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Tim Besley and Torsten Persson

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Centre for Economic Policy Research
33 Great Sutton Street, London EC1V 0DX, UK
Tel: +44 (0)20 7183 8801
www.cepr.org

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We examine the two-way interplay between organizational cultures and organizational design, where culture is modeled as the prevailing social identities among workplace groups that can affect project choices. In a setting where cultural dynamics depend on the expected relative payoffs of holding different identities, we investigate how tribalism and charismatic leadership shape organizational dynamics and steady-state cultures. We show how a strong culture can be a virtue when it permits greater delegated authority, but a vice when the culture is poorly aligned with organizational objectives. We apply our analysis to concrete debates about the interaction of design, performance and culture.

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Tim Besley - t.besley@lse.ac.uk
LSE and CEPR

Torsten Persson - torsten.persson@iies.su.se
Stockholm University and CEPR

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Timothy Besley
LSE

Torsten Persson
IIES

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We examine the two-way interplay between organizational cultures and organizational design, where culture is modeled as the prevailing social identities among workplace groups that can affect project choices. In a setting where cultural dynamics depend on the expected relative payoffs of holding different identities, we investigate how tribalism and charismatic leadership shape organizational dynamics and steady-state cultures. We show how a strong culture can be a virtue when it permits greater delegated authority, but a vice when the culture is poorly aligned with organizational objectives. We apply our analysis to concrete debates about the interaction of design, performance and culture.

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1 Introduction

A key question in economics – and the social sciences more broadly – is why private or public organizations in similar environments perform so differently. Economists have looked for answers primarily in terms of institution design, such as organization boundaries or authority structures. Other social scientists have looked for answers in terms of less tangible elements, such as organizational cultures or work-force motivations. This paper synthesizes these approaches by putting forward a tractable dynamic model of organizational culture, design and performance,

The key design choice in our model is how much power to decentralize in the organization. As in Aghion and Tirole (1997), this involves trading off the benefits from higher productivity against the costs from conflicting interests between leaders and managers. Following Akerlof and Kranton (2000), the organization's managers have identities that are associated with particular values and thus shape conflicting interests between leaders and managers. It is precisely this composition of group identities that we refer to as the organization's culture at a given point in time. Culture evolves over time and we explore the drivers of these dynamics along with the two-way interactions between culture and organization design.

A key distinction in the model is between what we call *individual* and *tribal* identities. The former identities only affect perceived conflicts of interest at the level of individuals, while the latter allow for in-group altruism and hence for conflicts at the level of groups. Group-based identities do not just affect the strength of identity-based preferences; if in-group motives are powerful enough, they can reshape the nature of the organization's cultural dynamics.

With individual identities, the organization converges to a unique interior steady-state culture, which does not maximize the organization's long-run performance. This result can be attributed to lack of commitment. Adding the possibility of charismatic leaders – who are able to persuade managers to follow organizational goals – a long-run culture may permit a greater use of performance-enhancing decentralization.

With sufficiently powerful tribal identities, a complementarity emerges between the share of agents that conform to a certain identity and the attractiveness of holding that identity. This results in divergent dynamics where an organization may converge to a suboptimal monoculture. Moreover, culture, design, and performance can become path-dependent. Such path dependence

results in organizational inertia that may prevent adaptability.

Methodologically speaking, our analysis pinpoints a source of inefficiency, which is conceptually distinct from the informational problems underlying most previous work in economics on organizational performance. In particular, the model conveys four new substantive insights. First, the organization's culture may drive both its design and performance, producing a "spurious correlation" between decentralization (centralization) and good (bad) performance. Second, a strong organizational culture can be both a virtue and a vice: it allows the organization to exploit the performance gains from decentralization in a stable environment, but it can prevent or slow down adjustments when the environment changes. Third, cultural path dependence may explain the common observation that organizations can develop different authority structures and performance levels in the same environment. Fourth, leadership traits are important for long-run cultures and performance: a charismatic leader who influences management can circumvent the downside of entrenched cultures, but this is more difficult with dysfunctional tribal cultures.

The paper is organized as follows. Section 2 offers a brief discussion of related research. In Section 3, we formulate our baseline model. Section 4 spells out its main results. In Section 5, we extend the baseline model to allow for tribal cultures and charismatic leaders. Section 6 illustrates our substantive and methodological insights with examples from the real world as well as the existing literature. We conclude in Section 7. Some details and background materials are relegated to an Online Appendix.

2 Related Research

The paper is related to the economics literature on how strategic design of organizational boundaries and authority structures may shape performance, following classic contributions by Coase (1937), Williamson (1979), and Grossman and Hart (1986). We build on a branch of this research where conflicting interests influence the organization's delegation of decision-making, with key theoretical contributions by Aghion and Tirole (1997), Alonso et al (2008), Bolton and Farrell (1990), Hart and Holmström (2010), and Rantakari (2012). As in that literature, our model's designer trades off costs of decentralizing power, due to conflicting interests and coordination, against benefits, due to higher productivity. But the extent of delegation

evolves endogenously across time and shifts across states of the world, as the organization's external environment and its internal culture interact.

Outside economics, performance differences are frequently attributed to heterogeneous organizational cultures (Whyte 1956, Hofstede 1984, Wilson 1989, and Schein 1990). Some economists sympathize with this notion, but have not reached a consensus on how to formally represent such cultures. Influential papers have focused on beliefs, often in overlapping-generations models. Kreps (1990) models corporate cultures as belief-based norms in games with overlapping generations of agents, where cooperation is sustained by threats of poor future performance. Tirole (1996) studies belief-based individual and collective reputations, which can produce persistently different organizational performance indicators such as corruption levels. Dessi (2008) shows how information transmission across generations may create distinct cultures through collective memory, while Benabou (2013) shows how organizations may develop common beliefs that induce group think. Greif (1994) sees belief-based cultural differences as solutions to (different) commitment problems, and collectivist cultures as more supportive of cooperation.

Unlike much of the economics literature, our approach to organizational culture is *not* belief-based. Instead, it relates to four main ideas in existing strands of research, inside and outside of economics.

First, we model culture as the distribution of types in an organization, as in Lazear (1995). This conforms to the voluminous literature on organizational cultures (see e.g., Schein 1990), influenced by sociology, psychology, and anthropology. In broad terms, our approach follows Tajfel (1974), who argues that social identities create within-group loyalty and out-group hostility. This idea has been picked up in studies of organizations by sociologists (e.g., Ashforth and Mael 1989) and economists (e.g., Akerlof and Kranton 2000 and Besley and Ghatak 2005). The approach parallels a large literature in business economics and organization theory on conflicts of interest inside firms, which goes all the way back to Cyert and March (1963).

Second, we suppose that organizational culture is transmitted across generations of employees via socialization where successful types replicate faster. This relates to economic studies of socialization and culture, as surveyed by Bisin and Verdier (2011). Our specific model focuses on changes in values – rather than in behavior or beliefs – following the lead of Güth and Yaari (1992), Güth (1995), and Alger and Weibull (2013). More generally, these dynamics relate to research on cultural evolution (e.g., the seminal work of Cavalli-Sforza and Feldman 1981 and Boyd and Richerson 1985), as well as

on evolutionary dynamics in population games (reviewed in Sandholm 2010).

Third, we study an organization's adaptability as its capacity for cultural flexibility. This idea is related to Teece et al (1997), who argue that adaptability is a core capability of the firm, and to Rantakari (2008), who considers the relationship between adaptability and the delegation of authority. The interplay between delegation and organizational culture, and between organizational culture and inertia, is also discussed in Van Den Steen (2010a). Dessein (2002) formalizes the idea that a key efficiency loss of delegation is a failure to exploit local information.

Dessein and Prat (2017) study *organizational capital* which they define as an intangible, slow-moving, productive asset. This notion has much in common with a slow-moving culture. However, in our core model, culture reproduces through the interaction of employees without input from leaders while, in their core model, the leadership can influence organizational capital. That is similar to the extension of our model with charismatic leadership. Van den Steen (2010b) discusses how a manager's beliefs influence corporate culture and how culture originates through screening, self-sorting, and manager-directed joint learning. Gibbons and Henderson (2012) survey the emerging literature on how management shapes firm-level productivity.

