{k, k+1, ..., 2k-1\}$. We will say that the majority is tight if $M = k$.

In order to make things interesting, we assume $s > b$. Otherwise, systematically voting for the majority candidate would yield the highest possible continuation payoff for the majority, and the majority would always move toward perfect homogeneity; put differently, when $s < b$, quality considerations do not affect electoral outcomes and the majority keeps coopting majority candidates.

We let x denote the probability that the majority (or minority) candidate is more talented (i.e. has vertical type s while the other candidate has vertical type 0), and thus $(1 - 2x)$ is the probability that they are equally talented (either both of quality s or both of quality 0). Let α denote the probability that both are of talent s conditional on both being equally talented. Thus the probability of an in- or out-group candidate being of type s is equal to $\overline{x} \equiv x + (1 - 2x)\alpha$.

Our basic equilibrium concept is *perfect equilibrium in sequentially weakly undominated strategies*[9]. We rule out weakly dominated strategies so as to ignore coordination failures in which, say, a majority member votes for an unfavored candidate because other majority

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[7]The term $\delta_0(1 - 2/N)$ stems from the conditioning on both the current member and the newly recruited one still being in the organization in the next period.

[8]Alternatively we could assume that a talented member derives a "quality payoff" from her own talent, which would thus write as $\tilde{s}/(1 - \delta) \neq s$. Such an assumption would leave the existence conditions unchanged, and would only marginally alter the expressions of welfare in Sections 2.2 and 3, while leaving the insights unchanged. We thus omit this possibility for notational simplicity.

[9]We refer to Acemoglu et al (2009) for a theoretical treatment of refinements in voting games. Technically, the relevant concept is their "Markov Trembling Hand Perfect Equilibrium", since the sequential elimination of weakly dominated stategies is feasible only with a finite horizon.

members also do. Concretely, each majority member votes as if he were pivotal, i.e. as if he chose the candidate.[10]

A specific subclass of equilibria restricts attention to strategies that further satisfy symmetry and Markov Perfection. Such strategies embody both symmetry (the behavior of A and B majorities are the same) and Markov Perfection (strategies do not depend on the talents of incumbent members, which are no longer payoff-relevant in the sense of Maskin-Tirole (2001): a majority member's von Neumann-Morgenstern preferences do not depend on their own talent or that of other majority or minority members, and so the state variable, given the symmetry assumption, is the size of the majority). We call these *symmetric Markov Perfect Equilibria* (symmetric MPEs).

Within this latter class, we will first look for equilibria in strategies satisfying:

(i) Members of the majority (all) vote for the majority candidate if the latter is equal or superior in talent.

(ii) Members of the majority (all) vote for the majority candidate with probabilities $\{\sigma(M)\}_{M \in \{k,...,N-1\}}$ with $\sigma(M) \in \{0, 1\}$, when the minority member is more talented.

We will say that the majority *switches* if it changes side. Consequently, for any symmetric MPE such that majority never switches, the majority candidate is chosen with probability 1 whenever the majority is tight (i.e. $\sigma(k) = 1$). We will say that the organization (or, equivalently, the majority) is:

- *meritocratic* if $\sigma(M) = 0$ for all M;

- *entrenched* if it favors a mediocre majority candidate over a talented minority one only when majority is tight ($M = k$), i.e. if $\sigma(k) = 1$ and $\sigma(M) = 0$ for all $M \geq k+1$;

- *entrenched at level l* if $\sigma(M) = 1$ for $M \in \{k, ..., k+l\}$, and $\sigma(M) = 0$ for $M \geq k+l+1$. Correspondingly, the organization (or the majority) is *super-entrenched* if it is entrenched at some level $l \geq 1$;

- *fully entrenched* if $\sigma(M) = 1$ for all M.

For future use, we will refer to the meritocratic and entrenched equilibria as the *canonical equilibria.*

2.1 Equilibrium characterization and existence results

Since the present discounted value of benefits from other incumbent members plays no role in a MPE, we do not include the legacy terms in the expression of the value functions. For any

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[10]Since we rule out coordination failures within the majority, the minority's behaviour is irrelevant (there is no absenteeism for the moment).
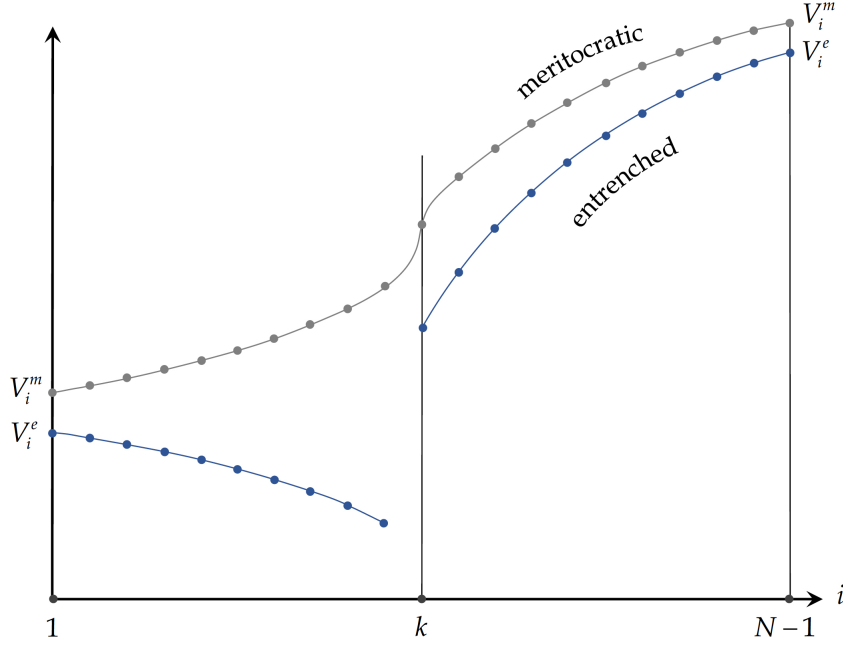
Figure 2: Properties of value functions in the meritocratic and in the entrenched equilibria.

group size $i \in \{1, ..., N-1\}$ just before candidacies are declared, we denote the value function of an individual in the given group by V_i: V_i is the expected discounted value of flow payoffs brought about by colleagues who will be coopted later in the period and in the future. V_i is a majority (resp. a minority) member's value function when $i \geq k$ (resp. $i < k$).[11]

We look for canonical equilibria. This focus will be vindicated by Proposition 1, which establishes that *(a)* there always exists a canonical equilibrium, and that *(a)* all symmetric Markov Perfect equilibria are canonical. We first investigate some properties of the value functions of majority and minority members under such strategies. Figure 2 illustrates the following lemma.

Lemma 1. *(Properties of value functions in the meritocratic (m) and in the entrenched (e) equilibria)*

(i) *(Majority value function) For $i \in \{k, ..., 2k-1\}$, V_i^e is increasing in i and has decreasing differences[12], strictly so if and only if $s > b$ and $x > 0$. Similarly, V_i^m is increasing in i and has decreasing differences, strictly so if and only if $b > 0$ and $x < 1/2$.*

(ii) *(Minority value function) For $i \in \{1, ..., k-1\}$, V_i^e is decreasing in i and has increasing differences in i, strictly so if and only if $b > 0$, or $s > 0$ and $x > 0$. By contrast, for*

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[11]Put differently, for any majority size $M \in \{k, ..., N-1\}$, V_M is the value function of a majority member, while V_{N-1-M} is the value function of a minority member.

[12]By "decreasing differences" (resp. "increasing differences"), we refer to the following concavity (resp. convexity) property:

$$|V_{i+1} - V_i| \leq |V_{j+1} - V_j| \qquad \left(\text{resp. } |V_{i+1} - V_i| \geq |V_{j+1} - V_j| \right) \qquad \text{whenever } j < i.$$

$i \in \{1, ..., k-1\}$, V_i^m is increasing in i and has increasing differences in i, strictly so if and only if $b > 0$ and $x < 1/2$.

