What You Don’t Know Can’t Hurt You: A Model of Politics and Organizational Learning

Scott C. Ganz

October 9, 2015

Abstract

Studies of organizational learning assume that rational organizations always pursue intelligence and therefore ascribe failures to learn to cognitive biases, costly information, or faulty information-aggregation routines. However, organizations are also political coalitions that face internal contestation over organizational strategies and goals. The decision whether to collect information impacts both the goals that organization members try to meet and the organization’s capacity to meet them. This paper develops a formal model that introduces political conflict into a theory of organizational learning. The model has a key insight: even in organizations where actors are rational and where there are no difficulties in aggregating information, organization members may still choose not to learn, because members can attain better organizational outcomes (for themselves) if the organization does not collect information than if it does. Furthermore, the model demonstrates that individual incentives for strategic ignorance increase when existing policies are less desirable and when there is greater uncertainty in the relationship between policies and outcomes.
Introduction

Two of the most enduring legacies of the “Carnegie School” of organizational theory are the importance of organizational learning and the image of the firm as a political coalition (Cyert and March 1963; March and Simon 1958). Despite their common roots, these two concepts are rarely integrated (Gavetti, Greve, Levinthal, and Ocasio 2012; Gavetti, Levinthal, and Ocasio 2007; Gibbons 2003). Research in organizational learning moved quickly into formal modeling and computer simulations that conceived of the organization as an actor facing a constrained optimization problem. Such models implicitly assume that all organizational decision-makers have the same preferences. Attempts to create models of organizations characterized by individuals with different preferences, which is the essence of organizational politics, required confronting the problems of chaotic collective preferences and unstable collective goals that plagued social choice theorists at the time (see Austen-Smith and Banks 1999). As a result, most organizational learning models assume that organizational preferences over outcomes are well-ordered and disregard the process through which individual preferences are aggregated (cf. Bendor, Moe and Shotts 2001; Ethiraj and Levinthal 2009; Schilling and Fang 2014).

Ignoring politics had a cost: modern theory solely ascribes organizational failures to learn to imperfections in information collection and decision-making biases. In his 2010 book, The Ambiguities of Experience, James March begins his inquiry with what appears to be an uncontroversial assumption: “Organizations pursue intelligence” (March 2010: 1). The remainder of his book—and the lion’s share of research on organizational learning—describes all of the ways that organizations fail in this pursuit: organization members imperfectly collect information, which is badly aggregated by managers, who then make biased decisions based on the information they gather (Czaszar and Eggers 2013; Denrell and March 2001; Levinthal and March 1993; Levitt and March 1988; March and Simon 1958). March acknowledges that his treatment of organizational learning ignores the role that conflicts of interest within organizations play in “influenc[ing] not only the pursuit of intelligence but also its
definition” (March 2010: 6). But readers searching elsewhere for models that describe how internal politics impact the pursuit of organizational intelligence will be left wanting.

This paper examines conditions under which rational organizations characterized by political conflict would choose not to pursue knowledge. Organizations are political coalitions that face internal contestation over organizational strategies and goals. The decision whether to collect information impacts both the goals that organization members try to meet and the organization’s capacity to meet them. More information can make it possible for organization members to overcome internal opposition and implement controversial new policies. But, more information can also provide internal opponents with ammunition to fight back against proposals to implement organizational change. For example, in an internal negotiation between management and the workforce over salary and benefits, an in-depth study of the compensation practices of close competitors could show that the current scheme is more generous than existing market norms, which would support proposals by management for modest wage increases. But, the survey could instead uncover that the current regime lags the rest of the market substantially. Labor leaders could then use this information in support of more generous compensation. Thus, under some conditions, rational organization members might choose not to gather more information, if they suspect that greater clarity will help their opponents.

My paper demonstrates that organizations navigating in a fog need not be full of irrational members and inoperative information sharing systems. Conflicting preferences among rational members is sufficient in some cases to convince organization members not to try to learn. Indeed, in organizations characterized by preference conflict, strategic uncertainty can help organization members overcome political constraints on action.

I develop a model that brings political conflict back into organizational learning. I utilize the analytical machinery for preference aggregation developed in political economics research (Diermeier and Krehbiel 2003). That machinery, which is implemented through the “spatial model,” has typically been applied to government decision-making and majority voting.
I show that the intuition underpinning spatial preferences can be applied to a variety of organizational settings. My paper has a key insight: even in organizations where actors are rational and where there are no difficulties in aggregating information, organization members may still choose not to learn, because members can attain better organizational outcomes (for themselves) if the organization does not collect information than if it does. Further, the model demonstrates that individual incentives for strategic ignorance increase when existing policies are less desirable and when there is greater uncertainty in the relationship between existing policies and their outcomes.

Background

Institutional Analysis

I examine the relationship between politics, uncertainty, and information collection through institutional analysis (Diermeier and Krehbiel 2003). Institutional analysis consists of four parts. First, I define a series of behavioral postulates for each actor. These behavioral postulates define the actors’ utility functions and the behavioral rules that govern individual decision-making. Second, I identify the key institutions of collective choice. These institutions determine the order in which decisions are made, the set of behaviors that each actor can take, and the information available to each actor when it is their turn to act. The third part of institutional analysis logically derives the behaviors of each actor and describes the collective outcomes resulting from their choices. The fourth part then uses these predicted behaviors to generate hypotheses that can be applied to data.¹

¹Institutional analysis bears strong resemblance to the theory of conflict systems in March (1962), the political model of choice described in Pfeffer (1981), and the political economy approach to organizational analysis in Zald (1970). March argues that analyses of conflict systems require two necessary conditions: “(1) that the elementary decision processes be susceptible to treatment as consistent basic units, and (2) that analytic procedures be available to explore the properties of the model,” where “consistent basic units...can be defined as having a consistent preference ordering over the possible states of the system” (March 1962: 663). Pfeffer (1981) adds two additional necessary conditions in order to “understand organizational choices using a political model”: (1) “what determines each actor’s relative power” and (2) “how the decision process arrives at a decision.”
Behavioral Postulates: Spatial Modeling, Euclidean Preferences, and Outcome Uncertainty

I define the individual preferences for each actor using spatial modeling. Spatial models map possible organizational outcomes into Euclidean space and identify an ideal outcome for each actor. Utility is a strictly decreasing function of the Euclidean distance between an actor’s ideal outcome and the realized outcome.

Spatial modeling defines actor preferences in a way that accords with theories of preference conflict in organizations. Most important decisions in organizations involve tradeoffs about organizational outcomes (Pondy 1992). Common tradeoffs include short-term goals versus long-term goals, risk vs. return, and social impact vs. financial performance. Although all organization members may agree that creating positive social impact is better than causing social harm, for example, they are likely to disagree about the ideal balance of social impact and corporate profits. Organization members in charge of corporate social responsibility (CSR) would be willing to forego corporate profits in exchange for positive social impact; shareholders would prefer high profits at the expense of social welfare goals; managers are somewhere in the middle.

The spatial model takes this intuition about preferences and projects it into Euclidean space. We can illustrate the tradeoff between social impact and corporate profits through an analogy to the set of real numbers, where low values indicate negative social impact (and more profits) and high values indicate positive social impact (and less profits). The numerical ideal outcome of the shareholder is less than the ideal outcome of the manager, which is less than the ideal outcome of the employee working in CSR. Lower policy outcomes are most desirable for the shareholder; middling outcomes are most desirable for the manager; high outcomes are most desirable for the worker in CSR.

Preferences over strategies or policies can be defined spatially in terms of the outcomes they are expected to produce. For example, in a bank there is likely to be outcome disagreement over the relative levels of risk and expected return in an investment portfolio. Risk
managers prefer lower volatility and more modest returns. Traders are more risk-seeking. Internal conflict will arise when risk managers try to implement policies that substitute bureaucratic reporting rules and restrictive risk limits for trader discretion, because more rules and tighter oversight generate outcomes more desirable for risk managers than for traders.

However, in many organizational contexts, environmental turbulence, implementation error, and unpredictable competitor behavior generates stochasticity in the mapping between the strategies an organization implements and the outcomes that emerge as a result. Therefore, overt internal conflict in organizations is rarely over outcomes per se. Instead, political disagreement usually takes place when organizations set strategy or implement policy. Policies are under the control of organization members; outcomes are not.

Uncertainty about current policies, however, is qualitatively different from uncertainty about policy changes. The mapping between a status quo policy and status quo outcome is potentially learnable. A new policy that results from an organizational change, in contrast, brings with it idiosyncratic uncertainty that is unknowable prior to its implementation. Lessons learned prior to a policy change may have limited applicability afterward.

**Institutions of Collective Choice: An Agenda-Setting Proposer and an Organizational Veto**

Decisions in organizations frequently involve one actor with proposal power (or agenda-setting power) and another that has the authority to reject, or veto, proposals. As a result of different interests, financial incentives, operational roles, or psychological perspectives, the preferences of the proposer and the preferences of the veto are often not entirely aligned. As a result, the proposer must take the preferences of the veto into account if it desires to initiate a change to the organization. This is the decision-making architecture that I examine in my model.

This decision-making architecture has applications to broad organizational contexts. It closely resembles top-down decision-making processes in which a manager proposes a strategic change to a work unit; the work unit, in turn, has the opportunity to integrate the change
or fight against it (Dalton 1959; Freeland 2001; Granovetter 2005; Granovetter and Swedberg 2011). The subordinate’s veto reflects a classic tension in hierarchical organizations: the managers responsible for setting the organization’s strategy are less expert than the work units whom they seek to control (Barnard 1938; Simon 1976; Weber 1978). In Richard Freeland’s study of the implementation of the “M-form” at General Motors, he concludes: “When top management makes decisions in a way that appears to eschew expert opinion, subordinates are likely to view the resulting decisions as unjustified and either will put forth less than consummate effort in carrying them out or will engage in outright resistance to their implementation” (Freeland 2001: 30).

