The Joint Dynamics of Organizational Culture, Design, and Performance*

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Abstract

This paper examines organizational cultures created through emerging values and how these cultures interact with a key aspect of organizational design, namely how far key decisions are delegated. We emphasize a cleavage between individualistic and collectivist cultures, modeled as whether senior managers care about the interests of other managers in the organization, or simply about their own material payoffs. Using a simple dynamics of socialization based on the relative payoffs of each type (their organization *fitness*), the paper investigates the conditions under which different cultures become dominant. We suggest four applications of these ideas: competitive threats and innovation incentives, determinants of firm-level productivity, conflicting missions in public bureaucracies, and the culture and centralization of political parties.

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1 Introduction

Research on public and private organizations has focused on understanding the drivers of effective performance. Despite a widespread acknowledgement that organizational culture may be critical for performance, there is little agreement on how to capture this concept in economic models. One influential approach is to model culture as shaping the beliefs that govern individual behavior, while ignoring the underlying values which mediate those beliefs. This contrasts with treatments outside of economics. For example, in their influential book on culture and organization, Hofstede et al (2010) use the term "software of the mind" to describe the role of culture and regard underlying values as the deepest embodiment of culture. In this paper, we consider culture to be part of individual mental programs, which get internalized in values and influence economic behavior.

We focus on a particular cultural distinction that has received a lot of attention among those who empirically study organizational cultures. We thus suppose that managers can be either "individualists," who care solely about their own material payoffs, or "collectivists" who internalize objectives of other members and whose values extend to the performance of the entire organization. The share of collectivist types evolves endogenously over time and interacts with choices of whether to centralize or decentralize the organization. This dynamic two-way interaction between organizational culture and design revolves around the alignment of interests between leaders and managers and the intuitive notion that agents are willing to put in more effort when they are allowed greater autonomy.

One key question that we pose is whether cultural dynamics further the over-arching objectives of the organization's principal(s). It is unclear *a priori* whether collectivism is good for an organization. For example, Whyte (1954) stressed that collectivism could have negative consequences although we are not aware of any formal investigation of this possibility. Another key question is how the cultural dynamics depend on the eco-system in which the organization operates. For example, does competition between organizations affect how their cultures evolve?

As discussed in more detail below, the approach we develop has three specific features which differentiate it from existing literatures. First, our notion of culture is based on evolving population types, in a setting where culture is internalized in agents' values. Second, values evolve according to a socialization process, which entails a combination of social learning and the "fitness"

of different individual types. Third, those who control the organization's design may respond to emerging cultures by redesigning authority structures – in particular, how much decision-making power to retain at the top rather than delegating it to managers. The insights derive from the combination of these three features in a dynamic model.

The paper is organized as follows. In the next section, we discuss some related research. In Section 3, we develop a canonical model of cultural dynamics where the key organizational choice is how far to decentralize decisions. Section 4 analyses the static and dynamic equilibria of this general model, while Section 5 puts versions of it to work in four specific applications to illustrate how it can illuminate cast debates about organizational performance. Section 6 concludes.

2 Related Literature

The literature on corporate culture is too vast to survey here. We refer the interested reader to the excellent survey by Hermalin (2001), who identifies various strands of the literature. One important approach, taken by Kreps (1990) and others, is to regard culture as a belief-based norm that emerges in a game played by overlapping generations of agents, where cooperation is sustained against the threat of poor future performance. This can be contrasted with another approach taken, for example, by Hodgson (1996) and Lazear (1995), which is more similar to our approach in stressing how different types evolve within an organization.

The foundations of cultural differences have also been explored in other contexts. Thus, Grief (1994) sees such differences as solutions to (different) commitment problems and as ways of creating beliefs systems which support more cooperative behaviors. He describes "collectivist" cultures as those which have beliefs more supportive of cooperation. The alternative approach taken by Akerlof (1976) and Akerlof and Kranton (2000) see manifestations of culture in preferences that drive individual behavior, like in the approach we develop.

We also build on models of cultural evolution, inspired by earlier research in anthropology beginning with Cavalli-Sforza and Feldman (1981) and Boyd and Richerson (1985). Research on socialization and cultural economics has grown in recent years and Bisin and Verdier (2011) survey this field. Our model of cultural change through the dynamics of values (rather than dy-

namics of behavior or beliefs) of a specific group follows the lead of Güth and Yaari (1992) and Güth (1995).

The empirical literature on cultural differences developed largely outside of economics. For example, Hofstede (1984) began a body of work on international comparisons of organizational cultures.[1] The widely used World Values Survey was developed as a means of examining cultural differences (see Inglehart et al, 2004). Empirical studies of culture in economics are also extensive by now (see, Alesina et al, 2015 and Guiso et al, 2006 for overviews). While these ideas have mostly been applied to individuals, they have also been applied to firms. For example, Guiso et al (2015) argue that a corporate culture that includes integrity is likely to improve performance.

There is a vast literature in business economics and sociology that studies conflicts of interest within firms (see, for example, Cyert and March, 1963). Economists picking up these ideas have asked how conflicting interests shape delegation of decision-making, with key contributions by Aghion and Tirole (1997), Bolton and Farrell (1990), Alonso et al (2008), and Hart and Holmström (2010). A major focus in this approach has been on the informational benefits of delegation weighed against the value of coordination. The resulting literature has influenced empirical studies of firm behavior. In this vein, Bloom et al (2012) look at the extent of decentralization by firms across countries, finding productivity gains from decentralization which are associated with greater levels of trust in a country. Bandiera et al (2016) examine how CEOs use their scarce time, and find the largest differences when it comes to direct involvement in production vs. coordination with high-level executives.

3 Basic Framework

Organizations and states of the world An organization has a continuum of divisions. These divisions have unit measure and are indexed by $\omega \in [0,1]$. A design choice denoted by $\rho(\omega) \in \{0,1\}$ has to be made for each division. The payoffs to this design choice depend on a state of the world $\sigma(\omega) \in \{0,1\}$. This state is made up of an aggregate (organization-wide) component $S \in \{0,1\}$ and an idiosyncratic component $s \in \{0,1\}$ where each outcome for s is equally likely. Let α be the probability that $\sigma = S$. Thus $\alpha \in [0,1]$ measures how well technologies, demands, or costs are aligned

[1] See Hofstede et al (2010) for a more recent survey of the extensive evidence that has been collected.

across divisions. Finally, the payoff in each division of the organization depends on another state of the world $\theta \in \{0, 1\}$. Let β be the probability that $\theta = 0$.

Members of the organization The organization has a leader. This leader represents the organization's ultimate principal(s) – the owners of the firm, the ministry or customers of the bureaucracy, or the voters of the party – and shares their preferences. She observes S but not $\sigma(\omega)$. Further, she chooses the organizational form $o \in \{d, c\}$, where d stands for decentralized and c for centralized. In a centralized organization, the leader also chooses $\rho(S) \in \{0, 1\}$ which is binding for all divisions ω.

Each division is staffed by an upper-tier manager, indexed by U, and a lower-tier manager, indexed by L. These sets of managers have two-period overlapping lives, such that this period's upper-tier managers are replaced in the next period by this period's lower-tier managers.

Each upper-tier manager observes $\sigma(\omega)$ is his own division (as well as S). The upper-tier manager thus has better local information than has the leader. The information disadvantage of the leader diminishes in parameter α. In a decentralized organization, the design choice ρ is delegated to upper-tier managers.

When entering the organization, lower-tier managers make an investment choice in effort, $e \in [1, E]$, which is specific to the organization. This effort is costly, where the cost $\psi(e)$ is increasing and convex with $\psi(1) = 0$. The latter guarantees a minimum investment of $e = 1$.

Manager preferences, choice of efforts, and values A non-standard but key distinction in our framework is that between values and preferences. This distinction will be the basis on which we will understand organization culture. A preference is attached to the direct individual payoff from a particular act or outcome. We use the term selfish preferences for the standard preferences over actions. An individualist will only have such preferences. A value is instead attached to overall performance (in this case the whole organization). Thus, some agents will absorb an organization culture, which leads them to care about everyone in their division as well as the organization as a whole.

A key modeling choice is how to formally represent these ideas. Following the labeling in Whyte (1954), let $\tau \in \{C, I\}$ be the two possible manager

types, where C stands for collectivist and I for individualist. We use μ to denote the fraction of collectivists in the organization. Only upper-tier managers have a type.

Selfish Preferences The preferences of the managers depend on the design choice and the state of the world. In division ω, the upper-tier manager receives

$$M^U\left(D\left(\omega\right),\tau\right)\cdot e \text{ for } \tau\in\left\{C,I\right\},$$

where $D\left(\omega\right)$ stands for "dissonance", given by $D\left(\omega\right)=\left|\rho\left(\omega\right)-\sigma\left(\omega\right)\right|\in\left\{0,1\right\}$. To simplify, we assume that

$$M^U\left(0,C\right)=M^U\left(1,I\right)=U>M^U\left(1,C\right)=M^U\left(0,I\right)=u=0. \qquad (1)$$

By assumption, collectivist upper-tier managers hence prefer $D\left(\omega\right)=0$, while individualist managers prefer $D\left(\omega\right)=1$. As per our simplification, the relative preferences are symmetric so there is no gain to being individualistic or collectivist in terms of selfish preferences.

Efforts Let $\gamma\in\left[0,1\right]$ denote the ex ante – when making the effort choice – probability for a lower-tier manager to be assigned to a division setting $D\left(\omega\right)=0$. Then, his expected utility is:

$$\left[\gamma M^L\left(0\right)+\left(1-\gamma\right)M^L\left(1\right)\right]e-\psi\left(e\right).$$

We assume that the payoffs to both types of managers are entirely non-contractible (as in Aghion and Tirole, 1997), such that no contracts contingent on performance are possible. In both cases, higher effort simply scales up the manager's payoff.