(iii) *(Control benefits) For $r \in \{e, m\}$ and any $i \geq k$, $V_i^r \geq V_{N-1-i}^r$ (strictly so if and only if $b > 0$ and $x < 1/2$ when $r = m$, if and only if $b > 0$, or $x > 0$ when $r = e$).*

Intuition. The three parts of Lemma 1 can be grasped as follows:

(i) The majority always picks its "myopically optimal" favorite candidate except in the entrenched equilibrium when $M = k$, where "myopically optimal" refers to the choice it would make in the absence of future elections or, equivalently, if future hiring decisions did not hinge on the current one. The higher M is, the more remote the picking of a myopically suboptimal decision (entrenched equilibrium) or the loss of control (meritocratic equilibrium).

(ii) The intuition underlying the concavity/convexity of the value function for minority members is analogous to the one for majority members. The impact of moving further away from the tight-majority state fades progressively. The sign of the impact depends on the equilibrium: in the entrenched (resp. meritocratic) equilibrium, the further away from minority's size $k - 1$, the smaller the additional *loss* (resp. *benefit*) of getting one step closer to $k - 1$.

(iii) There is a benefit from control – if only because the majority members could vote like the minority members if they wanted to –. More precisely, the majority's benefit from control stems from the homophily payoff that accrues to majority members whenever candidates have the same talent as the majority can then pick its in-group candidate at no cost in terms of quality.

Proposition 1. *(Canonical Equilibria)*

(i) All symmetric Markov Perfect equilibria in weakly undominated strategies are canonical.

There exists finite thresholds ρ^e and ρ^m satisfying: $1 \leq \rho^m < \rho^e < +\infty$, such that

(ii) The entrenched equilibrium exists if and only if $s/b \leq \rho^e$,

(iii) The meritocratic equilibrium exists if and only if $s/b \geq \rho^m$.

(iv) Patience fosters entrenchment: for any δ_0, $\partial \rho^m / \partial \delta_0 \geq 0$, and $\partial \rho^e / \partial \delta_0 \geq 0$.[13]

Figure 3 describes the existence regions over the line s/b for given x, δ. For s/b close to 1, there is little cost for the majority to select an untalented peer over a better qualified minority

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[13]Furthermore, for δ_0 small, ρ^m and ρ^e increase with the size of the organization $N = 2k$.
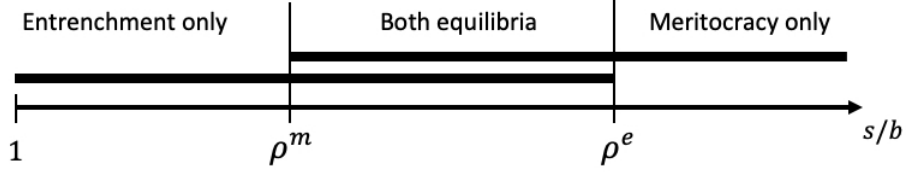
Figure 3: Existence regions for meritocratic and entrenched equilibria over the s/b line.

candidate, and there is a benefit from keeping control, so the majority is entrenched.

As the ratio quality/homophily payoffs s/b increases, the cooptation game moves from a (bounded) region where only the entrenched equilibrium exists, to an intermediate (bounded) interval where both equilibria coexist. Surrendering control is less costly if the opposite camp in turn does so in due course, yielding a form of strategic complementarity between the two groups. As s/b continues to increase, it reaches the (half-line) region where only the meritocratic equilibrium exists.

As the discount factor increases, the existence region of the meritocratic equilibrium shrinks while that of the entrenched equilibrium widens. These comparative statics are intuitive as when members become more patient, the cost of losing the majority to the outgroup increases.

Remark. If $x = 1/2$, i.e. the probability that both candidates have the same vertical type is nil, then $\rho^{\mathrm{m}} = 1$: for any $s \geq b$, there exists a meritocratic equilibrium. The result is intuitive, as there is no pure benefit from control.

Extension: Non-linear homophily benefit A non-linear homophily benefit would not require enlarging the state space, as the size of the majority is still a sufficient statistics looking forward. While the homophily benefit of an extra in-group member depends on future hirings under a non-linear homophily benefit, the key trade-offs (driven by meritocracy vs. control) are not affected. Namely, let $\tilde{\mathcal{B}}(i)$ denote the per-period homophily benefit enjoyed by a member whose in-group has size i (thus, in the linear case, $\tilde{\mathcal{B}}(i) \equiv (i-1)\tilde{b}$). It can be shown that:

- with strictly concave homophily benefits, the equilibrium is still either meritocratic or entrenched if $\tilde{\mathcal{B}}(k+1) - \tilde{\mathcal{B}}(k) \leq \tilde{s}$, and *super-entrenched* if $\tilde{\mathcal{B}}(k+1) - \tilde{\mathcal{B}}(k) > \tilde{s}$;[14]

- by contrast, under convex homophily benefits with $\tilde{\mathcal{B}}(M+1) - \tilde{\mathcal{B}}(M) < \tilde{s}$ (resp. $> \tilde{s}$) for any M below (resp. above) some threshold, there exists an equilibrium in which recruitments are meritocratic for small majorities, and entrenched for large ones.[15]

Remark: Supermajority clause for some decisions. The case in which each period, a non-hiring

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[14]See Section 4.2 on super-entrenchment, and Online Appendix D for more details on non-linear homophily benefits.

[15]For recruitments to be meritocratic for small majorities, the difference $\tilde{\mathcal{B}}(M+1) - \tilde{\mathcal{B}}(M)$ must not be too high at majority sizes above the threshold or be sufficiently low below the threshold, or δ be low enough.

decision is subject to a supermajority rule is similar to (locally) convex homophily benefits. We illustrate this by considering unanimity. Assume the decision yields $\tilde{b}^+$ for majority members where $\tilde{b}^+ + \tilde{b}$ is significantly larger than $\tilde{s}$ (and maybe yields something very negative for minority members to justify the rule). Then the organization may be meritocratic for small majorities and no longer so for large ones: the majority's expected cost of building a full majority (and maintaining it thereafter) becomes smaller as the majority size increases.[16,17]

2.2 Welfare

2.2.1 Non-ergodic welfare.

We first consider current members' welfare, defined as their expected discounted surplus (generated by both quality and homophily), at any given legacy and period. We refer to this welfare notion as "non-ergodic welfare". When they coexist, the meritocratic equilibrium is preferred to the entrenched one by all members of the organization. At any given majority size, minority members obviously prefer the meritocratic equilibrium, while majority members, who can always select to be entrenched, weakly prefer the meritocratic equilibrium which delivers a higher payoff when surrendering control.[18]

Proposition 2. *(Non-ergodic welfare)* *Whenever the meritocratic and the entrenched MPE coexist, i.e. for $s/b \in (\rho^m, \rho^e)$, at any majority size the meritocratic equilibrium is preferred by all current members of the organization to the entrenched equilibrium.*

Consider an ancillary game in which the "players" are incarnations of majorities; let $\mathcal{M}_{\tau,M}$ denote the majority "player" at date τ when the size of the majority is $M \geq k$. They are incarnations in the same sense as incarnations in the Bayesian model, i.e. versions of the same player corresponding to different types: they may or may not be called upon to play, based on a choice of Nature in the Bayesian model, the realizations of candidates' talents and the choices made by previous majorities in our model. In the spirit of Aumann (1959)'s strong equilibrium concept, we can ask whether starting at date t the different players $\{\mathcal{M}_{\tau,M}\}_{\tau \geq t, M \in \{k,...,N-1\}}$ might all be made better off by a joint deviation. This is indeed the case in the entrenched equilibrium: they would all prefer playing according to meritocratic equilibrium strategies. By contrast, a deviation from the efficient meritocratic equilibrium cannot make all "players" better off. Therefore only the meritocratic equilibrium is strong in this sense.

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[16]While the ergodic state exhibits full entrenchment, the dynamics differ from the other instances of full entrenchment exhibited in the paper and may be meritocratic for a while.

[17]More generally, convex homophily benefits, which may arise for instance when facilities or regulations must be added to accommodate the existence of a minority, or if a group's reaching a critical size delivers additional opportunities to its members, tend to generate super-entrenchment.

[18]Regardless to the regime $r \in \{m, e\}$, the majority faces an optimal stochastic control problem with boundary value V_{k-1}. All valuations V_{k+l}, with $l \geq 0$, are therefore non-decreasing functions of V_{k-1}.

