Conformity and Leadership in Organizations

Shunsuke Matsuno*

June 25, 2025

Abstract

Some organizations are characterized by a conformity culture, where followers are expected to conform to the leadership's behavior. In contrast, other organizations exhibit an anticonformity culture. What drives the variation in conformity culture across organizations? This paper develops a model of leadership and (anti)conformity culture in organizations with dispersed information. The optimal culture trades off coordination gains against informational losses. I show that with strategic complementarity, conformity is optimal; whereas with strategic substitutability, anticonformity is optimal. By showing how culture coordinates agents in organizations with dispersed knowledge–much like the price system coordinates agents in decentralized markets (Hayek, 1945)–I contribute to the theory of organizations centered on corporate culture (Kreps, 1990). Comparative statics of optimal culture sheds light on the origins of cultural variation across organizations from an informational perspective.

Keywords: Leadership, Corporate Culture, Conformity, Coordination Games
JEL Classification: D23, D82, M14, M21

*Columbia Business School (email: `SMatsuno26@gsb.columbia.edu`). For helpful comments and discussions, I thank Tyler Atanasov (discussant), Li Azinovic-Yang, Tim Baldenius, Wei Cai, Jon Glover, Ilan Guttman, Jacopo Perego, Sang Wu, Ran Zhao (discussant), and participants at the Columbia Accounting Theory Conference. I gratefully acknowledge financial support from Columbia Business School, the Bernstein Center for Leadership and Ethics, and the Nakajima Foundation. This paper received the 2024 Kanematsu Prize from the Research Institute for Economics and Business Administration, Kobe University.

"We are half ruined by conformity; but we should be wholly ruined without it."

— Charles Dudley Warner

1 Introduction

Corporate culture is a key driver of organizational behavior and outcomes. A growing body of research in economics, finance, and accounting studies how corporate cultural traits affect economic outcomes; studies have shown that corporate culture affects firm performance (Edmans, 2011; Guiso, Sapienza and Zingales, 2015), corporate misconduct (Liu, 2016), and financial reporting risk (Davidson, Dey and Smith, 2015; Bhandari et al., 2022). Although these findings underscore the economic significance of corporate culture, fundamental questions remain: how does corporate culture create value, what determines the formation and persistence of distinctive cultures, and why do they vary widely across organizations?

To address these questions, I isolate a single dimension for analysis, given the multidimensional nature of culture. Specifically, I focus on *conformity*–the degree to which agents in an organization are expected to conform to established norms and directives. In companies with a high degree of conformity, employees are expected to follow leadership's directions and adhere to organizational norms. Conversely, some corporate cultures encourage employees to challenge leaders and organizational norms ("anticonformity"). The notion of conformity itself is also multifaceted, depending on who/what agents in an organization conform to. In this paper, I specifically consider leadership as a reference point for (anti)conformity. The role of leadership in shaping these cultural dynamics is palpable: leaders not only set the tone for expected behavior but also serve as role models whose actions are referenced by followers.

Hayek (1945) convincingly argues that the price system serves as a mechanism to coordinate agents in decentralized markets with dispersed information. Explicit prices, however, are scarce inside an organization. My contribution is to present a mechanism by which culture serves as an alternative solution. Kreps (1990), and more recently Gorton and Zentefis (2024), discuss how corporate culture is foundational for constructing the theory of the firm. I aim to make progress on this front by analyzing a model of an organization characterized by culture and dispersed information.

In my model, the organization is led by a leader and faces a coordination problem among a continuum of followers; following Angeletos and Pavan (2007), payoffs are quadratic and information is Gaussian. Each follower performs a productive task that may exhibit strategic complementarity or substitutability. The followers and the leader face an uncertain state that determines payoffs of actions. The leader privately observes an informative signal about the state and moves first. The leader thus plays two roles: she provides information to the followers and coordinates their actions. The followers observe the leader's action and their private signals and choose their actions to maximize their payoffs. The leader's objective may not be perfectly aligned with the organization's.

To put the stylized model into context, consider a team of engineers developing a new product. They face uncertainty about which product will succeed. A lead engineer proposes an initial concept, based on which the team members also contribute their ideas. The optimal product corresponds to the state in the model. The product development process may exhibit strategic complementarity or substitutability. On the one hand, the team may efficiently develop a product by collaborating rather than by working independently (complementarity). On the other, the team may benefit from diversifying its efforts and trying different approaches (substitutability).[1]

I model conformity (anticonformity) culture through nonpecuniary costs (benefits) that followers incur when they take actions that are different from the leader's. The organization is characterized by a conformity parameter, which captures how much followers incur such costs or benefits by deviating from the leader's action. The degree of conformity affects equilibrium behavior of the followers and the leader. When the organization exhibits a high degree of conformity, the followers naturally tend to imitate the leader's action. In contrast, when the organization is characterized by a high degree of anticonformity, the followers react to the leader by taking actions that are different from the leader's. The leader, understanding the followers' incentives, determines her action. The primary goal of this paper is to characterize an optimal level of conformity that maximizes the organization's performance.

How can a conformity culture help the organization? First, I show that introducing a nonzero level of conformity culture helps eliminate an inefficient pooling equilibrium, wherein the leader's action does not convey any information to the followers. The biased leader has too much incentive to deceive the followers under a neutral culture. Under a nonzero level of conformity culture, the followers mimic the leader's action from the conformity motive; this makes it costly for the leader

[1] As another example of strategic substitutability, consider academic research. A university would like its researchers to produce high-quality research outputs. The university may benefit more if the researchers work on different topics and excel in distinct fields–certainly, no university would want all its researchers focused on the same topic.

to deceive the followers through her actions, because the biased leader's interest is still aligned with the organization's performance to some extent.

Second, since there is an externality in the followers' actions, the organization suffers from an inefficiency due to miscoordination (Angeletos and Pavan, 2007). Thus, there is room for a culture to improve the organization's performance by mitigating the miscoordination problem. Yet, whether the use of conformity culture could actually improve the organization's performance is not trivial. Once a positive level of conformity culture is introduced, the followers increasingly mimic the leader's action to avoid the cost of not conforming. This is beneficial for coordination. However, there are also equilibrium consequences of conformity: the followers' actions are more driven by the leader's action, making it easier to predict others' actions. As a result, the followers coordinate less.

In addition to this adverse coordination effect, a positive level of conformity might suppress the followers' valuable private information. In the extreme case where the cost of not conforming to the leader is prohibitively high, the followers entirely disregard their own information; the leader's action and culture solely dictate the followers' actions. This could be particularly problematic when the followers possess superior information compared to the leader.

Nevertheless, I show that (anti)conformity culture is always valuable. For a small level of conformity, the direct benefit to coordination always dominates the negative effect on coordination and the informational loss. The balance between these opposing effects determines a unique level of optimal culture. The nature of tasks dictates whether conformity or anticonformity culture prevails: a conformity culture is optimal when there is strategic complementarity, whereas an anticonformity culture is optimal when there is strategic substitutability. This is because a conformity (anticonformity) culture mitigates the under-coordination (over-coordination) problem.

Indeed, the optimal culture achieves constraint efficiency–the followers behave as if they commit to the efficient degree of coordination. This is the sense in which culture can substitute for the price system in coordinating agents under dispersed information Hayek (1945). In modern organizations with many agents, direct coordination is infeasible. Eliciting all relevant information from other members is impractical. Nor is it feasible to write contracts that account for every contingency. This paper shows that an agent who understands the organization's culture need not worry about any of these.

The comparative statics of the optimal culture sheds light on the origins of cultural variation across organizations from an informational perspective. Under strategic complementarity, the optimal level of conformity is higher when the leader's information is more precise than the followers'.

Pioneering social psychology research argues that individuals exhibit conformity under high uncertainty (Sherif, 1935; Deutsch and Gerard, 1955). My findings formalize this idea within the context of a coordination game. When there is strategic complementarity, a higher degree of conformity culture is desirable when followers have less information, because the under-coordination problem is more severe. Moreover, my analysis highlights that the relationship between conformity and uncertainty depends on the nature of tasks. In settings characterized by strategic substitutability, greater uncertainty among followers instead fosters *anti*conformity. To the best of my knowledge, this perspective is absent from the social psychology literature on conformity.

Having established the optimal culture, I turn to the fundamental questions of how and why it might emerge and persist. In my model, culture is an exogenous parameter. This approach helps clarify how culture creates value but does not explain the process by which culture is formed and evolves within organizations. While fully endogenizing culture is beyond the scope of this paper, I address this issue within the model's context in two ways.

First, for a culture to emerge and persist, its members must be willing to agree and adhere to it (Hermalin, 2012). The optimal culture is defined as one that maximizes organizational performance. However, it is not immediately clear whether the followers individually benefit from such a culture. In particular, when there is a positive level of conformity, the followers accept a "punishment" by deviating from the leader's action. Why do they accept such an arrangement? I identify a condition under which the followers are ex-ante better off under the optimal culture. Specifically, the need for coordination (the degree of strategic complementarity) and the leader's informational advantage should be sufficiently high. Sometimes, a little bit of pressure helps keep everyone on the same page.

Second, a culture's persistence depends not only on the consent of its members but also on its ability to function effectively as environments change. Corporate culture is persistent and difficult to change in the short run (Schwartz and Davis, 1981). How, then, can a fixed culture remain effective in the face of uncertainty? I extend the baseline model to derive a *robust culture*–one that maximizes organizational performance under uncertain environments. A key step in analyzing this problem is to derive the *value of information*–how much the organization benefits from increasing the precisions of the leader's and followers' signals. I demonstrate how a conformity culture affects the value of information in equilibrium. The analysis reveals that the robust culture is "conservative," optimized as if the organization had the least information possible.

Before I conclude the paper, I consider two extensions of the baseline model. First, I consider the possibility that coordination has only private value and does not benefit the organization. In the main analysis, I focus on the case where coordination affects the organization's performance. This seems to be a natural assumption in organizations that perform productive tasks. That said, it may also be plausible that followers try to guess others' actions, even though doing so does not contribute to the organization's performance. For example, consider a financial institution where individual traders are responsible for making trading decisions. Traders may believe that the market is driven by the investment decisions of other traders, much like Keynes's classic beauty contest. Alternatively, they may believe that they can "stand out" in the firm by making a unique investment that is different from others. Either way, such externalities may be purely private and wasteful to the organization.[2]

Second, I consider a more general specification of the leader's objective. In the baseline specification, even though the leader's preference can be misaligned with the organization's, the optimal level of conformity culture does not depend on the bias. In a more general specification, I show how the leader's bias restricts the value of conformity.

I discuss the related studies in Section 6. All proofs are relegated to the Appendix.

2 Model of Organization with Dispersed Information

2.1 Setup of the Model

As a model of an organization that engages in productive activities, I consider a stylized coordination game (Morris and Shin, 2002; Angeletos and Pavan, 2007). There is a continuum of followers ("he") and one leader ("she"). The leader privately observes a signal and moves first. The followers, upon observing the leader's action and their private signals, perform a task ("action"). The organization's profit depends on an unknown environment ("state"). The signals that the leader and followers receive are about this state. The organization's task may exhibit strategic complementarity or substitutability.

[2] As another example, consider a research community. Researchers wish to write a paper that discovers a new idea (i.e., close to the unknown state variable). At the same time, they may engage in beauty contests, where they try to write a paper on a topic that is popular among other researchers, possibly because they believe that such papers are more likely to be published. Once a paper is written and knowledge is disseminated, the publication outcome would be less important, if not irrelevant, for welfare.

In the analyses below, I often need to integrate over the followers' indices to compute an aggregate variable. As long as there is no risk of confusion, for a variable x indexed by i, I use the convention $\int x_i := \int_{[0,1]} x_i di$ to avoid cluttered notation.

Followers

The organization is populated with a continuum of followers with a unit mass, each indexed by $i \in [0, 1]$. Each follower i chooses an action $k_i \in \mathbb{R}$. The return π_i of the action k_i is given by

$$\pi_i = -(k_i - A)^2, \quad A = (1-\alpha)\theta + \alpha K,$$

where A is the action that maximizes the return. I call A the *best action*. The best action is a convex combination of an unknown state θ and the aggregate action level $K = \int k_i$. The state θ has a diffuse prior. All results extend to a non-diffuse Gaussian prior at the cost of slightly more complicated expressions.

The parameter $\alpha \in (-1, 1) \setminus \{0\}$ captures the degree of strategic complementarity ($\alpha > 0$) or substitutability ($\alpha < 0$). I impose the lower and upper bounds on α to ensure the existence of equilibrium. I exclude the trivial case $\alpha = 0$ for the sake of exposition. When there is strategic complementarity (substitutability), the return of an action is higher when it is closer to (farther from) the aggregate action. I use $\Pi = \int \pi_i$ to denote the aggregate return of the organization and call it the *fundamentals*.