However, the described decision-making architecture also can be applied to bottom-up decision-making processes in which work units are in charge of surveying the environment and then proposing policy changes to management, who can either “rubber stamp” or reject the proposal (Csaszar 2012; Knudsen and Levinthal 2007; Sah and Stiglitz 1986). The proposal-veto collective choice structure is also relevant to political decision-making in a government with a legislature responsible for proposing legislation and an executive with veto authority (Cameron and McCarty 2004; Krehbiel 1997; Matthews 1989; Shepsle and Weingast 1981).

The Model

Two players, an agenda-setting proposer, \( P \), and a player with veto-power, \( V \), interact to determine an outcome, \( o \), in \( \mathbb{R} \).

Preferences and Information

\( P \) and \( V \) have utility functions, \( u_p \) and \( u_v \), that are defined spatially in \( \mathbb{R} \), where \( o = 0 \) is \( P \)’s ideal outcome and \( o = 1 \) is \( V \)’s ideal outcome. \( P \) and \( V \) are risk-neutral. Their utilities are defined by the Euclidean distance between their ideal outcomes and \( o \).

\[
\begin{align*}
  u_p(o) & = -|o| \\
  u_v(o) & = -|1 - o|
\end{align*}
\]
There exists an exogenous status quo policy, \( p \in \mathbb{R} \), which maps stochastically to a policy outcome, \( \psi_p(p) \), where \( \psi_p(p) = p + X_p \). \( X_p \) is a random variable distributed uniformly on \([-\alpha, \alpha]\), where \( \alpha \in (0, \frac{1}{2}] \). Higher values of \( \alpha \) indicate greater uncertainty in the relationship between the status quo policy and its associated outcome.

There also exist a continuum of alternative policies, \( a \in \mathbb{R} \), which map stochastically to alternative outcomes, \( \psi_a(a) \). The level of stochasticity in the outcomes resulting from alternative policies is endogenously determined by the behavior of \( P \) and \( V \) in the game. \( \psi_a(a) = a + X_{Ia} + (1 - 1_I) \cdot X_{\bar{I}a} \), where \( 1_I \) evaluates to 1 if \( P \) and \( V \) choose to reveal \( \psi_p(p) \) at the outset of the interaction and evaluates to 0 otherwise. If \( \psi_p(p) \) is revealed, then \( \psi_a(a) = a + X_{Ia} \). If \( \psi_p(p) \) is not revealed, then \( \psi_a(a) = a + X_{\bar{I}a} \).

The uncertainty associated with a proposed alternative if \( \psi_p(p) \) is not revealed, \( X_{\bar{I}a} \), is distributed uniformly on \([-\alpha, \alpha]\). If \( \psi_p(p) \) is revealed, then the uncertainty in the mapping between alternatives and their resulting outcomes may be reduced. The uncertainty associated with a proposed alternative if \( \psi_p(p) \) is revealed, \( X_{Ia} \), is distributed uniformly on \([-\frac{\alpha}{\gamma}, \frac{\alpha}{\gamma}]\), where \( \gamma \geq 1 \). Higher values of \( \gamma \) are associated with greater uncertainty reduction in the relationship between \( a \) and \( \psi_a(a) \) if \( \psi_p(p) \) is revealed.\(^2\)

\( p, \alpha, \) and \( \gamma \) are known by both \( P \) and \( V \) prior to the game.

**Collective Choice Process**

The interaction consists of two subgames: the *learning subgame* and the *policy subgame*. In both subgames, \( P \) acts as agenda-setter and \( V \) has the opportunity to exercise a veto.

In the learning subgame, \( P \) and \( V \) decide whether to reveal \( \psi_p(p) \). Then, in the policy subgame, \( P \) can propose an alternative, \( a \), to \( V \). If in the policy subgame, \( P \) proposes an alternative and \( V \) accepts the proposal, then the outcome, \( o \), is \( \psi_a(a) \). Otherwise, the outcome is \( \psi_p(p) \).

\(^2\)Note that the mechanism through which learning \( \psi_p(p) \) generates reduced uncertainty in the model is through improved “shock absorption” (see Bendor and Meirowitz 2004) rather than through a correlation between \( X_p, X_{Ia} \) and \( X_{\bar{I}a} \). However, an alternate formulation in which \( X_p \) and \( X_a \) are distributed bivariate normal with common variance and a correlation coefficient between zero and one generates substantively similar, although less analytically tractable, results.
The Learning Subgame

In the learning subgame, $P$ has the option to propose to $V$ that $\psi_p(p)$ be revealed. $V$ then has the opportunity to exercise a veto. The decision to reveal $\psi_p(p)$ in the model is akin to the decision by an organization to initiate a program evaluation (Weiss 1998). If the organization undertakes the evaluation, the organization not only reveals information about existing policies, but also may reduce the uncertainty surrounding the outcomes resulting from a policy change.

The *proposal strategy* in the learning subgame is defined by the binary choice

$$\mathcal{L}^P \in \{\neg L, L\}$$

where $\mathcal{L}^P = \neg L$ indicates the decision by $P$ not to propose to reveal $\psi_p(p)$ and $\mathcal{L}^P = L$ indicates the decision by $P$ to propose to reveal $\psi_p(p)$.

The *veto strategy* in the learning subgame is defined by the binary choice

$$\mathcal{L}^V \in \{\neg A, A\}$$

where $\mathcal{L}^V = \neg A$ indicates that $V$ has exercised its veto and $\mathcal{L}^V = A$ indicates that $V$ has accepted the proposal to reveal $\psi_p(p)$.

If $\mathcal{L}^P = L$ and $\mathcal{L}^V = A$, then $P$ and $V$ learn $\psi_p(p)$. Otherwise, $P$ and $V$ enter the policy subgame knowing $p$, but not $\psi_p(p)$.

The Policy Subgame

Following the learning subgame, $P$ and $V$ begin the policy subgame.

$P$ has the option to propose a policy alternative, $a$, to $V$. The proposal strategy is a choice

$$\mathcal{P}^P_1 \in \{p, a \in \mathbb{R}\}$$
$P_i^P = p$ indicates that $P$ has not proposed a policy alternative. As a result, $\psi_p(p)$ becomes the outcome, $o$.

$P_i^P = a$ indicates that $P$ has proposed a policy alternative to $V$. If accepted, $\psi_a(a)$ becomes the outcome, $o$.

The subscript, $i \in \{-I, I\}$ indicates whether $P$ and $V$ are informed about $\psi_p(p)$ prior to beginning the policy subgame. If $\psi_p(p)$ has been revealed, then $i = I$. Otherwise, $i = -I$.

If $P_i^P = a$, then $V$ has the choice to accept the alternative or to veto the proposal. If $V$ vetoes, then $\psi_p(p)$ becomes the outcome, $o$. If $V$ accepts, then $\psi_a(a)$ becomes the outcome, $o$. The veto strategy for $V$ is a binary choice

$$P_i^V \in \{p, a\}$$

where $P_i^V = p$ indicates that $V$ has exercised its veto and $P_i^V = a$ indicates that $V$ has accepted $P$’s proposal. $i$ is defined as above.

At the conclusion of the interaction, $P$ and $V$ receive utility defined by the Euclidean distance of the outcome, $o$, from their individual ideal outcomes.

**Strategies and Solution Concept**

Both participants have the ability to perfectly predict the actions of their alter. As a result, they make decisions that are best responses to all the predicted future decisions in the game. I employ a subgame perfect Nash equilibrium (SPNE) concept for the model, which is common in rational actor models of this sort. In the subgame perfect refinement of Nash equilibrium, actors make expected utility maximizing decisions conditional on reaching every stage in the game. Unlike Nash equilibrium, which permits irrational strategies in parts of the game that will never be reached in equilibrium, SPNE requires full sequential rationality of actor behavior (Fudenberg and Tirole 1991).

The key results from the model are whether the subgame perfect strategy for the proposer includes learning $\psi_p(p)$ and whether the subgame perfect strategy for the veto includes
accepting a proposal to learn $\psi_p(p)$. If learning is part of the subgame perfect strategy for $P$, then the expected utility for the proposer if it learns exceeds the expected utility for the proposer if it does not learn. If accepting a proposal to learn is part of the subgame perfect strategy for $V$, then the expected utility for the veto if $\psi_p(p)$ is revealed exceeds the expected utility for the veto if $\psi_p(p)$ is not revealed.

The strategy for $P$, $S_P$, is a triple of decisions, $(\mathcal{L}_P, \mathcal{P}_{\sim I}, \mathcal{P}_I)$. Define the subgame perfect equilibrium strategy for $P$, $S_P^*$, as $(\mathcal{L}_P^*, \mathcal{P}_{\sim I}^*, \mathcal{P}_I^*)$, which is the set of decisions that result in the highest expected utility for $P$ conditional on available information and knowledge of the best responses of $V$.

The strategy for $V$, $S_V$, is a triple of decisions, $(\mathcal{L}_V, \mathcal{P}_{\sim I}, \mathcal{P}_I)$. Define the subgame perfect equilibrium strategy for $V$, $S_V^*$, as $(\mathcal{L}_V^*, \mathcal{P}_{\sim I}^*, \mathcal{P}_I^*)$.

I introduce a series of tie-breaking assumptions in order to simplify the formal analysis. If the proposer is indifferent between learning and not learning, the proposer chooses to learn. If the proposer is indifferent between proposing an alternative or retaining the status quo policy, the proposer retains the status quo. Finally, if the veto is indifferent between accepting or vetoing a proposal from the proposer in either subgame, the veto accepts the proposal.

I illustrate through the model that, depending on the status quo policy ($p$), the level of status quo policy uncertainty ($\alpha$), and the amount of uncertainty associated with policy alternatives that is reduced if $\psi_p(p)$ is revealed ($\gamma$), the proposer will sometimes choose to propose to reveal $\psi_p(p)$ and sometimes will prefer to keep the organization from revealing $\psi_p(p)$. Similarly, depending on $p$, $\alpha$, and $\gamma$, the veto will sometimes accept a proposal to reveal $\psi_p(p)$ and sometimes use its veto in order to keep the organization from revealing $\psi_p(p)$.

**Equilibrium Results**

First, I demonstrate equilibrium existence.

*Proposition 1: A unique, pure-strategy SPNE exists*
The game is finite and all players have perfect information. Therefore, the game can be solved by backwards induction and has a pure-strategy Nash equilibrium. Because all players have strict preferences over possible outcomes (and ties are broken deterministically), there exists a unique SPNE (Fudenberg and Tirole 1991).