We assume that $M^L\left(0\right)>M^L\left(1\right)$. That is, the preferences of lower-tier managers coincide with those of collectivist upper-tier managers. To simplify matters, we assume that $M^L\left(0\right)=L$ and $M^L\left(1\right)=l=0$. Then, optimal effort is given by:

$$e^*\left(\gamma\right)=\arg\max_{e\in[0,E]}\left\{\gamma Le-\psi\left(e\right)\right\},$$

an amount which is increasing in γ.

Values We assume that a collectivist upper-tier manager cares about more then his own individual preferences. This has two consequences. First, choices for the division are based on the *joint* payoff to himself and the lower-tier manager. Thus, we write the managers' joint payoff when the upper tier manager is collectivist as:

$$M\left(D\left(\omega\right),\gamma\right)=\left[M^{U}\left(D\left(\omega\right)\right)+M^{L}\left(D\left(\omega\right)\right)\right]e^{*}\left(\gamma\right)-\psi\left(e^{*}\left(\gamma\right)\right)$$

and note that

$$M\left(0,\gamma\right)>M\left(1,\gamma\right),$$

as collectivist upper-tier managers and lower-tier managers have the same ordinal preferences over $D\left(\omega\right)$.

Second, a collectivist upper-tier manager adopts reference points r for his view of the *entire organization's* success or failure. Given an outcome M, the value for a single division is

$$v\left(M,r_{g},r_{l}\right)=\max\left\{M-r_{g},0\right\}+\min\left\{r_{l}-M,0\right\},\tag{2}$$

where r_g is a reference point for gains and r_l is a reference point for losses.[2] We focus on the case where

$$r_{g}=M\left(1\right)\text{ and }r_{l}=M\left(0\right),$$

such that gains are measured relative to the worst possible outcome and losses relative to the best possible outcome. The manager's overall value, which depends on the organization's overall performance, is

$$V\left(r_{g},r_{l},\gamma\right)=\int_{0}^{1}v\left(M\left(D\left(\omega\right),\gamma\right),M\left(1,\gamma\right),M\left(0,\gamma\right)\right)d\omega.$$

This will depend on the weight of divisions that choose $D\left(\omega\right)=\rho\left(\omega\right)-\sigma\left(\omega\right)=0$, which give a gain in value of $M\left(0,\gamma\right)-M\left(1,\gamma\right)$, and the weight of those that choose $D\left(\omega\right)=1$, which give a loss in value of $M\left(0,\gamma\right)-M\left(1,\gamma\right)$.

One feature of this framework is that an upper-tier manager has a negligible influence on the overall performance of the firm, since he can only influence the choice of $\rho\left(\omega\right)$ in his own division. Nevertheless, as a collectivist type he internalizes the gains and losses for all manager pairs in his

[2] This formulation is obviously related to Prospect Theory (Kahneman and Tversky, 1979), allowing for endogenous reference points (Kozegi and Rabin, 2006). It would be easy to incorporate loss aversion by multiplying the second term in (2) by a factor $\gamma>1$.

own values. In this sense, the values are consistent with the assumptions in group-based models such as Coate and Conlin, (2004) or Feddersen and Sandroni (2006). More generally, the approach is consistent with Sagoff (1986) who argues that

> ..values are goals or intentions the individual ascribes to the group or community of which he is a member; they are his because he believes and argues they should be ours; he pursues them not as an individual but as one of us. The individual then shares with other members of his community intersubjective intentions or, to speak roughly, common goals and aspirations, and it is by virtue of these that a group or community is a group or community. (page 302).

Leader payoffs As already mentioned, the leader observes S but not $\sigma(\omega)$ and chooses the organizational form $o \in \{d, c\}$. Moreover, in a centralized organization, she chooses $\rho(S) \in \{0, 1\}$ which is binding for all manager pairs.

Suppose that a fraction $x \in [0, 1]$ of divisions choose the same value of ρ. Then, the payoff to the leader is

$$\Pi\left(\lambda(2x-1)^2, \int \pi(D(\omega), \theta)\, d\omega, e^*(\gamma)\right), \tag{3}$$

where $\pi(D(\omega), \theta)$ is the payoff in division ω, which depends on its design choice and the state of the world θ which determines what kind of conflicts prevail between the leader and the upper-tier managers. We assume that the payoff function Π is increasing in all its three arguments.

The first term $(2x-1)^2$ is a measure of coordination in the organization which is maximized (at 1) when every division takes the same action ρ (either $\rho = 1$ or $\rho = 0$). Parameter λ indexes the importance of coordination gains. Thus, greater coordination is always valuable, *ceteris paribus*. This way of capturing the benefits of coordination is similar to that in the literatures on the scope of the firm (Hart and Holmström, 2010) and coordination in firms or other organizations (Bolton and Farrell, 1990, Alonso et al, 2008).

The second term in (3) aggregates sub-profits across divisions. We will suppose that

$$\pi(1,1) > \pi(0,1) \text{ and } \pi(0,0) > \pi(1,0).$$

This says that the leader prefers $D(\omega) = 1$ when $\theta = 1$, such that her preferences are aligned with the individualists and conflicts with the collectivists. On the other hand, she prefers $D(\omega) = 0$ when $\theta = 0$, siding with the collectivists rather than the individualists. Recall that β is the probability of the latter state. This term will thus be crucial for how to make organizational choices to trade off adaptation to divisional information and conflicting interests (Aghion and Tirole, 1997).

Finally, we assume that effort in each division raises the leader's payoff. In the third term in (3), we write the effort as a single variable, however. This simplification anticipates the result below that the optimal effort level will be common to all lower-tier managers, since it is committed before other relevant choices.

Timing The model evolves over infinite time with variables indexed by t. The only state variable is μ_t the equilibrium evolution of which will be derived in the next section. The full timing of the model in period t is as follows:

1. The organization enters the period with a generation of upper-tier managers, a share μ_t of which are collectivist types. A new generation of lower-tier managers enter the organization. Nature determines $S \in \{0,1\}$, $\theta \in \{0,1\}$, observed by everybody, and $s(\omega) \in \{0,1\}$ for $\omega \in [0,1]$, observed only by upper-tier managers.

2. The lower-tier managers make firm-specific investments $e \in [1, E]$.

3. The leader chooses the organizational form $o \in \{c, d\}$.

4. Each lower-tier manager is matched with an upper-tier manager at random. Lower-tier managers are socialized, which determines μ_{t+1}.

5. If $o = c$, then the leader chooses $\rho \in \{0,1\}$ which is binding for all ω.

5' If $o = d$, then the upper-tier manager in each division chooses $\rho(\omega) \in \{0,1\}$.

6. Payoffs are realized, the current upper-tier managers leave the organization and get replaced by the current lower-tier managers.

4 Analysis

In this section, we first study the organizational equilibrium of the model laid out in Section 3, in a given period t with a fixed fraction of collectivist managers μ_t.Then, we study how this fraction evolves through a cultural evolutionary process. These dynamics of μ_t feed back to the form of the organization.

4.1 Project and Effort Choices

Consider now how $e^*(\gamma)$ and $\rho(\omega)$ are determined.

Centralized control – stage 5 In a centralized organization, the leader chooses $\rho(S)$ at stage 5. This choice of projects reflects the quality of centralized information. The decision will be as follows:

Lemma 1: *A leader chooses* $\rho = S$ *if* $\theta = 0$ *and* $\rho \neq S$ *if* $\theta = 1$.

The proof of this and all subsequent results is in the appendix.

We next turn to investments in effort at stage 2, noting that $\gamma = \alpha + \frac{1-\alpha}{2}$ if $\theta = 0$, and $\gamma = \frac{1-\alpha}{2}$ if $\theta = 1$. If lower-tier managers correctly foresee that the organization will be centralized, their effort choices are thus given by $e^*\left(\alpha + \frac{1-\alpha}{2}\right)$ if $\theta = 0$, and by $e^*\left(\frac{1-\alpha}{2}\right)$ if $\theta = 1$. They provide higher effort when $\theta = 0$ since the likelihood that the leader selects the project which they prefer is higher under that state.

Decentralized control – stage 5' With decentralized project control, the choice of $\rho(\omega)$ depends on the information $\sigma(\omega)$ and the type of the upper-tier manager in the division. In the μ divisions with collectivist upper-tier managers, each of them sets $D(\omega) = \rho(\omega) - \sigma(\omega) = 0$ to maximize the joint surplus $M(D(\omega), \gamma)$ of managers in the division. Half of these collectivist managers see $\sigma(\omega) = 1$ and the other half $\sigma(\omega) = 0$, so $\mu/2$ divisions set the same value of ρ. In the $(1-\mu)$ divisions with individualistic managers, these make design choices, $\rho(\omega) \neq \sigma(\omega)$, to maximize their selfish preferences $M^U(D(\omega), \gamma)$. Again, half of them see $\sigma(\omega) = 1$ and the other half $\sigma(\omega) = 0$, so $(1-\mu)/2$ of these divisions set the same value of ρ. It follows that $x = 1/2$ and the payoff to the leader becomes

$$\Pi\left(0, \mu\pi(0,\theta) + (1-\mu)\pi(1,\theta), e^*(\gamma)\right),$$

which now depends on the fraction of upper-tier manager types.

We can then turn to effort choices at stage 2, when lower-tier managers rationally expect a decentralized organization. In this case, $\gamma = \mu$, and the effort in a decentralized organization is hence given by $e^*(\mu)$.