2.2.2 Ergodic aggregate welfare.

We now draw an aggregate-welfare comparison between entrenchment and meritocracy in their respective ergodic distribution from the ("objective") perspective of a principal or third-party putting at least as much weight on quality as on homophily benefits. Denoting by S the organization's ergodic per-period aggregate quality, by B the ergodic per-period aggregate homophily benefits, the principal's objective writes

$$W \equiv qS + B$$

where $q \geq 1$ is the (relative) weight put by the principal on quality relative to homophily. The "no-externality case" $q = 1$ corresponds to the maximization of total member surplus. But it often makes sense to assume that $q > 1$: homophily benefits are fully appropriated by the members, while quality works for both members and their organization or society.

We first describe the ergodic distributions of majority sizes. Since payoffs in a given period accrue after the current-period vote and before the next-period departure, we are interested in the *end-of-period* distribution of majority sizes. Index the end-of-period majority size by $i \in \{k, ..., N\}$. Let ν_i^{r} denote the ergodic probability of state i at the end of a period in regime $\mathrm{r} \in \{\mathrm{e}, \mathrm{m}\}$ (see Online Appendix F for their expressions).

Lemma 2. (End-of-period ergodic distributions) *The probability distribution $\{\nu_i^e\}$ strictly first-order stochastically dominates $\{\nu_i^m\}$.*[19]

Ergodic quality. By taking the fixed point of the dynamic equation for (expected) aggregate quality in the ergodic state[20], aggregate per-period expected quality S^{r} is

$$\begin{cases} S^{\mathrm{m}} \equiv N(N-1)(\overline{x} + x)\tilde{s} \\[2mm] S^{\mathrm{e}} \equiv N(N-1)\left[\nu_{k+1}^{\mathrm{e}}\frac{k+1}{N}\overline{x} + \left(1 - \nu_{k+1}^{\mathrm{e}}\frac{k+1}{N}\right)(\overline{x} + x)\right]\tilde{s} \end{cases}$$

Unsurprisingly, the ergodic efficiency of a meritocratic organization exceeds that of an en-

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[19]Moreover, the ergodic probability that an entrenched majority is tight at the moment of vote decreases with N. In the entrenched ergodic state, appointments are more likely to be meritocratic the larger the organization.

[20]The aggregate quality at the end of period $t + 1$ is the aggregate quality at the end of period t minus the (expected) loss due to a member's departure, plus the (expected) contribution of the recruited candidate. For the meritocratic equilibrium,

$$S_{t+1}^{\mathrm{m}} = \frac{N-1}{N}S_t^{\mathrm{m}} + (N-1)[\overline{x} + x]\tilde{s}$$

Similarly for the entrenched equilibrium,

$$S_{t+1}^{\mathrm{e}} = \frac{N-1}{N}S_t^{\mathrm{e}} + (N-1)\left[\nu_{k+1}^{\mathrm{e}}\frac{k+1}{N}\overline{x} + \left(1 - \nu_{k+1}^{\mathrm{e}}\frac{k+1}{N}\right)[\overline{x} + x]\right]\tilde{s}$$

trenched one:

$$S^{\mathrm{m}} - S^{\mathrm{e}} = N(N-1)\nu_{k+1}^{\mathrm{e}}\frac{k+1}{N}x\tilde{s} > 0.$$

Ergodic homophily benefit. For regime $\mathrm{r} \in \{\mathrm{e}, \mathrm{m}\}$, the aggregate per-period expected homophily benefit B^{r} writes

$$B^{\mathrm{r}} \equiv \sum_{i=k}^{N} \nu_i^{\mathrm{r}} \left[i(i-1) + (N-i)(N-i-1) \right]\tilde{b}$$

An entrenched organization always dominates a meritocratic one in terms of ergodic aggregate homophily benefit ($B^{\mathrm{m}} < B^{\mathrm{e}}$): *(a)* the function $(i \mapsto i(i-1) + (N-i)(N-i-1))$ is strictly increasing for $i \in \{k, ..., 2k\}$, and *(b)* the probability distribution $\{\nu_i^{\mathrm{e}}\}$ strictly first-order stochastically dominates $\{\nu_i^{\mathrm{m}}\}$ from Lemma 2.

The following result compares the two *laissez-faire* equilibria's ergodic welfares:

Proposition 3. *(Ergodic per-period aggregate welfare)* *For any $s > b$, $W^m > W^e$, i.e. the meritocratic equilibrium dominates the entrenchment equilibrium in terms of ergodic per-period aggregate welfare.*

3   Policy

We investigate the consequences of different interventions a principal could carry on. To perform the policy analysis, we need to select an equilibrium in the multiple-equilibria region (our insights however do not depend on this particular selection).

Assumption. *(Equilibrium selection).* *Whenever two equilibria coexist, coordination occurs on the meritocratic one.*

The advisability of intervention naturally depends on the principal's information. The principal may have more information about quality than about horizontal attributes: a provost may use external letters or a visiting committee to assess the quality of a department or candidates, and a government may use a research assessment exercise to evaluate a university or its components. Yet the provost, say, may not know whether the department is hiring buddies or researchers in a declining field that is their own[21].

By contrast, the principal may observe the candidates' and members' horizontal types, but only the incumbent members observe talent. Many public interventions such as affirmative

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[21]In a number of countries (such as France) the hiring of civil servants is merit based, in the sense that new civil servants take a competitive exam; in the US by contrast, "civil servants" are often political appointees. Exams for entering the civil service can be viewed as obtaining a signal of s that is informative.

action policies are based on gender, race, disability or religion, but not necessarily on quality.

Previewing the formal analysis, the consequences of the interventions we investigate have three drivers. The first is a reduction in the value of decision rights: majorities cannot optimize as efficiently when they are faced with external constraints. This *loss-of-control effect* reduces the appeal of entrenchment. Second, the *fear of an involuntary loss of control* due to discretionary interventions in cooptation decisions may encourage the current majority to build a buffer against such majority transfers, i.e. to super- or fully entrench itself. The third driver arises when the members are rewarded for overall quality; intuitively *quality-based rewards* favor meritocracy.

3.1 Quality-based interventions

Assuming that the principal has only talent information, we consider two policies for the principal: (i) stepping in to choose the new member (which does not assume commitment by the principal), and (ii) rewarding quality (which does, as the intervention is backward looking).

Discretionary overruling of majority decisions. Suppose that in each period, the majority selects among the two candidates and then the principal can overrule the majority and pick the losing candidate. None of the players (principal, majority, and minority) can commit.

Suppose further that the principal occasionally receives a signal. Namely, in each period the principal learns the quality of the candidates (or at least their quality differential) with probability λ and receives no signal with probability $(1 - \lambda)$.

We look for equilibria (a) with level of entrenchment $l \geq 0$, and (b) in which the principal overrules the majority if and only if it is informed that the majority is violating meritocracy. Hence the probability η of intervention is given by $\eta = \lambda x$ if $M \leq k + l$, and $\eta = 0$ otherwise. The equilibrium nature of this intervention is motivated by the (correct) intuitions that (i) it is inefficient for the principal to intervene without information, and (ii) the principal can obtain a one-period benefit when informed that meritocracy is violated.

For talent-blind discretionary interventions ($\lambda = 0$), it is an equilibrium for the principal not to engage in quality-blind interventions[22]; and so the meritocratic and entrenchment equilibria exist for the same parameter values as in the absence of intervention. So the impact of external interventions is here tied to the availability of evaluative information. When $\lambda = 1$, the principal can select the best candidate in each period, and there is no real "cooptation". So let us assume that $0 < \lambda < 1$.

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[22]The intuition for the result stems from two observations: (a) from the perspective of the principal (with $q \geq 1$), the majority takes the socially optimal decision for any majority size $M \geq k+1$, and if it is meritocratic, also when $M = k$, whereas if it is entrenched and tight, it takes the optimal decision with probability $1-x \geq 1/2$; (b) if the majority is entrenched and tight, then its choice of candidate reveals no information on the latter's quality to the principal, and thus a talent-blind principal cannot outperform the majority's choice.

The condition of existence of a meritocratic equilibrium is unchanged, as the principal has no reason to intervene in such an equilibrium. This property however does not hold for the entrenchment equilibrium. Intuitively, the possibility of intervention has two opposite effects on the principal's welfare. The principal occasionally overrules the majority and imposes the meritocratic choice. But the majority may become wary of losing control when $M = k$ and so may decide to be super-entrenched so as to lower the probability of its losing control (without annihilating it completely, which is impossible).