I then derive the solution to the game using backwards induction. First, I examine the equilibrium behavior in the proposal subgame conditional on $\psi_p(p)$ not being revealed.

**Proposition 2:** In the proposal subgame, conditional on $\psi_p(p)$ not being revealed, the following defines the Nash equilibrium strategies for $P$ and $V$:

\[
P^\ast_{-I} = \begin{cases} 
  a = 0 & \text{if } p \leq 0 \\
  p & \text{if } 0 < p \leq 1 \\
  a = 2 - q & \text{if } 1 < p \leq 2 \\
  a = 0 & \text{if } p > 2 
\end{cases}
\]

\[
V^\ast_{-I} = a
\]

If $\psi_p(p)$ is not revealed, then $P$ and $V$ have no additional information about the distribution of outcomes resulting from the set of alternatives. Therefore, $V$ decides whether or not to accept an alternative by comparing the distance of $p$ from its ideal point with the distance of $a$ from its ideal point. $P$ therefore proposes the alternative, $a$, that is as close to 0 as possible and that is at least as close to 1 as $p$.

For $p \leq 0$ and $p > 2$, the Euclidean distance of $p$ from $V$’s ideal outcome is sufficiently large that $P$ can propose $a = 0$ (the best possible alternative from $P$’s perspective) and $V$ will accept.

For $p \in [0, 1]$, there are no alternatives that $P$ can propose that will also make $V$ weakly better off. As a result, $P$ does not make a proposal and retains the status quo policy, $p$. 
For $p \in (1, 2]$, $P$ is partially constrained by $V$’s veto power. The distance of $p$ from $V$’s ideal point is $p - 1$. As a result, $P$ proposes an equidistant from 1 as $p$: $a = 2 - p$.

Because all of the alternatives proposed make $V$ weakly better off, $V$ accepts in equilibrium.\(^3\)

Next, I examine the equilibrium behavior in the proposal subgame conditional on $\psi_p(p)$ being revealed. Importantly, if $\psi_p(p)$ is revealed, then the uncertainty in the mapping between $a$ and $\psi_a(a)$ may be reduced.

**Proposition 3:** In the proposal subgame, conditional on $\psi_p(p)$ being revealed, the following defines the Nash equilibrium strategies for $P$ and $V$:

\[ P^*_I = \begin{cases} 
  a = 0 & \text{if } \psi_p(p) \leq -\frac{\alpha}{2\gamma} \\
  a = 1 - \sqrt{(\psi_p(p) - 1) \frac{2\alpha}{\gamma} - \left(\frac{\alpha}{\gamma}\right)^2} & \text{if } \psi_p(p) \in \left(-\frac{\alpha}{2\gamma}, 1 + \frac{\alpha}{2\gamma}\right) \\
  a = 2 - \psi_p(p) & \text{if } \psi_p(p) \in \left(1 + \frac{\alpha}{2\gamma}, 1 + \frac{\alpha}{\gamma}\right] \\
  a = 0 & \text{if } \psi_p(p) > 2
\]

\[ V^*_I = a \]

The rationale for $P$’s proposal strategy if $\psi_p(p)$ is revealed is the same as had $\psi_p(p)$ not been revealed. $P$ aims to propose the alternative closest to 0 that makes $V$ weakly better off than $\psi_p(p)$.

For $\psi_p(p)$ sufficiently less than zero or greater than 2, $P$ and $V$ both prefer an alternative policy at 0 to the known status quo policy outcome.

For $\psi_p(p)$ that is negative, but near zero, $P$ prefers a known $\psi_p(p)$ to any uncertain alternative policy. The cutoff between $P$ proposing $a = 0$ and retaining the status quo

\(^3\)For complete proofs, please see the appendix.
policy, $p$, is one-quarter the range of uncertainty associated with an alternative policy, or $\frac{\alpha}{2\gamma}$.

Similarly, for $\psi_p(p)$ sufficiently near 1, there are no alternatives that $V$ finds an improvement over the status quo. This range is from $1 - \frac{\alpha}{2\gamma}$ to $1 + \frac{\alpha}{2\gamma}$. Therefore, for all $\psi_p(p)$ between $-\frac{\alpha}{2\gamma}$ and $1 + \frac{\alpha}{2\gamma}$, $P$ does not propose an alternative policy.

Finally, for $\psi_p(p) \in (1 + \frac{\alpha}{2\gamma}, 2)$, $P$ proposes the alternative for which $V$ is indifferent between retaining the status quo and accepting $a$.

Now, I examine the equilibrium behavior for $P$ and $V$ in the learning subgame, conditional on the best responses in the proposal subgame.

**Proposition 4:** In the learning subgame, the following defines the Nash equilibrium strategies for $P$ and $V$.

$$\mathcal{L}^P = \begin{cases} L & \text{if } E u_p(\mathcal{L}^P = L) \geq E u_p(\mathcal{L}^P = \neg L) \\ \neg L & \text{otherwise} \end{cases}$$

$$\mathcal{L}^V = \begin{cases} A & \text{if } p \leq -\alpha - \frac{\alpha}{2\gamma} \\ \neg A & \text{if } p \in \left(-\alpha - \frac{\alpha}{2\gamma}, \frac{\alpha}{2\gamma} - \alpha\right) \\ A & \text{otherwise} \end{cases}$$

In the learning subgame, the equilibrium behavior for $V$ is more straightforward than for $P$.

In order to demonstrate the values of $p$ for which $V$ will veto a proposal to reveal $\psi_p(p)$, I partition $\mathbb{R}$ into six segments, $P_i$, where $i \in \{1, 2, 3, 4, 5, 6\}$. $P_1 = (-\infty, -\alpha - \frac{\alpha}{2\gamma}]$, $P_2 = (-\alpha - \frac{\alpha}{2\gamma}, 0]$, $P_3 = [0, 2 - \alpha]$, $P_4 = (2 - \alpha, 2]$, $P_5 = (2, 2 + \alpha]$, and $P_6 = (2 + \alpha, \infty]$.

For $p \in P_1$, for all possible values of $\psi_p(p)$, $P$ will propose $a = 0$ if $\psi_p(p)$ is revealed. If $\psi_p(p)$ is not revealed, then $P$ will propose $a = 0$ as well. Therefore, $V$ is indifferent between revealing $\psi_p(p)$ and not. As a result, $V$ will accept a proposal to reveal $\psi_p(p)$.
For \( p \in P_6 \), the same holds. For all possible values of \( \psi_p(p) \), \( P \) will propose \( a = 0 \) if \( \psi_p(p) \) is revealed. If \( \psi_p(p) \) is not revealed, then \( P \) will propose \( a = 0 \) as well.

For \( p \in P_2 \), if \( \psi_p(p) \) is not revealed, then \( P \) will propose \( a = 0 \), \( V \) will accept, and \( Eu_v = -1 \). Therefore, by revealing \( \psi_p(p) \), \( V \) trades off the possibility that \( \psi_p(p) \in (-\frac{\alpha}{2\gamma}, 0) \), in which case \( \mathcal{P}_I^{P^*} \) is \( p < 0 \) and \( Eu_v < -1 \) against the possibility that \( \psi_p(p) \geq 0 \), \( \mathcal{P}_I^{P^*} \) is \( p \geq 0 \), and \( Eu_v \geq -1 \). For \( p \in (-\alpha - \frac{\alpha}{2\gamma}, \frac{\alpha}{2\gamma} - \alpha) \), \( Pr(\psi_p(p) \in (-\frac{\alpha}{2\gamma}, 0)) > Pr(\psi_p(p) > 0) \) and \( V \) prefers not to reveal \( \psi_p(p) \). For \( p \in [\frac{\alpha}{2\gamma} - \alpha, 0] \), the opposite is true and \( V \) prefers to reveal \( \psi_p(p) \).

For \( p \in P_3 \), if \( \psi_p(p) \) is revealed and \( P \) proposes an alternative, then \( V \) is indifferent between the alternative and \( \psi_p(p) \). Similarly, if \( \psi_p(p) \) is not revealed and \( P \) proposes an alternative, \( V \) is made exactly as well off as if the status quo policy were to remain. Therefore, \( V \) is indifferent between revealing \( \psi_p(p) \) and not.

For \( p \in P_4 \), if \( \psi_p(p) \) is not revealed, then \( P \) will propose an alternative that makes \( V \) indifferent between accepting the alternative and retaining \( p \). In contrast, if \( \psi_p(p) \) is revealed to be greater than 2, \( P \) will propose \( a = 0 \), which makes \( V \) strictly better off than \( \psi_p(p) \). Therefore, \( V \) prefers that \( \psi_p(p) \) be revealed.

For \( p \in P_5 \), if \( \psi_p(p) \) is not revealed, \( P \) will propose \( a = 0 \) and \( Eu_v(a) = -1 \). If \( \psi_p(p) \) is revealed to be greater than 2, then \( P \) will also propose \( a = 0 \). But, if \( \psi_p(p) \) is revealed to be less than 2, then \( P \) will propose \( a > 0 \) and \( Eu_v(a) > -1 \). As a result, \( V \) is strictly better off if \( \psi_p(p) \) is revealed.

\( P \)'s decision whether or not to learn is considerably more involved. Implicitly, if the expected utility from learning exceeds the expected utility for not learning, \( P \) will propose to reveal \( \psi_p(p) \). I demonstrate the equilibrium behavior for \( P \) through a series of numerical examples in order to generate intuition for the conditions in which not learning dominates learning and vice versa. The first two examples illustrate cases where internal politics create incentives for the proposer not to learn. The third demonstrates how political considerations can make information collection more valuable, rather than less.
Example 1: Price-setting in a manufacturing firm

Background

Zbaracki and Bergen (2010) describe the internal politics of price-setting in a manufacturing firm that sells products to warehouse distributors. They emphasize the conflict between the marketing team and the sales team. The organization’s goals included increasing market share and maximizing profit margins. Of these two goals, the marketing team placed greater emphasis on the market share goal and the sales team placed greater emphasis on the profit margin goal. These emphases reflected the roles of each team in the company. Marketers were in charge of setting pricing strategies intended to enlarge the company’s client base. Members of the sales team were tasked with developing long-term relationships with distributors, which entailed significant discretion over discounting.