Fourth, our model sheds additional light on an economics literature about management that links decentralization – or other aspects of structure – to firm performance. For example, Bloom et al (2012) study empirically decentralization of firms, and find productivity gains from decentralization associated with greater levels of trust. In our analysis, decentralization and performance are both endogenous and (partly) depend on organizational culture. Thus, a correlation between performance and decentralization might be driven by culture (as an omitted variable).

Measurements of cultural differences across time and place were largely developed outside of economics. For example, Hofstede (1984) began a body of research that compares organizational cultures across countries, assuming that cross-country cultural differences rub off on organizations active in those countries. Hofstede et al (2010) offer a survey of the extensive evidence that has been collected. The well-known World Values Survey was partly structured so as to examine international differences in values (see Inglehart et al 2004). Over time, empirical studies of culture have also spread to economics (see Alesina and Giuliano 2015, and Guiso et al 2006 for overviews). While most of these studies concern individuals, Guiso et al (2015) show how cultures that foster integrity tend to improve corporate performance.

3 Baseline Framework

In this section, we describe our core model of organizational design and culture, beginning with a static framework where identities are fixed. We then allow identities to evolve over time.

Organizational structure and hierarchy An organization has a continuum of divisions, indexed by $\omega \in [0,1]$, each of which must work on a project in every time period, indexed by t. (The time horizon is infinite.) There is a three-tier hierarchy: a leader of the whole organization, a senior manager in each division, and a junior manager working for each senior manager.

The leader faithfully serves the interests of the principal(s), such as the owners of a firm, a government ministry, or members of a political party. A senior manager of division ω can be one of two identity types, $\tau(\omega) \in \{0,1\}$. We denote by μ_t the share of identity-0 senior managers in the whole organization at t. Junior managers become senior managers in period $t+1$ and are socialized by interacting with the period-t senior managers.[1]

States, projects, and decentralization Payoffs depend on an aggregate state $\theta \in \{0,1\}$ which favors one kind of project choice and captures the current climate in which the organization operates. It is drawn afresh each period with *iid* draws over time with the probability of outcome $\theta = 0$ being β. The environment is more predictable when β is close to zero or one.

A project choice $\rho(\omega,\theta) \in \{0,1\}$ is made at the division level and can hence vary with ω. The leader can take over that choice in some divisions, which we refer to as *centralization*. Moreover, she determines the extent of *decentralization* – i.e., the share of divisions $d \in [0,1]$ where the senior manager is permitted to choose $\rho(\omega,\theta)$.

Leaders The leader observes θ and knows the identity composition of senior managers, captured by μ, but cannot observe (or verify) individual managers' types. Neither can the leader verify the projects $\rho(\omega,\theta)$ chosen in decentralized divisions. We thus follow Aghion and Tirole (1997) in abstracting from

[1] We abstract from the possibility of external recruitment by supposing that all upper-tier managers are internally recruited. External recruitment would be an interesting extension of the approach that we take. Part of the Online Appendix shows how we can also allow junior managers to put in effort.

allowing contracts – state-contingent or not – to shape decentralized project choices.

The leader's (and organization's) payoff in each division depends on the state, θ, and the project choice $\rho(\omega, \theta)$. If these do not match, $\rho(\omega, \theta) \neq \theta$, the payoff is 0. If they do match and the divisional choice is decentralized, the payoff is 1. However, centralization leads to an efficiency loss, at the *division* level. Even if $\rho(\omega, \theta) = \theta$, the payoff is π with $0 < \pi < 1$. We think about this cost as primarily reflecting an (unmodelled) failure to exploit local information. For example, Bolton and Farrell (1990) model the informational losses as centralized decision making it harder for organizations to find least cost solutions. They argue that trial and error at the local level might help discover new ways of completing a task.

By centralizing the choice in a division, the leader can guarantee that $\rho(\omega, \theta) = \theta$. Even though decentralization has a divisional benefit, $1 - \pi$, we assume that it has a cost at the *organization* level. For any share of decentralized divisions d, this cost is given by an increasing convex function $\phi(d)$ with $1 - \pi > \phi_d(0)$. We think about this cost as primarily reflecting the (organization-wide) lack of coordination associated with decentralization. The convexity assumption turns the leader's decentralization decision into a concave problem.

Putting these pieces together, decentralizing a share d of the divisions gives the leader a payoff:

$$\Pi(d, D(\theta)) = \pi + d(D(\theta) - \pi) - \phi(d), \tag{1}$$

where $D(\theta)$ denotes the share of *decentralized* divisions where $\rho(\omega, \theta) = \theta$. The leader chooses d in period t, following the realization of θ, to maximize the current value of (1).

Managers Each senior manager observes θ, and chooses $\rho(\omega, \theta)$ if the division is decentralized. He receives a payoff of u iff $\rho(\omega, \theta) = \tau(\omega)$. This may create an agency problem in the organization, because managers prefer the project $\rho(\omega, \theta) = \tau(\omega)$ and the leader prefers $\rho(\omega, \theta) = \theta$. Managers may also care about the aggregate payoff of their own group. *If* they do, the payoff of a senior manager is:

$$v(\omega, \theta, \tau) = u[\gamma(\omega, \theta, \tau) + \xi \mu Q(\theta, \tau)], \tag{2}$$

where indicator $\gamma(\omega, \theta, \tau) = 1$ iff $\rho(\omega, \theta) = \tau(\omega)$ and ξ indexes the strength of in-group altruism.

The variable $Q(\theta, \tau)$ denotes the share of all managers of the same type τ for whom $\rho(\omega, \theta) = \tau(\omega)$. This share of project-matched type-τ managers have a positive payoff, of u, while the complementary share $1 - Q(\theta, \tau)$ has a payoff of zero. It follows that $u\mu Q(\theta, \tau)$ is the total payoff in state θ to a type-τ senior manager's own identity group. Setting $\xi > 0$ is then a simple way of capturing the idea of tribal cultures, as discussed in the organizational psychology literature (see e.g., Kovach 2017). In our model, organizational tribalism thus takes the form of within-group loyalty, or altruism.

In the following, we consider two cases. The first is *individual* identities with $\xi = 0$. The second is *tribal* identities with $\xi > 0$ and the strength of tribalism captured by the level of ξ. As we shall see, individual and tribal identities can imply very different organizational dynamics.

Organizational culture We refer to μ_t – the share of identity-0 managers at t – as the organization's culture. In state $\theta = 0$, the leader's preferences align with those of type $\tau = 0$ managers, but clash with preferences of type $\tau = 1$ managers, and vice versa in state $\theta = 1$. The latent leader-manager conflict of interest thus varies both across states, with θ, and across time, with μ_t. This conflict crucially influences the leader's willingness to decentralize projects so as to take advantage of higher efficiency.

Cultural transmission Cultural transmission of identities from senior to junior managers is modelled as a deterministic map from μ_t to μ_{t+1}. We work with a specific forward-looking model, where culture evolves according to:

$$\mu_{t+1} - \mu_t = \mu_t(1 - \mu_t)[2G(\Delta_{t+1}) - 1]. \tag{3}$$

In (3), Δ_{t+1} is a measure of the expected "cultural-fitness advantage" of identity 0 relative to identity 1 at $t + 1$, the value of which we derive below. The function $G(\cdot)$ is a c.d.f. representing the distribution of (idiosyncratic) socialization costs/benefits, which we assume is symmetric around around 0, i.e. $G(0) = \frac{1}{2}$.

Equation (3) shows that Δ_{t+1} plays a key role in the analysis and reflects whether one type is expected to thrive more in future in an organization. If it does, then there will be more successful socialization towards the thriving type. The Online Appendix shows how (3) can be grounded in a specific micro-founded model of oblique organizational socialization, which mirrors

the approach in the evolutionary anthropology literature mentioned in Section 2. Specifically, we base our socialization model on Bidner and Francois (2011), by assuming that each junior manager is randomly matched for mentoring purposes with a specific senior manager. He will encounter a type-0 manager with probability μ_t and will himself become type 0 with probability $G(\Delta_{t+1})$. Even if such direct socialization fails, we allow for indirect socialization with the probability of becoming a type-0 depending on the average fraction of such types in the organization.