The next proposition establishes in particular that "well-meaning policies" systematically backfire for s/b close to 1 by generating full entrenchment.

Proposition 4. *(Perverse effects of discretionary quality-based interventions) Let $x < 1/2$ (there are benefits from control). Suppose that $\lambda \in (0,1)$.*

(i) The possibility of an informed overruling of majority decisions (with a strictly positive probability) results in full entrenchment for any $s/b \in [1, \rho]$ for some $\rho > 1$.

(ii) For λ in an intermediate range, the principal achieves a higher welfare if it can commit not to intervene.

Rewarding quality. We now assume that the principal implements a quality assessment exercise according to a Poisson process of rate η, and this after each period's election. A quality assessment exercise in period t results in an end-of-period bonus accruing to the organization and shared equally among the N members. We assume the bonus is one-shot, i.e. it is received at date t. Alternatively we could have assumed the bonus is split across several periods; yet frontloading the bonus is more effective[23]. For the sake of simplicity, we also assume the bonus is linear in the number of talented members in the organization: for each talented member in the organization at the end of period t, each member receives y. Consequently, the expected incremental lifetime contribution of a new talented (relative to mediocre) addition to each current member of the organization now writes as

$$s^+(\eta, y) \equiv s + \eta \frac{y}{1 - \delta_0(1 - 2/N)} = s\left(1 + \eta \frac{y}{\tilde{s}}\right) > s$$

while the expected lifetime utility for an incumbent member generated by the homophily payoff per new member sharing their opinion is still given by b.[24]

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[23]Because members may quit – and thus $\delta \leq (N-1)/N < 1$ –, frontloading the bonus maximizes the incentive for good recruitment.

[24]Computations go through as in the main model with a quality-payoff-over-homophily-benefit ratio now given by s^+/b instead of s/b. Hence, whenever $\rho^e < \infty$, for η, y sufficiently high, the ratio s^+/b is sufficiently high for the organization to reach the region where the unique symmetric MPE in weakly undominated strategies is the meritocratic equilibrium.

Letting T denote the ergodic expected per-period transfer and ξ its shadow cost, the ergodic welfare function in the presence of transfers becomes: $W = qS + B - \xi T$.

Proposition 5. *(Rewarding quality)* *For any positive cost of public funds ξ, there exists $\rho_\xi \in [1, \rho^m)$, strictly increasing with ξ and satisfying $\rho_0 = 1$, such that quality assessment exercises raise welfare W if and only if $s/b \in [\rho_\xi, \rho^m)$.*

The intuition behind Proposition 5 is that for high s/b, the organization embraces meritocracy by itself and so spending public funds is wasteful. When instead the organization has little appetance for meritocracy (s/b small), the principal must pour large amounts of money on the organization to be effective, and this may prove too costly. It is thus only in the intermediate range that a boost promotes meritocracy and quality at a reasonable cost.[25]

3.2 Affirmative action

Suppose that the principal mandates diversity by setting a "representation threshold" – i.e. committing to imposing that the minority count at least R members at the end of any given period. Since it is suboptimal for the principal to impose parity[26], we focus on weaker forms of affirmative action with representation thresholds $R \leq k - 1$.

Quality is reduced if at the moment of the vote, the representation threshold binds (i.e. $M = N - R$) and the majority candidate is more talented. Moreover, homophily benefits are also reduced on average. However, there is an indirect effect: control is less appealing both because the majority is constrained and because the minority is favored. That effect might make the "constrained meritocratic" equilibrium (the choice is meritocratic except perhaps when $M = N - R$ at the moment of the vote) more likely, which might actually benefit the principal.

Nonetheless, when s/b is very high, the efficiency loss at $M = N - R$ becomes extremely costly and majority members may be willing to pick the minority candidate at lower majority sizes whenever the latter is as talented as the majority one in order to avoid reaching a majority size of $M = N - R$ at a later period. We refer to such an equilibrium as *meritocracy with reverse favoritism*: majority members vote for their candidate if and only if he is strictly more talented than the minority candidate. In other words, the reverse-favoritism meritocratic (resp. constrained meritocratic) equilibrium features the most talented candidate being recruited with ties broken in favor of the minority (resp. majority) candidate – motivating its name.[27]

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[25]The optimal transfer is equal to 0 for s/b below a certain threshold (which increases with the cost of public funds ξ), jumps discontinuously strictly above zero at this threshold, and then decreases with s/bc above the threshold, down to zero when $s/b = \rho^m$.

[26]Suppose that the principal imposes parity (so at the end of the period the two groups are equally represented). Then the average quality of the coopted member ($\overline{x}s$) is smaller than in both the entrenched and meritocratic equilibria and homophily benefits are minimized.

[27]In order to alleviate the labels, we may omit the epithete "constrained" when referring to these equilibria whenever there is no ambiguity.

Proposition 6. *(Affirmative action)*

(i) Existence regions. Affirmative action in the form of a representation threshold $R \leq k-1$ expands the existence region of meritocracy. Furthermore, for s/b sufficiently high, meritocracy with reverse favoritism is an equilibrium, while meritocracy with standard favoritism is not.

(ii) Ergodic aggregate welfare. When $s/b \geq \rho^m$, affirmative action comes at a cost, both in terms of efficiency and homophily, and reduces welfare. Next, suppose that $s/b < \rho^m$: Whenever affirmative action induces an otherwise entrenched organization to become meritocratic, there exists a cut-off in the correlation of candidates' vertical types such that affirmative action dominates laissez-faire if and only if the correlation is below the cutoff, and is dominated otherwise. The more ambitious the affirmative action, the lower the cut-off.[28]

Remark. The case for affirmative action policies is stronger when candidates choose to invest in their talents.

4   The fragility of meritocracy: further drivers

This section considers robustness results and extensions in which meritocracy is violated and strong forms of entrenchment arise.

4.1   A continuum of vertical types

We have assumed so far that talent can take only two values. When talent is smoothly distributed in $\mathbb{R}_+$, for the natural generalization of canonical equilibria developed below, full meritocracy never prevails, as the majority always prefers an in-group candidate over a slightly more talented out-group candidate. But, as we will see, we can still order equilibria in terms of their "level of meritocracy". Our previous insights generalize: (i) a stronger majority engages in more meritocratic recruitments, and (ii) whenever several equilibria coexist, they can be ranked from more to less meritocratic and Pareto-compared.

Generalizing canonical equilibria to arbitrary distributions, equilibria can be described as a sequence of cut-offs $(\Delta_M)_{M \in \{k, \dots, N-1\}}$ such that a majority of size M recruits the out-group candidate with (discounted) talent $\hat{s}$ against the in-group candidate with (discounted) talent s if and only if $\hat{s} - s > \Delta_M$. In particular, any symmetric MPE in (pure) weakly undominated strategies in which indifference is always resolved in favor of the in-group candidate belongs

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[28]Namely, we show that: (a) The homophily (ergodic aggregate) payoff is strictly lower in the meritocratic equilibrium under affirmative action with representation threshold R than in the entrenchment equilibrium under *laissez-faire*. (b) There exists $x_{AA}(R) \in (0, 1/2)$ such that for any $x \in \left(0, x_{AA}(R)\right)$ (resp. $x \in \left(x_{AA}(R), 1/2\right)$), the quality (ergodic aggregate) payoff is strictly lower (resp. strictly higher) in the meritocratic equilibrium under affirmative action with representation threshold R than in the entrenchment equilibrium under *laissez-faire* (the two being equal for $x = x_{AA}(R)$). The cutoff $x_{AA}(R)$ strictly increases with R: the higher the representation threshold, the thinner the range of correlations for which meritocracy under affirmative action dominates entrenchment under laissez-faire.

to this class. We will show that in any such equilibrium, $\Delta_M > b$ for any $M \in \{k, ..., N-1\}$. We denote by $\prec$ the order relation defined over the set of decision rules such that $\Delta \prec \Delta'$ if and only if $\Delta_M < \Delta'_M$ for all $M \in \{k, ..., N-1\}$. We will then say that the former decision rule is more meritocratic.