Centralization versus decentralization – stage 3 Given the expressions above, it is clear that the leader's choice whether to centralize or decentralize the organization at stage 3 will depend on the value of μ and α, conditional on the realized value of θ. The optimal decisions are described in:

Proposition 1 *There exist* $\{\mu_L, \mu_H\}$ *with* $\mu_H > \mu_L$ *such that:*

1. *if* $\theta = 0$*, then the leader chooses decentralization if and only if*

$$\mu \geq \mu_H$$

2. *if* $\theta = 1$ *then the leader chooses decentralization if and only if*

$$\mu \leq \mu_L.$$

In extremis, $\mu_H = 1$ and/or $\mu_L = 0$. In each of these cases, it does not make sense to decentralize even when the upper-tier management is homogenous. This will be the case when λ is large enough. It is also interesting to note that if $\lambda = 0-$ i.e., there are no benefits of coordination – then $\mu_H = \alpha + \frac{1-\alpha}{2}$ and $\mu_L = \frac{1-\alpha}{2}$.

Proposition 1 makes intuitive sense. Suppose the leader's interests are aligned with the collectivist managers (the case $\theta = 0$). Then, she will decentralize when collectivist types make up a sufficiently large fraction of the upper-tier managers, as individualist manager types do not carry out the optimal choice for the leader. However, if alignment with collectivist managers is to the detriment of the leader (the case $\theta = 1$), then she decentralizes only with a sufficiently small fraction of collectivist types.

As for the other parameters, we note that when $\alpha = 1$ – such that the managers have no information advantage vs. the leader regarding $\sigma(\omega)$ – decentralization never occurs. In the opposite polar case, when $\alpha = 0$ – so that S contains no information about $\sigma(\omega)$ – the critical share of collectivist managers for decentralization is $\mu = 1/2$, whatever the value of θ.

4.2 Socialization and Cultural Evolution

Having solved for the static equilibrium, we now turn to the evolution of the organization's culture – measured by its share of collectivist managers – over time. This happens through socialization across generations of managers, whose types are determined once and for all when they join the firm. We have deliberately simplified by assuming that all upper-tier managers leave each period, and all lower-tier managers are promoted. Then, μ_{t+1} is determined by the way lower-tier managers are socialized in period t. At the cost of more algebra, we could consider longer than two-period lives in the organization, such that only a fraction of upper-tier managers retire, and a corresponding fraction of lower-tier managers get promoted, in each period. This would lead to more inertia in organizational culture.

Direct mentoring and indirect socialization We have assumed that being randomly matched with an upper-tier manager at stage 4 involves a mentoring component. This mentoring helps determine the lower-tier manager's type, which becomes relevant once he is promoted.

If a lower-tier manager is mentored by a collectivist type, which happens with probability μ_t, we assume that he may become collectivist depending on the relative fitness of collectivist and individualist types. Specifically, let $\Delta(\mu_t)$ be the expected-utility difference between being a collectivist and an individualist with μ_t collectivist types in the population.[3] Then, a lower-tier manager becomes collectivist through mentoring if:

$$\Delta(\mu_t) + \eta \geq 0,$$

where η is a mean-zero, symmetrically distributed idiosyncratic shock with continuous distribution function $G(\cdot)$. Thus the probability that that a new recruit mentored by a collectivist upper-tier manager becomes collectivist is just $G(\Delta(\mu_t))$.

If such direct socialization fails, the lower-tier manager may still be indirectly socialized by observing and learning from other managers. The probability of indirectly becoming a collectivist type depends monotonically on the average fraction of such types in the organization, a kind of social learning postulated in much of the cultural-evolution literature. Assuming a linear relation, the probability of indirect socialization becomes $(1 - G(\Delta(\mu_t)))\,\mu_t$.

[3] We are assuming here that socialization is based on the experience of current generation upper-tier managers. Otherwise, it would be $\Delta(\mu_{t+1})$ that mattered.

Adding these expressions, the overall probability that a new recruit who is matched with a collectivist upper-tier manager himself becomes a collectivist is:

$$G\left(\Delta\left(\mu_t\right)\right) + \left(1 - G\left(\Delta\left(\mu_t\right)\right)\right)\mu_t. \tag{4}$$

If a new lower-tier manager is matched with and mentored by an individualistic upper-tier manager, which happens with probability $1 - \mu_t$, he is never directly socialized into a collectivist type. On the other hand he is socialized into being individualistic if

$$\Delta\left(\mu_t\right) + \eta \leq 0.$$

Thus, $\left(1 - G\left(\Delta\left(\mu_t\right)\right)\right)$ is the proportion of individualists coming from such matches. The fraction $G\Delta\left(\mu_t\right)$ of lower-tier managers who do not become individualistic in this way, can – as above – indirectly become collectivist depending on the aggregate fraction of collectivists in the organization. The resulting probability of becoming collectivist is

$$G\left(\Delta\left(\mu_t\right)\right)\mu_t. \tag{5}$$

The law of motion Multiplying (4) with μ_t, (5) with $1 - \mu_t$, and adding the resulting expressions, we can write the equation of motion for the share of collectivist types – our measure of organizational culture – as

$$\begin{aligned} \mu_{t+1} &= \mu_t\left[G\left(\Delta\left(\mu_t\right)\right) + \left(1 - G\left(\Delta\left(\mu_t\right)\right)\right)\mu_t\right] + \left(1 - \mu_t\right)G\left(\Delta\left(\mu_t\right)\right)\mu_t \\ &= \mu_t + \left(1 - \mu_t\right)\mu_t 2\left[G\left(\Delta\left(\mu_t\right)\right) - \frac{1}{2}\right]. \end{aligned} \tag{6}$$

By (6), there are three possible-steady states for the organization's culture: fully individualistic with $\hat{\mu} = 0$, fully collectivist with $\hat{\mu} = 1$, and interior with $\Delta\left(\hat{\mu}\right) = 0$ (implying $G\left(\Delta\left(\hat{\mu}\right)\right) = \frac{1}{2}$). Which of these occurs occurs depends critically on the properties of $\Delta\left(\mu\right)$

Relative fitness Suppose first that μ is higher than its critical value μ_H in Proposition 1. Then, we know that the leader will choose decentralization when $\theta = 0$,which happens with probability β. Drawing on the assumptions in Section 3 and the results in Section 4.1, we can write the expected-utility difference between – the relative fitness of – being a collectivist rather than an individualist as

$$\hat{\delta}\left(\mu\right) = \left[\left(2\mu - 1\right)\left[U + L\right]\right]e^*\left(\mu\right).$$

But the leader will choose centralization with $\rho \neq S$ when $\theta = 1$,which happens with probability $1 - \beta$. In this case, the expected utility-difference becomes

$$\delta_L = -\left[\alpha\left[U + L\right]\right] e^* \left(\frac{1-\alpha}{2}\right) < 0.$$

Suppose next that μ is lower than critical value μ_L. Then, we get centralization and $\rho = S$ when $\theta = 0$ with collectivist-individualist expected-utility difference

$$\delta_H = \left[\alpha\left[U + L\right]\right] e^* \left(\alpha + \frac{1-\alpha}{2}\right) > 0.$$

But we get decentralization when $\theta = 1$ with expected-utility difference $\hat{\delta}(\mu)$.

Finally, if μ is in the interval $[\mu_L, \mu_H]$, we always get centralization with expected-utility difference δ_H when $\theta = 0$ and δ_L when $\theta = 1$. For future reference, we observe that $\hat{\delta}(\mu)$ is increasing in μ and positive (negative) whenever $\mu \geq 1/2$ $(\mu < 1/2)$. Moreover, $\hat{\delta}\left(\frac{1-\alpha}{2}\right) = \delta_L$ and $\hat{\delta}\left(\alpha + \frac{1-\alpha}{2}\right) = \delta_H$.

Dynamic paths Putting these pieces together, we can summarize the overall possibilities for the expected-utility difference between being a collectivist and an individualist:

$$\Delta(\mu) = \begin{cases} \beta\hat{\delta}(\mu) + (1-\beta)\delta_L & \text{if } \mu > \mu_H \\ \beta\delta_H + (1-\beta)\delta_L & \text{if } \mu \in [\mu_L, \mu_H] \\ \beta\delta_H + (1-\beta)\hat{\delta}(\mu) & \text{if } \mu < \mu_L. \end{cases}$$

As this expression shows, we have $\Delta_\mu(\mu) \geq 0$, for all values of μ. This implies a dynamic complementarity in the evolution of organizational culture. According to (6), this leads to divergent dynamics, which drive organizational culture to a corner over time. Specifically, the dynamic paths of the model are described in

Proposition 2 *There are three types of dynamics*

1. *If β is high enough, a collectivist culture always emerges in the long run (i.e., $\lim_{t\to\infty}\mu_t = 1$) from any starting value μ_0.*

2. *If β is low enough, an individualist culture always emerges (i.e., $\lim_{t\to\infty}\mu_t = 0$) from any starting value μ_0.*

3. If $\mu_H < 1$ and $\mu_L > 0$, *there is an intermediate range of* β, *where* $\tilde{\mu}(\beta) \in [0,1]$ *is defined by* $\Delta(\tilde{\mu}(\beta)) = 0$. *In this range, when* $\mu_0 < \tilde{\mu}(\beta)$, *an individualistic culture emerges in the long run* ($\lim_{t\to\infty} \mu_t = 0$), *but when* $\mu_0 > \tilde{\mu}(\beta)$ *a collectivist culture emerges in the long run* ($\lim_{t\to\infty} \mu_t = 1$).

In the first two cases of Proposition 2, the organization's culture lines up with the leader's average preferences, in a direction that depends on whether she more often sides with collectivist managers (Case 1) or individualist managers (Case 2). An intermediate range for β (Case 3) supports multiple steady states. However, given a specific initial condition for μ (and a specific value of β), the dynamics are still unique.