The important general idea embodied in (3) is a "Darwinian" transmission process, where the share of a certain identity group is growing whenever that group is expected to do better. This forward-looking formulation, based on expected utility, is different from evolutionary models, where a new generation is just trying to copy some existing types. It also differs from strategic economic models, such as the one in Bisin and Verdier (2001), where members of an earlier generation try to inculcate their own type on members of a later generation.

Timing The organization evolves over time, with all relevant variables indexed by t. The full timing of the model within each period t is as follows:

1. There is an initial share μ_t of senior managers with identity $\tau = 0$
2. Nature determines $\theta_t \in \{0, 1\}$
3. New junior managers enter and are randomly assigned to divisions
4. The organization's leader chooses the fraction of decentralized divisions $d_t \in [0, 1]$
5. Junior managers are socialized, which determines μ_{t+1}
6. The leader chooses projects $\rho(\omega, \theta_t)$ in each centralized division, while the senior manager chooses the project in each decentralized division
7. Payoffs are realized
8. Senior managers retire and are replaced by the existing junior managers who are randomly assigned to divisions.

4 Baseline Results

This section derives and discusses our main results, which are recorded in three propositions.

4.1 Organization Design

Optimal decentralization choices by the leader solve:

$$\delta\left(D\left(\theta\right)\right) = \arg\max_{d\in[0,1]} \Pi\left(d, D\left(\theta\right)\right). \tag{4}$$

Note that $D\left(0\right) = \mu$ and $D\left(1\right) = 1 - \mu$. Using (1), we have:

Proposition 1 *Decentralization $d\left(\theta\right)$ is optimally chosen with $d\left(0\right) = \delta(\mu)$ and $d\left(1\right) = \delta(1-\mu)$, where $\delta\left(\cdot\right)$ is an increasing function defined by*

$$\delta(x) = \begin{cases} \min\left\{\phi_d^{-1}(x-\pi), 1\right\} & \text{if } x > 0 \\ 0 & \text{otherwise.} \end{cases}$$

Proof. To prove this, note that

$$\delta\left(\mu\right) = \arg\max_{d\in[0,1]} [\pi + d(\mu - \pi) - \phi\left(d\right)]$$

and

$$\delta\left(1-\mu\right) = \arg\max_{d\in[0,1]} [\pi + d(1 - \mu - \pi) - \phi\left(d\right)]$$

At an interior solution, we have

$$\mu - \pi = \phi_d\left(\delta\left(\mu\right)\right) \quad \text{and} \quad 1 - \mu - \pi = \phi_d\left(\delta\left(1-\mu\right)\right).$$

A corner solution, $\delta\left(\mu\right) = 1$ for $\mu < 1$, arises if $1 - \pi > \phi_d\left(1\right)$. ■

To understand the proposition, suppose that $\theta = 0$. Then there are two possibilities. If $\mu \leq \pi$, $d = 0$ and the organization is fully centralized – the lack of alignment between state 0 and the fraction of managers who prefer $\rho\left(\omega, \theta\right) = \theta = 0$, as well as the coordination cost $\phi\left(d\right)$, push against decentralization. However if $\mu > \pi$, it can become beneficial to decentralize the choice of $\rho\left(\omega, \theta\right)$ in some divisions, as these divisions will produce an additional payoff of $1 - \pi$. But this gain must be weighed against the marginal

coordination cost ϕ_d associated with decentralization. Maximal decentralization, $\delta(1)$, occurs when $\mu = 1$. An analogous argument applies when the state $\theta = 1$.

Proposition 1 shows that culture, as measured by μ, shapes organizational decision-making by affecting the conflict of interest between the leader and senior management. Greater alignment fosters decentralization. However, since the leader's optimal decisions are state-dependent, she may occasionally "take back control" of previously decentralized decisions, depending on the realization of θ. How often this happens depends on β and μ. For example, if β is high decisions are more likely decentralized when μ is high compared to when μ is low.[2]

The model predicts that we should observe higher performance in more decentralized organizations. But this is merely a correlation, rather than a causal effect of decentralization, since the decision to decentralize is endogenous and depends on θ and μ.

Equilibrium cultural fitness Substituting the optimal decentralization decision in Proposition 1 into (2), allows us to define:

$$\begin{aligned} \Delta(\mu,\xi) &= \beta u\left[(1+\xi\mu)-(1+\xi(1-\mu))\,\delta(\mu)\right] \\ &\quad +(1-\beta)\,u\left[\delta(1-\mu)(1+\xi\mu)-(1+\xi(1-\mu))\right]. \end{aligned} \tag{5}$$

This can be used to explore how cultural fitness depends on μ and ξ which will be key to the cultural/identity dynamics.

Equation (5) can also be used to investigate how cultural fitness depends on anticipated decentralization decisions by the organization's leader at $t+1$, i.e. $\Delta_{t+1} = \Delta\left(\mu_{t+1},\xi\right)$. Substituting this expression into (3), we get the following condition for the dynamics:

$$1-2\mu(1-\mu)\,g(\Delta(\mu,\xi))\,\Delta_\mu(\mu,\xi) > 0. \tag{6}$$

The condition implies that the root of the difference equation (3) is always positive, but below (above) unity when Δ_μ has a negative (positive) sign. (The Online Appendix offers a further discussion, which also ties in with the analysis in Sections 4.2 and 5.1 below.)

[2]Note that the interior solutions for d reflects the presence of the decentralization cost. With $\phi(d) = 0$, we would have $d(0) = 1$ iff $\mu > \pi$ when $\theta = 0$ and $d(0) = 1$ iff $1-\mu > \pi$ when $\theta = 1$.

4.2 Steady-state Cultures

From now on, we focus on the case with a certain amount of uncertainty about the organization's environment and not too steeply rising coordination costs. Specifically, we assume that

$$\beta \in \left[\frac{1-\delta(1)}{2-\delta(1)}, \frac{1}{2-\delta(1)}\right]. \tag{7}$$

This assumption will always hold when $\delta(1) \to 1$ or β is close enough to $\frac{1}{2}$.

To create a benchmark, we first focus on individual rather than tribal identities – i.e., the case when $\xi = 0$. Since $\delta(\cdot)$ is increasing, it follows directly from (5) that $\Delta_\mu(\mu, 0) < 0$. Then, we have:

Proposition 2 If (7) *holds and identities are individually held, there is a unique stable interior steady state* $\widehat{\mu}$, *defined by* $\Delta(\widehat{\mu}, 0) = 0$.

Proof. Since (6) holds, it follows from (3) that $\mu_t = \mu_{t+1}$ if and only $G(\Delta(\widehat{\mu}, 0)) = 1/2$ which holds only if $\Delta(\widehat{\mu}, 0) = 0$. Moreover this interior steady state is stable since $\mu_{t+1} > \mu_t$ for all $\Delta_{t+1} > 0$ and $\mu_{t+1} < \mu_t$ for all $\Delta_{t+1} < 0$. ■

The equilibrium dynamics associated with Proposition 2 are illustrated in the top panel of Figure 1. The growth of μ – which is determined by $2\mu(1-\mu)G(\Delta(\mu, \xi))$ is plotted on the y-axis. It is positive (negative) when μ – plotted on the x-axis – is below (above) $\widehat{\mu}$. The chevrons in the diagram indicate that culture converges to an interior steady state $\widehat{\mu}$ from any starting point.

Intuitively, the result arises because managers who are of minority identity are more likely to be delegated authority when it really matters to them – i.e., when their preferences conflict with those of the leader. On the contrary, managers with a majority identity are more likely to be delegated authority when their preferences align with those of the leader. This pattern of leader decisions favors minority identities and prevents a mono-culture from arising.

Comparative statics We have already seen from Proposition 1 that there is no one-to-one relation between organizational design and culture. This relation reflects the organizational environment as captured by θ. Proposition 2 predicts long-run cultural diversity where culture converges to an interior share $\hat{\mu}$. This depends on β and other features of the environment that influence $\delta(\cdot)$. Specifically, we have the following

Corollary *If* $\beta = 1/2$, then $\hat{\mu} = 1/2$. *Moreover if (7) holds, then* $\hat{\mu}$ *is increasing in* β.