The organization is characterized by a conformity parameter $\beta \in \mathbb{R}$. Follower i's payoff is given by

$$u_i = \pi_i - \beta(k_i - k_L)^2, \tag{1}$$

where $k_L \in \mathbb{R}$ is the leader's action. The parameter β captures the degree of (anti)conformity. When $\beta > 0$, followers incur a nonpecuniary disutility when they deviate from the leader's action ("conformity culture"). In contrast, when $\beta < 0$, followers enjoy a nonpecuniary benefit from taking an action that is different from the leader's ("anticonformity culture"). When $\beta = 0$, the followers care only about the direct return π_i ("neutral culture").[3] I interpret π_i as the monetary profits that follower i's action generates and $\beta(k_i - k_L)^2$ as a nonmonetary utility. The main goal of this paper is to characterize the conformity parameter β that maximizes the fundamentals Π.

[3] Social psychologists often use the term "independence" as a middle ground between conformity and anticonformity (Levine and Hogg, 2010). I avoid this term to avoid confusion; the followers' actions have an externality, so they care about others' actions even with $\beta = 0$, contrary to what the term independence might suggest.

The followers privately observe a signal $s_i = \theta + \varepsilon_i$, where ε_i follows the normal distribution $\mathcal{N}(0, \tau_F^{-1})$ with precision $\tau_F > 0$ and is independent across followers. The followers simultaneously choose their actions after observing the leader's action k_L, which is publicly observed, and their private information s_i to maximize $\mathbb{E}_i u_i$, where $\mathbb{E}_i$ is the expectation operator conditional on s_i and k_L.

Leader

The organization has a leader, who moves before the followers. Before the leader takes an action, she observes a private signal $s_L = \theta + \varepsilon_L$, where ε_L follows the normal distribution $\mathcal{N}(0, \tau_L^{-1})$ with precision $\tau_L > 0$. The leader would like the followers to take actions that are close to the best action, but I allow for the possibility that her incentive is not completely aligned with the organization's objective. In particular, the leader maximizes the following payoff:

$$u_L = -\int (k_i - A - b)^2, \tag{2}$$

where $b \geq 0$ denotes the bias of the leader. When $b = 0$, the leader's objective is aligned with the organization's objective, i.e., $u_L = \Pi$. When $b > 0$, the leader's preferred actions of the followers are inflated by b from A. One possible interpretation of such bias is the empire-building incentive, where the leader wants the followers' action levels to be higher. The leader's bias may pose a challenge to the value of conformity culture: when the degree of conformity is high, the followers may follow the leader's biased action, which may not be optimal for the organization.

A few remarks are in order regarding the leader's objective. First, the restriction of b being nonnegative is for the sake of exposition, and the model can be extended to allow b to be negative. Second, the leader is measure zero, so the leader's action k_L does not directly affect the aggregate return Π. However, the leader's action affects the followers' actions, which in turn affect the fundamentals. Third, the way I model the leader's bias is intentionally chosen to simplify the analysis and to delineate the role of conformity culture. In Section 5.2, I explore a more general specification of the leader's objective and discuss how the leader's bias affects the value of conformity.

Timeline To summarize, the timeline of the model is as follows.

1. The state realizes.
2. The leader privately observes the signal s_L and publicly chooses k_L to maximize $\mathbb{E}[u_L \mid s_L]$.

3. Each follower i observes the leader's action k_L and privately observes the signal s_i.
4. The followers simultaneously choose their actions k_i to maximize $\mathbb{E}_i u_i$.

The solution concept I employ is perfect Bayesian equilibrium.

2.2 Discussion of the Model

Interpretation of β

In the model, "corporate culture" is characterized by the degree of nonpecuniary benefit/cost that a follower incurs by deviating from the leader's action. I call it nonpecuniary (or nonmonetary) benefit/cost in order to highlight the fact that it is not a monetary transfer made from the profits of the organization. Alternatively, one may call this "intrinsic motives" (Kreps, 1997), as opposed to extrinsic incentives. Indeed, social psychology research has long recognized the tendency of individuals to conform to social norms as well as the existence of anticonformity (Myers, 2009). Since the nonpecuniary benefit/cost is embedded in the followers' utility function rather than endogenously determined, the modeling approach is similar to that of Akerlof and Kranton (2000, 2005), who argue for the importance of nonmonetary incentives in organizations.

There are several interpretations of how an (anti)conformity culture operates in my model. For example, the follower may fear that the leader will "punish" him–say, by treating him poorly–if he deviates from the leader's action.[4] Such implicit punishment may be carried out by other followers as well. If a follower does not conform to the organization's norm, his peers may treat him poorly. Even if the leader or other followers do not seek to punish a deviator in any form, the follower may experience a sense of guilt or shame by not listening to the organization's culture. Conversely, a follower may feel a sense of pride or satisfaction from deviating from the leader's action.

In this paper, I am agnostic about how corporate culture emerges. Rather, I treat it as an exogenous parameter and analyze the optimal level of such culture. For example, if one adopts the view that the leader actively punishes or rewards followers who do not conform, it is natural to think that the leader sets β.[5] Even if the leader does not explicitly set culture, the leader's personal

[4] Alternatively, the organization can employ followers who are aligned with the culture (Prendergast, 2008; Campbell, 2012). For example, Cai (2023) empirically shows that introducing a formal culture-fit measurement system helps instill a desired culture among followers.

[5] In the main model, if the leader's bias b is zero, then this interpretation can be formalized: if the leader publicly sets β at the start of the game, then the leader chooses the optimal degree of conformity identified in the analysis.

traits can translate to culture (Benmelech and Frydman, 2015). Alternatively, if the nonpecuniary costs/benefits arise from a sense of organizational norms, then such norms can be viewed as something that naturally emerges over time. This perspective aligns with Schein (2016) who defines culture as accumulated social learning.

Leadership

In my model, there is one agent called the "leader." Why is this agent called such? There are two main reasons. First, the agent moves first. All the followers observe her action and learn from it. From this perspective, the model relates to the theory of "leading-by-example" (Hermalin, 1998). Second, and related, the agent's action is a focal point of the conformity culture. The followers' tendency to carefully observe the agent's action and base their actions on it allows one to call the agent a leader.

Of course, one could define conformity without a leader; conformity to the average behavior of others, conformity to some exogenous norm, etc. I focus on the notion of (anti)conformity in relation to leadership in this paper. This approach enables me to analyze the interaction between leadership and culture, a topic that is interesting in its own right (Hermalin, 2012; Grennan and Li, 2023).

3 The Role of Conformity

The goal of this section is to derive the optimal level of conformity in the organization. First, I demonstrate that the organization faces a coordination problem under the neutral culture ($\beta = 0$). The properties of the model under the neutral culture are now well-understood in the literature, but I summarize the results in the context of my model. This case serves as a benchmark case for the later analysis. Second, I derive the equilibrium strategies of the followers and the leader. Third, I characterize the optimal level of conformity and discuss its comparative statics.

3.1 Miscoordination Problem under the Neutral Culture

Consider the case of neutral culture $\beta = 0$, where followers do not care about conforming to or deviating from the leader's action. To illustrate the issue of coordination, assume further that s_L is publicly observed. In this case, the model reduces to a standard coordination game. In particular, the equilibrium action is the one described in Morris and Shin (2002):[6]

$$k_i = w_F^0 s_i + w_L^0 s_L, \quad w_F^0 = \frac{(1-\alpha)\tau_F}{(1-\alpha)\tau_F + \tau_L}, w_L^0 = 1 - w_F^0. \tag{3}$$

Follower i's action is a convex combination of his private signal s_i and the leader's signal s_L. Reflecting the strategic interaction among followers, the weight w_F^0 diverges from the "Bayesian weight," $\tau_F/(\tau_F+\tau_L)$. When there is strategic complementarity ($\alpha > 0$), the followers put more weight on the leader's signal than the Bayesian weight, as they want to coordinate on similar action levels. In contrast, when there is strategic substitutability ($\alpha < 0$), the followers put less weight on the leader's signal, as they want to avoid taking similar actions.

To understand the inefficiency in the organization, following Angeletos and Pavan (2007), define the *efficient degree of coordination* to be the weights (w_F^{FB}, w_L^{FB}) on the private and leader's signals that maximize the fundamentals Π:[7]

$$(w_F^{FB}, w_L^{FB}) := \underset{(w_F, w_L)}{\arg\max} -\mathbb{E}\left[\int (w_F s_i + w_L s_L - A)^2\right]. \tag{4}$$

That is, the weights (w_F^{FB}, w_L^{FB}) achieve the constrained efficient allocation under the incomplete information. The solution to the problem (4) is

$$w_F^{FB} = \frac{(1-\alpha)^2\tau_F}{(1-\alpha)^2\tau_F + \tau_L}, \quad w_L^{FB} = 1 - w_F^{FB}.$$

Say that there is an *under-coordination* (*over-coordination*) problem when the follower's equilibrium weight on the leader's signal is lower (higher) than w_L^{FB}. Since $w_L^0 < w_L^{FB}$ when $\alpha > 0$ and $w_L^0 > w_L^{FB}$ when $\alpha < 0$, the nature of the coordination problem depends on the strategic nature of tasks. The following lemma summarizes this observation and serves as a benchmark to understand the role of corporate culture:

Lemma 1. *Suppose that the leader's signal is publicly observed by the followers. Under the neutral culture ($\beta = 0$), the organization faces an under-coordination problem when there is strategic complementarity ($\alpha > 0$) and an over-coordination problem when there is strategic substitutability*

[6]The existence and uniqueness of the linear equilibrium are discussed later for my main model (Proposition 2), which incorporates this case as a special case.

[7]The terminology here is slightly different from Angeletos and Pavan (2007). They define the optimal degree of coordination as the agents' perceived parameter value of α, under which the fundamentals are maximized.

($\alpha < 0$).

The lemma implies that there is room for improvement in the organization's performance by changing the followers' behavior.

Remark 1. Even though the equilibrium in the above scenario mirrors that in Morris and Shin (2002), their specification of fundamentals ("welfare" in their paper) is different from mine. In my specification, coordination enters the fundamentals. This feature appears in other studies as well, most notably the "investment complementarity model" of Angeletos and Pavan (2004). My current specification is the most tractable I know of for delivering the economic intuition of this paper. Hellwig and Veldkamp (2009) use this specification to study information acquisitions in coordination games, though they abstract from welfare considerations.

3.2 Equilibrium

Signaling Equilibrium

The leader chooses her action after observing a private signal s_L, so the game belongs to the class of signaling games. As is well known, there are potentially multiple equilibria in such games (Cho and Kreps, 1987). I restrict attention to two types of signaling equilibria: fully separating equilibria (FRE) and pooling equilibria. I make this assumption for two reasons. First, these equilibria are the two extreme cases in terms of information transmission. They are arguably more "plausible" than the intermediate cases and serve to highlight the economic intuition more clearly. Second, from a technical standpoint, semi-separating equilibria present substantial complications: the followers' best response becomes nonlinear in both signal realizations and the leader's actions. I elaborate on the latter point in the Appendix (Remark A.1).

Given this restriction to either fully revealing or pooling equilibria, without loss, I work with pure strategies.[8]

Follower's Equilibrium Strategy

I derive the followers' equilibrium strategies given the leader's equilibrium strategy $\kappa : \mathbb{R} \to \mathbb{R}$, which maps s_L to $\kappa(s_L)$. Note that κ is either a bijection (FRE) or a constant function (pooling

[8]By definition, in an FRE, the leader does not randomize. In a pooling equilibrium, the leader's (possibly mixed) strategy affects the fundamentals only when $\beta \neq 0$, in which case a pooling equilibrium does not exist (Proposition 3).

equilibrium). In an FRE, the leader's action serves as a "public signal." In a pooling equilibrium, the leader's action does not convey any information about the state, but the followers still have the incentive to respond to the leader when the culture is not neutral ($\beta \neq 0$).

More specifically, from (1), follower i's best response given K is

$$k_i = \frac{1}{1+\beta}\mathbb{E}[A \mid s_i, k_L = \kappa(s_L)] + \frac{\beta}{1+\beta}k_L. \tag{5}$$

This is an affine combination of the expectation of the best action and the leader's action. The weight on the leader's action is increasing in the conformity parameter β. Naturally, when $\beta > 0$ becomes larger, the followers' actions converge to the leader's action. Therefore, a positive level of conformity helps coordination. A high level of conformity, however, may harm the fundamentals, because the followers utilize less of their valuable information. In an extreme case, the followers simply mimic the leader's behavior when $\beta \to \infty$. An analogous argument applies under strategic substitutability. Anticonformity not only encourages diversification, but also makes the leader less influential.