The disagreement over organizational outcomes created conflict over pricing strategies. The marketing team desired lower prices across the board and less individual discretion for the sales team. The sales team preferred higher prices and greater discretion to discount. The marketing team justified their position by arguing that prospective customers paid significant attention to list prices and that there was no evidence that selective discounting increased revenue for the company. The sales team believed that large customers did not take list prices seriously. Lower prices merely constrained the company’s ability to price discriminate.

The conflict remained latent until the firm’s management decided to make a large capital investment and to purchase a product line from a close competitor, generating a sizable decline in production costs. The organizational change had a direct impact on the firm’s existing pricing policy. If list prices were kept at the same levels, then the sales team would have even more discretion than before. However, the marketing team had institutional control over the published price lists. Marketing viewed the decreased production costs as an opportunity to slash prices across the board.

Political conflict erupted between the marketing team and the sales team. Marketing
criticized sales for being “champions of high price” (Zbaracki and Bergen 2010: 965). Sales responded that marketing had “very minimal experience in this industry” and titled the MBA-laden pricing team “mahogany row” (Ibid). According to one analyst, meetings between marketing and sales to negotiate new pricing policies became so contentious that they approached physical violence.

Notwithstanding the overt disagreement over organizational strategy, the marketing team made no serious attempt to collect information or to model alternative pricing schemes. Marketing admitted that they could not predict customer response to a large cut in prices. Interestingly, however, they also did very little to collect information about the status quo pricing policy. They refused to incorporate the data on differential pricing across market regions and product lines compiled by the sales team into their pricing simulations. As the sales team lacked the information and expertise to develop pricing simulations on their own, the political conflict erupted in the absence of any hard data.

In the end, firm executives agreed to the recommendations of the marketing team for the newer, high volume products, but made a specific exception for older products in order to make the price changes revenue neutral. The director of sales acknowledged that his team had lost in this political conflict: “You’ve got to move on. You can’t keep fighting it. It is pointless. You have to move on and make it work” (Zbaracki and Bergen 2010: 966).

**Strategic Analysis**

I illustrate how it could be in the best interests of the marketing team to refuse to collect information on the existing pricing scheme.

Define the outcome space by the relative importance of market share and profit margins, where high market share and low profit margins map to low values in \( R \). Define preferences over policies by their expected outcomes, where low values indicate lower prices and high values indicate more discretion.

Let the marketing team be \( P \), which is consistent with marketing’s control over the price lists and their ability to collect and analyze market data. Let sales be \( V \).
Let $p = \frac{5}{4}$, indicating that the status quo policy (following the firm’s investment) was more heavily weighted towards discretion than what was seen as optimal from the perspectives of both marketing and sales. However, the status quo is substantially less desirable from the perspective of the marketing team.

Let $\alpha = \frac{1}{4}$ and $\gamma = 1$, indicating a moderate level of uncertainty about the mapping from the status quo policy to the status quo outcome. Because the status quo policy was implemented prior to a significant organizational change, revealing $\psi_p(p)$ provides no additional information about the mapping between a proposed alternative and the associated policy outcome. Note that the sales team, $V$, will accept a proposal from the marketing team, $P$, to learn $\psi_p(p)$ ($L^{V*} = A$).

The strategic analysis involves calculating the expected utility for $P$ if $\psi_p(p)$ is revealed and if $\psi_p(p)$ is not revealed:

If the marketing team does not propose to collect information ($L^P = \neg L$), then the best alternative proposal is $\frac{3}{4}$ ($P^{P*}_{-L}$ is $a = \frac{3}{4}$), which is the nearest proposal to their ideal outcome, 0, that makes the sales team just as well off. Because the range of outcomes associated with the policy are distributed uniformly from $\frac{1}{2}$ to 1, the expected utility for the marketing team is $-\frac{3}{4}$ ($E_u_p(L^P = \neg L) = -\frac{3}{4}$). Note that for ease of notation, I will denote $E_u_p(L^P = \neg L)$ and $E_u_p(L^P = L)$ as $E_u_p(\neg L)$ and $E_u_p(L)$.

The game outcome if the marketing team does not propose to collect information ($L^P = \neg L$) is illustrated in Figure 1.
Figure 1: \( p = \frac{5}{4}, \alpha = \frac{1}{4}, \gamma = 1, \mathcal{L}^P = -L. \)

(a) The status quo policy, \( p = \frac{5}{4}. \)

\[
\begin{array}{c|c|c|c|c}
\text{Marketing (P)} & \text{Less discretion} & 0 & 0.5 & 1 \\
\text{ideal outcome} & & & & \\
\text{Sales (V)} & \text{ideal outcome} & 1.5 & 2 & \text{More discretion}
\end{array}
\]

Status quo policy, \( p = \frac{5}{4} \)

Distribution of status quo outcomes, \( p + X_p \sim U[1, \frac{3}{2}] \)

(b) The best alternative policy that the marketing team can propose that the sales team will accept is \( a = \frac{3}{4}. \)

\[
\begin{array}{c}
\text{Alternative proposal, } a \\
\end{array}
\]

If \( a \) is in the darkened range: \( V \) will accept \( a = \frac{3}{4} \)

\[ Eu_v(p) = -\frac{3}{4} \]

(c) The expected utility for \( P, Eu_p = -\frac{3}{4}. \)

\[
\begin{array}{c|c|c|c|c}
\text{P ideal outcome} & -0.5 & 0 & 0.5 & 0.75 \\
\text{V ideal outcome} & -1 & -0.5 & 0 & 1.0 \\
\end{array}
\]

Proposed alternative, \( a = \frac{3}{4} \)

Distribution of alternative outcomes, \( a + X_a \sim U[\frac{1}{2}, 1] \)
If the marketing team proposes to collect information ($L^P = L$) and learns that the status quo policy outcome, $\psi_p(p)$, is between 1 and $\frac{9}{8}$, there is no alternative that the marketing team, $P$, can propose that makes the sales team, $V$, better off. As a result, the marketing team does not propose an alternative ($P^*_L = p$). The probability that the status quo policy outcome lies in this range is $\frac{1}{4}$. ($Pr(\psi_p(p) < \frac{9}{8}) = \frac{1}{4}$). The expected utility of the marketing team, $P$, given that $\psi_p(p)$ lies in this range is $-\frac{17}{16}$.

The game outcome if the marketing team proposes to collect information ($L^P = L$) and $\psi_p(p) = \frac{17}{16}$ is illustrated in Figure 2.
Figure 2: \( p = \frac{5}{4}, \alpha = \frac{1}{4}, \gamma = 1. \mathcal{L}^P = L. \mathcal{L}^V = A. \psi_p(p) = \frac{17}{16}. \)

(a) Assume that the marketing team proposes to collect information and learns that the status quo outcome, \( \psi_p(p) = \frac{17}{16}. \)

(b) There are no alternatives that will make both marketing and sales better off. Therefore, \( P \) does not propose an alternative policy. The outcome is \( \psi_p(p) = \frac{17}{16}. \) The expected utility of \( P, \) \( Eu_p(\psi_p(p)) = -\frac{17}{16}. \)

If the marketing team proposes to collect information (\( \mathcal{L}^P = L \)) and learns that the status quo policy outcome, \( \psi_p(p),\) is between \( \frac{9}{8} \) and \( \frac{5}{4}, \) the marketing team will propose an alternative with an expected value between \( \frac{3}{4} \) and 1 that makes the sales team, \( V, \) indifferent between the proposed alternative and the status quo outcome. The probability that \( \psi_p(p) \) lies in this interval is \( \frac{1}{4}. \) (\( Pr(\frac{9}{8} \leq \psi_p(p) < \frac{5}{4}) = \frac{1}{4}) \). The expected utility of the marketing team, \( P, \) given that \( \psi_p(p) \) lies in this interval is strictly less than than \(-\frac{3}{4}.\)
The game outcome if the marketing team proposes to collect information \((\mathcal{L}^P = L)\) and 
\(\psi_p(p) = \frac{19}{16}\) is illustrated in Figure 3.
Figure 3: $p = \frac{5}{4}$. $\alpha = \frac{1}{4}$. $\gamma = 1$. $\mathcal{L}^P = L$. $\mathcal{L}^V = A$. $\psi_p(p) = \frac{19}{16}$.

(a) Assume that the marketing team proposes to collect information and learns that the status quo outcome, $\psi_p(p) = \frac{19}{16}$.

(b) The best alternative policy that the marketing team can propose that the sales team will accept is $a = 0.82$. 

(c) The expected utility of $P$, $Eu_p = -0.82$. 
If the marketing team proposes to collect information \( (L^P = L) \) and learns that the status quo policy outcome, \( \psi_p(p) \), is between \( \frac{3}{4} \) and \( \frac{3}{2} \), then the marketing team will propose an alternative policy with an expected value between \( \frac{1}{2} \) and \( \frac{3}{4} \) such that \( V \) is indifferent between the proposed alternative and the status quo outcome. The probability that \( \psi_p(p) \) lies in this interval is \( \frac{1}{2} \) \( (Pr(\psi_p(p) \geq \frac{5}{4}) = \frac{1}{2}) \). The expected utility of the marketing team, \( P \), given that \( \psi_p(p) \) lies in this interval is \( -\frac{5}{8} \).

The game outcome if the marketing team proposes to collect information \( (L^P = L) \) and \( \psi_p(p) = \frac{11}{8} \) is illustrated in Figure 4.
Figure 4: $p = \frac{5}{4}$, $\alpha = \frac{1}{4}$, $\gamma = 1$. $\mathcal{L}^P = L$, $\mathcal{L}^V = A$. $\psi_p(p) = \frac{11}{8}$.

(a) Assume that the marketing team proposes to collect information and learns that the status quo outcome, $\psi_p(p) = \frac{11}{8}$.

(b) The best alternative policy that the marketing team propose that the sales team will accept is $a = \frac{5}{8}$.