Let $\mathcal{G}$ be the set of continuous joint distributions of $(s, \hat{s})$, i.e. resp. the quality of the majority and the minority candidate, with support in $[0, +\infty)^2$ such that $\mathbb{E}[\max(\hat{s}, s+b)] < \infty$, and $(\hat{s} - s)$ is symmetrically distributed around 0 with $\mathbb{P}(\hat{s} - s > b) > 0$ and such that, letting the function h be defined by

$$h(\Delta) \equiv \mathbb{E}\big[(s+\Delta)\mathbf{1}\{\hat{s} - s \leq \Delta\}\big] + \mathbb{E}\big[\hat{s}\mathbf{1}\{\hat{s} - s > \Delta\}\big],$$

the functions $[h(\Delta) - \Delta/2]$ and $[\Delta - h(\Delta)]$ are strictly increasing with $\Delta \in (b, \overline{s})$ where $\overline{s} = \sup(\hat{s} - s) \in (b, +\infty]$. This set includes the set of (full support) continuous joint symmetric distributions. It also includes the case where the majority candidate has a fixed type $s \geq 0$ and the minority candidate a type $s + D$ where D is a (full support) random variable with a continuously differentiable distribution over $(-s, s)$ symmetric around 0.

Proposition 7. *(A continuum of vertical types)* *Assume talent is distributed according to a joint distribution $G \in \mathcal{G}$. Any symmetric MPE in weakly undominated strategies described by a sequence of cut-offs $(\Delta_M)_{M \in \{k, ..., N-1\}}$ is such that $\Delta_M > b$ for any M, and that the sequence $(\Delta_M)_M$ is strictly decreasing: a stronger majority discriminates less than a weaker majority.*

Moreover, whenever they coexist, any two such equilibria with distinct decision rules Δ and Δ', can be ranked by the order relation $\prec$. If $\Delta \prec \Delta'$, then the equilibrium characterized by the decision rule Δ (which is more meritocratic than the one described by Δ') is preferred at any majority size by all current majority members, and for δ small, by all current minority members as well.[29]

4.2   Super-entrenchment

Returning to the binary-talent case, the most obvious case for super-entrenchment is $s \leq b$, which trivially leads to full entrenchment. We noted that non-linear homophily benefits may lead to super-entrenchment. Section 3 showed that some well-meaning interventions may have the unintended consequence of incentivizing the majority to be super-entrenched. Besides these three reasons, two other drivers of super- and full-entrenchment (under *laissez-faire*) are

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[29]As a consequence, given a joint distribution $G \in \mathcal{G}$, in any equilibrium within this class, whenever the majority is not tight, it recruits a minority candidate with a strictly positive probability. In addition, we show that for distributions such that $\mathbb{P}(\hat{s} - s > \Delta) > 0$ for any $\Delta < \infty$, in any equilibrium within this class, the majority recruits a minority candidate with a strictly positive probability at any majority size. Hence control switches happen with strictly positive probability.

studied in this section.

4.2.1 Homogamic evaluation capability

We have assumed so far that all members are equally proficient at evaluating the talents of in- and out-group candidates. However some environments exhibit an asymmetry in this ability. For example, econometricians are better placed than development economists to evaluate an econometrician, and conversely. This section investigates how the analysis is affected when only in-group evaluation is feasible.

The majority still selects the majority candidate if the latter has quality s. So we can focus on the situation in which the majority candidate has quality 0. The conditional quality of the minority candidate is then

$$s^\dagger \equiv \frac{x}{x + (1 - 2x)(1 - \alpha)} s = \frac{x}{1 - \overline{x}} s$$

Two mutually exclusive cases must be distinguished.

Case 1: $b \geq s^\dagger$. This case arises when correlation is high (x low) and average quality low ($\overline{x}$ low), so the majority is pessimistic about the minority candidate's talent when its own candidate lacks talent. [Departing from the Bayesian framework, case 1 would also be more likely if the majority members had a negative stereotype about minority members' talent.]

When $b \geq s^\dagger$, the majority is fully entrenched: it keeps admitting solely majority candidates and ends up being homogeneous. This implies that imperfect information (in the form of homogamic evaluation capability) may transform an entrenched or meritocratic organization into a fully entrenched one.

Case 2: $b < s^\dagger$. For case 2 to arise, majority members need to be sufficiently optimistic about the average quality of minority candidates. That is, the draws in talent must be sufficiently uncorrelated (i.e. x large) and the average ability of a candidate high enough (i.e. $\overline{x}$ large). [Had we assumed non-Bayesian beliefs, a further condition would have been the absence of prejudice about the minority.]

We provide intuition for the results before starting the analysis. When $b < s^\dagger$, the model becomes similar to our baseline setup, yet with two crucial changes:

(i) The probability that the minority candidate is assessed by majority members as strictly more talented (in expectation) than the majority one increases from x to $x^\dagger \equiv x + (1 - 2x)(1 - \alpha) > x$. In other words, minority candidates may get the benefit of the doubt.

(ii) The stand-alone cost of an entrenched vote is smaller as $s^\dagger - b < s - b$.

We show that, except perhaps when the majority is tight ($M = k$), whenever the majority candidate lacks talent, the majority gives the benefit of the doubt to, and picks the minority candidate. This means that the minority candidate may be selected even though the two candidates are equally talented. The majority candidate is selected with probability $1-x^\dagger$ and the minority candidate is selected with probability $x^\dagger$. The homogamic choice has probability below $1/2$ if and only if $\alpha < 1/2$. Even more strikingly, for $\alpha < 1/2$, the majority's choice then makes the minority happier about the choice than the majority itself: the expected quality benefit from the appointment is the same for both groups, while the homophily benefit is $(1 - x^\dagger)b$ for a majority member and $x^\dagger b > (1 - x^\dagger)b$ for a minority member. *Hence, there is a curse of control*[30]. We show that for $\alpha < 1/2$ the two canonical equilibria still obtain: as is intuitive, the meritocratic one then exists for any $s^\dagger > b$, while the entrenchment one exists in a bounded region. Indeed, while the existence of the latter might seem surprising, it results from the following trade-off: although the minority benefits more from the new recruit than the majority whenever the majority size is not tight, the opposite holds when $M = k$, which happens frequently since $x^\dagger$ is high.

The same arguments as with perfect information apply, with the appropriate changes in payoffs and with $x^\dagger$ replacing x in the transition probabilities. We focus on the following two equilibria which are the analogs of the perfect-information canonical equilibria.[31]

Proposition 8. *(Canonical equilibria with homogamic evaluation capability)*

(i) *If $b \geq s^\dagger$, the majority coopts only candidates of the in-group and therefore becomes homogeneous. Homogamic evaluation capability lowers the ergodic per-period aggregate welfare relative to perfect information.*

(ii) *If $b < s^\dagger$ (i.e. $s/b > x^\dagger/x$), there exists an equilibrium in which for all $M \geq k + 1$, the majority votes for the majority's candidate if talented, and for the minority's candidate (of unknown talent) otherwise. There exist finite thresholds $\rho^{e\dagger}$ and $\rho^{m\dagger}$ satisfying*[32]

- *The entrenched equilibrium (in which the majority always chooses the majority candidate for $M = k$) exists if and only if $s/b \leq \rho^{e\dagger}$.*

- *The meritocratic equilibrium (in which the minority candidate is elected against an untalented majority candidate even for $M = k$) exists if and only if $s/b \geq \rho^{m\dagger}$.*

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[30]This effect may depend on our modelling assumptions. When the majority candidate lacks talent, majority members would presumably prefer to postpone the recruitment, de facto deneging the benefit of the doubt to the minority candidate. Our model rules out this option by assuming a recruitment must be made in each period – e.g. because it is too costly for the organization to go under-staffed for one period.

[31]As with perfect information, our equilibrium concept rules out coordination failures within the majority, and thus the minority's behaviour becomes irrelevant.

[32]If $b < s^\dagger$ and $x^\dagger \leq 1/2$, then $\rho^{m\dagger} < \rho^{e\dagger}$. If $b < s^\dagger$ and $x^\dagger \geq 1/2$, then $\rho^{m\dagger} \leq x^\dagger/x$, and thus the meritocratic equilibrium exists for all $s/b \geq x^\dagger/x$.

Whenever they co-exist, the meritocratic equilibrium is preferred to the entrenchment equilibrium by all members at any majority size[33] *Furthermore, the meritocratic and entrenchment equilibria with homogamic evaluation capability yield a lower ergodic per-period aggregate welfare than their perfect-information counterparts.*

For δ close to 0, or for x close to 0, i.e. whenever patience is low or candidates' talent is very positively correlated, homogamic evaluation capability reduces the existence region of meritocracy, and thus, assuming that the Pareto-dominating equilibrium is selected whenever it exists, homogamic evaluation capability lowers the ergodic aggregate welfare.