The expression (5) does not represent an equilibrium strategy, as the right-hand side depends on A, which in turn depends on $\{k_i\}$. In principle, the equilibrium depends on the higher-order beliefs and thus is potentially complicated. However, as in Morris and Shin (2002), the equilibrium takes a simple linear form. To state the result, define the higher-order expectations recursively: $\bar{\mathbb{E}}^n := \int \mathbb{E}_j \bar{\mathbb{E}}^{n-1}$ for $n \geq 1$ and $\bar{\mathbb{E}}^0 := \theta$. The following result characterizes the followers' equilibrium strategies:

Proposition 1. *Fix the leader's equilibrium strategy κ. Assume the non-explosive higher-order belief condition: $\lim_{n\to\infty}\left(\frac{\alpha}{1+\beta}\right)^n \mathbb{E}_i[\bar{\mathbb{E}}^n[K]] = 0$. Assume further that $|\alpha/(1+\beta)| < 1$. The followers' equilibrium strategy is unique and linear in s_i and k_L and takes the following form on the equilibrium path:*

$$k_i = \frac{1-\alpha}{1-\alpha+\beta}\sum_{n=0}^{\infty}(1-\alpha+\beta)\left(\frac{\alpha}{1+\beta}\right)^n \mathbb{E}_i[\bar{\mathbb{E}}^n[\theta]] + \frac{\beta}{1-\alpha+\beta}k_L. \tag{6}$$

Furthermore,

1 *If κ is an FRE, then (6) reduces to*

$$k_i = \frac{1-\alpha}{1-\alpha+\beta}\left[w_F^\beta s_i + w_L^\beta \mathbb{E}[s_L \mid k_L]\right] + \frac{\beta}{1-\alpha+\beta}k_L, \tag{7}$$

where $w_F^\beta = \frac{(1-\alpha+\beta)\tau_F}{(1-\alpha+\beta)\tau_F+(1+\beta)\tau_L}$ and $w_L^\beta = 1 - w_F^\beta$.

2 *If κ is a pooling equilibrium, then* (6) *reduces to*

$$k_i = \frac{1-\alpha}{1-\alpha+\beta}\mathbb{E}[\theta \mid s_i] + \frac{\beta}{1-\alpha+\beta}k_L. \tag{8}$$

Proposition 1 generalizes the result of Morris and Shin (2002) to the case with the conformity parameter β. The equilibrium action (6) is an affine combination of the higher-order expectation term and the leader's action. Note that the proposition asserts nothing about the existence (or uniqueness) of FRE or pooling equilibrium. Rather, it characterizes the followers' equilibrium when FRE or pooling equilibrium happens to exist. I impose $|\alpha/(1+\beta)| < 1$ to guarantee the existence of the equilibrium. This assumption will be maintained throughout the paper. The proposition requires one mild restriction on the behavior of higher-order expectation (non-explosive higher-order belief). I relegate the discussion of this point and related issues to Remark 2 and move on to discuss the expressions (7) and (8).

Consider the FRE case. In an FRE, the leader's action reveals her private signal, so $\mathbb{E}[s_L \mid k_L] = s_L$. Define $\tilde{\mathbb{E}}^{\alpha,\beta}\theta := w_F^\beta s_i + w_L^\beta s_L$, which is the "modified posterior expectation" of the state.[9] It is an affine combination of the follower's signal and the leader's signal, where the weights w_F^β and w_L^β depend on the conformity parameter β, in addition to α. The expression (7) is, in turn, an affine combination of $\tilde{\mathbb{E}}^{\alpha,\beta}$ and k_L. Compare $\tilde{\mathbb{E}}^{\alpha,\beta}\theta$ to the Morris-Shin benchmark (3). If $\beta = 0$ in (7), then the two expressions (3) and (7) coincide. The expression (7) clarifies that the leader's action plays two roles in an FRE: it serves an informational role, reflected by $s_L = \mathbb{E}[s_L \mid k_L]$ inside $\tilde{\mathbb{E}}^{\alpha,\beta}$, and a coordination role, reflected by the last term. Even if $\beta = 0$, the followers still put weight on the leader's signal because of the informational role.

The followers' best responses in a pooling equilibrium (8) take a similar form as the FRE case (7), but now $\tilde{\mathbb{E}}^{\alpha,\beta}\theta$ is replaced by $\mathbb{E}[\theta \mid s_i]$. In this equilibrium, the leader's action serves no informational role. The followers put a weight on the leader's action *only* because of conformity culture: when $\beta = 0$, the equilibrium action (8) is simply $k_i = \mathbb{E}[\theta \mid s_i]$. Even though the followers observe the leader's actions, they do not coordinate using the publicly observed leader's action under a neutral culture. If the followers were to put some weight on the leader's action, the fundamentals could be improved due to the reduced miscoordination problem. However, such coordination is not sustainable in equilibrium. Each follower benefits by unilaterally deviating to

[9]More precisely, the expectation operator $\tilde{\mathbb{E}}^{\alpha,\beta}$ is induced by modifying the precision of the follower's signal to $(1-\alpha+\beta)\tau_F$ and of the leader's signal to $(1+\beta)\tau_L$. Under this modified signal structure, follower i's posterior expectation is given by $\tilde{\mathbb{E}}^{\alpha,\beta}$, hence the name modified posterior expectation. See Huo and Pedroni (2020) for further discussion on the relationship between modifying signal structure and higher-order beliefs.

rely more on his private information.[10]

Remark 2. The non-explosive higher order belief condition is due to Dewan and Myatt (2008). Proposition 1 asserts that, for a fixed leader's strategy κ, a unique equilibrium strategy takes the form (6). Follower i's belief $\mathbb{E}_i[\theta]$ is a linear function of s_i and s_L for both the FRE case and the pooling cases.[11] Therefore, *the followers' equilibrium strategy is linear* in s_i and s_L.

Leader's Equilibrium Strategy

Having characterized the followers' equilibrium response to the leader's action, I now characterize the leader's equilibrium action. Recall that the leader's payoff is given by (2). The leader's action depends on whether the leader plays an FRE or a pooling equilibrium. The main focus of this paper is the FRE case, but I also discuss pooling equilibria because it illustrates how a conformity culture helps select an equilibrium (Kreps, 1990). A reader who wishes to skip the discussion of pooling equilibria can do so without loss of much continuity.

FRE Suppose that the leader plays an FRE. The leader chooses an action based on a conjectured followers' response, and the equilibrium condition requires that such conjecture matches (7). Let $k_i = c_F s_i + c_{L,sig}\mathbb{E}[s_L \mid k_L] + c_{L,beta}k_L$ be the leader's conjecture about the followers' strategy. The leader's action affects the followers' actions through the signaling channel ($c_{L,sig}$) and the conformity channel ($c_{L,beta}$). Thus, the leader solves

$$\max_{k_L} -\mathbb{E}\left[\int ((c_F s_i + c_{L,sig}\mathbb{E}[s_L \mid \kappa^{-1}(k_L)] + c_{L,beta}k_L) - A - b)^2 \;\middle|\; s_L\right], \tag{9}$$

where κ is the leader's equilibrium strategy.[12]

Fixing the followers' beliefs, since (9) is concave in k_L, it is straightforward to show that κ is unique and linear. The first-order condition of the problem (9) is given by

$$\mathbb{E}\left[(1-\alpha)c_{L,beta}(k_L - \theta) - b \mid s_L\right] = 0.$$

[10]To see this, each follower's best response under $\beta = 0$ is $k_i = \mathbb{E}[A \mid s_i] = (1-\alpha)\mathbb{E}[\theta \mid s_i] + \alpha\mathbb{E}[K \mid s_i]$ from (5). If the followers were to put some weight on the leader's action in equilibrium, say $k_i = c_F s_i + c_L k_L$ with $c_L > 0$, then the aggregate action K also puts weight c_L on k_L. But each follower's best response would place weight $\alpha c_L < c_L$ on the leader's action, a contradiction.

[11]If κ is the pooling equilibrium, $\mathbb{E}_i[\theta]$ does not depend on s_L.

[12]To be precise, the followers' action is based on their conjecture about the leader's strategy, denoted by $\hat{\kappa}$. The equilibrium condition requires that the leader's best response coincide with the followers' conjecture.

Therefore, the leader's optimal action is

$$k_L = s_L + \frac{b}{(1-\alpha)c_{L,beta}} = s_L + \frac{1-\alpha+\beta}{\beta(1-\alpha)}b. \tag{10}$$

The leader's action equals her posterior expectation of the state ($\mathbb{E}[\theta \mid s_L] = s_L$) plus a constant bias term. As the bias b increases, the leader further inflates her action. When the leader is unbiased ($b = 0$), her action coincides exactly with her posterior expectation. To clarify, decompose the difference between follower i's action and the best action as $k_i - A = (1-\alpha)(k_i - \theta) + \alpha(k_i - K)$. The first term captures the loss due to deviation from the state, while the second term represents the loss (or gain, if $\alpha < 0$) arising from miscoordination. Since the leader's action is publicly observed, the deviation from the average action $k_i - K$ does not depend on k_L. Therefore, the leader's action influences outcomes only through the first term. The followers rely on their private signal s_i, but from the leader's perspective, the expectation of followers' signals equals her own signal: $\mathbb{E}[s_i \mid s_L] = s_L$. Hence, choosing $k_L = s_L$ minimizes the expected loss $(k_i - \theta)^2$. Introducing a bias $b > 0$ provides additional payoff for the leader when she inflates her action, which appears as the second term in (10).

From (10), it is evident that the FRE does not exist if $\beta = 0$ and $b > 0$. If the leader is biased ($b > 0$), then her incentive to deceive the followers is simply too high under the neutral culture ($\beta = 0$): in such a case, the leader's action is cheap talk. When the culture is not neutral ($\beta \neq 0$), the leader's action is disciplined by the possibility that the followers react to the leader's action *regardless of its information content.* The following proposition summarizes the above discussion:

Proposition 2. *An FRE exists if and only if $\beta \neq 0$ or $b = \beta = 0$. If an FRE exists, then the leader's equilibrium action is given by* (10).

Pooling Equilibrium In a pooling equilibrium, the followers react to the leader's action only because of a conformity culture (see (8)). Under the neutral culture $\beta = 0$, the leader's action is completely irrelevant to the followers. Therefore, for any leader's strategy, this constitutes an equilibrium. The converse is also true: if a pooling equilibrium exists, then the culture should be neutral. This is because, as I have discussed, under a non-neutral culture ($\beta \neq 0$), the followers put a nonzero weight on the leader's action, which does not contain any information. Therefore, some leader types always have an incentive to deviate from the pooling equilibrium and lead the followers to take actions that are preferable to the leader.

Proposition 3. *A pooling equilibrium exists if and only if $\beta = 0$. If a pooling equilibrium exists, then the leader's equilibrium action can take any value.*

There are many possible off-path beliefs that support the pooling equilibrium. Indeed, under a pooling equilibrium, the leader's incentive is solely shaped by the followers' conformity motive, so the specification of off-path beliefs is not crucial. See the proof of Proposition 3 in the Appendix for details.

FRE vs Pooling Equilibrium The idea that culture serves as an equilibrium selection device echoes the insight of Kreps (1990). Table 1 summarizes the conditions under which an FRE or a pooling equilibrium exists. If the leader is unbiased ($b = 0$), then both pooling and FRE are possible under the neutral culture. However, introducing a conformity culture ($\beta \neq 0$) eliminates pooling equilibria. In such settings, the followers care about the leader's action itself; the leader thus cannot help but adjust her action in a way that reveals some information.[13]

If the leader is biased ($b > 0$), then under the neutral culture ($\beta = 0$), the leader's information cannot be revealed in equilibrium due to the leader's strong incentive to deceive the followers. When the culture is not neutral ($\beta \neq 0$), the leader's action is disciplined by the followers' conformity motive, so the leader can fully reveal her information.

Table 1: Signaling Equilibria and Culture

	$\beta = 0$	$\beta \neq 0$
$b = 0$	Pooling, FRE	FRE
$b > 0$	Pooling	FRE

3.3 Optimal Level of Conformity

The main goal of this paper is to characterize the degree of conformity that maximizes the fundamentals. As Table 1 shows, the cases of $\beta = 0$ and $\beta \neq 0$ are fundamentally different, as the set of possible equilibria changes. Moreover, when the culture is neutral and the leader is unbiased ($\beta = b = 0$), there arises an issue of equilibrium selection. For these reasons, defining an "optimal" level of conformity is not straightforward. The following result shows that this is not an issue: a neutral culture can always be improved upon by a non-neutral culture as long as $\alpha \neq 0$.[14]

[13] The same logic likely extends to semi-separating equilibria. I conjecture that an FRE is the unique signaling equilibrium when $\beta \neq 0$. However, due to the difficulty in explicitly characterizing semi-separating equilibria (see Remark A.1), I am unable to formally establish this claim.