(c) The expected utility of $P$, $E_{u_p} = -\frac{5}{8}$.
If the marketing team proposes to collect information \((L^P = L)\), the marketing team has a 25 percent chance of expected utility of \(-\frac{17}{16}\), a 25 percent chance of expected utility less than \(-\frac{3}{4}\), and a 50 percent chance of expected utility of \(-\frac{5}{8}\). The expected utility for the marketing team if they propose to collect information, therefore, is lower than the expected utility if they do not \((Eu_p(L) < Eu_p(\neg L))\).

\[
Eu_p(L) = Pr(\psi_p(p) < \frac{9}{8})(Eu_p|\psi_p(p) < \frac{9}{8}) + \\
Pr(\frac{9}{8} \leq \psi_p(p) < \frac{5}{4})(Eu_p|\frac{9}{8} \leq \psi_p(p) < \frac{5}{4}) + Pr(\psi_p(p) \geq \frac{5}{4})(Eu_p|\psi_p(p) \geq \frac{5}{4})
\]

\[
Eu_p(L) < \frac{1}{4} \cdot -\frac{17}{16} + \frac{1}{4} \cdot -\frac{3}{4} + \frac{1}{2} \cdot -\frac{5}{8} \\
Eu_p(L) < -\frac{3}{4} \\
Eu_p(\neg L) = -\frac{3}{4} \\
Eu_p(\neg L) > Eu_p(L)
\]

Thus, the marketing team chooses not to propose to collect information \((L^P* = \neg L)\).

Conclusion

Because learning about the uncertain status quo policy increases the likelihood that the sales team would refuse any potential proposed alternative, the marketing team prefers to make a proposal without learning the mapping of status quo outcomes to status quo policies.

Example 2: Congressional investigations following the financial crisis of 2008

Background

In the aftermath of the 2008 financial crisis and, in particular, following the emergency passage of legislation approving the Troubled Asset Relief Program, Democrat and Republican legislators agreed that the American financial regulatory regime was badly broken. Traditionally, Democrats in Congress supported a more stable financial system at the cost of sacrificed economic growth. Republicans, in contrast, were willing to risk greater financial instability for faster economic growth. These disagreements over economic values tended to play out in negotiations over financial regulatory policy. Democrats supported more stringent...
banking regulation. Republicans tended to favor deregulation.

After the financial crisis, however, Democrats and Republicans agreed that the needle had swung too far towards deregulation. The debate was over how much additional regulation was necessary. Congressional Democrats supported replacing the existing regulatory apparatus with a regime similar to the one in place following the Great Depression. Congressional Republicans supported more targeted reforms.

It is common for the U.S. legislature to establish investigatory commissions when national emergencies occur that warrant policy intervention. Investigatory commissions of this type were created to great fanfare following the Great Depression, the Challenger Disaster, and the terrorist attack on the World Trade Center. The investigative reports published by these commissions were influential in directing the subsequent policy debate. Even today, the Pecora Commission, the Rogers Commission, and the 9/11 Commission remain a part of public discourse.

However, Democrats in the Congress were unenthusiastic about creating a commission following the financial crisis. Chairman of the House Financial Services Committee Barney Frank called proposals to form an investigatory commission “a silly idea whose time has come” (Kaiser 2013). Unable to keep a commission from being created, Frank instead convinced congressional leadership in the House of Representatives to stipulate that the commission’s findings be published after the financial reform effort was complete.

Sweeping financial reforms were signed by the President on July 21, 2010. Major changes included the creation of new regulatory agencies, significant expansion of existing regulatory authority, and the re-introduction of restrictions on investment behavior that had been slowly eroded through deregulation.

The results of the commission’s investigation were published six months later.

Strategic Analysis

I demonstrate one reason why Congressional Democrats were opposed to the creation of an investigatory commission.
Define the outcome space by the relative importance of economic stability and economic growth, where high stability and low growth map to low values in $\mathbb{R}$. Define preferences over policies by their expected outcomes, where low values indicate more market regulation and high values indicate less market regulation.

Let Democrats be $P$, which is consistent with the partisan control of the Congress and the Executive when the commission was proposed. Let Republicans be $V$.

Let $p = 1.9$, indicating that the status quo policy (following the financial crisis) was more heavily weighted towards instability than what was seen as optimal from the perspectives of both Democrats and Republicans.

Let $\alpha = \frac{1}{2}$ and $\gamma = \frac{5}{4}$. There is high uncertainty about the mapping between the status quo policy and status quo outcome, although there is agreement that all possible status quo outcomes are associated with too little regulation. Learning about the mapping between the status quo policy and policy outcome does provide some additional information about the distribution of outcomes resulting from proposed alternatives. This differs from the previous example, in which learning about the mapping from status quo policy to status quo outcome did not decrease the range of possible outcomes resulting from proposed alternatives.

$L^V = A$, indicating that $V$ will accept a proposal to reveal $\psi_p(p)$.

If $L^P = \lnot L$, then $P^*_{\lnot L}$ is $a = 0.1$, which is the nearest point to 0 which makes $V$ just as well off. $Eu_p(\lnot L) = -0.26$.

If $L^P = L$ and $\psi_p(p) \in [1\frac{2}{5}, 1\frac{3}{5})$, $P$ will propose $a = 2 - \psi_p(p)$. The probability that $\psi_p(p) \in [1\frac{2}{5}, 1\frac{3}{5})$ is $\frac{1}{5}$. The expected utility for $P$ given $\psi_p(p) \in [1\frac{2}{5}, 1\frac{3}{5})$ is $-\frac{1}{5}$.

If $L^P = L$ and $\psi_p(p) \in [3\frac{3}{5}, 2)$, $P$ will propose $a \in (0, \frac{2}{5})$. The probability that $\psi_p(p) \in [3\frac{3}{5}, 2)$ is $\frac{2}{5}$. The expected utility for $P$ given $\psi_p(p) \in [3\frac{3}{5}, 2)$ is strictly less than $-\frac{1}{5}$.

If $L^P = L$ and $\psi_p(p) \in [2, 2\frac{1}{5}]$, $P$ will propose $a = 0$. The probability that $\psi_p(p) \in [2, 2\frac{1}{5}]$ is $\frac{2}{5}$. The expected utility for $P$ given $\psi_p(p) \in [2, 2\frac{1}{5}]$ is $-\frac{1}{5}$.

As a result, if $L^P = L$, $P$ has a 20 percent chance of expected utility of $-\frac{1}{5}$, a 40 percent chance of expected utility of $-\frac{1}{5}$, and a 40 percent chance of expected utility of strictly less
than $-\frac{1}{5}$, which is less than $E_{u_p}(\neg L) = 0.26$.

Thus, $L^{P^*} = \neg L$.

Conclusion

Congressional Democrats would do fairly well without learning, because the status quo policy is thought to be so extreme. If they investigate, Congressional Republicans could learn that the current regulatory system was stronger than had previously been thought, in which case Democrats would be unable to get as desirable a new policy accepted by Republicans. Although, if they investigate, Congressional Democrats could learn that the current regime was even less regulated than legislators previously thought, the political value of this information is bounded by the Democrats’ ideal outcome.

Example 3: Drug testing, Major League Baseball, and the players’ union

Background

The late 1990s were a boon to Major League Baseball. The assaults on Roger Maris’ storied home run record by sluggers Mark McGwire, Ken Griffey, Jr., Sammy Sosa, and Barry Bonds brought fans back to baseball after a nasty labor dispute canceled the 1994 World Series. However, the power surge also stimulated suspicion among baseball fans about the possibility of widespread performance-enhancing drug use. Following a series of investigations into specific players and even some high profile admissions of guilt, the Office of the Commissioner came to believe that steroid use was hurting the long-term popularity of the sport.

The Major League Baseball Players Association agreed that steroid use was a problem, but was deeply uncomfortable with subjecting its members to the steroid testing regime proposed by the owners. The union was concerned that the owners would use steroid tests as a tool to discriminate against disfavored players, that violators could be open to federal prosecution, and that the testing regime could be a first step towards more draconian oversight over the private lives of players. The union was willing to make steroid testing a part of the collective bargaining process, but expected concessions from ownership in order to
accept widespread randomized testing and stiff penalties for violators.

In 2006, Major League Baseball commissioned a report on the prevalence of steroids in baseball, which was conducted by former U.S. Senator George Mitchell. The report, which was completed in the fall of 2007, found conclusive evidence of performance-enhancing drug use by 89 current and former players. Included in the report were also interviews with current and former players and coaches that insinuated that the problem of performance-enhancing drugs was far more widespread than had been expected.

The resulting change in player perceptions about the prevalence of performance-enhancing drugs in baseball combined with the bad public optics of appearing to be in favor of illegal drugs have led the union to take a more conciliatory stance towards increased testing. In the 2011 negotiations between the commissioner’s office and the union, the players accepted significantly more stringent testing standards, including agreeing to collection of blood samples in order to test for human growth hormone. In 2013, the players’ union also agreed to increased penalties for players caught using performance enhancing drugs, random blood tests, and substantially increased supervision for past offenders.

**Strategic Analysis**

I illustrate how the decision to commission a report on steroids in baseball helped the commissioner’s office in negotiations with the Major League Baseball Players Association.

Define the outcome space by the relative importance of clean players and personal privacy, where clean players and low privacy map to low values in $\mathbb{R}$. Define preferences over policies by their expected outcomes, where low values indicate more drug testing and high values indicate less drug testing.

Let the Office of the Commissioner be $P$, which is consistent with power that owners have over the players and the considerably greater resources at the disposal of the commissioner than the head of the players’ association. Let the union be $V$.

Let $p = 1$, indicating that the status quo policy is optimal from the perspective of the union, but undesirable from the perspective of the owners.
Let $\alpha = \frac{3}{10}$ and $\gamma = 1$, indicating a moderate level of uncertainty about the prevalence of the use of steroids in the current regime and a belief that learning the current rate of steroid usage would not reduce the uncertainty surrounding an alternative performance-enhancing drug policy.

$L^V = A$, indicating that $V$ will accept a proposal to reveal $\psi_p(p)$.

If $L^P = \neg L$, then $P_L^p = p$, because there are no alternative policies than can make the union better off than the status quo. $Eu_p(\neg L) = -1$.