Proof. The expression in (5) with $\xi = 0$ implicitly defines $\hat{\mu}$ from $\Delta(\hat{\mu}, 0) = 0$. Differentiating this expression with regard to β yields

$$\frac{\partial \hat{\mu}}{\partial \beta} = \frac{[1 - \delta(\mu)] + [1 - \delta(1 - \mu)]}{\beta \delta_{\mu}(\mu) + (1 - \beta)\delta_{1-\mu}(1 - \mu)}$$

Because $\delta(\mu)$ is an increasing function (by Proposition 1), $\partial\hat{\mu}/\partial\beta$ is positive, whenever there are interior solutions for $\delta(\cdot)$. ■

The steady-state equilibrium culture has exactly half the managers of each type when the state is maximally uncertain, at $\beta = 1/2$. However, as β moves away from $1/2$, steady-state culture adapts adapts and settles at an interior point where a larger fraction of managers are better suited to most likely aggregate state of the world θ. Decentralization at the steady state-culture depends on the alignment of this culture with θ. The organization will look "conflictual" some of the time, when the leadership centralizes control to improve performance in the wake of shifts in θ. The comparative statics with respect to π, the cost of decentralization, are ambiguous as a shift in π reduces the amount of decentralization in all states of the world.[3]

Optimality? Is the steady-state culture pinned down by Proposition 2 optimal from the organization's (and the leader's) perspective? To explore this question, we need to chose a benchmark. In an unconstrained world, the organization would like to choose a culture each period depending on the realization of θ. An optimally chosen state-dependent culture would always be a mono-culture, which can take maximum advantage of decentralization.[4] But an agile and instantly adaptable process like this is not compatible with viewing culture in terms of manager organization-specific identities as a source of intertia where governance structure rresponds to θ.

[3]Note that when $\delta(\cdot)$ is interior, then

$$\frac{\partial \hat{\mu}}{\partial \pi} = \frac{-\beta \delta_{\mu}(\mu) + (1 - \beta)\delta_{1-\mu}(1 - \mu)}{\beta \delta_{\mu}(\mu) + (1 - \beta)\delta_{1-\mu}(1 - \mu)}.$$

[4]One interpretation of this would be where a firm hires and fires workers each period to avoid being entrapped by a particular workplace culture.

Therefore, we only compare the equilibrium steady-state culture $\hat{\mu}$ to the hypothetical culture that would maximize the organization's long-run payoff, namely the value of μ that maximizes:

$$\beta\Pi\left(\delta\left(\mu\right),\mu\right)+\left(1-\beta\right)\Pi\left(\delta\left(1-\mu\right),1-\mu\right).$$

Since $\delta\left(\cdot\right)$ is increasing, as is $\Pi\left(\cdot,\cdot\right)$ (in both of its arguments), we get:

Proposition 3 *The long-run payoff of the organization is maximized by a monoculture with either $\mu=1$ (only identity-0 managers) or $\mu=0$ (only identity-1 managers), with $\mu=1$ ($\mu=0$) being preferred when $\beta>1/2$ ($\beta<1/2$).*

Proof. Define

$$\begin{aligned} H\left(\mu\right) &= \pi+\beta\left[\delta\left(\mu\right)\left(\mu-\pi\right)-\phi\left(\delta\left(\mu\right)\right)\right]+ \\ &\quad \left(1-\beta\right)\left[\delta\left(1-\mu\right)\left(1-\mu-\pi\right)-\phi\left(\delta\left(1-\mu\right)\right)\right] \end{aligned}$$

and note that the optimal culture $\mu^{*}=\arg\max_{\mu\in[0,1]}H\left(\mu\right)$. The first two derivatives of $H\left(\cdot\right)$ are

$$H_{\mu}\left(\mu\right)=\beta\delta\left(\mu\right)-\left(1-\beta\right)\delta\left(1-\mu\right)$$

(after using the envelope theorem), and

$$H_{\mu\mu}\left(\mu\right)=\beta\delta_{\mu}\left(\mu\right)+\left(1-\beta\right)\delta_{1-\mu}\left(1-\mu\right)\geq 0.$$

Since $H\left(\mu\right)$ is convex, we must have a corner solution. Finally, note that

$$H\left(1\right)-H\left(0\right)=\left(2\beta-1\right)\left[\delta\left(1\right)\left(1-\pi\right)-\phi\left(\delta\left(1\right)\right)\right],$$

since $\delta\left(0\right)=0$. This expression is positive iff $\beta>1/2$, since $1-\pi>\phi_{d}\left(0\right)$. ■

Together, Propositions 2 and 3 imply:

Corollary *If (γ) holds and identities are individual, the equilibrium steady-state culture is suboptimal for the organization.*

Our baseline model thus predicts that, in any long-run equilibrium, the organization is multicultural. This leads to worse performance for the organization than with a long-run optimal culture. The other side of this coin is that some conflict of interest between the leader and managers remains whichever the realized state.

Lack of commitment In our framework, the leader cannot choose μ directly, although the path of μ still reflects expected organizational-design decisions. However, the reason for the long-run suboptimality is not that leaders have a short-run (one-period) horizon, but rather their lack of commitment. Even if a leader cares about long-run payoffs, she is unable to commit herself to future levels of d in order to influence the path of μ. As we now argue, any attempt to promise a sequence of such choices would therefore run into a generic credibility (time-consistency) problem.

To see the nature of the problem, note that to influence long-run payoffs, the leader at t would like to promise $d_{t+1} = 0$, which would yield $\Delta(\mu, 0) = u(2\beta - 1)$. This, in turn, would push the organization's culture towards $\mu = 1$ ($\mu = 0$) whenever $\beta > 0$ ($\beta < 1/2$) – i.e., in the right direction as per Proposition 3. But promising $d_{t+1} = 0$ is not credible, as the short-run optimum generally has $d(\theta) > 0$ – i.e., once θ_{t+1} is revealed it may be valuable to decentralize decisions to maximize current payoffs, as per Proposition 1. With commitment, an optimal path for decentralization would find the right trade-off between short-run and long-run payoffs. (We sketch out this argument more fully in the Online Appendix.)

This observation about the downside of being unable to commit is reminiscent of discussions around the failure of the Coase Theorem (Coase 1960) in dynamic settings without commitment. In particular, it parallels the argument in Acemoglu (2003), who shows how a lack of commitment by current decision-makers may be a key impediment to efficiency in dynamic political models.

A possible substitute for commitment in our setting would be for the principals to strategically delegate control of the organization to a leader who favors one particular culture over another, even though this culture is suboptimal in the short-run. This would be particularly relevant if the (otherwise unachievable) commitment path would prescribe either $d_t = 1$ or $d_t = 0$ for all time.[5] However, we show below that the long-run optimum may also be achievable without commitment if the leader is charismatic in a specific sense.

[5] This 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. In a classic paper, Rogoff (1985) studies strategic delegation in the context of central banking.

5 Extensions

This section develops a richer analysis, by extending the baseline model in two ways, each of which is summarized in a new proposition. These new results come in handy when we develop insights from the model in the next section.

5.1 Tribal Identities

Now suppose that $\xi > 0$, the case of tribal identities discussed in the organizational psychology literature. Tribalism does not affect the decentralization decisions in Proposition 1. However, it sows the seed of a *dynamic complementarity* between the size of a group and this group's cultural-fitness advantage. As we shall see, this may alter Proposition 2.

Divergent dynamics In particular, for strong enough tribalism – meaning large enough ξ – we can have $\Delta(\mu, \xi)$ *increasing* in μ. In words, the expectation that more future managers will have a particular identity makes it *more* attractive to select that identity during socialization. This complementarity will result in divergent dynamics with alternative steady states and initial conditions shaping the long-run equilibrium.

To get clean results, we work with the following assumption:

$$1 + \delta(\mu) \geq (1-\mu)\,\delta_{\mu}(\mu) \quad \text{and} \quad 1 + \delta(1-\mu) \geq \mu\delta_{1-\mu}(1-\mu), \tag{8}$$

which holds under a wide range of conditions.[6] Then, we have:

[6] Suppose that

$$\phi(z) = z^{1+\frac{1}{\eta}}$$

with $\eta \leq 1$. Then

$$\begin{aligned} & 1 + (1-\mu-\pi)^{\eta} - \eta\,(1-\mu-\pi)^{\eta-1}(1-\mu) \\ = \;& 1 + (1-\mu-\pi)^{\eta}\left[1 - \eta\frac{1-\mu}{1-\mu-\pi}\right] > 0 \end{aligned}$$

if η is small enough and likewise

$$\begin{aligned} & 1 + (\mu-\pi)^{\eta} - \eta\,(\mu-\pi)^{\eta-1}\mu \\ = \;& 1 + (1-\mu-\pi)^{\eta}\left[1 - \eta\frac{\mu}{\mu-\pi}\right] > 0 \end{aligned}$$

if η is small enough.