[14] I denote by $\Pi(\alpha, \beta)$ the fundamentals as a function of the parameters α and β.

Lemma 2. *Suppose that $\beta = 0$. In any equilibrium, there exists $\beta' \neq 0$ such that $\Pi(\alpha, 0) < \Pi(\alpha, \beta')$.*

Intuitively, under a pooling equilibrium, the followers do not learn the leader's valuable information. However, by introducing a small level of (anti)conformity culture, the leader's information is revealed to the followers. Such information helps the followers predict the state better and coordinate more effectively. If a pooling equilibrium is played at $\beta = 0$, such adjustments strictly improve the fundamentals. Note that, when the leader is unbiased ($b = 0$), even at $\beta = 0$, the leader's information can be fully revealed in equilibrium. Thus, the informational benefit described above does not arise. Nevertheless, it remains true that $\beta \neq 0$ improves on the neutral culture. This is because appropriate adjustments in β facilitate coordinating the followers' actions.

Given Lemma 2, I can restrict my attention to $\beta \neq 0$. In this case, I can assume that the leader plays a unique FRE.

Definition 1. The *optimal level of conformity*, denoted by β^*, is the value of β that maximizes the fundamentals:

$$\beta^* \in \arg\max_{\beta \neq 0} \Pi(\alpha, \beta).$$

With this definition, I now present the main result.

Theorem 1 (Optimal Culture)**.** *The optimal level of conformity β^* exists uniquely and is given by*

$$\beta^* = \frac{\alpha}{1-\alpha} \frac{\tau_L}{\tau_F + \tau_L}. \tag{11}$$

The optimal level of conformity is positive (negative) when there is strategic complementarity (substitutability).

Theorem 1 characterizes the optimal level of conformity. From (11), it is clear that $\mathrm{sgn}(\alpha) = \mathrm{sgn}(\beta^*)$–a conformity (anticonformity) culture is optimal when there is strategic complementarity (substitutability). A rough intuition is as follows: without conformity culture, the organization faces a miscoordination problem (Lemma 1). When there is an under-coordination problem ($\alpha > 0$), a positive level of conformity culture helps the followers coordinate more efficiently. Alternatively, anticonformity helps the over-coordination problem ($\alpha < 0$). However, this intuition does not explain how β affects the information role and coordination role of the leader's action. Moreover, (11) does not depend on b. Why is this the case? Below, I explain the intuition for Theorem 1 in more detail. For the sake of discussion, I focus on the case of strategic complementarity ($\alpha > 0$); the case of strategic substitutability is analogous.

The key is to understand how β affects the followers' equilibrium action (7). In particular, the conformity parameter β not only directly affects the followers' conformity to the leader's action ($\beta/(1-\alpha+\beta)k_L$), but also indirectly affects how the followers utilize the leader's information ($w_L^\beta \mathbb{E}[s_L \mid k_L]$). The former positively affects coordination, $\frac{\partial}{\partial\beta}\frac{\beta}{1-\alpha+\beta} > 0$: the followers have a stronger incentive to mimic the leader when conformity is stronger. The latter effect is more subtle. Recall that, when $\beta = 0$, the followers place more weight on the leader's signal than the Bayesian weight (and the efficient weight) due to the coordination motive. When β becomes positive, each follower believes that others put more weight on the leader's action due to the conformity motive. But then, it becomes "easier" for each follower to predict the aggregate action, which in turn reduces the incentive to rely on the leader's signal to predict the state. Indeed, the indirect effect negatively affects coordination: $\frac{\partial}{\partial\beta}w_L^\beta < 0$. This is not ideal, since the efficiency would be improved if the followers placed more weight on the leader's signal (Lemma 1).

What are the combined effects of these two forces? The direct, positive coordination effect of β always dominates the negative information effect: When $\alpha > 0$,

$$\frac{\partial}{\partial\beta}\frac{\beta}{1-\alpha+\beta} > -\left[\frac{\partial}{\partial\beta}\frac{1-\alpha}{1-\alpha+\beta}w_L^\beta\right].$$

This occurs because the conformity motive exerts a first-order effect on the followers' actions, whereas the information effect operates through higher-order equilibrium adjustments. Thus, although a higher level of conformity culture induces the followers to rely less on the leader's signal to predict the state, the followers end up relying more on the leader's signal, owing to the nature of FRE.

The preceding analysis fully clarifies the intuition for the optimal level of conformity when the leader is unbiased ($b = 0$). However, when the leader exhibits bias ($b > 0$), one might conjecture that greater bias would render increased conformity costly as the leader's bias propagates to the followers' actions. Somewhat surprisingly, this conjecture is incorrect. A key reason is that the leader's payoff does not directly depend on her own action. Consequently, as conformity (β) changes, the leader strategically adjusts her actions to counterbalance the impact of this change on followers' strategies. To see this clearly, substitute the leader's equilibrium action (10) to the followers' equilibrium action (7):

$$k_i = \frac{1-\alpha}{1-\alpha+\beta}\left[w_F^\beta s_i + w_L^\beta s_L\right] + \frac{\beta}{1-\alpha+\beta}s_L + \frac{1}{1-\alpha}b.$$

This expression reveals that the leader's bias b manifests as a constant bias that does not depend on β in the followers' actions. Therefore, conformity and bias do not interact in equilibrium, consistent with the optimal conformity result (11).

Comparative Statics

Now, I discuss how β^*, the optimal level of conformity, changes with the strategic nature of the tasks that the organization performs (the degree of strategic complementarity/substitutability) and the information structure within the organization. The following result is immediate from (11).

Corollary 1 (Comparative Statics of β^*)**.** *The optimal degree of conformity is*

1. *increasing in α;*
2. *increasing (decreasing) in the leader's signal precision τ_L and decreasing (increasing) in the followers' signal precision τ_F when $\alpha > 0$ ($\alpha < 0$).*

The first part is intuitive given the discussion after Theorem 1; under strategic complementarity ($\alpha > 0$), an increase in α means that there is more need for coordination, and this can be achieved by a higher level of conformity. Similarly, when α is negative, a higher degree of strategic substitutability leads to a higher degree of anticonformity.

The second part highlights the relationships between the information environment within an organization and corporate culture. Consider the case of strategic complementarity ($\alpha > 0$). When the leader's signal is more precise, the followers rely more on the leader's signal (i.e., $\partial w_L^\beta / \partial \tau_L \geq 0$). However, this adjustment is not enough; the fundamentals improve if the followers utilize more of the leader's information. This inefficient use of the leader's information is due to the externality of actions. Under the FRE, this is possible by increasing β. The case of strategic substitutability is the opposite.

Related to the second part of Corollary 1, it is insightful to consider the cases of extreme information structures. When the leader's signal is arbitrarily informative, the optimal culture is $\lim_{\tau_L \to \infty} \beta^* = \alpha/(1-\alpha)$. This is because, as the leader's signal becomes more precise, the followers put more weight on the leader's signal, so the marginal benefit of increasing β diminishes. Alternatively, when the followers' signal is arbitrarily informative, the optimal culture is $\lim_{\tau_F \to \infty} \beta^* = 0$. This is because, as the followers' signal becomes more precise, the followers can achieve more efficient outcomes by themselves, so the marginal informational loss of increasing β outweighs the coordination benefit.

Optimal Culture and Efficiency

Recall that the organization is inherently beset by the inefficiency due to externality and incomplete information (Lemma 1). I have shown that an optimal level of (anti)conformity culture mitigates this inefficiency. In my stylized setting, however, a stronger statement can be made: the optimal culture *eliminates* the inefficiency and achieves the constrained first-best allocation.

Corollary 2. *At the optimal level of conformity, the efficient degree of coordination is achieved:* $(w_F^{FB}, w_L^{FB}) = (w_F^{\beta^*}, w_L^{\beta^*})$.

Therefore, carefully designed (anti)conformity culture solves the inefficiency arising from the information asymmetry and externality. In particular, the followers behave as if they cooperate on and commit to how to utilize information.[15] Of course, this comes at a cost for the followers, as they have to incur a nonpecuniary cost of conformity when there is strategic complementarity. Indeed, it is not clear if the followers are better off by accepting the leadership and the optimal culture. If they are always worse off as a result of the conformity culture, then such culture is not sustainable and followers would not follow the leader. More generally, why do cultures persist in organizations? I take up this question in the next section.

4 Foundations of Cultural Persistence

This section explores the emergence and persistence of the optimal culture in organizations. I first examine why the followers would voluntarily accept the leadership and the optimal culture. Such voluntary acceptance is a necessary condition for the culture to take root and persist in the organization. I then ask how a culture can be designed to remain robust in uncertain environments.

4.1 Why Do Followers Follow the Leader?

The notion of conformity defined in relation to leadership may appear similar to the concept of authority (Van den Steen, 2009, 2010*b*). A fundamental distinction between authority and leadership is that leadership is voluntary (Hermalin, 2012). In my model, followers accept nonpecuniary punishment (if $\beta > 0$) when deviating from the leader. Why do they accept such leadership and

[15]Because of the bias term b, the equilibrium fundamentals do not reach the optimal value in the problem (4). Since the equilibrium efficiency loss from the bias term b is independent of the followers' strategies, the definition of the efficient degree of coordination in (4) is intact in the presence of the leader's bias.

culture? For the model to offer a theory of leadership and culture, it should be able to explain why followers could benefit from voluntarily following the leader and accepting the associated culture.

To address this, I evaluate whether followers benefit ex-ante from the leader's presence. Define $U(\beta) = \mathbb{E}[u_i; \beta]$ as the followers' ex-ante expected payoff, where I drop the subscript i due to symmetry. I compare the followers' ex-ante payoffs under the neutral culture ($\beta = 0$) and the optimal level of conformity (β^*). I assume that the FRE is played when $\beta = 0$ (i.e., the leader is unbiased, $b = 0$). This is to ensure that the *amount of information* in equilibrium remains constant across different cultural regimes–the followers always learn the leader's signal. Thus, any ex-ante gain from adopting conformity culture *cannot* be explained by additional information provided by the leader.

The following result characterizes the conditions under which the followers are better off by accepting the leadership and the optimal level of conformity culture. Define the followers' relative information advantage as

$$\gamma_F := \frac{\tau_F}{\tau_F + \tau_L}.$$

Proposition 4. *The followers are ex-ante better off with the optimal level of conformity culture if and only if*

1. $\alpha < 0$ *or;*
2. $\alpha \in (1/2, 1)$ *and* $0 \leq \gamma_F \leq \bar{\gamma}_F(\alpha)$*. The upper bound* $\bar{\gamma}_F$ *is increasing in* α*,* $\lim_{\alpha \to 1/2} \bar{\gamma}_F(\alpha) = 0$*, and* $\lim_{\alpha \to 1} \bar{\gamma}_F(\alpha) = 1$*.*

To understand this result, observe that

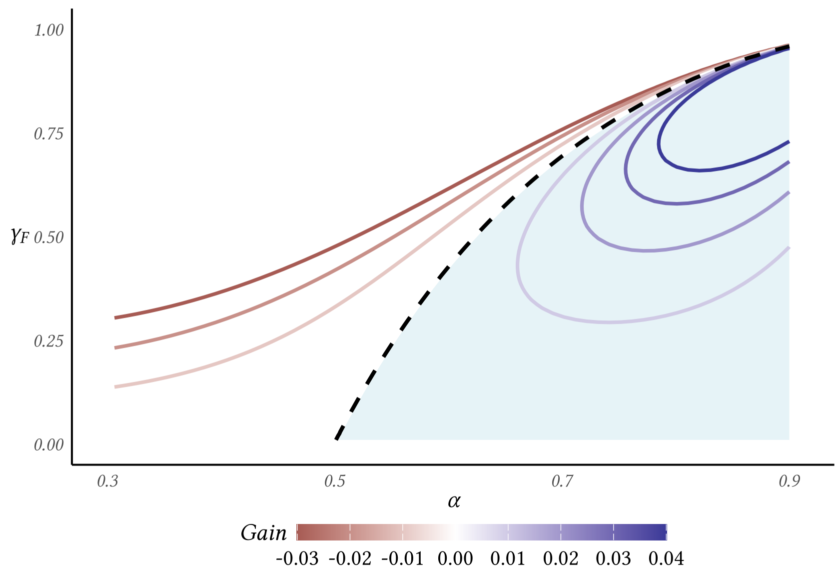
$$U(\beta^*) \geq U(0) \iff \mathbb{E}\left[(k_i - A)^2; 0\right] - \mathbb{E}\left[(k_i - A)^2; \beta^*\right] \geq \beta^* \mathbb{E}\left[(k_i - k_L)^2; \beta^*\right]. \tag{12}$$

That is, for the followers to benefit from the leadership and the optimal culture, the improvement in the pecuniary payoff $\pi_i = -\mathbb{E}[(k_i - A)^2]$ by the optimal culture β^* should be larger than the cost of conformity (the right-hand side of (12)).