If $L^P = L$ and $\psi_p(p) \in [\frac{3}{20}, \frac{13}{10}]$, $P$ will propose $a \in [\frac{7}{10}, 1]$. The probability that $\psi_p(p) \in [\frac{3}{20}, \frac{13}{10}]$ is $\frac{1}{4}$. The expected utility for $P$ given $\psi_p(p) \in [\frac{3}{20}, \frac{13}{10}]$ is strictly greater than $-1$.

If $L^P = L$ and $\psi_p \in [\frac{7}{10}, \frac{3}{20}]$, $P$ will not propose an alternative. The probability that $\psi_p(p) \in [\frac{7}{10}, \frac{3}{20}]$ is $\frac{3}{4}$. The expected utility for $P$ given $\psi_p(p) \in [\frac{7}{10}, \frac{3}{20}]$ is $-1$.

As a result, if $L^P = L$, $P$ has a 75 percent chance of expected utility of $-1$, but a 25 percent chance of expected utility greater than $-1$.

Thus, $L^P = L$.

The Learning Decision

These three examples illustrate how conflicting preferences can complicate incentives for organizational learning. I now generalize from the examples and explore the organization’s decision whether to collect information for a range of parameter values. The analysis provides a few important insights about equilibrium behavior in the model. First, the strength of the incentives both to reveal $\psi_p(p)$ and not to reveal $\psi_p(p)$ grow with $\alpha$. Second, as $\gamma$ increases, the incentives to learn for both $P$ and $V$ increase as well. However, there remain values of $p$ for which $P$ does not propose to reveal $\psi_p(p)$ and for which $V$ vetoes a proposal to reveal $\psi_p(p)$. Finally, for all values of $p$ such that the organization does not reveal $\psi_p(p)$, $p$ is either less than 0 or greater than 1. Therefore, the organization only chooses not to reveal $\psi_p(p)$ when the existing policy is undesirable for both $P$ and $V$.

Figures 5, 6, and 7 illustrate the expected utility functions for the proposer and the veto
conditional on \( p \) and whether \( \psi_p(p) \) is revealed for \( \alpha \in \{ \frac{1}{10}, \frac{1}{4}, \frac{1}{2} \} \) and \( \gamma = 1 \) (on the left) and the difference between the utility functions if \( \psi_p(p) \) is revealed and if \( \psi_p(p) \) is not revealed (on the right). The top left panels demonstrate the proposer’s expected utility if \( \psi_p(p) \) is revealed and the proposer’s expected utility if \( \psi_p(p) \) is not revealed. The bottom left panels demonstrate the veto’s expected utility if \( \psi_p(p) \) is revealed and the veto’s expected utility if \( \psi_p(p) \) is not revealed. The right panels illustrates the differences between the two expected utilities for \( P \) and \( V \). Higher values on the right panel indicate a larger benefit to learning relative to ignorance.

Figure 5 compares \( Eu_p \) and \( Eu_v \) when \( \psi_p(p) \) is revealed and when \( \psi_p(p) \) is not revealed for \( \alpha = \frac{1}{10} \) and \( \gamma = 1 \). \( Eu_{p,v}(I) \) represents the expected utility for \( P \) or \( V \) if \( \psi_p(p) \) is revealed. \( Eu_{p,v}(-I) \) represents the expected utility for \( P \) or \( V \) if \( \psi_p(p) \) is not revealed.

Figure 5: \( \alpha = \frac{1}{10} \), \( \gamma = 1 \).

Figure 5 indicates that when the level of uncertainty in the mapping from policies to outcomes is small, the strategic choice to reveal \( \psi_p(p) \) is less important. However, even with low uncertainty, for both \( P \) and \( V \) the incentives to keep the organization from learning \( \psi_p(p) \) are largest when \( p \) is believed to be undesirable.
Figure 6 compares $Eu_{p,v}(I)$ and $Eu_{p,v}(-I)$ when $\alpha = \frac{1}{4}$ and $\gamma = 1$.

Figure 6: $\alpha = \frac{1}{4}$. $\gamma = 1$.

Figure 7 compares $Eu_{p,v}(I)$ and $Eu_{p,v}(-I)$ when $\alpha = \frac{1}{2}$ and $\gamma = 1$.

Figure 7: $\alpha = \frac{1}{2}$. $\gamma = 1$. 
Figures 6 and 7 demonstrate how these results change as the level of uncertainty increases. There are three major differences between figures 5, 6, and 7. As uncertainty increases, the size of the expected utility difference between learning and not learning increases for both $P$ and $V$. Also, both the range of values for which learning dominates not learning and the range of values for which not learning dominates learning grow considerably for both $P$ and $V$. Finally, for both $P$ and $V$, the strength of the incentive to keep the organization from learning $\psi_p(p)$ conditional on preferring that $\psi_p(p)$ not be revealed grows with $\alpha$.

There are many organizational contexts in which learning about the status quo provides information that is relevant to potential policy changes, as well. Figures 8 and 9 demonstrate how the equilibrium outcome changes when organizations also learn about the distribution of outcomes resulting from an alternative policy when they learn about the status quo, i.e. $\gamma > 1$. In the examples, $\alpha = \frac{1}{2}$ and $\gamma \in \{2, 3\}$.

Figure 8 compares $Eu_{p,v}(I)$ and $Eu_{p,v}(\neg I)$ when a great deal of uncertainty is reduced as a result of learning: $\alpha = 0.5$ and $\gamma = 3$.

Figure 9 compares $Eu_{p,v}(I)$ and $Eu_{p,v}(\neg I)$ when a moderate amount of uncertainty is
reduced as a result of learning: $\alpha = 0.5$ and $\gamma = 2$.

Figure 9: $\alpha = \frac{1}{2}$. $\gamma = 2$.

Importantly, even when significant uncertainty is reduced as a result of organizational learning, there remains a range of status quo values for which not learning dominates learning for both $P$ and $V$.

Figure 10 summarizes the equilibrium outcomes of the learning subgame conditional on $p$ for $\alpha \in \{\frac{1}{10}, \frac{1}{4}, \frac{1}{2}\}$ and $\gamma \in [1, 5]$. The areas of the graphs colored black indicate the sets parameter values for which $P$ will not propose to reveal $\psi_p(p)$, or $\mathcal{L}^P = \neg L$. The areas of the graph colored grey indicated the sets of parameter values for which $V$ will not accept a proposal to reveal $\psi_p(p)$, or $\mathcal{L}^V = \neg A$.  

![Diagram](image-url)
An important insight from the model that is demonstrated in figure 10 is that the parameter values for which the organization will not learn are associated with status quo policies that are likely to be associated with Pareto inefficient outcomes. These are precisely the conditions under which there are likely to exist mutually-beneficial alternative policies. Furthermore, the regions of the parameter space for which the organization does not learn grow with the uncertainty in the mapping between status quo policies and their associated outcomes. As a result, the model predicts that internal politics make organizations less likely to collect information about existing policies prior to making organizational changes, especially when there is a great deal of uncertainty surrounding existing policies and even when learning reduces the uncertainty associated with a proposed alternative.

**Discussion and Conclusion**

The importance of politics and preference conflict in organizations is as important today as when it was first emphasized by organizational scholars at the Carnegie School. However, the implications of internal politics on organizational learning have gone underexplored in
the organizational strategy literature. My paper develops a model that illustrates how fairly simple political negotiations between two organization members over organizational goals generate complex incentives relating to information collection. For organization members endowed with the authority to collect information, learning is a strategic decision. Under certain conditions, the benefits from learning are outweighed by the political constraints imposed by more information. As a result, failures of organizations to learn do not need to be the result of irrationality or suboptimal design. Entirely rational organization members facing political opposition will sometimes prefer ambiguity to certainty.

The idea that organization members can benefit from purposive ignorance is an old one (e.g., Feldman and March 1981; Pfeffer 1981; Vancil 1979), but efforts to formalize the conditions under which organization members are expected to keep organizations from gathering new information are fairly novel. This paper builds on recent work on Bayesian persuasion by Brocas and Carillo (2007) and Kamenica and Gentzkow (2011), which examine behavior in games where one actor can strategically experiment in order to attempt to convince an alter about the state of the world. The model is also related to research in organizational economics that demonstrates the challenges of information transmission in principal-agent models characterized by actors with partially aligned preferences (Austen-Smith and Banks 2000; Crawford and Sobel 1982; Gibbons, Matouschek, and Roberts 2012; Milgrom and Roberts 1988). However, to my knowledge, this is the first paper to formally show how proposer-veto political dynamics in organizations create incentives for organization members to forego information collection.

The model has normative implications for managers as well. Managers often face steady institutional pressure to justify new proposals with objective data and analysis (Feldman and March 1981). Naïve managers see these requests for information as a part of an organizational effort to achieve commonly held goals and, as a result, always acquiesce. Strategic managers realize that requests for more information by organization members are a part of a political process. As a result, strategic managers may refuse to collect information. In fact, strategic
managers will sometimes even be willing to pay a personal cost to impede the capacity of political rivals to collect information.

Finally, the model seeks to restart a dialogue between the organizational strategy and political economics literatures. A half century ago, James March, Richard Cyert, and the Carnegie School highlighted that organizational studies and formal political theory address a similar core question: *how do groups of people with different preferences come together to solve collective problems?* Theoretical innovations such as spatial modeling and institutional analysis have allowed formal political theorists to move past the frustrations that plagued social choice theorists of the earlier era. This paper’s novel contribution is that it takes a classic political veto game and introduces uncertainty in order to derive an insight about patterns of organizational learning. However, it will hopefully also begin a broader research program that examines how political conflict and preference aggregation in organizations impact a number of important organizational outcomes, including search behavior, organizational demography, organizational structure, and social network formation.
References


Chicago Press.


Appendix

Proof of Proposition 2

I find the solution to the model using backwards induction. First, I determine the optimal strategies for \( P \) and \( V \) conditional on reaching the proposal subgame. Then, I determine the optimal strategies in the learning subgame, given subsequent equilibrium strategies.