Proposition 4 *Suppose that (8) holds and identities are tribal. Then, for β close enough to $1/2$, $\delta(1) < 1$, and ξ high enough, there exists $\tilde{\mu}(\beta) \in [0,1]$ such that if $\mu_0 > \tilde{\mu}(\beta)$, an identity-0 monoculture emerges in the long run ($\lim_{t\to\infty} \mu_t = 1$). But if $\mu_0 < \tilde{\mu}(\beta)$, an identity-1 monoculture emerges in the long run ($\lim_{t\to\infty} \mu_t = 0$).*

Proof. To prove this, note that if (i) $\Delta_\mu(\mu,\xi) > 0$ and (ii) $\Delta(1,\xi) > 0 > \Delta(0,\xi)$, the intermediate-value theorem implies that there exists $\tilde{\mu}$ defined by $\Delta(\tilde{\mu},\xi) = 0$. For (ii) to hold, we need

$$\xi \geq \max\left\{\frac{\beta-(1-\beta)(1-\delta(1))}{(1-\beta)(1-\delta(1))}, \frac{1-\beta-\beta(1-\delta(1))}{\beta(1-\delta(1))}\right\}.$$

This condition becomes $\xi \geq \delta(1)/1-\delta(1)$ if $\beta = 1/2$. Hence, it will always hold for high enough ξ when β is close to $1/2$ as long as $\delta(1) < 1$. To show when (i) holds note that

$$\begin{aligned}\Delta_\mu(\mu,\xi) &= \xi[\beta(1+\delta(\mu))+(1-\beta)(1+\delta(1-\mu))] \\ &\quad -\beta(1+\xi(1-\mu))\delta'(\mu)-(1-\beta)(1+\xi\mu)\delta_{1-\mu}(1-\mu)\end{aligned}$$

and

$$\begin{aligned}0 &< \Delta_{\mu\xi}(\mu,\xi) = \beta[1+\delta(\mu)-(1-\mu)\delta_\mu(\mu)] \\ &\quad +(1-\beta)[1+\delta(1-\mu)-\mu\delta_{1-\mu}(1-\delta)].\end{aligned}$$

as long as (8) holds. Thus (i) will hold for ξ high enough. Finally, the existence of $\tilde{\mu}$ together with $\Delta_\mu(\mu,\xi) > 0$ implies divergent dynamics on both sides of $\tilde{\mu}$, as claimed. ■

The possibility of two steady states is illustrated graphically in the bottom panel of Figure 1. It shows how the growth of μ – determined by $2\mu(1-\mu)G(\Delta(\mu,\xi))$ – is now negative (positive) as μ is below (above) the point $\tilde{\mu}(\beta)$, implying divergent dynamics towards $\mu = 0$ ($\mu = 1$).

Proposition 4 vividly illustrates how having a tribal culture can be a virtue. With $\xi = 0$, we found that the organization never fully converges to the leader's optimal long-run culture. But such a monoculture is now possible with strong enough tribalism. However, strong tribal cultures may also have a downside, as we discuss next.

The wrong culture? Proposition 4 says that, if tribal identities are strong enough, we have path dependence and convergence to alternative steady states depending on the initial value of μ. This result strengthens the argument that equilibrium culture may not be optimal from a leader's perspective. For example, if μ_0 is small enough and ξ is large enough, then the organization converges to an identity-1 monoculture with $\mu = 0$, even though the organization would be better off with $\mu = 1$. Thus, tribalism may drive the organization's culture in the "wrong" direction.

Inertia Proposition 4 also reveals the possibility of organizational inertia in the tribal-culture model. In the baseline model without tribalism, long-run equilibrium culture, $\hat{\mu}$, responds to changes in the model's parameters. With tribalism, however, organizational culture can be unresponsive to exogenous shocks over some parameter range. This inertia rhymes with frequent (informal) claims that a tribal culture may limit organizational adaptability.

To illustrate this point, suppose that β increases from $\beta' < \frac{1}{2}$ to $\beta'' > \frac{1}{2}$. By Proposition 3, this shifts the long-run optimal culture from $\mu = 0$ to $\mu = 1$. Assume further that the shift in β occurs when μ has converged far enough towards $\mu = 0$ that $\mu < \tilde{\mu}(\beta'')$. Then, convergence towards a – now dysfunctional – type-1 monoculture will continue, despite the shift in β.

The organization only adapts when a certain shock – like a shift in β – is large enough. But even if culture starts moving in the right long-run direction, the organization will suffer a productivity decline along the adjustment path due to more centralization of project choices as long as culture is maladapted. We believe that this observation is relevant in concrete applications of our ideas, such as to the history of IBM (discussed in Section 6).

A broader interpretation of tribalism? Our model associates tribal identification with altruism. But the actual role of tribal identification may be considerably broader and include other characteristics that raise the probability that the next generation of managers inherits the most common type from the previous generation. Altruism is one factor in this decision, but other factors might include choices by the organization, such as how it trains or mentors new managers, the types of "team-building" exercises that it encourages, and the extent to which a new manager interacts with a broad cross-section of older managers. It would be interesting to extend our formal analysis with further microfoundations that incorporates some of these

features.

5.2 Charismatic Leaders

So far, a leader's influence has been limited to deciding in how many divisions to decentralize project choices and how to choose projects in the remaining, centralized divisions. But as emphasized in the management literature, some leaders may have enough "charisma" that they can influence the intrinsic motivation of managers, and persuade those with identity $\tau \neq \theta$ to act in line with the organization's objectives.[7]

Leader persuasiveness To make the main points as simply as possible, we introduce an almost trivial model of charismatic leaders, which still captures the essence in Weber (1922). The extended model serves to show how culture and leadership influence can interact, including the limits in guiding an organization towards an optimal culture.

Let κ be the additional utility boost managers obtain if they follow a certain leader's plea for setting $\rho(\omega, \theta) = \theta$. Managers with $\tau = \theta$ already have aligned motives, so this boost just increases their payoff from following their identity. But for non-aligned managers with $\tau \neq \theta$, the payoff from following their identity becomes weaker. Finally, assume that leaders vary in their persuasiveness, and that some leaders are charismatic with $\kappa > u$. Such leaders will lead non-aligned managers to change their decisions just to please the leader.[8]

Under these assumptions, the analysis proceeds in the same way as earlier, as long as $\kappa < u$. But with $\kappa > u$, we have the following:

Proposition 5 (a) *Charismatic leaders always choose* $d(0) = d(1) = \delta(1)$. (b) *If the organization has a charismatic leader and identity is individually held,* $\xi = 0$*, it converges to its optimal long-run culture.* (c) *If the leader is charismatic and identity is tribal, with* ξ *positive and large enough, there exists* $\tilde{\mu}(\beta) \in [0, 1]$ *such that if* $\mu_0 > \tilde{\mu}(\beta)$ $(\mu_0 < \tilde{\mu}(\beta))$ *an identity-*0 (*identity-*1) *monoculture emerges in the long run.*

[7] We continue to assume that there are no contractual solutions around the problem since project choices (and identities) are non-verifiable.

[8] An obvious extension would be to assume a distribution of u across managers. In this case, progressively higher leader charisma would smoothly raise the share of non-aligned managers that acted in the organization's interest.

Proof. Result (a) follows because all managers set $\rho(\omega, \theta) = \theta$, whenever $\kappa > u$. A charismatic leader can thus choose maximal decentralization (given coordination costs), whichever the state.

Result (b) follows by cultural fitness of identity 0 vs. 1, when $\xi = 0$, which is given by

$$\Delta(\mu, 0) = \beta(\kappa + u) + (1 - \beta)\kappa - \beta\kappa - (1 - \beta)(\kappa + u) = u[2\beta - 1].$$

In other words, μ converges towards $\mu = 1$ when $\beta > 1/2$ and $\mu = 0$ when $\beta < 1/2$.