Remark: Cheap talk. One may wonder whether communication could help the majority select a candidate. The answer is that, for $x^{\dagger} \leq 1/2$, cheap talk cannot operate in this environment due to a form of winner's curse. Because the majority picks its candidate whenever talented, the minority infers that whatever message it sends can only have an impact when the majority candidate is untalented. Conditional on a low-quality majority candidate, the minority always prefers its own candidate, and so any message sent to the majority is necessarily uninformative.

Remark: Intermediate assessment abilities. We have so far assumed that a group is able to access the quality of outgroup members either perfectly or not at all. Intermediate assessment abilities would give rise to additional and interesting insights. One might imagine in particular that having more minority members in the organization brings more familiarity with their characteristics and therefore an enhanced ability to assess outgroup candidates' ability. We conjecture that as in Board et al (2019), the majority may want to voluntarily engage in (limited) affirmative action for "talent intelligence" purposes; virtuous and vicious circles would similarly emerge.

4.2.2 Uncertain voting participation and absenteeism

We have assumed so far that all members of the organization vote. Absenteeism, whether due to illness or alternative obligations, may incentivize the majority to secure majorities of more than one vote so as to minimize the probability of a majority switch. Even large polities may find it optimal to stand in the way of talented minority candidates.

Returning to symmetric evaluation capability, we first model absenteeism in a general fashion before providing an explicit illustration. Namely, for any majority size $M \in \{k, ..., N-1\}$, let $\Lambda(M)$ be the probability that, because of absenteeism, a majority of size M loses the vote, i.e. that the minority's opinion prevails[34]. We assume that the majority is strictly more

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[33]Similarly, in terms of ergodic per-period aggregate welfare, the meritocratic equilibrium dominates the entrenchment equilibrium for any s/b whenever $x^{\dagger}$ is below or close to $1/2$, or close to 1.

[34]We assume that absenteeism in a given period is independent of the candidates' qualities in that given period: in particular, absenteeism does not result from members' strategic decisions given candidates' types.

likely than the minority to win the vote, and the more so, the greater the majority size, and is certain to win for sufficiently large majority sizes (perhaps $N-1$)[35]:

$$
\begin{cases}
\Lambda \text{ decreases with respect to majority size } M \\
\Lambda(M) \in (0, 1/2) \quad \text{for any } M \in \{k, ..., k+l-1\}, \quad \text{and} \quad \Lambda(M) = 0 \quad \text{for any } M \geq k+l
\end{cases}
\tag{1}
$$

While the Λ function can capture correlation in absenteeism, either within groups or across the entire population of members, an interesting case occurs when absences are i.i.d. (the Bernoulli case). That case satisfies (1) with $\Lambda(M) > 0$ for all $M < N-1$. While we allow for a wide range of absenteeism functions (in particular as we allow for correlation in voting turnout), condition (1) may not always be warranted if voting participation is strategic rather than caused by exogenous events.

We look for monotonic (in the sense that a stronger majority makes more meritocratic recruitments[36]) symmetric MPEs in weakly undominated strategies, which indeed exist.[37]

Proposition 9. *(Absenteeism and super-entrenchment) Let Λ satisfy (1) and $x < 1/2$. For s/b sufficiently close to 1, super-entrenchment at level l is the unique symmetric MPE in weakly undominated strategies such that a stronger majority makes (weakly) more meritocratic recruitments[38]. In particular, if $l = k-1$ as in the Bernoulli case, the possibility of absenteeism may trigger full-entrenchment for any s/b sufficiently close to 1.*

When Λ satisfies (1) with $l < k-1$, the majority is "safe" at any majority size $M \geq k+l+1$ as it will still control the outcome with probability 1 in the next period. Therefore, meritocracy, i.e. picking the minority candidate whenever she is strictly more talented, is optimal at these majority sizes.

Imperfect identification of group allegiance. Our modelling of uncertain voting participation also applies to imperfect identification of group allegiance. As an illustration, we

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[35]Absenteeism raises the question of what happens when the numbers of majority and minority members who show up are equal (or if no-one shows up). The key assumption behind the statement of the Λ function is that a process is in place, which will guarantee a decision in case of such draws. One can envision a variety of such processes. For example, the majority leader might take the decision. Or the assembly of members might reconvene as many times as is needed to break the tie (technically, an infinite number of times if one wants to reach a decision with probability 1. Otherwise the results are just limit results). Similarly, one could add a quorum rule given such reconvening; this quorum, for a given absenteeism process, would generate a different Λ function, but still one satisfying our assumptions. The Λ function captures all kinds of processes and all forms of correlation among members' absences, as long as the process delivers an outcome.

[36] There may exist non-monotonic symmetric MPEs in weakly undominated strategies, see Online Appendix M.

[37]In contrast to the baseline model, the minority's strategy now matters at any majority size. Because the minority's probability of being pivotal is positive for $M \leq k+l-1$, it is in fact an equilibrium requirement for minority members to behave as if they picked the outcome.

[38]Furthermore, for s/b sufficiently close to 1, in any symmetric MPE in weakly undominated strategies, the majority is entrenched when it has size $k+l$.

now introduce the possibility that a candidate be able to mascarade as belonging to the other group and thereby be elected. Namely, we assume there is a probability $\vartheta \in (0, 1/2)$ that the best candidate of the majority group[39] is incorrectly identified (tagged as belonging to majority group, when actually belonging to the minority group). To avoid having to consider complicated coming-out strategies of misidentified members, we further assume that the real identity of the newly elected member is revealed after the vote and before curent-period payoffs accrue.

The probability of a fully-entrenched majority with size $M = N - 1$ losing control, is strictly positive and proportional to ϑ^k, as it takes k consecutive occurrences of "bad luck" to topple its grip on the organization. By the above argument on uncertain voting participation (replacing the probability of the majority losing the vote with the probability of recruiting a minority candidate incorrectly identified), there exists a non-empty neighbourhood of 1 such that for s/b in this neighbourhood, the (only monotone) equilibrium is the fully-entrenched equilibrium.

This analysis of turncoats presumes that candidates identified as sympathetic to the majority may actually favor the minority. A milder version of the same idea is that candidates identified as pro-majority may actually prefer a majority candidate, but with an intensity that is not observable at the moment of their election. So a majority recruit may put more weight on talent relative to homophily than the average majority member[40] and therefore resist the entrenched strategy. Anticipating this possibility, the majority may again want to be super-entrenched, so as to minimize the probability of a switch in control.

4.3 Anterooms for appointments

We have so far viewed the appointment process as an organizational choice between coopting candidates and letting them go away for good. While a first step, this assumption ignores the possibility that appointments may result from a dynamic process operating outside or inside the organization. First, turned-away candidates may be persistent and later reapply. Second, the organization may groom junior members for possible promotion to senior positions. This section analyzes in sequence these two possibilities, which display several similarities.

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[39]We implicitly assume that all candidates of the majority group are equally "unreliable" (incorrectly identified with the same probability). Alternatively, a richer modelling would allow for heterogeneity within a group: an untalented yet fully "reliable" candidate (i.e. identified as perfectly belonging to the majority) may then be preferred to a talented yet "unreliable" candidate.

[40]For example, a small fraction of majority candidates might have homophily benefit zb, where $z < 1$, and a preference for the meritocratic strategy over the entrenched one favored by their colleagues in the majority.

4.3.1 Candidates can re-apply

We investigate the consequences of unselected candidates being able to re-apply. "Stored" candidates keep re-applying until they are recruited[41]. For the sake of exposition, we make a further simplyfing assumption: $\alpha = 0$, so that in any period, the new majority and the minority candidates are equally talented if and only if they both are untalented (which happens with probability $(1 - 2x)$), and the unconditional probability that a new candidate is talented is given by $\bar{x} = x$. This assumption implies that under meritocratic hiring, talented candidates are always hired and so the ability to re-apply is irrelevant on an equilibrium path.