Proposal Subgame Given \( \psi_p(p) \) Not Revealed

I first find the outcome of the proposal subgame, assuming that in the learning subgame either \( \mathcal{L}^P = \neg L \), or \( \mathcal{L}^P = L \) and \( \mathcal{L}^V = \neg A \).

Define the acceptance set for \( V \), \( \mathcal{A}_v(p) \), as the set of alternatives which would be accepted by \( V \) conditional on \( p \). Spatially, \( \mathcal{A}_v(p) \), is the set of points in \( \mathbb{R} \) which are closer to 1 than \( p \):

\[
\mathcal{A}_v(p) = \begin{cases} 
[p, 2 - p] & \text{if } p \leq 1 \\
[2 - p, p] & \text{if } p > 1 
\end{cases}
\]

Define \( \bar{a} \) as the alternative in \( \mathcal{A}_v(p) \) that is optimal for \( P \) to propose. If \( E u_p(\bar{a}) \geq E u_p(p) \), then \( P_{\neg L}^P = \bar{a} \). Otherwise, \( P_{\neg L}^P = p \).

\[
P_{\neg L}^P = \begin{cases} 
a = 0 & \text{if } p \leq 0 \\
p & \text{if } 0 < p \leq 1 \\
a = 2 - p & \text{if } 1 < p \leq 2 \\
a = 0 & \text{if } p > 2 
\end{cases}
\]

Because the proposals are all contained in the acceptance set, \( \mathcal{A}_v(p) \), \( V \) will accept \( a \) in equilibrium.

\[
P_{\neg L}^V = a
\]
The expected utility for $P$, conditional on $p$, $\alpha$ and $\gamma$, and either $L^P = \neg L$, or $L^P = L$ and $L^V = \neg A$:

If $\mathcal{P}^P_{\neg L}$ is $a = 0$:

$$ Eu_p = -[Pr(\psi_v(a) \leq 0) |E(\psi_v(a)|\psi_v(a) \leq 0)| + Pr(\psi_v(a) > 0) |E(\psi_v(a)|\psi_v(a) > 0)|] = -\left[\frac{1}{2} \cdot \frac{\alpha}{2\gamma} + \frac{1}{2} \cdot \frac{\gamma}{2\gamma}\right] = -\frac{\alpha}{2\gamma} $$

If $\mathcal{P}^P_{\neg L} = p$ and $p \in (0, \alpha]$:

$$ Eu_p = -[Pr(\psi_v(p) \leq 0) |E(\psi_v(p)|\psi_v(p) \leq 0)| + Pr(\psi_v(p) > 0) |E(\psi_v(p)|\psi_v(p) > 0)|] = -\left[\left(\frac{-p-\alpha}{2\alpha}\right) \cdot \frac{\alpha}{2\gamma} + \frac{p+\alpha}{2\gamma} \cdot \frac{p+\alpha}{2\gamma}\right] = -\frac{\gamma^2 + \alpha^2}{2\alpha} $$

If $\mathcal{P}^P_{\neg L} = p$ and $p \in (\alpha, 1]$: $Eu_p = -p$.

If $\mathcal{P}^P_{\neg L}$ is $a \in (\alpha, 1)$: $Eu_p = -a$.

If $\mathcal{P}^P_{\neg L}$ is $a \in (0, \alpha]$: $Eu_p = -\frac{\alpha + \gamma}{2\alpha}$.

Proposal Subgame Given $\psi_v(p)$ Revealed

Next, I find the solution to the proposal subgame, assuming that $L^P = L$ and $L^V = A$:

$V$ defines its acceptance set with respect to $\psi_v(p)$ in the same way as it defined $\mathcal{A}_v(p)$. However, now the acceptance set is defined with respect to the revealed $\psi_v(p)$. As a result, for $\psi_v(p)$ near 1, there do not exist any values of $a$ such that $Eu_v(a) > Eu_v(\psi_v(p))$. There are also two sets of intermediate values, where $V$’s preference for a known $\psi_v(p)$ over an uncertain $a$ makes the range of $\mathcal{A}_v(\psi_v(p))$ smaller than the range of $\mathcal{A}_v(p)$.

For sufficiently low $\psi_v(p)$, $V$ is indifferent between $\psi_v(p)$ and $a = \psi_v(p)$, because $p + \frac{\alpha}{\gamma} < 1$.

I find the maximum value for which $V$ is indifferent:

$$ \psi_v(p) + \frac{\alpha}{\gamma} = 1 $$

$$ \psi_v(p) = 1 - \frac{\alpha}{\gamma} $$

Therefore, for all $\psi_v(p) \leq 1 - \frac{\alpha}{\gamma}$, $V$ will accept $\psi_v(p) \geq a \geq 1$. By the symmetry of $V$’s utility curve, $V$ will also accept $1 < a \leq 2 - \psi_v(p)$. Therefore, if $\psi_v(p) \leq 1 - \frac{\alpha}{\gamma}$: $\mathcal{A}_v(\psi_v(p)) = [\psi_v(p), 2 - \psi_v(p)]$. 

44
For $1 - \frac{\alpha}{\gamma} < \psi_p(p) < 1$, $V$ prefers a known $\psi_p(p)$ to an uncertain $a$. In order to define the indifference set, I need to find the minimum and maximum $a$ such that $V$ is indifferent.

First, I find the minimum $a$ that satisfies:

$$Eu_v(\psi_p(p)) = Eu_v(a)$$

$$-(1 - \psi_p(p)) = -\left[Pr(\psi_a(a) \leq 1)E(\psi_a(a)|\psi_a(a) \leq 1) + Pr(a > 1) \cdot E(\psi_a(a)|\psi_a(a) > 1)\right]$$

$$1 - \psi_p(p) = \left(\frac{1 - (a - \frac{\alpha}{\gamma})}{2\frac{\alpha}{\gamma}} \cdot \left(1 - \frac{1 + a - \frac{\alpha}{\gamma}}{2}\right)\right) + \left(\frac{a + \frac{\alpha}{\gamma} - 1}{2\frac{\alpha}{\gamma}} \cdot \left(\frac{a + \frac{\alpha}{\gamma} + 1}{2} - 1\right)\right)$$

$$a = 1 - \sqrt{2(1 - \psi_p(p))\frac{\alpha}{\gamma} - \left(\frac{\alpha}{\gamma}\right)^2}$$

By the same logic, the maximum $a$ that satisfies the equality is $1 + \sqrt{2(1 - \psi_p(p))\frac{\alpha}{\gamma} - \left(\frac{\alpha}{\gamma}\right)^2}$.

I find the minimum of the range of values of $\psi_p(p)$ for which there does not exist an $a$ that $V$ will accept by finding the values of $\psi_p(p)$ for which the set defined above is empty:

Find $\psi_p(p)$ that satisfies: $1 - \sqrt{2(1 - \psi_p(p))\frac{\alpha}{\gamma} - \left(\frac{\alpha}{\gamma}\right)^2} = 1 + \sqrt{2(1 - \psi_p(p))\frac{\alpha}{\gamma} - \left(\frac{\alpha}{\gamma}\right)^2}$.

$$\sqrt{2(1 - \psi_p(p))\frac{\alpha}{\gamma} - \left(\frac{\alpha}{\gamma}\right)^2} = 0. \psi_p(p) = 1 - \frac{\alpha}{2\gamma}.$$ 

Therefore, if $\psi_p(p) \in (1 - \frac{\alpha}{\gamma}, 1 - \frac{\alpha}{2\gamma})$:

$$A_v(\psi_p(p)) = [1 - \sqrt{2(1 - \psi_p(p))\frac{\alpha}{\gamma} - \left(\frac{\alpha}{\gamma}\right)^2}, 1 + \sqrt{2(1 - \psi_p(p))\frac{\alpha}{\gamma} - \left(\frac{\alpha}{\gamma}\right)^2}].$$

Further, if $\psi_p(p) \in (1 - \frac{\alpha}{2\gamma}, 1]$: $A_v(\psi_p(p)) = \emptyset$.

By the symmetry of $V$’s utility curve, I define the acceptance sets for other possible
values of $\psi_p(p)$.

$$
\mathcal{A}_v(\psi_p(p)) = \begin{cases} 
[\psi_p(p), 2 - \psi_p(p)] & \text{if } \psi_p(p) \leq 1 - \frac{\alpha}{\gamma} \\
1 - \sqrt{(1 - \psi_p(p))\frac{2\alpha}{\gamma} - \left(\frac{\alpha}{\gamma}\right)^2}, 1 + \sqrt{(1 - \psi_p(p))\frac{2\alpha}{\gamma} - \left(\frac{\alpha}{\gamma}\right)^2} & \text{if } 1 - \frac{\alpha}{\gamma} < \psi_p(p) \leq 1 - \frac{\alpha}{2\gamma} \\
\emptyset & \text{if } 1 - \frac{\alpha}{2\gamma} < \psi_p(p) \leq 1 + \frac{\alpha}{2\gamma} \\
1 - \sqrt{(\psi_p(p) - 1)\frac{2\alpha}{\gamma} - \left(\frac{\alpha}{\gamma}\right)^2}, 1 + \sqrt{(\psi_p(p) - 1)\frac{2\alpha}{\gamma} - \left(\frac{\alpha}{\gamma}\right)^2} & \text{if } 1 + \frac{\alpha}{2\gamma} < \psi_p(p) \leq 1 + \frac{\alpha}{\gamma} \\
[2 - \psi_p(p), \psi_p(p)] & \text{if } \psi_p(p) > 1 + \frac{\alpha}{\gamma}
\end{cases}
$$

As before, define $\bar{a}$ as the $a \in \mathcal{A}_v(\psi_p(p))$ that is optimal for $P$ to propose. If $E_{u_p}(\bar{a}) \geq E_{u_p}(\psi_p(p))$, then $\mathcal{P}_L^{P*} = \bar{a}$. Otherwise, $\mathcal{P}_L^{P*} = p$.

$$
\mathcal{P}_L^{P*} = \begin{cases} 
a = 0 & \text{if } \psi_p(p) \leq -\frac{\alpha}{2\gamma} \\
p & \text{if } -\frac{\alpha}{2\gamma} < \psi_p(p) \leq 1 + \frac{\alpha}{2\gamma} \\
a = 1 - \sqrt{(\psi_p(p) - 1)\frac{2\alpha}{\gamma} - \left(\frac{\alpha}{\gamma}\right)^2} & \text{if } 1 + \frac{\alpha}{2\gamma} < \psi_p(p) \leq 1 + \frac{2\alpha}{\gamma} \\
a = 2 - \psi_p(p) & \text{if } 1 + \frac{2\alpha}{\gamma} < \psi_p(p) \leq 2 \\
a = 0 & \text{if } \psi_p(p) > 2
\end{cases}
$$

$$
\mathcal{P}_L^{V*} = a
$$

Because the proposals are all contained in the acceptance set, $\mathcal{A}_v(\psi_p(p))$, $V$ will accept in equilibrium.