Result (c) follows by computing

$$\begin{aligned} \Delta(\mu, \xi) &= \beta[(1 + \xi\mu)(\kappa + u) - \kappa(1 + \xi(1 - \mu))] \\ &\quad + (1 - \beta)[\kappa(1 + \xi\mu) - (\kappa + u)(1 + \xi(1 - \mu))] \\ &= u[(2\beta - 1) + \xi(\mu - (1 - \beta))]. \end{aligned}$$

Clearly, $\Delta_\mu(\mu, \xi) > 0$ in this case. The rest of the argument follows the same lines as in Proposition 4, with $\tilde{\mu}(\beta)$ defined by $\Delta(\tilde{\mu}(\beta), \xi)) = 0$, which is interior when ξ is large enough or β is not too far from $1/2$. For example, when $\beta = 1/2$, the critical value is given by $\tilde{\mu}(\beta) = 1/2$. ■

With individual identities, a charismatic leader can afford to decentralize more and this yields higher payoffs. By shaping expected payoffs, such a leader also guarantees convergence to the optimal long-run monoculture. But for this path to materialize in the long run, a charismatic leader must remain in place. If not, the organization reverts towards the interior solution in Proposition 2.

Proposition 5(c) shows the limitations to charismatic leadership. We have already seen in Proposition 4 that cultures based on tribal identities can lead to a complementarity between payoffs and the share of each type in the organization. So even if a charismatic leader is able to decentralize more, expected payoffs also depend on the initial value of μ. Indeed, the organization may now again have more than one steady state. This means that a charismatic leader – even if she were guaranteed to stay in place – no longer ensures convergence to the organization's optimal culture. The organization does converge to a monoculture, but this need not be the one that maximizes its long-run payoff.

6 Insights

In this section, we illustrate some insights that emanate from the model.

Strong cultures can be a virtue and a vice: IBM The organizational culture in IBM has been the subject of extensive discussion. Indeed, some of the most influential work on corporate cultures has focused on IBM, including the classic work of Hofstede (1984). Leading textbooks on the origins of corporate success, such as Peters and Waterman (1982), also feature the company as a prominent example. As a case study, IBM illustrates two key insights from our model.

The alignment between IBM's inside culture and outside demands has been given pride of place in explaining the ebb and flow of the company's fortunes (Cortada 2018 surveys this research). The company thrived on developing a strong culture focused on producing mainframes. Indeed, IBM was the undisputed leader in the mainframe market fifty years ago, with a share of the *overall* computer market of 60 percent in 1970. By 1980 it still had a 62 percent share of the mainframe-computer market, but its share of the overall market had declined to 32 percent. This largely reflected IBM's under-performance in the fast-growing mini-computer market. In 1979, this led *Business Week* to label IBM as a "stodgy, mature company", a view corroborated by a 20-percent decline in the price of IBM stock.

To espouse the new personal-computer industry, the firm began developing the now-famed IBM PC, which prompted the quip that "IBM bringing out a personal computer would be like teaching an elephant to tap dance." In line with our model, Mills (1996) emphasizes how an ingrained culture was a central reason for the slow response to a changing environment.

But why did IBM have such a strong culture in the first place? This and subsequent developments can be seen through the lens of our model. For the 15 years from 1956 to 1971, Thomas Watson Jr. held the CEO position, which he had taken over from his own father. Watson Jr. is universally described as a charismatic leader ($\kappa > u$ in the model), who spearheaded the company's switch from punch-card to mainframe technology. Upon taking over the CEO position, he reorganized the company into a divisional structure and decentralized many decisions (increased d). Watson continued to build a strong mainframe-oriented culture (managers adopted identity $\tau = 0$, associated with mainframe projects in a mainframe world $\rho = \theta = 0$, by Proposition 5). His reign was in the heyday of IBM's success and market

dominance in what our model would portray as a predictable environment favoring mainframes (β close to 1). At such a time, IBM would benefit from a strong mainframe-oriented culture, well aligned with market trends, that permitted the company to reap the productivity gains from extensive decentralization (a high value of $d(0)$, by Proposition 1).

But the CEOs who succeeded Watson Jr. after his resignation – Vincent Learson and Frank Cary – did not have the same charisma in leading senior management ($\kappa < u$). We believe that this is also a key part of IBM's story. As the market turned away from mainframes (a fall in β), our model would indeed predict a sustained fall in performance because the strong mainframe culture led to inertial adjustment (by Proposition 4). The performance fall would result from less decentralization as the market turned toward PCs, as the latter was not well aligned with IBM's prevailing mainframe culture (the leader setting $d(1)$ low when $\theta = 1$ and μ is high, by Proposition 1). Even though the company eventually found its way back to profitability, the slow adjustment could be explained by slow cultural dynamics.

To us, a model where culture built on identity is a state variable appears better suited to explaining these dynamics than a model of organizational culture built on beliefs. The analytic narrative of IBM's history we have developed clearly brings out how a strong organizational culture can be both a virtue and a vice. It is a virtue when it supports extensive decentralization in a stable environment, but a vice when it sustains inertia in a changing environment.

Coexisting culture and design differences: public bureaucracies Another key feature of our model is that – with tribalism – different organizations in the same environment can end up with different cultures and designs. We believe that this applies to many public bureaucracies, which seem to operate and perform very differently, in spite of similar levels of funding and other conditions. For that reason, they also seem extremely difficult to reform.

How much local control to offer in the delivery of public services has been discussed in research on education and health-care provision (see e.g., Wilson 1989 and Ahmad et al. 2005). Decentralization is frequently claimed to work best in taking advantage of local conditions, when the objectives of the center and delivery units are aligned.

Honig (2018) stresses a similar point in a different context, namely that

of international-aid organizations. He contrasts the relatively decentralized practices of the United Kingdom's Department for International Development (DFID) with the penchant for centralized management in the United States Agency for International Development (USAID). How can we understand this difference through the lens of our model?

We first note that DFID operations are very much oriented towards collaboration with host governments. Decentralized provision of aid can indeed be thought of as giving power to NGOs to make key project choices, rather than trying to impose these from above. Our model would interpret this as a situation where the prevailing culture among country managers and the objectives of DFID leaders are well aligned.

However, USAID operations are much more oriented towards supporting host-country, private-sector projects. Our model suggests that the more centralized design of USAID can be interpreted in two different ways, which both reflect lacking alignment between leadership and country managers. In one interpretation, the objectives of DFID and USAID leaders are similar, but the culture of USAID officers has developed in a different direction. In the other, USAID country officers espouse the same culture as DFID officers, but the leadership has different objectives. It would be interesting to conduct a case study along these lines.

Performance and decentralization: causation or correlation? Our model gives insights into the management literature which links decentralization – or other forms of design – and firm performance. For instance, Bloom et al (2012) study empirically the decentralization of firms, and find productivity gains from decentralization associated with greater levels of trust. Bandiera et al (2016) examine how CEOs use their scarce time, especially when it comes to their involvement in production vs. coordination.

In our setting, decisions to decentralize are endogenous and partly reflect how well the culture is matched to the state of the world. Therefore, we would indeed expect a correlation between performance and decentralization. However, culture could be an important omitted variable in mediating this relationship.

Bloom et al (2014, 2015) do find differences in public-bureaucracy management styles to be correlated with performance indicators. However, management practices and performance are likely to be co-determined with factors that help shape organizational cultures. Indeed, our model suggests that

management practices should be a key manifestation of organizational culture. How far these cultures, or their drivers, have changed over time does not appear to have been systematically studied.

7 Final Remarks

We have shown how identities held by sequential generations of managers may give rise to organizational-culture dynamics that interact with organizational-design choices. In our model, culture moves slower than design choices and is the only state variable. This model generates a range of substantive and methodological insights into the two-way dynamics between organizational culture and design, with implications for performance. By modelling culture as a state variable based on identity formation, we can see why generating cultural change amounts to more than shifting beliefs: design choices that maximize short-run payoffs shape the long-run evolution of organizational culture. These insights complement the insights from studies based on informational frictions.