Proposition 10. *(Reapplying for membership)* *Assume $\alpha = 0$. Entrenchment yields the majority a higher value function when candidates reapply than when they cannot: being able to "keep in store" a talented minority candidate when the majority is tight reduces the cost for the majority of turning down her application. Moreover, the existence region for the meritocratic equilibrium shrinks when the organization can store applications.*

4.3.2 Hierarchies and the glass ceiling

The expression "glass ceiling" refers to the difficulty for women (or minorities) to rise beyond a certain level in a hierarchy. While there are various hypotheses for its existence, whose relevance is reviewed in Bertrand (2018), we here investigate whether non-meritocratic cooptation might be a factor. Even if male dominance and favoritism contribute to discrimination against women, it is not a priori obvious that they imply a lower rate of promotion for women and therefore a glass ceiling.

An explicit modelling can be found in Online Appendix O. We consider a two-tier organization with senior and junior positions. Seniors exogenously depart and are replaced by juniors promoted to seniority. Some juniors exogenously quit the organization as well. Flows out of the junior pool are offset by new recruitments. Seniors have control over hiring and promotion decisions.

We define the glass ceiling as a relative probability of promotion of talented majority and minority members greater than 1. Note that unlike discrimination at the hiring stage, the existence of a glass ceiling is not a necessary implication of a taste for homophily. Nonetheless, a glass ceiling arises in our framework[42] provided that at least one of the following two effects operates:

- *Concern for control:* as earlier in the paper, control allows groups to engage in favoritism. Because control is located at the senior level, this in turn implies some discrimination in

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[41]Our results would still hold if we assumed instead that "stored" candidates stopped re-applying following some Poisson process.

[42]This environment can be enriched in interesting ways. See Online Appendix O.

promotions, which in general exceeds that at the hiring level (if any).

- *Differential mingling effect:* for organizational reasons, senior members tend to hang around more with senior members than with junior ones. Their homophily concerns are therefore higher for promotions than for hiring decisions.

Proposition 11. *(Glass ceiling) In the hierarchical organization's steady state, hiring at the junior level is fully meritocratic*[43]. *By contrast, there exists a glass ceiling for minority juniors.*

5 Related literature

This research is related to several strands of the literature.

Discrimination theory. It shares with the literature on the economics of discrimination initiated by Becker (1957) the idea that homophily may lead organizations to disfavor minority members in their hiring decisions. Becker, though, famously emphasized that competitive market forces may make such discrimination vacuous, while we look at organizations facing imperfect market pressure. Also, Becker's analysis is static while the focus of our study is on the evolution of the organization. In thinking about policies that protect minorities, our work is akin to the extensive literature on affirmative action (see Fryer-Loury 2005 for an overview). In Coate-Loury (1993), employers have a taste for discrimination and a principal wants to boost minority workers' incentives to invest in skills. Affirmative action gives the minority prospects and boosts minority incentives if modest, but creates a "patronizing equilibrium" and reduces incentives if extensive. In Rosen (1997)'s statistical discrimination model, a group of workers who find it hard to get a job in competition with candidates from the outgroup become less choosy; they apply for jobs for which they are less suited, and knowing this, firms rationally discriminate against group members and in favor of the outgroup.

Recruiting like-minded candidates. Our emphasis on cooptation is reminiscent of the theories of clubs (initiated by Buchanan 1965) and of local public goods (e.g. Tiebout 1956, Jehiel-Scotchmer 1997). A couple of contributions examine the dynamics of organizational membership assuming, as we do, that current members think through the impact of joiners on future recruitment decisions. They consider contexts rather different from ours, though. In particular, they stress the time variation of the size of the organization. Barberà et al (2001) look at clubs in which each member can bring on board any candidate without the assent of other members. They are interested in the forces that determine the growth or the

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[43]In line with Carmichael (1988) and Friebel-Raith (2004), it is thus optimal for the seniors' majority not to let current juniors coopt new juniors as a majority of out-group juniors may engage in un-meritocratic hiring in order to increase their chances of being appointed to the senior board. This optimality result may not hold if for instance, juniors are better able than seniors at scouting talented candidates.

stagnation of organizations. A member's (unilateral) decision of coopting a candidate hinges on the number of additional candidates whom the newly admitted one brings in the future; for instance, a member may not vote for his friend, because his friend may bring enemies to the group. Roberts (2015), like us, assumes majority rule, but posits that individuals care only about the (endogenous) size of the organization; there is a well-determined order of cooptation, with new members being more favorable to expansion than previous ones and therefore, if admitted, taking incumbent members into dynamics they may not wish[44]. Acemoglu et al (2012) also looks at the long-term consequences of reforms that benefit the rulers in the short run, but may imply a transfer of control in the future; for instance, a controlling elite may not want to liberalize (give political or religious rights to other citizens) by fear of a slippery slope that would later entail a loss of control.

Recruiting talent under incomplete information. Section 4.2.1 on homogamic evaluation capability bears resemblance with Board et al (2019). The latter paper assumes that talented people are better at identifying new talents, from which it derives rich dynamics. Section 4.2.1 also considers homogamic evaluation capability, but in the horizontal dimension rather than the vertical one; there may then be a separation between information and control, unlike in Board et al.[45]

Trade-off between talent and like-mindedness. Cai et al (2018) analyze the dynamics of a three-member club. Like in this paper, players are characterized by a vertical and a horizontal type[46], and (what we label) meritocratic and entrenched equilibria may arise. Sections 2 and 4.1 thus generalize their analysis to an arbitrary-size organization and a larger set of talent distributions. An interesting insight of their analysis that is not (but could be) present in our model is the possibility of "intertemporal free riding": Even in a homogenous population (which corresponds to $b = 0$ in our model), current members will not maximize social welfare; for, members in Cai et al engage in costly search for candidates. As current members are not infinitely lived and thus do not enjoy the benefits of quality recruitment as long as the

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[44]A small literature on organizational dynamics looks at factors of hysteresis other than control over membership. In Tirole (1996) groups' reputations reflect the past behavior of their members, while members themselves have reputations based on incomplete data (that is why the individuals with whom they interact take into account the group's reputation as well). That paper shows that (uniquely determined) dynamics may converge to a high- or low- group reputation steady state, and that group reputations are fragile and hard to reconstruct once destroyed, so that a temporary shock may permanently confine a group to a low-quality trap. Sobel (2000) looks at an organization in which new recruits must "maintain the standard" of the existing population of members. He shows how, with such a rule, shocks may decrease, but not increase standards.

[45]Moldovanu-Shi (2013) model also exhibits heterogeneous evaluation capabilities. Members of a committee sequentially assessing candidates for a job and coopting using the unanimity rule each have a superior expertise in evaluating a candidate's performance along the dimension he cares most about. The focus is on the acceptance standards and the comparison between a dictator and a committee; given the focus on a single job opening, the dynamics of control are not investigated. In Egorov-Polborn (2011), similar backgrounds (homophily dimension) facilitate the estimation of others' ability. A force pushing toward homogeneity of organizations is then the winner's curse: competition among employers makes it more likely that organizations will hire majority candidates, on whom they have superior information.

[46]Homophily benefits are constant-sum (the sharing of spoils) in Cai et al., while they are not in our model.

organization, they underinvest in search[47]. In contrast with Cai et al, our model allows for the study of super-entrenchment and explores its drivers. Moreover, while Cai et al focus on optimal voting rules[48], we investigate a distinct set of familiar policy interventions.

Glass ceiling. In Athey et al (2000), players also have a horizontal (gender) and vertical (talent) types. Ability to fill a senior position depends on intrinsic talent and on mentoring received as a junior member. Mentoring is type-based, and so majority juniors receive more mentoring and are favored in promotions. The upper level may therefore become homogenous. The organizations however may (depending on the mentoring technology's concavity) want to bias the promotion decision in favor of minority juniors, so as to create diversity and more efficient mentoring. Control is not a focus of their paper, unlike ours.