From this observation, the first part of Proposition 4 is trivial; when actions are strategic substitutes, the optimal culture is one of anticonformity ($\beta^* < 0$). Thus, the followers' nonpecuniary utility from the culture is always positive. Moreover, since the optimal level of culture always improves pecuniary payoffs (the left-hand side of (12) is always positive), the followers are better off under β^*.

What is interesting is the second part. Under strategic complementarity, the optimal level of conformity culture imposes a cost on the followers, as the followers' actions are not always

Figure 1: Contour Plot of $U(\beta^*; \alpha, \gamma_F) - U(0; \alpha, \gamma_F)$



Note: The figure shows the contour plot of the followers' ex-ante payoff gain from the optimal culture β^* over the neutral culture $\beta = 0$ for different values of α and γ_F. The dashed line represents $\bar{\gamma}_F$, the boundary of the region where the followers are better off under the optimal culture.

the same as the leader's actions. The proposition shows that the benefit of the optimal culture outweighs such costs when strategic complementarity is strong and the followers' signals are not too precise relative to the leader's. Intuitively, when α is high, the coordination motive is strong, so the benefit of conformity is large. However, if the followers already possess precise information, the marginal value of additional coordination induced by conformity is limited. As α becomes higher, the value of the optimal culture becomes higher for a fixed information environment, so the upper bound $\bar{\gamma}_F$ is increasing in α.

Figure 1 illustrates this point. The figure shows a contour plot of the followers' ex-ante payoff gain from adopting the optimal culture β^* relative to the neutral culture $\beta = 0$. The dashed line marks the break-even contour. The figure additionally shows the contour lines for different levels of gain. As the gain increases, the range of (α, γ_F) that delivers a high gain shrinks. Achieving a higher gain requires both α and γ_F to be larger.

Focusing on the voluntary nature of leadership, Komai, Stegeman and Hermalin (2007) ask a related question: If the leader is privately informed, and she can motivate the followers to exert more effort (Hermalin, 1998), then what justifies granting the leader exclusive access to that information? They compare two regimes: one in which the leader has exclusive access to information and another in which the same information is public. They show that providing less information to the followers can be beneficial for the organization. In my analysis, by contrast, the information environment is kept constant: the followers learn the leader's signal regardless of the culture. The benefit of conformity culture comes from the improved coordination. Thus, my result complements Komai, Stegeman and Hermalin (2007) by showing that the coordination motive can explain why followers voluntarily conform to the leader.

An implication of Proposition 4 is that the organization under the optimal conformity culture is fragile if the conditions in the proposition are not satisfied. Even though I do not formally model the process of electing a leader and establishing a culture, the proposition suggests that the followers would not want to stay in the organization with a positive level of conformity culture under certain circumstances. In particular, followers are willing to accept a positive level of conformity only when the need for coordination is sufficiently high and their informational disadvantage relative to the leader is large.

4.2 Uncertain Environment, Robust Culture, and the Value of Information

The optimal level of conformity culture is determined by the organization's environment characterized by (α, τ_F, τ_L). However, it is natural to think that organizations face uncertain environments, where the exact environment is unknown. For example, the quality of the information that the leader and the followers receive may change period-by-period. The formula for the optimal level of conformity (11) is not valid under such uncertainty. The only assurance is that the prediction regarding the direction of conformity culture–complementarity (substitutability) necessitates conformity (anticonformity)–does not depend on such details.

In this section, I explore the optimal level of conformity culture when the organization faces uncertain environments. To highlight the interesting aspects of the optimal culture under uncertainty, I focus on the uncertainty about the information structure.[16] Exploring such scenarios requires an understanding of the value of information within the organization and its interaction with corporate culture.

Specifically, I extend the baseline model to the case in which the information environment parameters, (τ_F, τ_L), are drawn from a set of possible values. Specifically, $\tau_F \in [\underline{\tau}_F, \bar{\tau}_F]$ and $\tau_L \in [\underline{\tau}_L, \bar{\tau}_L]$, where $\bar{\tau}_F \geq \underline{\tau}_F > 0$ and $\bar{\tau}_L \geq \underline{\tau}_L > 0$. To simplify the discussion, I focus on the case of

[16] The analysis in this section easily extends to the case where the organization faces uncertainty about the strategic nature of the tasks, as long as the sign of α is known.

strategic complementarity ($\alpha > 0$).

The leader and the followers observe the realization of the environment. Consequently, the equilibrium play for a fixed β is the same as before. However, in determining the optimal culture, I assume that β cannot be tailored to the realization of the environment. I consider the conformity culture that is "robust" to uncertain environments.

Definition 2. The *robust conformity culture*, denoted by β^R, is β that solves the following program:

$$\max_{\beta \geq 0} \min_{(\tau_F, \tau_L) \in [\underline{\tau}_F, \bar{\tau}_F] \times [\underline{\tau}_L, \bar{\tau}_L]} \Pi(\alpha, \beta, \tau_F, \tau_L). \tag{13}$$

The problem (13) derives the optimal level of conformity culture for the worst-case environment. Since I focus on the case of strategic complementarity, I restrict β to be nonnegative without loss. One interpretation of the situation is where the organization performs the task repeatedly and independently with changing environments. The robust culture is the level of conformity that takes into account every possible environment. The formulation (13) is consistent with the idea that corporate culture is a way to deal with unforeseen contingencies (Kreps, 1990).

The following result characterizes the robust level of conformity culture.

Proposition 5 (Robust Culture)**.** *The robust conformity culture β^R is given by*

$$\beta^R = \frac{\alpha}{1 - \alpha} \frac{\underline{\tau}_L}{\underline{\tau}_F + \underline{\tau}_L}. \tag{14}$$

The formula (14) shows that the robust conformity culture treats the environment as if the lower bounds of the information precisions are realized. Therefore, in a sense, the robust culture is *conservative*. From a normative perspective, this result offers a managerial implication for designing conformity culture in uncertain corporate environments: it is optimal to prepare for the lowest possible level of information precision.

Below, I unpack this result in detail. A key step is analyzing the *value of information*–the effect of signal precision on the fundamentals.[17] In particular, the interaction between the culture and the value of information plays a crucial role.

Value of information To solve the problem (13), one needs to understand how τ_F and τ_L affect the fundamentals in equilibrium for a given β. The case of neutral culture ($\beta = 0$) is well

[17] See Ui and Yoshizawa (2015) for a comprehensive discussion on the value of information in coordination games.

understood (Morris and Shin, 2002; Angeletos and Pavan, 2004, 2007). In particular, because followers under-coordinate in equilibrium, increasing the precision of the leader's signal always benefits the organization. In contrast, increasing the precision of the followers' signal may harm the fundamentals by exacerbating the under-coordination problem. The following lemma characterizes the value of information when there is a positive level of conformity culture.

Lemma 3.

1. **The Value of Leader's Information.**
The leader's information is always beneficial for the organization:

$$\frac{\partial \Pi}{\partial \tau_L}(\alpha, \beta, \tau_F, \tau_L) \geq 0, \quad \forall(\alpha, \beta, \tau_F, \tau_L)$$

2. **The Value of Followers' Information.**
The followers' information is not necessarily beneficial for the organization:

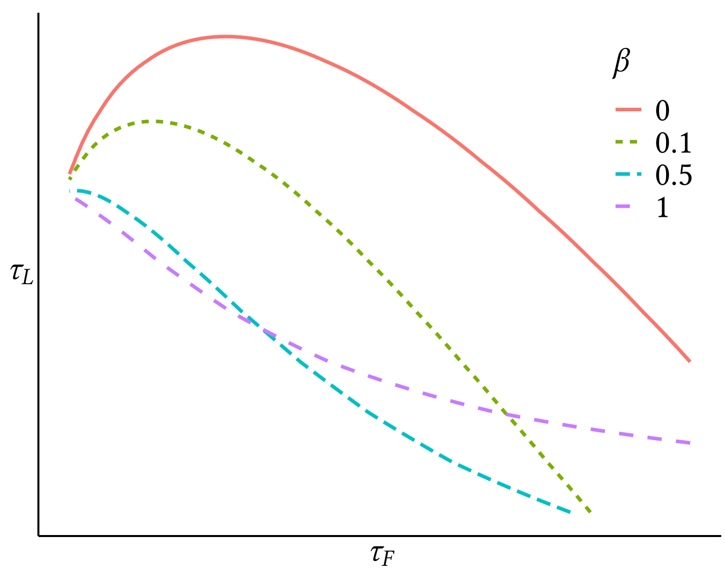
$$\frac{\partial \Pi}{\partial \tau_F}(\alpha, \beta, \tau_F, \tau_L) \geq 0 \iff \tau_F \geq \left[\frac{\alpha - \psi}{2\alpha(1-\psi)\psi - (\alpha - \psi)}\right]\tau_L, \quad \psi := \frac{1+2\beta}{2(1+\beta)} \tag{15}$$

The first part of the lemma says that the leader's information is always valuable regardless of β. At first, this may be somewhat counter-intuitive: strong conformity can push followers to over-coordinate, so public signals might hurt. What this argument misses is the negative effect of conformity on the followers' *strategic* reaction. When β becomes higher, the followers react to the leader simply because of the conformity motive, so the higher-order beliefs (the modified expectation term in (7)) matter less. In other words, the followers become "less strategic" as the conformity rises. This implies that the organization's behavior is increasingly approximated by the leader's behavior. Since the leader's problem comes down to predicting the state in a Bayesian manner (i.e., only the first-order expectation matters), any extra information for the leader is always beneficial.

The second part identifies the condition under which the precision of the private information is valuable to the organization. If $\alpha \leq \psi$, then the condition is always satisfied regardless of the signal precisions. The parameter ψ is an increasing function of β and lies in $[1/2, 1)$. The message is that when the degree of conformity is high enough compared to the degree of strategic complementarity, the followers' information is always beneficial. This highlights the role of conformity in mitigating the coordination problem; without conformity, the followers' information can be harmful (Angeletos and Pavan, 2007). If $\alpha > \psi$, however, then the information structure matters. The ratio of the precisions τ_F/τ_L should be sufficiently large for the followers' information to be beneficial. Since $\frac{\alpha-\psi}{2\alpha(1-\psi)\psi-(\alpha-\psi)}$ is decreasing in ψ, the followers' information advantage required for the condition is smaller when the degree of conformity is higher.

In any case, the condition (15) suggests that the organization can mitigate the detrimental effect of the followers' information by increasing the degree of conformity. Figure 2 shows the contour plot of Π in (τ_F, τ_L)-space to illustrate this point. If the contours are upward sloping at some point, then increasing the precision of the followers' signal has a negative effect on the fundamentals at that point. When $\beta = 0$, this does happen when τ_F is small. As the degree of conformity rises, the area where the followers' information is harmful vanishes.

Figure 2: Contour Plot of Π



Note: The figure shows the contour plot of the fundamentals Π with respect to the precisions of the signals τ_F and τ_L. That is, each line represents the set $\{(\tau_F, \tau_L) \mid \Pi(\alpha, \beta, \tau_F, \tau_L) = \text{constant}\}$. The parameter α is fixed at 0.7.

Deriving the robust culture How does Lemma 3 help derive the robust culture? Since the fundamentals are increasing in τ_L for any parameters, in choosing β^R, one can restrict attention to $\tau_L = \underline{\tau}_L$. In other words, since the leader's information always helps the organization, the robust culture treats the leader's signal precision as if the lower bound is realized.

Deriving the robust culture for the uncertainty about the followers' signal precision is less trivial. For given β, there is a unique $\tau_F = \tau_F^*(\beta)$, which is possibly strictly positive and minimizes the fundamentals. As the intuition of Lemma 3 suggests, such $\tau_F^*(\beta)$ is decreasing in β.[18] Since the value of a conformity culture is higher when τ_F is smaller, the degree of conformity, β, that maximizes the fundamentals given $\tau_F^*(\beta)$ tends to be higher. This in turn suggests that $\tau_F^*(\beta^R)$ is small. It turns out that $\tau_F^*(\beta^R) = \underline{\tau}_F$. That is, even though Π is not necessarily monotone in τ_F, at the solution to the problem (13), it happens to be the case that τ_F is at the lower bound. Hence the result (14).

