Leadership, Coordination and Mission-Driven Management

Patrick Bolton, Markus Brunnermeier and Laura Veldkamp
Columbia, Princeton and NYU

Spring 2008
Three Challenges of Leadership

- Balancing coordination and adaptation.
  - Strong commitments achieve coordination but sacrifice adaptation to changing circumstances.

- Maintaining credibility.
  - New information creates a time-consistency problem, a temptation to commit to something and then renege.

- Listening and learning from followers.
  - The actions of perfectly coordinated followers do not reveal new information.

What are valuable attributes of a leader?
Leadership

Outline

• Three ingredients of the model:
  – A leader balancing coordination, adaptation and time-consistency (credibility).
  – Give the leader a commitment technology (a reputation).
  – Leader learns from followers’ actions.

• Main result: Resoluteness (believing your initial information is more precise than it truly is) is a valuable attribute of a leader. Everyone knows that resolute leaders will “stick to their guns.” This credibility allows them to better coordinate their followers.


**Relationship to the Literature**


- Van Den Steen (2005) - A leader with strong beliefs attracts people with similar beliefs → coordination and more worker effort.

- Dessein & Santos (2006) - What institutional structure best facilitates communication and coordination?

- Kaplan, Klebanov & Sorensen (2007) - Reputation measures like “follows through” and “persistent” predict performance.
The Simple Model: Payoffs

A continuum of followers values three things:

1. **Alignment**: taking an action $a_i$ that is close to (or consistent with) the organization’s strategy $a_L$,

2. **Coordination**: belonging to a well-coordinated organization,

3. **Adaptation**: belonging to an organization whose strategy is well-adapted to its environment $\theta$.

$$\Pi_i = - (a_i - a_L)^2 - \int_j (a_j - \bar{a})^2 dj - (a_L - \theta)^2$$

Leaders have the same preferences, except that $(a_i - a_L) = 0$, because $i = L$. The organization’s payoff is $\Pi := \int_i \Pi_i$. 
Model Timing

1. Leader has a prior belief: $\theta_L \sim N(\theta, 1)$.
   Leader believes: $\theta_L \sim N(\theta, \sigma^2_p)$, $\sigma^2_p < 1$ (resoluteness).
   Follower $i$ believes: $\theta_i \sim i.i.d. N(\theta, \sigma^2_\theta)$

2. Leader announces the organization’s strategy: discloses $\theta_L$ (credibly).

3. Followers update with Bayes’ law and choose actions $a_i$.

4. Leader then observes a signal about the state: $S_L \sim N(\theta, \sigma^2_2)$, rational beliefs (later, $S_L$ is from others’ actions).

5. Leader chooses the ultimate direction for the organization $a_L$.

6. Payoffs are realized.
**Optimal Actions**

- Leader chooses

\[ a_L = E[\theta|\theta_L, S_L] = \lambda \theta_L + (1 - \lambda) S_L \]

where \( \lambda := \sigma_p^{-2}/(\sigma_p^{-2} + \sigma_2^{-2}). \)

- Follower \( i \) chooses

\[ a_i = E[a_L|\theta_i, \theta_L] = \lambda \theta_L + (1 - \lambda) [\phi \theta_L + (1 - \phi) \theta_i] \]

where \( \phi := 1/1 + \sigma_\theta^{-2}. \)
Result: Optimal Resoluteness

Result: Resoluteness is optimal. The $\sigma_p^2$ that maximizes firm utility is always $< 1$.

- The announcements of resolute leaders are more credible.
  - A leader wants followers to believe that his final action will be the one he first announces: $a_L = \theta_L$. This achieves perfect coordination.
  - After the followers act, the leader gets new information and wants to adapt his action. He reneges on his commitment.
  - Resolute leaders discount new information. They choose $a_L$ closer to $\theta_L$.

- Resoluteness improves alignment $-(a_i - a_L)^2$, improves coordination $-(a_i - a_j)^2$, but inhibits adaptation $-(a_L - \theta)^2$. 

Bolton, Brunnermeier and Veldkamp
Introducing a Commitment Technology

- Resoluteness acts like a commitment device that keeps a leader from changing his mind too much. If a leader has a traditional commitment technology, does this eliminate the need for resoluteness?