Empirical evidence. There is growing evidence that meritocracy may not prevail even in organizations that are incentivized to behave efficiently. Zinovyeva-Bagues (2015) shows that in the Spanish centralized process for promoting researchers to the ranks of full and associate professor, the promotion rate is higher when evaluated by the PhD advisor, a colleague or coauthor and that the bias dominates the informational gain (that exists with weaker connections). Bagues et al (2017) by contrast find that the presence of women on (Italian and Spanish) committees may not increase the quantity and the quality of female promotions; but male evaluators become less favorable to women if a woman joins the evaluation committee. Hoffman et al (2018) show that under discretionary hiring, the availability of test scores raises the quality of appointments (as measured by subsequent job tenure), but that the overruling of test score ranking lowers quality[49]. Rivera (2012) finds evidence of biased hiring based on shared leisure activities. Bertrand et al (2018)'s study of affirmative action on Norwegian boards (a mandated 40% female representation), together with the evidence showing that qualifications of women on boards increased rather than decreased suggests that discrimination, perhaps based on prejudice, was at stake prior to the reform.[50]

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[47]A similar effect is present in Schmeiser (2012), who analyses the dynamics of board composition and the potential benefits of outside-directors rules and nominating committee regulations. In his paper, even outside directors may not stand for shareholders' best interests, even if they can be ascertained to have no connection with insiders. The point is that, in the absence of delayed compensation, outside directors favor immediate benefits due to their limited tenure.

[48]Our model also allows for the investigation of voting rules. Consider for instance supermajority rules, assuming that a (completely uninformed) principal mandates that, to be elected, a candidate requires at least $k + l$ votes, where $l \geq 1$. If no candidate reaches the election threshold, the principal picks one among the two candidates at random. Consequently, the principal's blindess makes failing to reach the election threshold costly for majority members. It can be shown that for $x < 1/2$, (i) for s/b sufficiently close to 1, super-entrenchment at level l is the unique symmetric MPE in weakly undominated strategies such that a stronger majority makes (weakly) more meritocratic recruitments; (ii) nonetheless, for δ sufficiently low, the existence region of meritocracy widens with respect to *laissez-faire*.

[49]Suggesting either homophily objectives or poor judgment.

[50]The gender gap and glass ceiling have a number of potential explanations, as stressed by Bertrand in her 2018 survey: difference in education (mainly in the best educational tracks), in psychological traits (higher aversion to competition/relative performance evaluation, higher risk aversion), women's demand for flexibility (particularly penalizing in professions that highly reward long hours), higher demands on time (non-market work, child penalty).

6 Alleys for future research

The introduction covered the main insights of our analysis. Consequently, these concluding remarks will focus on some of the (many) areas that would benefit from future research. Some of these lines of research are (interesting) direct extensions of the current model[51]. Others, on which we will focus, are more radical departures from it.

Theoretical research: (a) Endogenous candidacies. Moisson-Tirole (2020) allows the pool of candidates to depend on the current quality and diversity of the organization. For example, a woman may not apply to an organization that is an all-male club; a talented individual may not be willing to join a low-quality group. The state space is then two-dimensional (current quality and diversity). Two main insights emerge from the analysis. Firstly, small shocks may affect whether the organization enters a virtuous or vicious circle; a small degradation may lead to the organization's not attracting talented minorities, and later on even talented majority candidates; the organization then goes down the drain, and converges toward a low-quality, low-diversity steady state. Secondly, the organization may thwart such downward spirals by engaging in (voluntary) affirmative action; the organization may coopt mediocre minority members to later be able to recruit more talented ones, who will be attracted by the diversity improvement.

(b) More than two groups and coalitions. While a two-group structure is natural in a number of environments, exercising control over appointments may require building up a majoritarian coalition in others. As is well-known from academic departments or politics, such coalitions may be unstable over time, as a partner in a coalition may be evicted for the benefit of another or may be wary that the dominant coalition group becomes hegemonic. Studying such dynamics may involve a quantum leap in the complexity of the analysis, but would be very rewarding.[52]

(c) Integrity of quality assessment exercises. One of our insights on the policy side is that quality assessment exercises promote meritocracy and diversity, and that, leaving their cost aside, they do not generate the perverse entrenchment effects that plague some other inter-

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[51] *Heterogeneous tastes for homophily.* We assumed that members have similar preferences for homophily. This need not be the case. A specialization may then arise, in which agents sort themselves out in their applications between highly entrenched organizations and more tolerant/open structures.

Heterogeneous time discount factors and internal structure of power. Members' heterogeneous horizons in the organization affect their willingness to invest for the future. As we showed, discrimination against the minority is an investment benefitting patient majority members. Would "older" members (i.e. with a shorter time horizon) be more meritocratic than "younger" members?

Searching for talented candidates. Talented candidates, even if they are willing to join the organization, may not become members because they are unaware of an opening or have misconceptions about their chance of being coopted. Search raises a host of interesting questions: does it result from members' initiative or is it conducted through a search committee? In the former case, does the majority benefit from its larger size (which is unclear: a larger membership size increases the number of coincidental thoughts as well as the extent of free riding; social pressure within groups may also differ)? Is the intuition that search will be mainly directed toward in-group candidates correct?

[52] One could use the Shapley value in order to compute a group's ability to select a candidate.

ventions. We however presumed that these assessments were accurate. Casual empiricism suggest that integrity is not to be taken for granted. Dominant groups may control not only the organizations themselves, but also the panels that are supposed to assess them. At the same time, minority groups may be minorities not because they suffer from some innate trait that is unrelated to quality (gender, ethnicity...), but because they are perceived as lower-quality agents by the majority group. Mandating diversity in the assessment panels may then be less appealing than when horizontal traits are really perceived to be horizontal. Capturing this may require a diversity of beliefs as to what constitutes high-quality work, and would for example shed light on how science progresses.

(d) Cooptation as manipulation. This paper assumes that individuals outside the organization have no capability of causing harm to it. Introducing the possibility that coopting outsiders may change their behaviour and reduce nuisance would allow us to capture the second meaning of "cooptation" originating with Selznick.[53]

(e) Territorial communities as coopting organizations. Our analysis could be extended to a wide range of settings beyond those of "coopting organizations" *stricto sensu.* As an illustration, the model may have a geographic dimension, with the organization being a neighborhood, a city, a region or a country with some policy levers for influencing who its newcomers are. The horizontal type might be a cultural or religious trait, or alternatively preferences on amenities. The homophily benefit would stem from the fact that the larger the group, the more traction it gets on the allocation of public funds within the community. As emphasized in this paper, the neighborhood might be expected to engage in super-entrenchment depending on the shape of the homophily benefits – which depends here on the political structure of the territorial authority –, or in reaction to policy interventions from a higher authority.

Empirical investigations. The model could be tested from its basic assumptions to its predictions. For instance, the homophily incentive *b* has in recent years increased in some dimensions (e.g. political polarization) and decreased in others (as when social norms penalize a lack of diversity); depending on factors such as initial conditions, the nature of internal interactions, the size of the organization[54] or the competitiveness of the market for talent, this evolution should impact dependent variables such as the quality of recruitments and the heterogeneity within and across organizations. Does patience (e.g. longer-term perspectives for members within the organization) foster entrenchment as the model predicts? For example, the model's predictions on the role of patience may be particularly relevant when applied to local

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[53]One of many ways of capturing the cooptation of members with sufficient nuisance power outside is to assume that the probability that the organization continues falls sharply when it is too monolithic – e.g. due to the prospect of a "revolution".

[54]Our model indeed predicts that at least for δ_0 small, small organizations are more likely to be in the meritocratic equilibrium, yet that conditional on entrenchment, larger organizations make on average more meritocratic recruitments.

communities. People with low prospects of ever leaving a region or a neighborhood (the "somewheres", to borrow from Goodhart 2017), should be expected to be more inclined to entrench themselves, i.e. be opposed to a large immigration that would make them become a minority, while by contrast, highly mobile individuals (the "anywheres") should be more tolerant/less sensitive. In addition, the model's predictions on the impact of policy interventions could be tested: how do organizations react, and do policies backfire as predicted? The model's results on the drivers of the fragility of meritocracy could also be tested. For instance, do uncertain voting participation and imperfect group allegiance trigger super-entrenchment?[55] Does homogamic evaluation capability threaten meritocracy and harm welfare?[56] We leave these empirical questions as well as the theoretical ones to future investigation.

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[55]In particular, other things being equal, do lower levels of trust within groups lead to higher levels of entrenchment as the model suggests? Conversely, do more disciplined groups foster meritocracy?

[56]As the polarization of a society increases, reciprocal knowledge across groups may be expected to recede, hence generating the asymmetric information structure of Section 4.2.1. As a consequence, polarization in a society may jeopardize meritocracy both by raising homophily benefits, and by lowering information on out-group individuals.

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