The expected utility for $P$, conditional on $\psi_p(p)$, $\alpha$ and $\gamma$, and $\mathcal{L}^P = L$ and $\mathcal{L}^V = A$: 
Learning Subgame

In order to determine the optimal strategies for $P$ in the learning subgame, I first calculate the expected utility of $P$ conditional on learning prior to $\psi_p(p)$ being revealed. Let $Eu_p(p, L)$ denote the expected utility of $P$ given $p$ conditional on $\psi_p(p)$ being revealed and $Eu_p(p, \neg L)$ denote the expected utility of $P$ given $p$ conditional on $\psi_p(p)$ not being revealed. $Eu_v(p, L)$ and $Eu_v(p, \neg L)$ are similarly defined.

I partition the possible values for $p \in \mathbb{R}$ into six segments, $\rho_j(\mathbb{R})$, $j \in \{1, 2, 3, 4, 5, 6\}$,

- In $\rho_1$, $\psi_p(p) \leq -\frac{\alpha}{2\gamma}$. $P_L^{P*}$ is $a = 0$.
- In $\rho_2$, $-\frac{\alpha}{\gamma} < \psi_p(p) \leq 1 + \frac{\alpha}{2\gamma}$. $P_L^{P*} = \psi_p(p)$.
- In $\rho_3$, $1 + \frac{\alpha}{2\gamma} < \psi_p(p) \leq 1 + \frac{\alpha}{\gamma}$. $P_L^{P*}$ is $a = 1 - \sqrt{(\psi_p(p) - 1)2\frac{\alpha}{\gamma} - \left(\frac{\alpha}{\gamma}\right)^2}$. $a \in \left[1 - \frac{\alpha}{\gamma}, 1 - \frac{\alpha}{2\gamma}\right)$.
- In $\rho_4$, $1 + \frac{\alpha}{\gamma} < \psi_p(p) \leq 2 - \frac{\alpha}{\gamma}$. $P_L^{P*}$ is $a = 2 - \psi_p(p)$. $a \in \left[\frac{\alpha}{\gamma}, 1 - \frac{\alpha}{\gamma}\right)$.
- In $\rho_5$, $2 - \frac{\alpha}{\gamma} < \psi_p(p) \leq 2$. $P_L^{P*}$ is $a = 2 - \psi_p(p)$. $a \in \left[0, \frac{\alpha}{\gamma}\right)$.
- In $\rho_6$, $\psi_p(p) > 2$. $P_L^{P*}$ is $a = 0$.

The following describes $Eu_p(p)$ if $\psi_p(p)$ is revealed. Conceptually, the solution is the sum of the product of the probabilities that $\psi_p(p)$ lies in a partition and the expected utility from $a$ given that $\psi_p(p)$ lies in the partition:
Define $\rho$ as the partition in which $p - \alpha$ lies. If $\rho_j = \rho$ and $\rho_j \neq \bar{\rho}$, then $Pr(\psi_p(p) \in \rho_j) = \frac{\max(\rho_j) - (p - \alpha)}{2\alpha}$. If $\rho_j = \rho$ and $\rho_j \neq \bar{\rho}$, then $Pr(\psi_p(p) \in \rho_j) = \frac{\max(\rho_j) + (p - \alpha)}{2}$.

Define $\bar{\rho}$ as the partition in which $p + \alpha$ lies. If $\rho_j = \bar{\rho}$ and $\rho_j \neq \rho$, then $Pr(\psi_p(p) \in \rho_j) = \frac{p + \alpha - \min(\rho_j)}{2\alpha}$, $E(\psi_p(p)|\psi_p(p) \in \rho_j) = \frac{\psi_p(p) + \alpha + \min(\rho_j)}{2}$.

If $\rho = \bar{\rho}$, then $Pr(\psi_p(p)|\psi_p(p) \in \rho_j) = 1$, $E(\psi_p(p)|\psi_p(p) \in \rho_j) = p$.

Define $\hat{\rho}$ as the set of partitions which lie between $\rho$ and $\bar{\rho}$.

If $\rho_j \in \hat{\rho}$, then $Pr(\psi_p(p)|\psi_p(p) \in \rho_j) = \frac{max(\rho_j) - min(\rho_j)}{2\alpha}$, $E(\psi_p(p)|\psi_p(p) \in \rho_j) = \frac{\max(\rho_j) + \min(\rho_j)}{2}$.

If $\rho_j \notin \rho \cup \bar{\rho} \cup \hat{\rho}$, then $Pr(\psi_p(p) \in \rho_j) = 0$.

$$Eu_p(p, L) = - \sum \left( Pr(\psi_p(p) \in \rho_1) + Pr(\psi_p(p) \in \rho_6) \right) \cdot \frac{\alpha}{2\gamma}
- Pr(\psi_p(p) \in \rho_2) E(\psi_p(p)|\psi_p(p) \in \rho_2)
- Pr(\psi_p(p) \in \rho_3) \cdot \Psi
- Pr(\psi_p(p) \in \rho_4) \cdot (2 - E(\psi_p(p)|\psi_p(p) \in \rho_4))
- Pr(\psi_p(p) \in \rho_5) \cdot E\left(\frac{(2 - \psi_p(p))^2}{2\gamma} + \frac{\alpha}{2}\right)$$

$$\Psi = \left\{ \begin{array}{ll}
1 - \int_{\frac{1 + \alpha}{2\gamma}}^{1 + \frac{p - \alpha}{2\gamma}} \frac{(2(\psi_p(p) - \frac{\alpha}{2}) - (\frac{\alpha}{2})^2)^{\frac{1}{2}}}{1 + \frac{p - \alpha}{2\gamma}} d\psi_p(p) & \text{if } \rho_3 \in \rho \text{ and } \rho_3 \notin \bar{\rho} \\
1 - \int_{\frac{1 + \alpha}{2\gamma}}^{1 + \frac{p + \alpha}{2\gamma}} \frac{(2(\psi_p(p) - \frac{\alpha}{2}) - (\frac{\alpha}{2})^2)^{\frac{1}{2}}}{1 + \frac{p + \alpha}{2\gamma}} d\psi_p(p) & \text{if } \rho_3 \in \bar{\rho} \text{ and } \rho_3 \notin \rho \\
1 - \int_{\frac{1 + \alpha}{2\gamma}}^{1 + \frac{p - \alpha}{2\gamma}} \frac{(2(\psi_p(p) - \frac{\alpha}{2}) - (\frac{\alpha}{2})^2)^{\frac{1}{2}}}{1 + \frac{p - \alpha}{2\gamma}} d\psi_p(p) & \text{if } \rho_3 \in \bar{\rho} \text{ and } \rho_3 \notin \rho \\
1 - \int_{\frac{1 + \alpha}{2\gamma}}^{1 + \frac{p + \alpha}{2\gamma}} \frac{(2(\psi_p(p) - \frac{\alpha}{2}) - (\frac{\alpha}{2})^2)^{\frac{1}{2}}}{1 + \frac{p + \alpha}{2\gamma}} d\psi_p(p) & \text{if } \rho_3 \in \rho \end{array} \right\}$$

For $P$, $L^{P*}$ is defined implicitly. If $Eu_p(p, L) \geq Eu_p(p, -L)$, then $L^{P*} = L$. Otherwise, $L^{P*} = -L$.

Now, I consider the values of $p$ for which $V$ accepts $P$’s proposal to learn. As demonstrated in the text of the paper, if $P_L^{*}$ is $p$, then, for all values of $\psi_p(p)$, $V$ is made at least as well off as if $\psi_p(p)$ had not been revealed. As a result, $L^{V*} = A$ for all of these values of $p$.

Therefore, I limit attention to those values of $p$ for which $P_L^{*} = \psi_p(p)$. Note that for $\psi_p(p)$ such that $p + \alpha$ is less than or equal to $-\frac{\alpha}{2\gamma}$, $V$ is indifferent between $\psi_p(p)$ being...
revealed and not, because $P_{L}^{P^*} = P_{-L}^{P^*}$ is $a = 0$ for all possible values of $\psi_p(p)$.

Also note that for $p + \alpha = -\frac{\alpha}{2\gamma} + \epsilon$, where $\epsilon$ is small, $V$ prefers that $\psi_p(p)$ not be revealed, because if $\psi_p(p) \in \left(-\frac{\alpha}{2\gamma}, -\frac{\alpha}{2\gamma} + \epsilon\right)$, then $P_{L}^{P^*} = p$ and $u_v < -1$. In contrast, if $\psi_p(p)$ is not revealed, $P_{-L}^{P^*}$ is $a = 0$ and $u_v = -1$. Therefore, $p = -\alpha - \frac{\alpha}{2\gamma}$ defines the lower boundary of a region where $P^{V^*} = \neg A$.

There exists a cutpoint at which $V$ is indifferent between $\psi_p(p)$ being revealed at not that provides the upper boundary for this region. At that cutpoint, $E_{u_v}(p, \neg L) = E_{u_v}(p, L)$. This cutpoint is defined by $p = \alpha - \frac{\alpha}{2\gamma}$. At this point, $E_{u_v}(p, L) = -1$, because for all values of $p$ such that $P_{L}^{P^*} = p$, $Pr(\psi_p(p)) > 0 = Pr(\psi_p(p)) < 0$. For all $p$ below this cutpoint, $L^{V^*} = \neg A$. Otherwise, $L^{V^*} = A$.

This fully characterizes the equilibrium behavior described in Proposition 2.