- A leader “can stake the firm’s reputation” on staying with his original course of action. Choose $c$ at stage 1.

$$\Pi_i = -(a_i - a_L)^2 - \int_j (a_j - \bar{a})^2 dj - (a_L - \theta)^2 - c(a_L - \theta_L)^2$$
Commitment Costs and Resoluteness

Result: Even with a commitment device, it is still optimal to choose a resolute leader. However, the level of resoluteness is lower than when $c = 0$.

2 reasons:

1. Resolute leaders put more on the line. If firms value coordination more than leaders, firms should choose resolute leaders.
   - Only the firm bears the misalignment cost $(a_L - a_i)^2$.

2. Resolute leaders incur less commitment cost. (They change their minds less.)
Learning from Followers

- No commitment technology.
- Second signal comes from firm output $A$:
  \[ A = \int a_j dj + e \quad e \sim \mathcal{N}(0, \sigma^2_e). \]
- If followers actions are linear in their signals,
  \[ a_i(\theta_i) = (1 - \beta)\theta_L + \beta\theta_i \]
  then the second period signal is $A = (1 - \beta)\theta_L + \beta\theta + e$. The precision of $A$ depends on $\beta$. 
Optimal Actions with Learning

- Leader’s optimal action is

\[ a_L = E[\theta|\theta_L, \hat{S}_2] = \lambda \theta_L + (1 - \lambda)\hat{S}_L. \]

where

\[ \lambda = \frac{\sigma_p^{-2}}{\sigma_p^{-2} + \beta^2 \sigma_e^{-2}} \]

- Followers’ optimal action is

\[ a_i = E[a_L|\theta_L, \theta_i] = \lambda \theta_L + (1 - \lambda)(\phi \theta_L + (1 - \phi)\theta_i). \]

Matching coefficients \( \rightarrow \beta = (1 - \lambda)(1 - \phi). \)
Where Do Multiple Equilibria Come From?

- Mathematically: Substituting $\beta$ into $\lambda$ delivers an equation that is a third-order polynomial $\rightarrow$ 1 or 3 solutions.

- Conceptually: If followers choose action $\theta_L$, then the leader will learn nothing new from their actions. With only one signal to base his action on, leader chooses $a_L = \theta_L$. If followers believe that the leader will see an informative second signal, they use their private information to forecast it. When private information affects actions, $A$ is informative.

Followers’ beliefs are self-confirming.
Equilibria with Learning from Followers

Two stable (linear) equilibria:

1. **“Dictatorial equilibrium”** achieves perfect coordination
   \[ a_i = a^L = \theta_L, \]
   but no information flow.
   - In the dictatorial equilibrium resoluteness is irrelevant.

2. **“Lead by being led”** worsens coordination and alignment,
   but improves adaptation because leader gets more information.
   - Resoluteness is optimal iff output reveals most information
     or followers have little private information
     \[ \beta^{-2} \sigma_e^2 < \phi(2 - \phi) \]
Resolute Managers are Bad Listeners

- Dictatorial equilibrium always exists.

- The lead by being led equilibrium equilibrium only exists when resoluteness is not too high – It exists if

\[(1 - \phi)^2 > 4\sigma_e^2 \sigma_p^{-2}.\]

A resolute leader’s perceived information can crowd out followers’ information. (A bad listener)
Resoluteness vs. Competence

- Generalize the model: $\text{var}(\theta_L|\theta) \neq 1$. Call $\text{var}(\theta_L|\theta)^{-1}$ competence.

- Result: Resoluteness can be better than competence.

- Greater competence raises the weight that followers put on the first signal ($(1 - \phi)$ falls) and raises the leader’s perception of his signal quality ($\sigma_p^{-2}$). Both make the lead by being led equilibrium harder to sustain.

- Higher resoluteness only raises $\sigma_p^{-2}$.

- Resoluteness balances the need for commitment and the ability to solicit information from others who know that the leader’s beliefs are distorted.
Conclusions

- Resoluteness facilitates coordination.
- Resoluteness enhances credibility.
- Commitment costs/reputation are an imperfect substitute.
- Choosing resolute managers allows firms to reconcile differences between theirs and the managers’ incentives. Firms can get resolute managers to take more risk.
- A warning: Resolute managers can suppress information transmission. But so can competent managers.