Though our framework is very simple, it offers insights into debates about organizational culture. It suggests that a strong culture can be both a virtue and a vice, and it helps us understand when charismatic leaders can bring about more cultural homogeneity. But our framework also shows how cultures and leaders may interact with the stability of the organization's environment. Applying these insights, we get a fresh perspective on the extensive literatures in business history and organizational behavior on the ups and downs of IBM.

Our model also helps to understand how organizations, which operate in the same environment, may develop different authority structures and performance levels. Recognizing that agency problems exist, however, may not fully account for these performance differences. To explain them further, it would be natural to extend the analysis with endogenous effort. This would rely on the natural assumption that intrinsically motivated managers are prepared to exert more effort. That kind extension would enrich the analysis of tribal cultures (The Online Appendix sketches such an extension.)

One could also extend our analysis in other directions. Perhaps most importantly, if conflicting interests due to culture is indeed a source of inefficiency, then we would expect organizations to try and circumvent that problem. We have assumed that limited verifiability makes it impossible to "contract around it." But in passing we have already mentioned how our

analysis suggests motives for strategic recruitment or strategic delegation. In a richer setting, the cultural issues we have stressed may thus help us understand organizational-design features, which are different from those identified by the conventional limited-information approach.

Related to this, one could explore issues about organizational governance and leadership. For example, tasking a leader with a particular objective could have a long-run transformational effect. But a leader may also create short-run unhappiness by de-motivating existing managers in her attempts to transform a prevailing culture. Careful monitoring would then be important, such that principals do not interpret poor short-term performance as the result of inability. Stories abound about leaders who attempt to change organizational cultures, but are edged out via protests by disgruntled insiders or complaints by short-run-profit-oriented owners. One could analyze such endogenous leadership selection in our framework.

It is possible to extend our framework in yet other ways. Hirschman (1970) famously emphasized three sources of organizational dynamics: exit, voice, and loyalty. While earlier analyses have highlighted exit vs. voice, our analysis focuses on loyalty as embedded in social identity. But our setting has room for exit and voice as well. Exit could e.g., reflect organizations under stress hiring outside managers with different cultural convictions to bypass inside managers with a certain dysfunctional culture. Voice could e.g., reflect senior managers being allowed to vote over the organization's mission.

Finally, this paper asks how organizations adapt their design to endogenously changing values. We believe the idea of linking cultural and institutional change is a promising way of exploring societal dynamics in other contexts. In Besley and Persson (2019), we study how evolving democratic values interact with reforms of democratic institutions by country leaders. More research should follow on the interplay between strategically-chosen institutions and slow-moving cultural values.[9]

[9]Persson and Tabellini (2021) provide an analytical survey of the emerging theoretical literature on interacting cultures and institutions

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Online Appendix

A Microfoundations of Cultural Dynamics

In this section, we show how to provide some microfoundations for the dynamic formulation assumed in Section 3 of the text.

A socialization model The approach that we take is similar to Bidner and Francois (2011). Assume that each junior manager is randomly matched for mentoring with a specific senior manager. Suppose a junior manager is mentored by an identity-0 senior manager (his "biological parent" in the organization), which happens with probability μ_t. Then, we assume that he is socialized into being identity 0 depending on the relative cultural fitness Δ_{t+1}. A junior manager becomes a type 0 through mentoring if:

$$\Delta_{t+1} + \eta \geq 0,$$

where η is a mean-zero, symmetrically distributed idiosyncratic shock with continuous distribution function $G(\cdot)$. Thus the probability that a new recruit mentored by a type-0 senior manager becomes type 0 is just $G(\Delta_{t+1})$.

In the event that such direct socialization fails, the junior manager may still be indirectly socialized by observing and learning from other senior managers (his "cultural parents"). The probability of indirectly becoming a type 0 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 $(1 - G(\Delta_{t+1}))\,\mu_t$.

Adding these expressions, the total probability that a new recruit, who is matched with a type-0 senior manager, himself becomes a type 0 is:

$$G(\Delta_{t+1}) + (1 - G(\Delta_{t+1}))\,\mu_t. \tag{9}$$

If a new junior manager is matched with and mentored by a type-1 senior manager, which happens with probability $1-\mu_t$, he is never directly socialized into being a type 0. On the other hand he is socialized into being a type 1 if

$$\Delta_{t+1} + \eta \leq 0.$$

Thus, $(1 - G(\Delta_{t+1}))$ is the proportion of type-1 managers coming from such matches. A junior manager who does not become a type 1 in this way, can – as above – indirectly become type depending on the aggregate fraction of collectivists in the organization. The resulting probability of becoming type 0 is

$$G(\Delta_{t+1})\,\mu_t. \tag{10}$$

Multiplying (9) with μ_t, (10) with $1-\mu_t$, and adding the resulting expressions, we can write the law of motion for the share of identity type-0 managers – our measure of organizational culture – as

$$\begin{aligned}\mu_{t+1} &= \mu_t\left[G(\Delta_{t+1}) + (1 - G(\Delta_{t+1}))\,\mu_t\right] + (1-\mu_t)\,G(\Delta_{t+1})\,\mu_t \\ &= \mu_t + (1-\mu_t)\,\mu_t 2\left[G(\Delta_{t+1}) - \frac{1}{2}\right]. \end{aligned} \tag{11}$$

Different varieties of dynamics Let us make the following first-order approximation of $G\left(\Delta\left(\mu_{t+1}\right)\right)$ around μ_t:

$$G\left(\Delta\left(\mu_{t+1}\right)\right) \simeq G(\Delta(\mu_t)) + g(\Delta(\mu_t))\,(\mu_{t+1} - \mu_t)\Delta_\mu\ .$$

Substituting this approximation into (11), we get

$$\mu_{t+1} - \mu_t \simeq 2\mu_t(1-\mu_t)\left[G(\Delta(\mu_t)) - \frac{1}{2} + g(\Delta(\mu_t))\,(\mu_{t+1} - \mu_t)\Delta_\mu\right],$$

which we can rewrite as

$$\mu_{t+1} - \mu_t \simeq r(\mu)\left[G(\Delta(\mu_t)) - \frac{1}{2}\right], \tag{12}$$

where

$$r(\mu) = \frac{2\mu_t(1-\mu_t)}{1 - 2\mu_t(1-\mu_t)\,g(\Delta(\mu_t))\,\Delta_\mu}.$$

As long as condition (6) in the text holds, $r(\mu)$ itself is positive, and its numerator is smaller than 1.[10] If we ignore the dependence of $r(\mu)$ on μ – or rather assume that this dependence is dominated by the direct effect via

[10] The former follows by (6) and the latter is follows because $\mu_t(1-\mu_t)$ has a maximum value of $1/2$.

$G(\Delta(\mu_t))$ – we can write the approximate root of the difference equation in (12) as

$$\frac{d\mu_{t+1}}{d\mu_t} = 1 + r(\mu)g(\Delta)\Delta_\mu.$$

Consider now how this formalism applies to the dynamic analyses in Sections 4.2 and 5.1, respectively. With individual identities in Section 4.2, we have $\Delta_\mu < 0$, which implies $r(\mu) < 1$ and $\frac{d\mu_{t+1}}{d\mu_t} < 1$. This means that the dynamics are convergent, as illustrated in Figure 1a. With (strong enough) tribal identities in Section 5.1, we instead have $\Delta_\mu > 0$. This implies $r(\mu) > 1$ and $\frac{d\mu_{t+1}}{d\mu_t} > 1$ and divergent dynamics, as in Figure 1b.

B Commitment and Longer Time-Horizon

In this section, we elaborate on the discussion about short horizons and the lack of commitment at the end of Section 4 in the text.