Organizational culture and organizational form How does the evolution of organizational culture, μ, interact with the choice of organizational form, centralized authority versus delegation? Propositions 1 and 2 tell us that there is no deterministic relation between the two. But when β is high enough for Case 1, the organization is characterized by a steadily increasing collectivist culture, together with a decentralized organization in most periods (since $\theta = 0$ in most periods for high β). When β is low enough for Case 2, we instead see a trend towards individualism, and observe centralization most of the time (since $\theta = 1$ most of the time for low β). In Case 3, when β is in an intermediate range, either of these long-term outcomes can occur depending on the initial condition.

Long-run payoffs Proposition 2 shows that the organization converges to either a fully collectivistic culture $\mu = 1$, or a fully individualistic culture $\mu = 0$ n the long run. In a steady state with $\mu = 1$, Lemma 1 and Proposition 1 say that the leader chooses decentralization when $\theta = 0$, but centralization with $\rho \neq S$ when $\theta = 1$. It is possible to derive expressions for the long-run expected payoff for the leader when $\mu = 1$ and $\mu = 0$. When $\mu = 1$ – assuming that $\mu_H < 1$ – the payoff is given by

$$\beta\Pi\left(0, \pi\left(0,0\right), e^*\left(1\right)\right) + \tag{7}$$
$$\left(1-\beta\right)\left\{\Pi\left(\lambda, \left(\alpha + \frac{1-\alpha}{2}\right)\pi\left(1,1\right) + \left(\frac{1-\alpha}{2}\right)\pi\left(0,1\right), e^*\left(\left(\frac{1-\alpha}{2}\right)\right)\right)\right\}.$$

In a steady state with $\mu = 0$ – assuming that $\mu_L > 0$ – the leader chooses centralization with $\rho = S$ when $\theta = 0$, but decentralization when $\theta = 1$. This

gives her a long-run payoff:

$$\beta\left\{\Pi\left(\lambda,\left(\alpha+\frac{1-\alpha}{2}\right)\pi\left(0,0\right)+\left(\frac{1-\alpha}{2}\right)\pi\left(1,0\right),e^{*}\left(\alpha+\frac{1-\alpha}{2}\right)\right)\right\}$$
$$+\left(1-\beta\right)\Pi\left(0,\pi\left(1,1\right),e^{*}\left(0\right)\right). \tag{8}$$

Does the culture which is best for the organization emerge in the long run? Inspecting the two expressions reveals a possible trade-off between alignment and effort. Alignment of preferences between the leader and upper-tier management is valuable under decentralization. Formally (comparing the first rows in each expression), $\pi\left(0,0\right)>\pi\left(1,0\right)$ occurs more often in the collectivist organization when $\theta=0$, while (comparing the second row in each expression) $\pi\left(1,1\right)>\pi\left(0,1\right)$ occurs more often in the individualistic organization when $\theta=1$. Such alignment may or may not be best served by a collectivist culture, depending on how often $\theta=0$ (as captured by parameter β) when collectivist and leader interests coincide.

But, everything else equal, a collectivist culture is good for the organization, as this is brings about design choices that are valued by the lower-tier management, which motivates them to work harder. Formally, comparing the effort levels row by row in the two expressions, the e^{*} values are always higher in the collectivist organization.

There is no guarantee that the organization will converge to a culture that maximizes long-run payoffs. Cultural evolution hinges on $\Delta\left(\mu\right)$, which reflects the expected payoff for managers. These, in turn depend on the design choices by leaders, which are optimized period by period. Therefore, the culture may very well converge to a point which diverges from the one that best serves the leader's (and the principals') long-run interests.

Dysfunctional cultures As an illustration, suppose that $\beta=0$ and $\alpha=0$. It follows from Proposition 2 that then we get $\mu=0$ in the long run, i.e., an individualistic culture emerges. Because the leader has the same interests as individualistic managers and full information she always chooses centralization, which makes it a better deal for the managers to be individualistic. Using (8) in this special case, we get a long-run equilibrium leader expected payoff of

$$\Pi\left(0,\pi\left(1,1\right),e^{*}\left(0\right)\right).$$

There is little effort $e^{*}\left(0\right)$ as lower-tier managers (correctly) expect that they will never work with their preferred project design, as the leader decentralizes

all projects to individualistic upper-tier managers to get the project design she prefers. As $x = \frac{1}{2}$ there are coordination costs – decentralization makes half the managers choose different projects (half of them see $\sigma(\omega) = 0$ and choose $\rho(\omega) = 1$, the other half see $\sigma(\omega) = 1$ and choose $\rho(\omega) = 0$).

Consider instead the counterfactual long-run payoff with $\mu = 1$. Applying (7) to this special case, the leader is likely to get a higher expected payoff, namely

$$\Pi\left(\lambda, \frac{\pi(1,1) + \pi(0,1)}{2}, e^*\left(\frac{1}{2}\right)\right)$$

Under a fully collectivist culture, the leader would choose to centralize which would remove coordination costs since $x = 1$, independently of the realization of S. Moreover, when $S = 1$, which occurs with probability $\frac{1}{2}$, the leader chooses $\rho = 0$ and all lower-tier managers choose high effort $e^*(1)$ because they will work on the project they like. With this aggregate state, however, project adaptation in the collectivist organization is worse $\pi(0,1) < \pi(0,1)$. Assuming that the adaptation disadvantage does not dominate the lower coordination costs and higher effort, a collectivist culture would yield a higher payoff.

However, developing a collectivist culture is not incentive compatible, given the cultural dynamics. The leader cannot credibly promise decentralization when this is not the optimal choice in a given period. This aspect of our model ties in with much older discussions around the Coase theorem whether organizational forms are efficient. There is a parallel with the argument in Acemoglu (2003) that lack of commitment by current decision-makers is a barrier to efficiency. The individualistic culture that emerges in long-run equilibrium is dysfunctional from the leader's viewpoint. If the owners could take a long-run view and delegate long-run control of the organization to a collectivist leader, they would prefer to do so. The logic is reminiscent of that in Vickers (1985), where an oligopolistic firm seeking to maximize profits can raise profits by appointing a CEO with an objective to maximize sales as a way of committing to aggressive pricing behavior.

Coexistence of different cultures A key observation is that similar parameter configurations can lead to divergent paths for organizations depending on their initial conditions. To be precise, suppose two or more organizations engage in the same activity. That is, they share the same parameters $\alpha, \beta, \lambda, U, L$, and the same functions e^*, M, and Π. However, the results in

Propositions 1 and 2 imply that these organizations may end up with very different cultures, meaning long-run values of μ. In particular, this would be the case if parameter β lies in the intermediate range identified in Case 3 of Proposition 2. If two organizations have different initial values of μ_0 lie on opposite sides of $\tilde{\mu}(\beta)$, we will observe two coexisting organizations, one with an individualist and another with a collectivist long-run culture.

While this is an interesting observation, our analytical framework so far does not allow for interactions between different organizations. Since firms, bureaucracies and political parties typically do not operate in a vacuum, this is an important omission.

In the next section, we study different applications of the theory, which illustrate different implications of our general framework. Some of these applications do allow for organizational interactions. In these cases, we ask if different organizational cultures may still coexist in the same market or the same polity. We also ask if stiffer competition between organizations tend to create homogenous cultures, e.g., by fostering individualism, and to what extent it reshapes organizational forms.

5 Applications

In this section, we put the model to work in four specific applications to show how it can illuminate questions around the role of culture in organizations such as firms, bureaucracies, and political parties. The specificity of the approach can also generate new insights, which may merit further analysis in future research.

5.1 Innovation and Competition

The idea that corporate culture is linked to innovation is commonplace. For example, according to Wolcott and Lippitz (2007):

> "Unless a company if blessed with the right culture – and few are – corporate entrepreneurship won't just happen. It needs to be nurtured and managed as a strategic, deliberate act." (page 82).

In this first subsection, we thus apply our model to innovation by profit-maximizing firms. This application of our general framework is useful to

illustrate the possibility of long-run dysfunctional corporate cultures.

Product lines and competitors Suppose that the organization studied in Sections 3 and 4 is a firm, which produces two product lines $k \in \{0,1\}$. The firm earns a baseline profit in each product market (which we normalize at 0) and can earn a monopoly rent by being the sole innovator, bringing product k to the next level of a quality ladder, in which case it earns $R_k(\theta)$. Suppose further that $R_k(\theta)$ only lasts for one period, since it will be imitated by a competitor in the following period. Finally, the innovation-based temporary monopoly rent is only available to the firm if no other firm innovates in the current period.[4] Specifically, the probability of earning $R_k(\theta)$ depends on the probability that a competitor will also innovate in the same market. We treat this "innovation threat" as exogenous with $Q_k(\theta) \in [0,1)$ denoting the probability that a competitor innovates in market k.

Payoffs Suppose that the probability that the firm innovates is $\int_0^1 ([1-D(\omega)]\, d\omega$ in product line 0 and $\int_0^1 D(\omega)\, d\omega$ in product line 1. Using the previous assumptions, the expected profit of the firm summed across all its divisions is given by:

$$\Pi\left((2x-1)^2, \int_0^1 \pi(D(\omega),\theta)\, d\omega, e\right) = e^*(\gamma) \cdot \int_0^1 \pi(D(\omega),\theta)\, d\omega =$$

$$e^*(\gamma) \cdot [\int_0^1 ([1-D(\omega)] R_0(\theta)[1-Q_0(\theta)] + D(\omega) R_1(\theta)[1-Q_1(\theta)]\, d\omega].$$

Thus, there are no gains from coordination in this application of the general model. Let $q(\theta) = \frac{[1-Q_0(\theta)]}{[1-Q_1(\theta)]}$ reflect the relative probability of capturing the temporary monopoly rent if innovation is successful and $r(\theta) = \frac{R_1(\theta)}{R_0(\theta)}$ be the relative returns to innovation in each market.