5 Extensions

5.1 Coordination only has Private Value

In the main model, the degree of coordination matters for the performance of organizations. This is consistent with the interpretation that α represents the strategic nature of the tasks that the organization performs. An alternative case is where the organization does not care about the degree of coordination: the organization's objective is to minimize the distance between each follower's actions and the unknown state.[19]

What is the optimal degree of conformity culture when the coordination only has private value and does not contribute to the fundamentals? To address this question, I modify the model as follows. First, the organization's objective is to maximize

$$\Pi^P := -\int (k_i - \theta)^2.$$

Second, the leader with bias $b \geq 0$ maximizes

$$u_L^P := -\int (k_i - \theta - b)^2.$$

The followers' payoff and the remaining elements of the model are the same as the main model. I denote the optimal degree of conformity under the modified objective as β^P:

$$\beta^P = \arg\max_{\beta} \Pi^P(\alpha, \beta).$$

[18]Note that the followers' signal precision is not beneficial for the organization for $\tau_F \leq \tau_F^*(\beta)$.

[19]In such a scenario, the parameter α may also be interpreted as corporate culture. When α is positive, the organization's culture is that the followers would like to behave similarly.

The key tension in this model is that, in general, followers over-coordinate (under-coordinate) when there is strategic complementarity (substitutability) in the absence of conformity (anticonformity) culture.[20] This is because the followers try to predict and adjust to other followers' actions, even though such activity is wasteful for the organization. Therefore, in light of the intuition for Theorem 1, it is natural to expect that the optimal level of conformity culture is negative (positive) when there is strategic complementarity (substitutability). The following proposition confirms this intuition.

Proposition 6. *The optimal level of conformity culture β^P exists and is given by*

$$\beta^P = -\alpha \frac{\tau_L}{\tau_F + \tau_L}. \tag{16}$$

Combined with the main result (Theorem 1), this result shows that the optimal level of conformity culture is determined to solve the coordination problem that the organization is facing. Consider the case of strategic complementarity ($\alpha > 0$). In the baseline model, the organization suffers from the under-coordination problem. The optimal culture is a conformity culture that helps the followers coordinate more effectively. In the present model, the organization does not care about the degree of coordination. The optimal culture is an anticonformity culture that helps the followers avoid over-coordination.

The following comparative statics are immediate from (16).

Corollary 3. *The optimal level of conformity culture β^P is*

1. *decreasing in α;*
2. *decreasing (increasing) in the leader's signal precision τ_L and increasing (decreasing) in the followers' signal precision τ_F when $\alpha > 0$ ($\alpha < 0$).*

The first part of the comparative statics is straightforward. Since the followers over-coordinate in the absence of β, anticonformity is optimal. When there is strategic complementarity ($\alpha > 0$), a higher value of α amplifies the inefficiency caused by over-coordination. To mitigate this over-coordination, the optimal degree of anticonformity (the negative of β^P) increases. The second part is also intuitive. Suppose that the leader's signal becomes more precise. In this case, the followers place more weight on the leader's signal, further exacerbating the over-coordination problem. Thus, the optimal level of anticonformity should be higher.

[20]See Section 3.1 for comparison.

5.2 Leader's Bias: Alternative Specification

Now I return to the main model where coordination directly affects the fundamentals. In the main model, the leader's objective (2) is modeled in the simplest way to capture a possible bias. This specification yields a rather counter-intuitive result: the leader's bias does not affect the optimal level of conformity culture (see (11)). However, this result does not hold in general. In this section, I explore an alternative specification of the leader's bias and discuss how the bias and conformity interact. For the sake of exposition, I focus on the case of strategic complementarity ($\alpha > 0$).

In particular, I extend (2) so that the leader's payoff directly depends on her own action as well: let the leader's objective be

$$\hat{u}_L = -(1-\lambda) \int (k_i - A - b_F)^2 - \lambda (k_L - A - b_L)^2. \tag{17}$$

The leader would like to minimize the distance between her action and the preferred action A as well. The parameters $b_F \geq 0$ and $b_L \geq 0$ capture the leader's degree of bias for the followers' actions and the leader's action, respectively. The weight $\lambda \in [0, 1]$ determines the relative importance of aligning with followers' actions versus her own action towards the preferred actions. When $\lambda = 0$, the expression reduces to the baseline one (2).

With this specification, it can be shown that the followers' actions become more biased as the leader's bias increases (the details are in Appendix). In other words, the leader's incentive to bias her action is stronger as the followers put more weight on the leader's action. To see this, consider the extreme case, $\lambda = 1$, where the leader cares only about her action being close to $A + b_L$. In that case, the leader's action is $k_L = \mathbb{E}[A \mid s_L] + b_L$.[21] When the degree of conformity is higher, the followers' actions are biased by an amount on the order of b_L (the details are in Appendix). Therefore, increasing the degree of conformity is more costly when the biases are higher. As a result, the degree of optimal conformity is decreasing in the biases. This observation is summarized in the following.

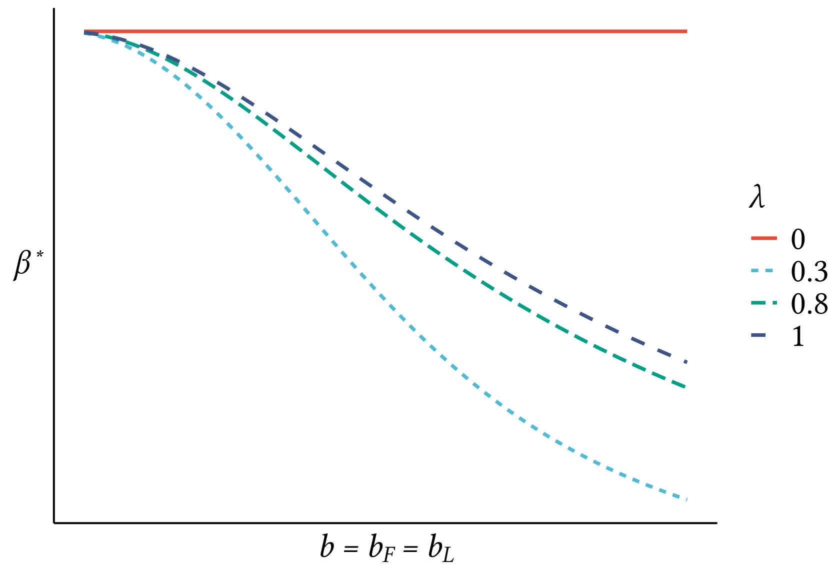
Corollary 4. *Suppose that the leader's payoff is given by* (17)*. The optimal level of conformity culture β^* is decreasing in b_F and b_L. Compared to the baseline model, the optimal degree of conformity is lower with the alternative leader's objective* (17).

Figure 3 illustrates this result. It plots the optimal degree of β^* as a function of bias b, where

[21] Note that, since A depends on the aggregate action K, which in turn depends on k_L, this expression does not represent an equilibrium.

$b = b_F = b_L$. When $\lambda = 0$, the model is the same as the baseline case. As I have shown, the optimal degree of conformity does not depend on the bias. However, when λ is nonzero, β^* is decreasing in the bias. This figure also suggests that β^* is not monotone in λ, as λ enters the leader's strategy in a nonlinear and nonmonotone way.

Figure 3: Optimal β with Alternative Leader's Objective



Note: The figure shows the optimal degree of conformity as a function of the leader's bias $b = b_F = b_L$ under the alternative leader's preference, (17). Each line corresponds to a different value of λ as indicated in the legend. The other parameters are set to $\alpha = 0.6$, $\tau_F = \tau_L = 1$.

6 Conclusion

6.1 Related Literature

Leadership This paper is related to the literature on leadership and corporate culture. Leadership is extensively studied in the management literature (see, for example, Burns, 1978 and Bass and Riggio, 2005). Traditionally, the majority of management studies employ qualitative methodologies to develop theories of leadership. In contrast, I employ a formal model to analyze the role of leadership in organizations. In particular, my paper belongs to the literature that seeks to understand leadership through the lens of economic theory (see Bolton, Brunnermeier and Veldkamp (2010); Hermalin (2012) for reviews). Particularly relevant to my work are the studies that utilize coordination games to analyze leadership (Dewan and Myatt, 2008; Bolton, Brunnermeier and Veldkamp, 2013; Landa and Tyson, 2017).

Bolton, Brunnermeier and Veldkamp (2013) analyze a coordination game with a leader and followers. In their model, there is a time-inconsistency problem of the leader, who moves first but also after the followers. They show that a "resolute leader," who possesses behavioral bias and overestimates her signal precision, can improve the organization's performance. In my model, the leader does not face such a commitment problem. I focus on inefficiency due to miscoordination. My analysis of how conformity culture helps organizations thus complements their research. Dewan and Myatt (2008) also considers a coordination game with a leader and followers. Their main focus is communication between the leader and the followers. In my model, the leader also communicates her private information to the followers, but this is achieved through signaling rather than direct communication. Landa and Tyson (2017) studies a related coordination game where the leader can force the followers to take actions that are close to her own action. In their model, absent the leader's bias, making followers completely mimic the leader is optimal, because the leader observes the underlying state. In contrast, my focus is to explore the optimal degree of conformity culture when there is a tradeoff associated with utilizing such a culture.[22]

Corporate culture A growing number of studies in economics formally examine the role of corporate culture (Van den Steen, 2010*a*; Gorton, Grennan and Zentefis, 2022). An influential work by Kreps (1990) advocates for the importance of formally analyzing corporate culture. One of the ideas advanced in the paper is to understand corporate culture in terms of relational contracting and multiple equilibria. My approach of modeling corporate culture is different from the relational-contracting perspective. Rather, my model is more closely related to economic models of social norms and peer pressure (Kandel and Lazear, 1992; Akerlof and Kranton, 2000; Fischer and Huddart, 2008).

6.2 Concluding Remarks

Empirical Implications The results yield two key empirical predictions. First, conformity culture is stronger in organizations where tasks exhibit greater strategic complementarity. Second, within such organizations, conformity should increase as information asymmetries between leaders

[22] Huck and Rey-Biel (2006) also consider a model where there is a follower who incurs a conformity penalty in a two-agent "moral hazard in teams" setting. They also do not analyze the optimal degree of conformity.

and followers widen.

Empirically testing these predictions, however, is challenging. This is because measuring an organization's culture, the nature of its tasks, and its internal information environment is difficult. Nevertheless, survey data may provide a feasible approach. Researchers could elicit employees' perceptions of conformity within their organizations. For example, Dessein, Lo and Minami (2022) conduct a survey of a large retailer to measure factors such as the need for coordination, task allocation, and perceived market uncertainty. Alternatively, internal evaluations such as 360-degree feedback may also serve as measures of conformity. These data could be used to test whether conformity is indeed more prevalent in organizations with greater strategic complementarity and stronger information asymmetries between leaders and followers.

Limitations The model provides new insights into how corporate culture creates value by focusing on conformity. Yet, conformity represents only a single dimension of corporate culture. In practice, corporate culture is more complex and a variety of forces are at play. Future research could explore other aspects of corporate culture and their interaction with conformity culture. Moreover, the paper abstracts from the dynamic process through which culture forms and evolves. Section 4 partially addresses why a certain culture might emerge and persist in my model, but it falls short of providing a satisfactory understanding of the foundations of corporate culture. A natural–though admittedly more difficult–next step is to model explicitly the process through which culture forms and evolves.

References

Akerlof, George A., and Rachel E. Kranton. 2000. “Economics and Identity.” *The Quarterly Journal of Economics*, 115(3): 715–753.

Akerlof, George A., and Rachel E. Kranton. 2005. “Identity and the Economics of Organizations.” *Journal of Economic Perspectives*, 19(1): 9–32.

Angeletos, George-Marios, and Alessandro Pavan. 2004. “Transparency of Information and Coordination in Economies with Investment Complementarities.” *American Economic Review*, 94(2): 91–98.

Angeletos, George-Marios, and Alessandro Pavan. 2007. “Efficient Use of Information and Social Value of Information.” *Econometrica*, 75(4): 1103–1142.

Bass, Bernard M., and Ronald E. Riggio. 2005. *Transformational Leadership.* . 2 ed., New York:Psychology Press.

Benmelech, Efraim, and Carola Frydman. 2015. “Military CEOs.” *Journal of Financial Economics*, 117(1): 43–59.

Bhandari, Avishek, Babak Mammadov, Maya Thevenot, and Hamid Vakilzadeh. 2022. “Corporate Culture and Financial Reporting Quality.” *Accounting Horizons*, 36(1): 1–24.

Bolton, Patrick, Markus K. Brunnermeier, and Laura Veldkamp. 2010. “Economists’ Perspectives on Leadership.” *Handbook of leadership theory and practice*, 239–264.