A long-term objective To explore this, we express the period-t reduced-form payoff as a function $\widetilde{\Pi}(\mu_t, d^t(\theta_t))$ of μ_t culture (the single state variable), and $d^t(\theta_t)$ the state-dependent "policy function" which determines the extent of decentralization in each period. Now use equation (3) to write $\mu_{t+1} = \tau(\mu_t, d^{t+1}(\theta_{t+1}))$. We can iterate this map $\mu_{t+1} = \tau\left(\tau\left(\mu_{t-1}, d^t(\theta_t)\right), d^{t+1}(\theta_{t+1})\right)$ to write $\mu_t = \tilde{T}(\mu_0, \mathbf{d}_{t+1})$ as a function of μ_0, its initial value, and $\mathbf{d}_{t+1}$ the policy function up to $t+1$. (Note that the horizon beyond $t+1$ does not affect the outcome given our specification for cultural transmission.) Now write the expected discounted payoff given a sequence of decentralization choices and an initial condition, μ_0 as:

$$W\left(\left\{d^t(\theta_t)\right\}_{t=0}^{\infty}, \mu_0\right) = \sum_{t=0}^{\infty} \phi^t \widetilde{\Pi}(\tilde{T}(\mu_0, \mathbf{d}_{t+1}), d^t(\theta_t)), \tag{13}$$

where $\phi \leq 1$ is a discount factor.

The equilibrium of our baseline model maximizes (13) subject to a no-commitment assumption – i.e., taking the decisions of all future leaders as given. Since managers have a one-period horizon, the choice of d_t does not affect cultural transmission – i.e., d_t does not affect Δ_{t+1} which depends on $d(\theta_{t+1})$ and influences the cultural evolution process according to (3). Without commitment, we thus get the model's equilibrium even if leaders

have an infinite horizon.[11] It follows that it is not the absence of a longer time horizon that drives our results.

A (hypothetical) commitment solution Suppose that the $t = 0$ leader could commit herself to a sequence of policy rules for every future period. The optimal sequence of decisions is given by

$$\hat{d}^t(\theta_t) \in \arg \max_{d^t(\theta_t)\in[0,1]} \left\{ W\left(\left\{ d^t\left(\theta_t\right) \right\}_{t=0}^{\infty}, \mu_0 \right) \right\}. \tag{14}$$

In general, this differs from the model equilibrium for two reasons: (i) it allows for a time-dependent policy rule and (ii) with commitment, it can anticipate the impact of $d^{t+1}\left(\theta_{t+1}\right)$ on cultural evolution.

To illustrate, a leader who wishes to may now commit herself to state-independent centralization, $\hat{d}^t\left(\theta_t\right) = 0$ for any θ_t to initiate a transition towards the culture that is best for the organization. To see this note that $\hat{d}^t\left(\theta_t\right) = 0$ implies $\Delta_{t+1} = u\left[2\beta - 1\right]$ and that $\beta \gtreqless 1/2$ determines what is the best long-run culture. This kind of commitment will be attractive if foregoing the short-run benefits from decentralization are offset by the long-run gains in aligning the culture with long-run optimal payoff. This is more likely if discount factor ϕ is close to 1.

C Endogenous Effort

In this section, we consider what happens if we extend the model such that managers put in effort, as mentioned in Section 7 of the text.

A simple model of effort We rely on the simple presumption that workers who are intrinsically motivated put in more effort and that they are happier if they get to work on projects in line with their identity, or when they get feedback from a charismatic leader.

To capture this idea in the simplest possible way, suppose that junior managers out in effort in division ω given by $e = e(\omega, \theta)$. the payoff at the

[11] Short horizons among the managers do play a role, however. If each generation of managers were to internalize the payoffs of group members, not only in their own generation but also in future generations of managers, strategic concerns among leaders may reappear.

firm level is now As effort and project choices are non-verifiable, no effort-contingent contracts are possible. Effort has a private cost $\psi(e)$,which is increasing and convex with $\psi(\underline{e}) = 0$. The payoff of a junior manager is now $e(\omega, \theta)v(\omega, \theta, \tau)$, where $v(\omega, \theta, \tau)$ is the payoff of the senior manager they work with.

We assume that junior managers decide on effort *after* learning state θ but *before* learning which senior manager they will be matched with – that is, effort is chosen at stage 3 in the timing spelled out at the end of Section 3 in the text.

Results Let $\chi(\theta, \xi, \mu)$ be the senior manager's expected payoff . Then, optimal junior manager effort will be:

$$e^*(\chi) = \arg\max_{e \in [\underline{e}, \bar{e}]} \{\chi e - \psi(e)\}, \tag{15}$$

where $e^*(\chi)$ is increasing in $\chi = \chi(\theta, \xi, \mu)$. Under the assumed timing, all junior managers choose the same level of effort with the payoffs at the firm level being $e^*(\chi(\theta, \xi, \mu))\,\Pi(d, D(\theta))$. We now have:

Proposition A.1 *Junior managers exert higher effort when* (a) *manager and leader interests are strongly aligned* $\mu = 1-\theta$, (b) *collective identities* ξ *are stronger,* (c) *the organization has a charismatic leader* $\kappa > u$.

Proof. To see why (a) and (b) are true, note that

$$\chi(\theta, \xi, \mu) = \begin{cases} [(1+\xi\mu)\mu + (1-\delta(\mu))(1-\mu)(1+\xi(1-\mu))]\,u & \text{if } \theta = 0 \\ [(1+\xi(1-\mu))(1-\mu) + \mu(1-\delta(1-\mu))(1+\xi\mu)]\,u & \text{if } \theta = 1. \end{cases}$$

is the expected payoff from working for a for a senior manager. Clearly, χ is maximal for $\mu = 1$ ($\mu = 0$) when $\theta = 0$ ($\theta = 1$). Moreover χ is increasing in ξ which ever the state. To see why (c) is true, note that with a charismatic leader $\chi(\theta, \xi)$ becomes:

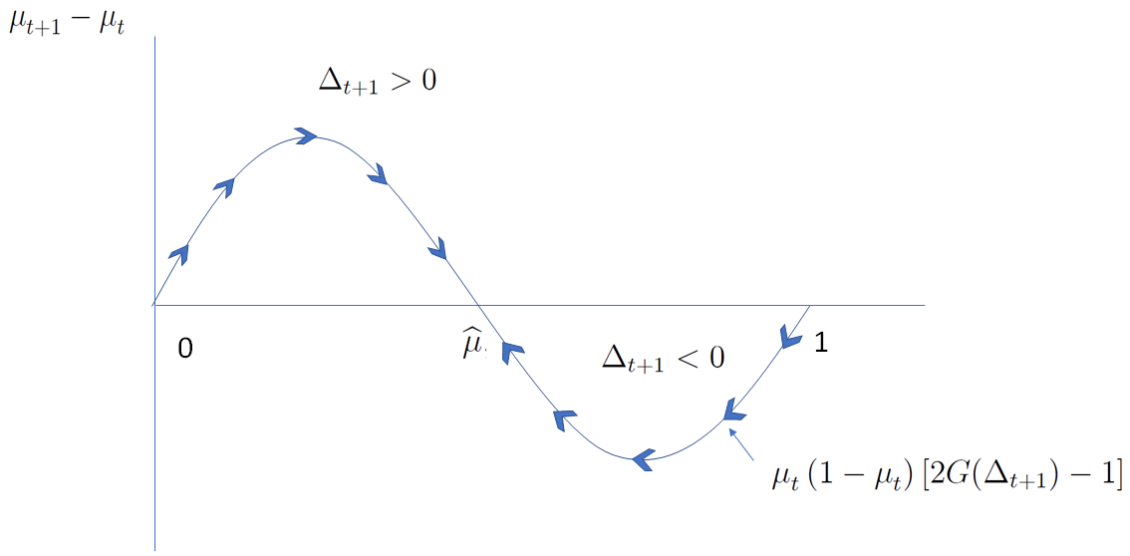
$$\chi(\theta, \xi, \mu) = \begin{cases} (1+\xi\mu)\mu(\kappa+u) + (1-\mu)(1+\xi(1-\mu))\kappa & \text{if } \theta = 0 \\ (1+\xi(1-\mu))(1-\mu)(\kappa+u) + \mu(1+\xi\mu)\kappa & \text{if } \theta = 1, \end{cases}$$

where κ basically takes the place of u. Since $\kappa > u$, effort is unambiguously higher in this case. ■

Effort will also affect firm payoffs, which will be reflected in the static analysis, as well as along the dynamic path. In particular, endogenous effort will affect organizational performance as μ changes. Analyzing this will yield additional insights, but we do not pursue such an analysis here.

Figure 1 Alternative Cultural Dynamics

Panel a Dynamics with individual identities



Panel b Dynamics with tribal identities