In this notation, the payoff of a CEO who seeks to maximize aggregate expected profits, is:

$$\Pi(\theta,\gamma) = e^*(\gamma) \cdot [yR_0(\theta)[1-Q_0(\theta)] + (1-y) R_1(\theta)[1-Q_1(\theta)]],$$

where $y = \int_0^1 [1-D(\omega)]\, d\omega$. To fix ideas, suppose that $q(0) > r(0)$ and that $r(1) > q(1)$. The realization of the alignment shock θ thus determines

[4] This could be microfounded by assuming that there is Bertrand with identical cost functions whenever there are two innovators.

whether or not the chances of successful innovation in each market is greater or less than the relative value of the innovation rents. There is alignment of the interests of the CEO and managers with a collectivist culture in state $\theta = 0$, because the latter favor a product line with a low risk of competitor innovation and/or with a high return to innovation.

Competitive threats, steady states, and Google Because the profit function is a special case (where coordination does not enter) of the objective function in our general model, the earlier results can be used to interpret how corporate cultures shape the profits of a firm and how the nature of profitable opportunities and threats by competitors shape the corporate culture of the firm.

Proposition 1 implies that the firm's CEO will centralize control over the firm's innovation strategy when there is poor alignment between manager preferences and the constellation of profit and innovation returns. The competitive advantage through corporate culture is greatest in firms whose profit advantages are aligned with the preferences of collectivists, as this will foster decentralization of control to upper-tier managers, which in turn will produce high effort by lower-tier managers.

With such alignment and a strong collectivist culture, there is a little need to direct innovation. This seems to reflect the situation at Google, a company whose leadership encourages decentralized innovation efforts among its workers. This would fit with our model if Google anticipates a low chance that others will take over, or a relatively higher yield to innovation in those product lines which excite its employees – i.e., $R_0(0)$ is high relative to $R_1(0)$ and/or $Q_0(0)$ is low relative to $Q_1(0)$.

The converse is true when state $\theta = 1$ prevails for a firm – i.e., when $r(1) > q(1)$. In this case there is more of a trade-off, as the CEO would like to direct innovation away from what collectivists want, which may lead to clash between her interests and those of a collectivist management.

Comparative steady states The model can also be used to think through what happens when a firm faces a permanent change in its competitive environment, due to a technology shock or perhaps a change in market regulation. In terms of the general model, this could be captured by a permanent change in β. Apart from standard effects of technological or regulatory change, our approach suggests additional implications for corporate cultures and long-run

profits.

One way to study this issue is to consider comparative steady states. Suppose initially that $\beta = 1$ so that we always have $\theta = 0$. In this case, Proposition 2 shows that the firm will gradually converge to a collectivist culture where eventually $\mu = 1$.

Changing the innovation culture at IBM Much as been written on the example of IBM who faced difficulty kin shifting its focus away from mainframes, in which it was a dominant force to networks and personal computing. Mills (1996) discusses this experience based on interviews with IBM management. He explicitly emphasizes the need to balance centralized and decentralized decision making.

> "IBM's top executives attempted to manage the corporation from the top, despite its great size and complexity, and in so doing exceeded their capabilities. But IBM is a closely integrated company, operates in only one industry, and has much synergy between its various businesses. It requires a high degree of central coordination and direction. It needs a judicious blend of decentralized operating management and centralized strategic direction. In the 1980s, IBM's executives failed to get the mixture right," (page 81).

Mills also explicitly blames the role of culture in limiting IBM's capacity to respond:

> "Is IBM the victim of a corporate culture that pushed the wrong type of executive to the top? Yes. IBM chief executives were too inbred, too steeped in the arrogance of success, and too certain of their own judgment in a time of challenge. IBM's culture contributed greatly to each shortcoming." (page 81)

This experience can be interpreted in terms of our model if one thinks of the starting point as having evolved a corporate culture around mainframes, which allowed the firm to decentralize control to its management. However, technological change in the 1980s brought a shock, a new environment with a lower value of β. The discovery of the micro-chip opened up a new product line $k = 1$, which was potentially much more profitable than the mainframe

line, $k = 0$. This required IBM to move from an established market niche ($\beta = 1$), to a less certain environment with $\beta \in (0, 1)$. Proposition 2 shows that this can result in multiple steady states depending on the starting value. If μ is initially high enough, then $\mu = 1$ (or the path towards it) will be maintained. But sticking to this collectivist corporate culture may have become dysfunctional.

When state $\theta = 1$ hits the firm, the CEO will respond by centralizing – because of a clash of her interest with those of the collectivist managers – and imposing the same project choice $\rho \neq S$ for all divisions ω. This centralized choice stifles initiative and brings about lower effort among lower-tier managers, because it lowers the probability of their favored project being implemented – relative to that collectivist upper-tier managers making decentralized project choices when $\theta = 0$. As a result, IBM's productivity falls in state $\theta = 1$, which adds to the problem of stiffer competition in the market for the new product line.

Similar concerns are now being expressed about the prospects for Google as it tries to adapt to greater competition and new product lines. For example, taking on Facebook and adapting to the use of mobile apps has created key challenges.

5.2 Firms, Productivity, and Corporate Cultures

This subsection applies our general model to profit-maximizing firms, where corporate culture affects the level of productivity. Specifically, we use a Lucas-style "span of control" model, in which the managers in each division of the firm can hire workers and the leader of the firm is again a CEO who cares about profits. This particular application of our framework is useful for thinking about whether different corporate cultures can survive in the long-run.

Technology Consider a set of firms in the same (competitive) industry. Suppose that the productivity level of a typical division in one of these firms is given by

$$\nu \left(D \left(\omega \right), \theta, e, x \right)^{1-\zeta} = \left[\hat{\phi} \left(x \right) u \left(D \left(\omega \right), \theta \right) e \right]^{1-\zeta}$$

where $\hat{\phi}(x) = \frac{1+\lambda[2x-1]^2}{1+\lambda}$ reflects the value of coordination for productivity.[5] Independently of the organization of the firm, each division can hire labor $l(\omega)$ with a decreasing returns divisional production function: $\nu^{1-\zeta} l^{\zeta}$ where $\zeta < 1$. Laborers can be hired at wage w. Parameter β can now be thought of as capturing how different types of division management decisions shape firm productivity – a higher (lower) value of β, meaning a higher (lower) probability of state $\theta = 0$, is a case where collectivist management is more likely to result in higher (lower) profits. Assume that

$$u(0,0) = u(1,1) = u_H > u(1,0) = u(0,1) = u_L.$$

Profits The profitability of a division optimizing its hiring decision is:

$$\max_{l} \left\{ \nu \left(D(\omega), \theta, e \right)^{1-\zeta} l^{\zeta} - wl \right\} = \hat{\zeta}(w) \hat{\phi}(x) u \left(D(\omega), \theta, e \right).$$

where $\hat{\zeta}(w) = (1-\zeta) \left(\frac{w}{\zeta} \right)^{-\frac{\zeta}{1-\zeta}}$. In this setting, division-level and firm-level heterogeneities depend on organization and project decisions by upper-tier managers – think about the latter as the firm's "management style". In this sense, the model in this section provides a theoretical micro-foundation for the empirical analysis in Bloom and Van Reenen (2007) and Bloom et al (2012).

Suppose that, to stay in business, each firm has to pay a fixed cost F in terms of labor in each period. Total firm profits are:

$$\Pi \left(\lambda (2x-1)^2, \int_0^1 \pi \left(D(\omega), \theta \right) d\omega, e \right) = \hat{\zeta}(w) e \hat{\phi}(x) \int_0^1 u \left(D(\omega), \theta \right) d\omega - wF. \tag{9}$$

A firm is therefore viable if and only if $\Pi \left((2x-1)^2, \int_0^1 \pi \left(D(\omega), \theta \right) d\omega, e \right) \geq 0$. This is less likely to be the case when it has low management effort (i.e., e is low), when it is poorly coordinated (i.e., x is low), and the state of the world is one (i.e., $\theta = 1$) where choices by collectivist managers (i.e., $\rho(\omega) = \sigma(\omega)$) decrease productivity.

[5] We normalize by $(1+\lambda)$ so that coordinated firms do not become unboundedly more productive as λ gets large.

To summarize, in this framework corporate culture can affect a firm's management style – which, in turn, shapes organizational choices. The latter choice can become a source of competitive advantage by affecting the firm's profitability. Realizations of alignment shock θ also influence productivity via the choice of projects and the concomitant choices of effort. As we have seen, we can interpret different values of θ in terms of whether projects favored by collectivist managers raise or lower productivity. This chimes with ideas in the management literature on whether collectivism should be seen as a form of rent-seeking. Parameter β allows us to argue that this could depend on sectorial and temporal circumstance.

Long-run profits Because the firm's profit function in (9) is a special case of the organization's objective function in the general model, we can straightforwardly apply the findings in Propositions 1 and 2 to this environment. We have the following result (proof in the Appendix), which shows that dysfunctional cultures can emerge under different conditions.

Proposition 3

1. *For large enough λ, there is a range of β such that a collectivist corporate culture emerges in the long run, even though an individualistic culture would yield higher profits.*

2. *For large enough $e^*(1)$ and as $\lambda \to 0$, there is a range of β such that an individualistic corporate culture emerges in the long run, even though a collectivist culture would yield higher profits.*

This result essentially illustrates our previous discussion around Proposition 2 in this firm application, by showing that the equilibrium steady-state corporate culture may not maximize long-run profits. In the first case where the gains from coordination are large, the firm is always centralized. However, since β is high, managers see collectivist values rewarded sufficiently often that they become collectivists, even though this is to the long-run detriment of the organization. In the second case, β has to be high enough for collectivism to emerge. But there may still exist starting values for μ, such that the firm develops an individualistic culture (cf. case 3 in Proposition 2).