Bolton, Patrick, Markus K. Brunnermeier, and Laura Veldkamp. 2013. “Leadership, Coordination, and Corporate Culture.” *Review of Economic Studies*, 80(2): 512–537.

Burns, James MacGregor. 1978. *Leadership.* New York : Harper & Row.

Cai, Wei. 2023. “Formalizing the Informal: Adopting a Formal Culture-Fit Measurement System in the Employee-Selection Process.” *The Accounting Review*, 98(3): 47–70.

Campbell, Dennis. 2012. “Employee Selection as a Control System.” *Journal of Accounting Research*, 50(4): 931–966.

Cho, In-Koo, and David M. Kreps. 1987. “Signaling Games and Stable Equilibria.” *The Quarterly Journal of Economics*, 102(2): 179–221.

Davidson, Robert, Aiyesha Dey, and Abbie Smith. 2015. “Executives’ “off-the-Job” Behavior, Corporate Culture, and Financial Reporting Risk.” *Journal of Financial Economics*, 117(1): 5–28.

Dessein, Wouter, Desmond (Ho-Fu) Lo, and Chieko Minami. 2022. “Coordination and Organization Design: Theory and Micro-Evidence.” *American Economic Journal: Microeconomics*, 14(4): 804–843.

Deutsch, Morton, and Harold B. Gerard. 1955. “A Study of Normative and Informational Social Influences upon Individual Judgment.” *The Journal of Abnormal and Social Psychology*, 51(3): 629.

Dewan, Torun, and David P. Myatt. 2008. “The Qualities of Leadership: Direction, Communication, and Obfuscation.” *The American Political Science Review*, 102(3): 351–368.

Edmans, Alex. 2011. “Does the Stock Market Fully Value Intangibles? Employee Satisfaction and Equity Prices.” *Journal of Financial Economics*, 101(3): 621–640.

Fischer, Paul, and Steven Huddart. 2008. “Optimal Contracting with Endogenous Social Norms.” *American Economic Review*, 98(4): 1459–1475.

Gorton, Gary B., and Alexander K. Zentefis. 2024. “Corporate Culture as a Theory of the Firm.” *Economica*, 91(364): 1391–1423.

Gorton, Gary B., Jillian Grennan, and Alexander K. Zentefis. 2022. "Corporate Culture." *Annual Review of Financial Economics*, 14(Volume 14, 2022): 535–561.

Grennan, Jillian, and Kai Li. 2023. "Corporate Culture: A Review and Directions for Future Research." *Handbook of Financial Decision Making*, 112–132.

Guiso, Luigi, Paola Sapienza, and Luigi Zingales. 2015. "The Value of Corporate Culture." *Journal of Financial Economics*, 117(1): 60–76.

Hayek, Friedrich A. 1945. "The Use of Knowledge in Society." *American Economic Review*, 35(4): 519–530.

Hellwig, Christian, and Laura Veldkamp. 2009. "Knowing What Others Know: Coordination Motives in Information Acquisition." *The Review of Economic Studies*, 76(1): 223–251.

Hermalin, Benjamin E. 1998. "Toward an Economic Theory of Leadership: Leading by Example." *American Economic Review*, 88(5): 1188–1206.

Hermalin, Benjamin E. 2012. "Leadership and Corporate Culture." *Handbook of organizational economics*, 432–78.

Huck, Steffen, and Pedro Rey-Biel. 2006. "Endogenous Leadership in Teams." *Journal of Institutional and Theoretical Economics*, 162(2): 253–261.

Huo, Zhen, and Marcelo Pedroni. 2020. "A Single-Judge Solution to Beauty Contests." *American Economic Review*, 110(2): 526–568.

Judd, Kenneth L. 1985. "The Law of Large Numbers with a Continuum of IID Random Variables." *Journal of Economic Theory*, 35(1): 19–25.

Kandel, Eugene, and Edward P. Lazear. 1992. "Peer Pressure and Partnerships." *Journal of Political Economy*, 100(4): 801–817.

Komai, Mana, Mark Stegeman, and Benjamin E Hermalin. 2007. "Leadership and Information." *American Economic Review*, 97(3): 944–947.

Kreps, David M. 1990. "Corporate Culture and Economic Theory." *Perspectives on Positive Political Economy*, 90(109-110): 8.

Kreps, David M. 1997. "Intrinsic Motivation and Extrinsic Incentives." *The American Economic Review*, 87(2): 359–364.

Landa, Dimitri, and Scott A. Tyson. 2017. "Coercive Leadership." *American Journal of Political Science*, 61(3): 559–574.

Levine, John, and Michael Hogg. 2010. "Anticonformity." In *Encyclopedia of Group Processes & Intergroup Relations*. 20–22. Thousand Oaks:SAGE Publications, Inc.

Liu, Xiaoding. 2016. "Corruption Culture and Corporate Misconduct." *Journal of Financial Economics*, 122(2): 307–327.

Morris, Stephen, and Hyun Song Shin. 2002. "Social Value of Public Information." *American Economic Review*, 92(5): 1521–1534.

Myers, David G. 2009. *Social Psychology.* McGraw-Hill.

Prendergast, Canice. 2008. "Intrinsic Motivation and Incentives." *American Economic Review*, 98(2): 201–205.

Schein, Edgar H. 2016. *Organizational Culture and Leadership.* . 5th ed., Hoboken, New Jersey:Wiley.

Schwartz, Howard, and Stanley M. Davis. 1981. "Matching Corporate Culture and Business Strategy." *Organizational Dynamics*, 10(1): 30–48.

Sherif, Muzafer. 1935. "A Study of Some Social Factors in Perception." *Archives of Psychology (Columbia University).*

Sun, Yeneng. 2006. "The Exact Law of Large Numbers via Fubini Extension and Characterization of Insurable Risks." *Journal of Economic Theory*, 126(1): 31–69.

Uhlig, Harald. 1996. "A Law of Large Numbers for Large Economies." *Economic Theory*, 8(1): 41–50.

Ui, Takashi, and Yasunori Yoshizawa. 2015. "Characterizing Social Value of Information." *Journal of Economic Theory*, 158: 507–535.

Van den Steen, Eric. 2009. "Authority versus Persuasion." *American Economic Review*, 99(2): 448–453.

Van den Steen, Eric. 2010*a*. "Culture Clash: The Costs and Benefits of Homogeneity." *Management Science*, 56(10): 1718–1738.

Van den Steen, Eric. 2010*b*. "Interpersonal Authority in a Theory of the Firm." *American Economic Review*, 100(1): 466–490.

Appendix

This section provides the proofs of the results described in the main text. Following the convention of the literature, I assume that a law of large numbers for a continuum of independent random variables holds: $\int s_i = \theta$. See Judd (1985), Uhlig (1996), and Sun (2006) for the discussion of this assumption. I omit the proofs for the results that are derived in the main text or straightforward to prove.

A Proofs

Proof of Proposition 1

First, I show that the followers' equilibrium strategy is uniquely expressed as (6). For any fixed K and k_L, follower i's objective is globally concave in k_i. The first-order condition gives

$$k_i = \frac{1}{1+\beta}\left[(1-\alpha)\mathbb{E}_i[\theta] + \alpha\mathbb{E}_i[K]\right] + \frac{\beta}{1+\beta}k_L, \tag{A1}$$

which expresses follower i's best response using his first-order belief $\mathbb{E}_i[\theta]$. Integrating this expression over the set of followers implies that

$$K = \frac{1}{1+\beta}\left[(1-\alpha)\bar{\mathbb{E}}^1[\theta] + \alpha\int \mathbb{E}_j[K]\right] + \frac{\beta}{1+\beta}k_L. \tag{A2}$$

Substituting (A2) back into (A1) gives

$$k_i = \frac{1}{1+\beta}\left[(1-\alpha)\mathbb{E}_i[\theta] + \frac{\alpha}{1+\beta}\left[(1-\alpha)\mathbb{E}_i\bar{\mathbb{E}}^1[\theta] + \alpha\mathbb{E}_i\int \mathbb{E}_j[K]\right]\right] + \frac{\beta}{1+\beta}\left[1+\frac{\alpha}{1+\beta}\right]k_L,$$

which now expresses follower i's best response using his second-order belief $\bar{\mathbb{E}}^1[\theta]$. Successively applying this procedure gives the following:

$$\begin{aligned} k_i = &\frac{1}{1+\beta}\left[(1-\alpha)\sum_{n=0}^{\infty}\left(\frac{\alpha}{1+\beta}\right)^n \mathbb{E}_i[\bar{\mathbb{E}}^n[\theta]] + \alpha\lim_{n\to\infty}\left(\frac{\alpha}{1+\beta}\right)^n \mathbb{E}_i[\bar{\mathbb{E}}^n[K]]\right] \\ &+ \frac{\beta}{1+\beta}\sum_{n=0}^{\infty}\left(\frac{\alpha}{1+\beta}\right)^n k_L. \end{aligned}$$

Together with the assumption $|\alpha/(1+\beta)| < 1$ and the non-explosive higher-order belief condition, the expression reduces to (6).

Now, consider a fully revealing strategy κ. In this case, the first-order expectation is

$$\begin{aligned}\mathbb{E}_i[\theta] &= \mathbb{E}[\theta \mid s_i, k_L] \\ &= \frac{\tau_F}{\tau_F+\tau_L} s_i + \frac{\tau_L}{\tau_F+\tau_L}\kappa^{-1}(k_L),\end{aligned}$$

and thus $\int \mathbb{E}_i[\theta] = \frac{\tau_F}{\tau_F+\tau_L}\theta + \frac{\tau_L}{\tau_F+\tau_L}\kappa^{-1}(k_L)$. Iteratively computing the higher-order beliefs gives (7). Alternatively, consider a pooling strategy κ. Then, $\mathbb{E}_i[\theta] = \mathbb{E}[\theta \mid s_i] = s_i$, which implies (8). In any case, the follower's best response is linear in s_L and k_L.

Remark A.1 (Nonlinear Equilibrium)**.** In the main text, I restrict attention to linear equilibria. The above proof implies that, given full separation and the non-explosive higher-order belief condition, this is without loss of generality. Since the signals are Gaussian, $\mathbb{E}_i\bar{\mathbb{E}}^n[\theta]$ is linear in s_i and k_L for all $n \geq 0$.

However, if the leader's signaling strategy is not fully revealing, then the followers' best responses are generally nonlinear in s_i and k_L. To see this, for an index set Λ–which may be finite, countable, or uncountable–consider a partition $\biguplus_{\ell\in\Lambda} S_\ell = \mathbb{R}$, where S_ℓ is a Lebesgue-measurable set for each $\ell \in \Lambda$. The leader's strategy can be written as

$$\kappa(s_L) = \kappa_\ell \quad \text{if } s_L \in S_\ell,$$

where $k_\ell \neq k_{\ell'}$ if $\ell \neq \ell'$. A fully separating strategy corresponds to the case in which each S_ℓ is a singleton, while a full pooling strategy corresponds to $\Lambda = 0$ and $S_0 = \mathbb{R}$.

Now, suppose that $\Lambda = \{0, 1\}$ and $S_0 = (-\infty, c)$ and $S_1 = [c, \infty)$ for some $c \in \mathbb{R}$. If the leader observes $s_L < c$, she chooses κ_0; if $s_L \geq c$, she chooses $\kappa_1 \neq \kappa_0$. Under this strategy, the follower's first-order expectation of the state is

$$\mathbb{E}_i[\theta] = \mathbb{E}[\theta \mid s_i, s_L \in S_l].$$

This expression is not linear in s_i or c. In particular, for $\ell = 0$,

$$\mathbb{E}[\theta \mid s_i, s_L \in S_0] = \frac{\int \theta \exp\left\{\tau_F \frac{-(s_i-\theta)^2}{2}\right\} \Phi\left(\tau_F^{1/2}(c-\theta)\right) d\theta}{\int \exp\left\{\tau_F \frac{-(s_i-\theta)^2}{2}\right\} \Phi\left(\tau_F^{1/2}(c-\theta)\right) d\theta},$$

which is nonlinear in s_i and c. (The case of $\ell = 1$ is analogous). Hence, the n^{th}-order belief is most likely nonlinear as well. The analysis of such cases is beyond the scope of this paper. I focus on the linear equilibrium to illustrate the key economic intuition in a tractable manner.