Coexistence and survival of firm cultures The model in this subsection also allows us to think about whether both cultures are viable in the long-run. Assume that all firms have identical technologies and suppose that they have identical values of β because they share the same market conditions. Then, for low enough fixed costs, F, profits are positive both when $\mu = 1$ and when $\mu = 0$. For the range of β where there are multiple equilibria (case 3 in Proposition 2), firms can converge to collectivist or individualistic cultures depending on their starting values for μ. Both types of firms may survive in the long run, but they will have different observed labor productivities even though they face identical production technologies and market conditions. This illustrates the idea that different corporate cultures may coexist and that having the right culture may be a source of competitive advantage. Thus our model offers a particular take on the observation that firms in the same market sometimes operate with persistently different productivities. Moreover, as in Bloom and Van Reenen (2007), this could be associated with persistently different management styles.

In Case 2 of Proposition 3, both types of firms are centralized for large enough values of λ. However, with a low vale of λ, there could be partial centralization depending on the outcome of θ. If θ shocks are common to all firms, centralization decisions are negatively correlated across firms, because collectivist firms centralize when $\theta = 1$ and decentralize when $\theta = 0$, while individualistic firms do precisely the opposite. Moreover, collectivist firms would appear more more productive when decentralized, as in Bloom et al (2012), because their managers always expend more effort than those in individualistic firms.

The application in this subsection also gives some insight into whether some corporate cultures are infeasible in the long run. If the fixed cost of operating is significant, then the less efficient culture may not survive, meaning that there is a potential threshold on the culturally generated inefficiencies that can remain in a market setting. However, there is no presumption that collectivist corporate cultures would be driven out more often than individualistic corporate cultures.

5.3 Performance of Public Bureaucracies

One of the biggest puzzles about public organizations is the wide range of performance among units of government, which use similar technologies and have similar levels of resources. Due to the difficulty of measuring key public-sector

service outputs, formal incentive arrangements have limited bite, meaning that high-performance delivery may have to rely on the underlying motivations of key personnel, such as detectives, physicians, or teachers. Effective bureaucracies can thus be thought of as mission-oriented organizations employing motivated agents, as suggested in Besley and Ghatak (2005).

Applying measurement tools and insights from their analysis of private firms, Bloom et al (2014, 2015) find the same differences in bureaucratic management as in private management, and management styles systematically correlated with performance indicators. Appeals to organizational culture are commonplace in consulting reports on performance. A case in point is CHKS (2012), a report by the leading provider of healthcare intelligence and quality improvement services in the UK, which concluded that

> "top-performing acute sector organisations invest considerable time and effort into developing an organisational culture around the delivery of high-quality, safe and efficient care" (page 13).

A key issue in designing a bureaucratic system is indeed how far to centralize and how far to rely on local decision making. The concern is that decentralization may foster greater inequality in performance than centralized control. Reducing local autonomy is therefore a frequent reaction to under-performance.

Our framework is useful for understanding the challenges of building an effective organizational culture, which best serves the ultimate beneficiaries like victims of crime, patients, or students.

Assumptions Suppose that the leader of a public-sector organization cares predominantly about the benefits delivered to the citizens who consume these services. These concerns are represented by the payoff:

$$\Pi\left(\lambda\left(2x-1\right)^{2},\int_{0}^{1}\pi\left(D\left(\omega\right),\theta\right)d\omega,e\right)=\int b\left(D\left(\omega\right),\theta\right)d\omega\cdot e, \tag{10}$$

where $b\left(D\left(\omega\right),\theta\right)\in\left\{b_{L},b_{H}\right\}$ with $b_{H}>b_{L}$. We can think of the choices $D\left(\omega\right)$ as representing aspects of the mission: where to orient resources to fight crime, which medical treatments to prioritize, or what kind of school curriculum to develop.

In this framework, collectivism represents a tendency to favor the interests of those in the lower tier of the organization, e.g., police, doctors, or

teachers. We now think of lower-tier managers as professionals who deliver services and from whom the senior management are drawn. In practice, not every front-line professional becomes a senior manager, but it is common to appoint senior public managers among previous practitioners – school principals are often former teachers. Hence, our core framework for understanding organizational culture applies.

Mission alignment? To study these issues as simply as possible, our specific model makes coordination unimportant (setting weight $\lambda = 0$). The remaining issue is how the preceptions at the top about the bureaucracy's mission coheres with the views of those who manage and implement the service: conflicts of interest arise when the head bureaucrat takes a different view than the individual units (e.g., police stations, clinics, and schools). In line with our core model in Section 3, we suppose that the leadership's view is uncertain. To simplify, we assume that for $\theta \in \{0, 1\}$

$$b(0,0) = b(1,1) = b_H > b(0,1) = b(1,0) = b_L.$$

Because (10) is a special case of the objective in our general framework, we can apply its results to the choice of organizational form and the dynamics of bureaucratic culture. A head public bureaucrat who tries to promote a particular mission may be reluctant to give too much power to her senior managers if these are collectivists siding with those who actually deliver the services. For example, doctors are sometimes accused of focusing excessively on narrow aspects of medical excellence rather than on the wider experience of hospital patients. But allowing doctors to organize clinical care as they wish may elicit effort. Of course, collectivism may also involve cozy vertical relationships, which look more like a form of rent seeking with little or no effect on effort.

Centralization and emerging cultures Applying Proposition 1, we can predict how culture affects the organization and the decision to centralize. Specifically, centralization occurs when the preferences of the head bureaucrat clash with the culture in the divisional units – i.e., when $\mu = 1$ but $\theta = 0$ and when $\mu = 0$ but $\theta = 1$. With little culture-clash, the head bureaucrat will choose to decentralize choices to divisional heads. However, Proposition 2 shows that multiple equilibria are possible when the divisional management is uncertain about the likely focus of the head bureaucrat – i.e., in a middle region for β.

When does collectivism dominate? Collectivism now corresponds to a case where senior management appears to pander to the wishes of front-line professionals, which has a motivational benefit and gives greater effort. Whether this effect is strong enough to make collectivism a better culture than individualism requires comparing the long-run payoffs with the two different cultures.

To get a sharp result suppose that $\beta = 1/2$, so that *ex ante* the leader of the bureaucracy is balanced between different missions – a case which is conducive to multiple equilibria (case 3 in Proposition 2). Then, we have (proof in the Appendix):

Proposition 4 *If $\beta = 1/2$, a collectivist culture is always better in the long run than an individualistic culture when b_H/b_L is large enough.*

This result hinges on effort being higher under collectivism, an effort advantage which is larger when the high-productivity outcome is more important, i.e., when b_H is greater. Thus, collectivism dominates even though the institution has an uncertain mission. Under that condition those bureaucracies which take a collectivist path will indeed operate more effectively. A more general insight is that creating bureaucracies with a strong collectivist ethic may pay off in settings where it is difficult to verify and contract on bureaucratic performance.

The model can reproduce three features which are central to debates about effective bureaucracies and organizational culture. First, similar environments can generate different outcomes with the same technology and resources. Second, this will be linked to different styles of management, e.g., regarding the autonomy of senior managers. Third, long-run equilibria are stable, meaning that it is extremely difficult to reform poorly performing elements of the bureaucracy once a certain culture becomes entrenched.

5.4 Political Parties

In this last subsection, we apply our general framework to political parties and electoral competition, looking at the emergence of party cultures and their interaction with party organization, with more or less say to mid-level politicians. Although standard political-science treatments of parties do emphasize that centralized authority is sometimes needed but can also be too strong (Cox and McCubbins, 2003), this dimension of political parties is understudied. It is nevertheless important. For example, Willis et al (1999)

argue convincingly that the differential structure of Latin American parties – e.g., very centralized parties in Mexico and decentralized parties in Brazil – are important to understand the differential decentralization of political powers on the continent.

Voter preferences Consider a set-up with two parties $P = A, B$. Each of these parties has a leader who manages a multi-division organization – with local party heads and party workers, analogous to the upper-tier and lower-tier managers – like the one studied in Sections 3 and 4.

Voters are partitioned into a continuum of districts, or groups, indexed by ω. All voters in district (or group) ω have identical preferences

$$W(D(\omega), x, \theta, e) = \lambda(2x-1)^2 + T(D(\omega), \theta) \cdot e + D_B \xi. \tag{11}$$

The first term represents a country-wide policy which has higher value to the voters the more coordinated the actions by the party. The second captures a policy targeted to district ω, which is magnified by the effort local party workers put into policy design. Finally, D_B is a binary indicator for party-B rule, and ξ is a popularity shock in favor of party B, continuously distributed with mean zero, $E(\xi) = 0$, symmetric single-peaked density. By symmetry, the c.d.f. of the popularity shock, Π has $\Pi(0) = 1/2$. The ξ-shock is realized after policy-design choices at stage 5 or 5′, but before the election that occurs in each period.

Let us assume the following functional form for the targeted policy benefits:

$$T(D(\omega), \theta) = \theta D(\omega) + (1-\theta)(1 - D(\omega)). \tag{12}$$

Thus voter preferences accord with those of individualist district leaders, when $\theta = 1$, which occurs with probability $1 - \beta$, and with those of collectivist managers when $\theta = 0$, which occurs with probability β. In terms of our general notation, $\pi(1,1) = \pi(0,0) = 1$ and $\pi(0,1) = \pi(1,0) = 0$. These rankings are now properties of voter preferences, but they will be fully internalized by office-seeking party leaders.

Winning probabilities Let $W^P(\omega)$ be voter utility with party P's policy in place. Voters in district ω will thus vote for party A if

$$\xi \leq W(D^A(\omega), x_A, \theta, e_A) - W(D^B(\omega), x_B, \theta, e_B).$$

Standard arguments allow us to write party A's probability of winning the entire election as

$$\begin{aligned} p\left(x_A, e_A, \theta; x_B, e_B\right) &= \\ \text{Prob}[\xi &\leq \int W(D^A(\omega), x_A, \theta, e_A)d\omega - \int W(D^B(\omega), x_B, \theta_B, e_B)d\omega] \\ &= \Pi\left(\int W(D^A(\omega), x_A, \theta, e_A)d\omega - \int W(D^B(\omega), x_B, \theta, e_B)d\omega\right) \end{aligned} \tag{13}$$

Substituting from (11) and (12) into (13), we see that the resulting Π-function is a special case of the general model, in which Π is additive in the division benefits and coordinated benefits and multiplicative in the former and effort. The probability of winning for party B is just given by $1 - p\left(x_A, e_A, \theta; x_B, e_B\right)$.

Given the equilibrium choices under decentralization, each party leader will organize her party to maximize its probability of winning the election, taking the policy benefits offered by the other party as given. Since the latter is just like adding a constant to the objective function, each party leader effectively has an identical objective, namely to maximize

$$\begin{aligned} W^A &= \int W^A(D^A(\omega), x_A, \theta_A, e)d\omega = \\ &\quad \lambda(2x-1)^2 + e \cdot \int \left[\theta D(\omega) + (1-\theta)(1-D(\omega))\right] d\omega \end{aligned}$$

Because this is a special case of the objective for the single organization in our general model, it follows that Propositions 1 and 2 apply to each one of the two parties separately. Note that each party is also choosing a party organization in each period. Under centralization the policy vector is chosen centrally, but under decentralization it is delegated to local party managers. [6]

[6] Now when $\theta = 0$ then with decentralization, the payoff of the party is μ and with $\theta = 1$, it is $1 - \mu$. And with centralization, the payoffs are $\left[\alpha + \frac{1-\alpha}{2}\right] + \lambda$ with $\theta = 0$ and $\frac{1-\alpha}{2} + \lambda$ if $\theta = 1$. Now

$$\mu_H = \min\left\{\left[\alpha + \frac{1-\alpha}{2}\right] + \lambda, 1\right\}$$

and

$$\mu_L = \max\left\{1 - \lambda - \left(\frac{1-\alpha}{2}\right), 0\right\}.$$

Coexistence Following the logic of the model, different party cultures can emerge. In particular, consider a value of β in the intermediate range identified in Proposition 2, such that its case 3 applies. Further, assume that the initial values of μ in the two parties lie on opposite sides of critical value $\tilde{\mu}(\beta)$. To fix ideas, presume that

$$\mu_0^B < \tilde{\mu}(\beta) < \mu_0^A.$$

Then, it follows from Proposition 2 that – in the long run – party A will evolve a fully collectivist party culture with $\mu^A = 1$, while party B will evolve a fully individualistic culture with $\mu^B = 0$. Both parties can coexist and one party could spend more time in office even if the party fundamentals are similar, simply on the back of their party structures being different. In the long-run, parties may or may not be decentralized depending on the value of λ, i.e., to what extent greater coordination is valuable to winning.

Competitive cultural advantage? Intuitively, we might expect that party A with its collectivist culture will do better in state $\theta = 0$, when the choices of its collectivist managers are aligned with voter preferences. Similarly, we might expect that the party B with its individualistic culture will do better in state $\theta = 1$, when the choices of its individualistic managers are aligned with voter preferences. We now show that these intuitions are only partially correct.

Let us compute the equilibrium probability of winning for party A, as $p^A = \Pi(W^{A*} - W^{B*})$, where W^{P*} denotes the equilibrium utility offered by party P to the aggregate of voters. Party A has an electoral advantage with $p^A \gtrless 1/2$ as $\Pi(W^{A*} - W^{B*}) \gtrless 1/2$. In the Appendix, we derive the following result:

Proposition 5: *Suppose that* $\mu_L > 0$ and $\mu_H < 1$ *and that party A has a collectivist culture while party B has an individualist culture, then*:

1. *If* $\theta = 1$, p^A *is given by*

$$p^A = \Pi\left(\lambda + \left[\alpha + \frac{1-\alpha}{2}\right] e^*\left(\frac{1-\alpha}{2}\right) - e^*(0)\right) \gtrless \frac{1}{2} \qquad (14)$$

2. *If* $\theta = 0$, p^A *is given by*

$$p^A = \Pi\left(e^*(1) - \left[\alpha + \frac{1-\alpha}{2}\right] e^*\left(\alpha + \frac{1-\alpha}{2}\right) - \lambda\right) \gtrless \frac{1}{2}. \qquad (15)$$

Three things go into whether party A is more likely to win in this case. First, party A managers are putting in more effort than party B's managers (the 3rd term in brackets in (14)). However, since its policies are chosen centrally, they are not adapted to local preferences. Thus, higher effort applies only to a fraction of districts (the 2nd term in brackets in (14)). Given that party A offers higher utility on the centralized policy (the 1st term in brackets in (14)), a sufficient condition is that effort is elastic enough for $\left[\alpha + \frac{1-\alpha}{2}\right] e^*\left(\frac{1-\alpha}{2}\right)$ to be close enough (or higher) in value compared to $e^*(0)$.[7]

A collectivist culture may also dominate when $\theta = 0$. Now party A has the advantage of both higher effort and well-adapted local policies since it decentralizes policy to local managers who all do exactly the thing that voters want (the 1st vs. 2nd term in (15)). Provided that party B does not have too great an advantage of offering a more coordinated central policy (the 3rd term in brackets in (15)), party A's probability of winning is higher than 50% also in this state.

If effort among party workers is important, then having a collectivist culture (which promotes local initiative) will to constitute an advantage to a party in both states of the world. In contrast, it is hard to find general conditions on parameters and functional form under which party B with its individualistic culture has an advantage in both states of the world.

Differences in political advantage due to party culture will be large if there is stronger political competition represented by a density function for the popularity shock ξ which is larger around it mean (zero). This means that any positive difference in $W^{A*} - W^{B*}$ maps into a larger difference in their probability of winning the election for party A. [8]

Discussion These results show why party culture can be a source of political advantage. However, it will also have a bearing on the willingness of party leaders to centralize party strategy so as to win elections. In the long run, if $\mu = 1$ for party A and $\mu = 0$ for party B, these efforts will be negatively correlated, with one party centralizing in exactly the circumstances where the other party is decentralizing (assuming that θ is common across

[7] Note that if $e^*\left(\frac{1-\alpha}{2}\right) = e^*(0) = 1$, then party A will win with higher probability if $\lambda > \frac{1-\alpha}{2}$.

[8] To see this concretely suppose that ξ is uniform on $[-1/M, 1/M]$ then $\Pi(Z) = \frac{1}{2} + MZ$, assuming an interior solution. A higher density (more intense competition) then corresponds to a higher value of M.

the parties). However, this would not be the case when λ is large enough to make $\mu_L = 0$ and $\mu_H = 1$, in which case both parties will eventually be centralized.

The analysis in this subsection hints at a novel aspect of electoral competition, which has not received much attention in the academic literature to date. For example, Green parties in European countries like Germany and Sweden started out as very decentralized organizations accommodating a strong party culture among engaged local party workers. As these parties gradually came to take part in national and regional coalition governments, party leaders saw a need to centralize policy-making – think about this as a higher weight λ on coordinated policies in the model. But this was met with complaints among party members and former party leaders. Our model can be used to think about such developments and, under some conditions, would predict that a change in party objectives and party organization would gradually change the prevailing party culture. Studying this further in specific contexts would be worthwhile.

6 Final remarks

This paper has developed a model of organizational culture where socialization of one generation of managers by another generates cultural dynamics. The framework provides a range of insights on the interplay between organization culture, performance and design. We have made precise the conditions for an individualistic or collectivist organizational culture to emerge in the long-run. This depends on the alignment between the leadership of the organization and the upper-tier of management. Whether the organization is centralized or decentralized is endogenous and depends on its internal conflicts of interest, which in turn reflect the organization's culture.

To breathe life into the analysis, we have offered some applications to illustrate the value of our approach. But our ideas can be developed in many directions. For one, we have taken as given the process of appointing leaders of organizations. Given the importance of leadership alignment in the framework, leader selection should be studied further. One key issue is how far insiders are given a role in selecting their leaders.

A richer theory of how leaders shape organizational culture would also be interesting. In the model as it stands, this can only happen indirectly via a changing authority structure. However, inspiring leaders are often held up

as independent sources of organizational culture.

We have also set aside issues of mobility between organizations. Hiring managers from the outside, rather than allowing them to become socialized by an organization, is an interesting way of delivering cultural change that has been much discussed. Given our framework, this seems more likely to work when trying to reduce collectivism in organizations. However, outside recruitment appears less obviously effective as a strategy for reducing individualism.

A particular feature of our approach is its focus on how organizations adapt their form to endogenously changing values. We believe the idea of a tie between cultural change and institutional change is a promising way of exploring societal dynamics. In Besley and Persson (2016), we have thus studied how the evolution of democratic values interacts with reforms of democratic institutions. Studies of the interplay between formal rules and cultural values remain scarce – further explorations may allow us to better understand the determinants of economic success and failure.

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Appendix

A Proofs of Propositions

Proof of Lemma 1: To see this, suppose that $S = 1$. Then, the expected fraction of divisions with $\sigma(\omega) = 1$, and hence with $D(\omega) = 0$, is $\alpha + \frac{1-\alpha}{2}$ and the fraction with $\sigma(\omega) = 0$ is $\frac{1-\alpha}{2}$. The payoff from choosing $\rho = 1$ is thus

$$\Pi\left(\lambda, \left(\alpha + \frac{1-\alpha}{2}\right)\pi(0,0) + \left(\frac{1-\alpha}{2}\right)\pi(1,0), e\right),$$

while the payoff from choosing $\rho = 0$ is

$$\Pi\left(\lambda, \left(\frac{1-\alpha}{2}\right)\pi(0,0) + \left(\alpha + \frac{1-\alpha}{2}\right)\pi(1,0), e\right)e.$$

The result follows from comparing these two expressions. As the weight on $\pi(0,0)$ is higher than that on $\pi(1,0)$ when $\rho = 1$ and $\pi(0,0) > \pi(1,0)$, it pays to set $\rho = S = 1$. A similar argument shows that $\rho \neq S$ is optimal when $\theta = 1$.