Proof of Proposition 3

From Proposition 1, the followers' equilibrium strategy is $k_i = \frac{1-\alpha}{1-\alpha+\beta}\mathbb{E}[\theta \mid s_i] + \frac{\beta}{1-\alpha+\beta}k_L$, where $k_L = \kappa(s_L)$, $\forall s_L \in \mathbb{R}$ is the leader's pooling action. If $\beta = 0$, the followers do not respond to the leader's action; thus, any k_L can be supported in equilibrium. Conversely, if $\beta \neq 0$, the first derivative of the leader's expected payoff with respect to k_L is

$$\frac{\partial \mathbb{E}[u_L \mid s_L]}{\partial k_L} = -\left[(1-\alpha)\frac{\beta}{1-\alpha+\beta}(k_L - \mathbb{E}[\theta \mid s_L]) - b\right].$$

Therefore, for any fixed k_L, a leader with a signal realization $\mathbb{E}[\theta \mid s_L] \neq k_L - \frac{1-\alpha+\beta}{(1-\alpha)\beta}b$ wishes to deviate from k_L. Notice that I did not have to specify off-path beliefs for the leader's deviation from the pooling level–the followers adjust their actions by $\beta/(1-\alpha+\beta)$ per unit change in k_L, *regardless of the beliefs about the leader's signal.* Hence, a pooling strategy does not constitute an equilibrium when $\beta \neq 0$.

Proof of Lemma 2

Suppose that a pooling equilibrium is played when $\beta = 0$. Then,

$$k_i - A = (1-\alpha)\left[(s_i - \theta) + \frac{b}{1-\alpha}\right] + \alpha(s_i - \theta),$$

and thus the fundamentals under the neutral culture are $\Pi(\alpha, 0) = -\tau_F^{-1} - b^2$. Alternatively, if any $\beta \neq 0$, then only the FRE is possible (Table 1) and thus

$$\Pi(\alpha,\beta) = -\left(\frac{1-\alpha}{1-\alpha+\beta}w_F^{\beta}\right)^2 \tau_F^{-1} - (1-\alpha)^2\left(1 - \frac{1-\alpha}{1-\alpha+\beta}w_F^{\beta}\right)^2 \tau_L^{-1} - b^2. \tag{A3}$$

Since the FRE is supported as long as $\beta \neq 0$,

$$\lim_{\beta\to 0}\Pi(\alpha,\beta) = -(w_F^0)^2\tau_F^{-1} - (1-\alpha)^2(1-w_F^0)^2\tau_L^{-1} - b^2.$$

After some algebra, I obtain that

$$\lim_{\beta\to 0}\Pi(\alpha,\beta)-\Pi(\alpha,0)=\frac{(1-\alpha^2)\tau_F+\tau_L}{\tau_F\{(1-\alpha)\tau_F+\tau_L\}}>0.$$

Therefore, it is always optimal to choose a nonzero level of β.

Proof of Theorem 1

From (A3), I can set $b=0$ without loss to solve $\max_\beta \Pi(\alpha,\beta)$. Owing to Lemma 2, $\beta^*\neq 0$. Differentiating Π with respect to β gives

$$\frac{\partial\Pi}{\partial\beta}=C(\alpha\tau_L-(1-\alpha)(\tau_F+\tau_L)\beta),$$

where

$$C=\frac{2(1-\alpha)^2\tau_F(\tau_F+\tau_L)}{\tau_L\{(1-\alpha+\beta)\tau_F+(1+\beta)\tau_L\}^3}.$$

This expression shows that Π is quasi-concave in β and $\beta^*=\frac{\alpha}{1-\alpha}\frac{\tau_L}{\tau_F+\tau_L}$ uniquely achieves the optimum.

Proof of Proposition 4

When $\alpha<0$, there is nothing to prove, so let $\alpha>0$. I compute each term of the expression (12). When $\beta=0$, the expected return is

$$\mathbb{E}[-(k_i-A)^2;0]=-\frac{(1-\alpha)^2(\tau_F+\tau_L)}{((1-\alpha)\tau_F+\tau_L)^2}.$$

Similarly, when $\beta=\beta^*$,

$$\mathbb{E}[-(k_i-A)^2;\beta^*]=-\frac{(1-\alpha)^2}{(1-\alpha)^2\tau_F+\tau_L}.$$

The cost of conformity is

$$\beta^*\mathbb{E}[-(k_i-k_L)^2;\beta^*]=\beta^*\left(\frac{1-\alpha}{1-\alpha+\beta}w_F^\beta\right)^2(\tau_F^{-1}+\tau_L^{-1})=-\frac{(1-\alpha)^3\alpha\tau_F}{((1-\alpha)^2\tau_F+\tau_L)^2}.$$

Using these expressions,

$$\begin{aligned}&\mathbb{E}\left[(k_i-A)^2;0\right]-\mathbb{E}\left[(k_i-A)^2;\beta^*\right]-\beta^*\mathbb{E}\left[(k_i-k_L)^2;\beta^*\right]\\&=\frac{(1-\alpha)^2}{\tau_F+\tau_L}\left[\frac{1}{(\gamma_L+(1-\alpha)\gamma_F)^2}-\frac{1}{(1-\alpha)^2\gamma_F+\gamma_L}-\frac{(1-\alpha)\alpha\gamma_F}{((1-\alpha)^2\gamma_F+\gamma_L)^2}\right],\end{aligned}$$

where $\gamma_F=\tau_F/(\tau_F+\tau_L)$ and $\gamma_L=1-\gamma_F$. After some algebra, the condition for this expression to be positive is equivalent to $\alpha\in(1/2,1)$ and $\gamma_F<\bar{\gamma}_F(\alpha)$, where

$$\bar{\gamma}_F(\alpha):=2-\frac{1+\alpha^2}{2\alpha}-\frac{1-\alpha}{2\alpha}\sqrt{(5-\alpha)(1-\alpha)}.$$

This increases monotonically from 0 to 1 as α rises from 1/2 to 1.

Proof of Proposition 5 and Lemma 3

In the main text, I claim that the robust culture with respect to the uncertainty on τ_F is chosen so that the problem treats it as if τ_F is the lowest realization. More precisely, consider the case where only τ_F is uncertain and let $\tau_F^*(\beta)=\arg\max_{\tau_F}\Pi(\beta,\tau_F)$, where I omit α and τ_L from Π as they are irrelevant. The robust culture in this case is defined by $\beta^R=\arg\max_{\beta}\Pi(\beta,\tau_F^*(\beta))$.

Lemma A.1. $\tau_F^*(\beta^R)=\underline{\tau}_F$.

Proof. First, observe that

$$\frac{\partial\Pi}{\partial\tau_F}=\frac{(1-\alpha)^2g_F(\tau_F,\beta)}{((1-\alpha+\beta)\tau_F+(1+\beta)\tau_L)^3},$$

where

$$g_F(\tau_F,\beta)=\tau_L(1+\beta)\{1-2\alpha+2\beta(1-\alpha)\}+\tau_F\{-\alpha(1+2\beta(1+\beta))+(1+\beta)(1+2\beta)\}.$$

Since g_F is linear in τ_F the coefficient on τ_F in g is always positive,[23] it follows that

$$\tau_F^*(\beta)=\max\left\{\frac{\tau_L(1+\beta)(1-2\alpha+2\beta(1-\alpha))}{\alpha(1+2\beta(1+\beta))-(1+\beta)(1+2\beta)},\underline{\tau}_F\right\}\tag{A4}$$

uniquely minimizes $\Pi(\beta,\tau_F)$.

[23] From $\beta\geq 0$ and $\alpha<1$, the coefficient is $-\alpha(1+2\beta(1+\beta))+(1+\beta)(1+2\beta)>-(1+2\beta(1+\beta))+(1+\beta)(1+2\beta)=\beta$.

Second, I solve $\max_\beta \Pi(\beta, \tau_F^*(\beta))$. By substituting $\tau_F^*(\beta)$ into Π, I obtain

$$\Pi(\beta, \tau_F^*(\beta)) = -\frac{(1-\alpha)^2(1+2\beta)^2}{4\alpha(1+\beta)(1-\alpha+(2-\alpha)\beta)\tau_L}.$$

It is straightforward to show that this is uniquely minimized by $\beta^R = \max\left\{\frac{1}{2(1-\alpha)} - 1, 0\right\}$. However, it is evident from (A4) that $\tau_F^*(\beta^R) = \underline{\tau}_F$. □

Furthermore, the effect of τ_L on Π is

$$\frac{\partial \Pi}{\partial \tau_L} = \frac{(1-\alpha)^2 g_L(\tau_L)}{\tau_L^2((1-\alpha+\beta)\tau_F + (1+\beta)\tau_L)^3},$$

where

$$g_L(\tau_L) = (1+\beta)^3\tau_L^3 + \beta^2(1-\alpha+\beta)\tau_F^3 + (1+\beta)\left\{3\beta^2\tau_F + (1+\alpha+(2+\alpha)\beta+3\beta^2)\tau_L\right\}\tau_F\tau_L.$$

The function g_L is positive, so Π is increasing in τ_L. This completes the proof of Lemma 3. Proposition 5 then follows from the discussion in the main text.

Proof of Proposition 6

The proof is essentially the same as the proof of Theorem 1. The only difference is that the objective function in equilibrium is now written as

$$\Pi^P(\alpha, \beta) = -\left(\frac{1-\alpha}{1-\alpha+\beta} w_F^\beta\right)^2 \tau_F^{-1} - \left(1 - \frac{1-\alpha}{1-\alpha+\beta} w_F^\beta\right)^2 \tau_L^{-1} - b^2.$$

Therefore,

$$\frac{\partial \Pi^P}{\partial \beta} = C'(\alpha\tau_L + (\tau_F+\tau_L)\beta), \quad C' = \frac{2(1-\alpha)\tau_F(\tau_F+\tau_L)}{\tau_L\{(1-\alpha+\beta)\tau_F + (1+\beta)\tau_L\}^3},$$

which shows that $\beta^P = -\frac{\alpha\tau_L}{\tau_F+\tau_L}$ is the unique solution.

Proof of Corollary 4

Assuming that an FRE exists, the followers' best responses are described by (7). Write the followers' best responses as $k_i = c_1 s_i + c_2 \mathbb{E}[s_L \mid k_L] + c_3 k_L$, where

$$
\begin{aligned}
c_1 &= \frac{1-\alpha}{1-\alpha+\beta} \frac{(1-\alpha+\beta)\tau_F}{(1-\alpha+\beta)\tau_F + (1+\beta)\tau_L}, \\
c_2 &= \frac{1-\alpha}{1-\alpha+\beta} \frac{(1+\beta)\tau_L}{(1-\alpha+\beta)\tau_F + (1+\beta)\tau_L}, \\
c_3 &= \frac{\beta}{1-\alpha+\beta}.
\end{aligned}
$$

Using this expression, the first-order condition of the leader's problem gives

$$
\begin{aligned}
0 = (1-\lambda)]\mathbb{E}&\left[\int \{(1-\alpha)(k_i-\theta) + \alpha(k_i - K) - b_F\} \mid \alpha_L, s_L\right](1-\alpha)\frac{\partial k_i}{\partial k_L} \\
&+ \lambda \mathbb{E}\left[(1-\alpha)(k_L-\theta) + \alpha\{c_1(k_L-\theta) + c_2(k_L - \mathbb{E}[s_L \mid k_L])\} - b_L\right]\left\{(1-\alpha) + \alpha\left(1 - \frac{\partial k_i}{\partial k_L}\right)\right\}.
\end{aligned}
$$

The solution is

$$
k_L = s_L + B,
$$

where

$$
B = s_L + \frac{(1-\lambda)(1-\alpha)(1-c_1)b_F + \lambda\{(1-\alpha)+\alpha c_1\}b_L}{(1-\lambda)(1-\alpha)^2 c_3(1-c_1) + \lambda\{(1-\alpha)+\alpha c_1\}(1-\alpha c_3)}.
$$

This expression also illustrates that an FRE exists even when $\beta = 0$ as long as $\lambda > 0$. Therefore, I focus on FRE in the following analysis.

The equilibrium fundamentals are thus

$$
\Pi = -\left(\frac{1-\alpha}{1-\alpha+\beta} w_F^\beta\right)^2 \tau_F^{-1} - (1-\alpha)^2\left(1 - \frac{1-\alpha}{1-\alpha+\beta} w_F^\beta\right)^2 \tau_L^{-1} - \left(\frac{(1-\alpha)\beta}{1-\alpha+\beta}\right)^2 B^2.
$$

Compared with the fundamentals in the baseline model (A3), the only difference is that the third term now depends on β. It is straightforward to show that the last term $\left(\frac{(1-\alpha)\beta}{1-\alpha+\beta}\right)^2 B^2$ is increasing in β as long as $\beta \geq 0$. Moreover, $\frac{\partial B}{\partial b_F}, \frac{\partial B}{\partial b_L} > 0$. Hence, the optimal β that maximizes (A3) is lower than the baseline model and is decreasing in b_F and b_L.