Proof of Proposition 1: Define

$$H(x, \phi, \theta, e) = \Pi\left(\lambda(2x-1)^2, \phi\pi(0,\theta) + (1-\phi)\pi(1,\theta), e\right).$$

In this notation, the expected payoff of the leader under decentralization is $H(0, \mu, \theta, e)$. Under centralization and $\theta = 0$, the expected payoff is $H\left(\lambda, \alpha + \frac{(1-\alpha)}{2}, 0, e\right)$ and $H(x, \phi, 0, e)$ is an increasing function of ϕ. If there exists $\bar{\mu} \in [0,1]$ such that

$$H(0, \bar{\mu}, 0, e) = H\left(\lambda, \alpha + \frac{(1-\alpha)}{2}, 0, e\right).$$

then $\mu_H = \bar{\mu}$ Otherwise, $\mu_H = 1$. Now consider $\theta = 1$ and note that $H(x, \phi, 1, e)$ is a decreasing function of ϕ. If there exists $\underline{\mu} \in [0,1]$ such that

$$H\left(0, \underline{\mu}, 1, e\right) = H\left(\lambda, \frac{(1-\alpha)}{2}, 1, e\right)$$

then $\mu_L = \underline{\mu}$. Otherwise, $\mu_L = 0$.

Proof of Proposition 2: In Case 3, β is such that the leader changes sides often enough for there to be multiple steady states. To see this, let

$$\hat{\beta} = \frac{-\delta_L}{\delta_H - \delta_L} = \frac{e^*\left(\frac{1-\alpha}{2}\right)}{e^*\left(\alpha + \frac{1-\alpha}{2}\right) + e^*\left(\frac{1-\alpha}{2}\right)} \in (0,1).$$

If $\beta > \hat{\beta}$, then $\Delta(\mu) > 0$ for $\mu \in [\mu_L, \mu_H]$. This implies that $\beta\hat{\delta}(\mu) + (1-\beta)\delta_L > 0$ for $\mu > \mu_H$. Moreover, since $\delta(\mu_L) < \delta_L$, then $\beta\delta_H + (1-\beta)\hat{\delta}(\mu) < 0$ for $\mu < \mu_L$. Hence for β close enough $\hat{\beta}$ there exists $\tilde{\mu}(\beta) < \mu_H$ such that $\Delta(\mu) > 0$ for $\mu \geq \tilde{\mu}(\beta)$ and $\Delta(\mu) < 0$ for $\mu < \tilde{\mu}(\beta)$. A similar argument shows that if $\beta < \hat{\beta}$, there exists $\tilde{\mu}(\beta) > \mu_L$ such that $\Delta(\mu) > 0$ for $\mu \geq \tilde{\mu}(\beta)$ and $\Delta(\mu) < 0$ for $\mu < \tilde{\mu}(\beta)$.

Proof of Proposition 3: In this model

$$\mu_H = \min\left\{(1+\lambda)\left[\alpha + \frac{1-\alpha}{2}\right] + \lambda\left[\frac{u_L}{u_H - u_L}\right], 1\right\}$$

and

$$\mu_L = \max\left\{(1+\lambda)\frac{1-\alpha}{2} - \lambda\left[\frac{u_H}{u_H - u_L}\right], 0\right\}$$

Turning now to long-run productivity.

And if λ is high then this becomes for $\mu = 1$ and

$$\hat{\zeta}(w)\left[\left(\alpha + \frac{1-\alpha}{2}\right)u_H + \left(\frac{1-\alpha}{2}\right)u_L\right]\left(\beta e^*\left(\alpha + \frac{1-\alpha}{2}\right) + (1-\beta)e^*\left(\frac{1-\alpha}{2}\right)\right) - wF$$

and

$$\hat{\zeta}(w)\left[\left(\alpha + \frac{1-\alpha}{2}\right)u_H + \left(\frac{1-\alpha}{2}\right)u_L\right]\left((1-\beta)e^*\left(\alpha + \frac{1-\alpha}{2}\right) + \beta e^*\left(\frac{1-\alpha}{2}\right)\right) - wF$$

for $\mu = 0$. Now individualism is better if

$$(1-2\beta)\left[e^*\left(\alpha + \frac{1-\alpha}{2}\right) - e^*\left(\frac{1-\alpha}{2}\right)\right] \geq 0$$

which holds if $\beta < 1/2$. For a collectivist culture to emerge now is that

$$\beta\delta_H + (1-\beta)\delta_L > 0$$

which holds if

$$\beta \geq \frac{e^*\left(\frac{1-\alpha}{2}\right)}{e^*\left(\alpha+\frac{1-\alpha}{2}\right)+e^*\left(\frac{1-\alpha}{2}\right)} < \frac{1}{2}.$$

So there exists a range of β as claimed.

When $\mu = 1 > \mu_H$, this is

$$\hat{\zeta}(w)\left(\frac{\beta}{1+\lambda}e^*(1)u_H + (1-\beta)\left[\left(\alpha+\frac{1-\alpha}{2}\right)u_H + \left(\frac{1-\alpha}{2}\right)u_L\right]e^*\left(\frac{1-\alpha}{2}\right)\right) - wF$$

and for $\mu = 0 < \mu_L$, it is

$$\hat{\zeta}(w)\left(\frac{(1-\beta)}{1+\lambda}e^*(0)u_H + \beta\left[\left(\alpha+\frac{1-\alpha}{2}\right)u_H + \left(\frac{1-\alpha}{2}\right)u_L\right]e^*\left(\alpha+\frac{1-\alpha}{2}\right)\right) - wF$$

Now set $\lambda = 0$ and let

$$\hat{\beta} = \frac{e^*(0)u_H - \left[\left(\alpha+\frac{1-\alpha}{2}\right)u_H + \left(\frac{1-\alpha}{2}\right)u_L\right]e^*\left(\frac{1-\alpha}{2}\right)}{e^*(0)u_H - \left[\left(\alpha+\frac{1-\alpha}{2}\right)u_H + \left(\frac{1-\alpha}{2}\right)u_L\right]e^*\left(\frac{1-\alpha}{2}\right) + e^*(1)u_H - \left[\left(\alpha+\frac{1-\alpha}{2}\right)u_H + \left(\frac{1-\alpha}{2}\right)u_L\right]e^*\left(\alpha+\frac{1-\alpha}{2}\right)} < \frac{1}{2}.$$

So for $e^*(1)$ large enough, there exists β such that

$$\hat{\beta} < \beta < \frac{e^*\left(\frac{1-\alpha}{2}\right)}{e^*\left(\alpha+\frac{1-\alpha}{2}\right)+e^*\left(\frac{1-\alpha}{2}\right)}.$$

In which case an individualistic culture emerges when a collectivist culture generates higher profits.

Proof of Proposition 4 When $\mu = 1$, then the long-run payoff is:

$$\left[\beta b_H e^*(1) + (1-\beta)\left[\left(\alpha+\frac{1-\alpha}{2}\right)b_H + \left(\frac{1-\alpha}{2}\right)b_L\right]e^*\left(\frac{1-\alpha}{2}\right)\right]$$

and with $\mu = 0$, it is

$$\left[\beta\left[\left(\alpha+\frac{1-\alpha}{2}\right)b_H + \left(\frac{1-\alpha}{2}\right)b_L\right]e^*\left(\alpha+\frac{1-\alpha}{2}\right)\right] + (1-\beta)b_H e^*(0).$$

Now set $\beta = 1/2$ and note that $e^*\left(\alpha+\frac{1-\alpha}{2}\right) - e^*\left(\frac{1-\alpha}{2}\right) > 0$, then a collectivist culture is preferable if and only if

$$\frac{b_H}{b_L} \geq \frac{\left[\left[e^*(1) - \left(\alpha+\frac{1-\alpha}{2}\right)e^*\left(\alpha+\frac{1-\alpha}{2}\right)\right] + \left[\left(\alpha+\frac{1-\alpha}{2}\right)e^*\left(\frac{1-\alpha}{2}\right) - e^*(0)\right]\right]}{\left(\frac{1-\alpha}{2}\right)\left[e^*\left(\alpha+\frac{1-\alpha}{2}\right) - e^*\left(\frac{1-\alpha}{2}\right)\right]}$$

Proof of Proposition 5 The long-run winning probabilities for party A (given what is offered by party B is offering) with $\mu_H < 1$ and $\mu_L > 0$ are:

$$\begin{aligned} &\beta\Pi\left(e^*\left(1\right) - \bar{W}^B\right) + \\ &\left(1-\beta\right)\left\{\Pi\left(\lambda + \left[\alpha + \frac{1-\alpha}{2}\right] e^*\left(\frac{1-\alpha}{2}\right) - \bar{W}^B\right)\right\}. \end{aligned} \tag{16}$$

and

$$\begin{aligned} &\beta\left\{\Pi\left(\lambda + \left[\alpha + \frac{1-\alpha}{2}\right] e^*\left(\alpha + \frac{1-\alpha}{2}\right) - \bar{W}^B\right)\right\} \\ &+ \left(1-\beta\right)\Pi\left(e^*\left(0\right) - \bar{W}^B\right). \end{aligned} \tag{17}$$

The result now follows by considering the cases where $\beta = 1$ and $\beta = 0$ and plugging in the relevant payoffs for party B.