Credit Claiming

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Abstract

We consider a leader and a subordinate he appoints who engage in team production. The public observes the organization's performance, but is unable to determine the separate contributions of the leader and of the subordinate. The leader may therefore claim credit for the good work of his subordinate. We find conditions which induce the leader to claim credit (both truthfully and untruthfully), and the conditions which lead the leader to appoint a subordinate of low ability.

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An important literature in political science examines credit-claiming by politicians. For the seminal work see Mayhew (1974). Fiorina (1977) goes further, saying that congressmen can turn unhappiness with government programs to their own advantage by helping constituents who encounter problems with the bureaucracy. Members of Congress have increased their ability to get reelected, Fiorina argues, by favoring government programs that created bureaucratic difficulties—and then helping constituents deal with those problems.

A leader can engage in several forms of credit claiming: for his own good actions, for events over which he had no control, or credit for someone else's good actions. Thus, a congressman can claim that he drafted legislation that was instead written by a lobbyist or by his staff. A governor may cut the ribbon on a stadium for which the mayor was the driving force.

Credit claiming is especially likely to occur when it is difficult for the public to verify claims. Several research questions then arise. Under what conditions will claims be truthful, that is have a leader claim credit only when the facts justify it? Does a leader who aims to claim credit and who has the authority to appoint a subordinate prefer to appoint someone with low ability or with high ability? How do these incentives vary with the leader's own ability? Would rules or institutions that reduce credit claiming make it harder or easier for voters to evaluate the performance of a leader?

Intuition suggests that a credit-claiming leader would prefer to work with a high-ability subordinate, since then there is more to claim. We show that this intuition does not hold, that under some conditions Fiorina was right, and that leaders may pick subordinates of low quality. The leader's gain from working with a low-ability subordinate arises when something good does happen: the public is more willing to credit the leader for a good outcome.

1. Literature

In addition to the literature on Congress cited above, the idea that a leader cares about his reputation appears in important earlier works. Scharfstein and Stein (1990) show that concern about reputation may induce herd-like behavior by managers. The importance of reputation and credit claiming in politics is a central point in Mayhew's (1974) book about congressmen. Rogoff (1990) notes that political business cycles may send signals about agent quality, and therefore create superior outcomes. But he focuses on the generation of political business cycles rather than on how one actor's reputation affects another's.

A different line of research examines a manager who wants to signal his ability by continuing policies he had adopted in the past.[1]

Levy (1999) considers able decision makers who are better informed than unable decision makers. He shows that an able decision maker may choose an unable advisor to signal his own ability. Making a decision that contradicts the advice signals confidence in his own information and thereby in his own ability. Unable decision makers, who must rely on others for information, choose able advisors. Relatedly, Swank (2000) considers a principal who can seek the advice of a well-informed agent. Since disagreement between the principal and agent casts doubt on the principal's independent ability in gathering or analyzing information, a principal who cares about his reputation may avoid advice from an agent.

Segendorff (2000) investigates under what circumstances a separating equilibrium exists in which competent leaders choose incompetent co-workers, and incompetent leaders choose competent co-workers. The competent leader is risk averse, and can benefit from blaming failure on an incompetent co-worker. A low-ability leader's expected gain from such implicit insurance is outweighed by its costs in lowering expected policy outcomes. Our approaches differ in that here we assume a worker's prior quality is observable, but his action is unobservable, and in that we can find strong results even with a simple production technology and under different compensation methods.

Other papers, less related to ours, study strategic use of information and reputational or career concerns (see Effinger and Polborn (1999), Gibbons and Murphy (1992), Jeon (1998), Meyer and Vickers (1997), Trueman (1994), and Glazer (2001)).

2. Assumptions

We study an organization consisting of a leader and his subordinate. Each undertakes one action which can be either *good* or *bad*. The performance of the organization increases with the number of *good* actions the two did. The leader differs from the subordinate in only two ways: the leader appoints the subordinate, and only the leader can claim credit. The assumption of asymmetric credit-claiming captures the idea that a congressman often has better access to media than does a bureaucrat or staff member, or that a vice president has better access to the CEO than does an assistant vice president.

[1] See Kanodia, Bushman, and Dickhaut (1989), Boot (1992), Prendergast and Stole (1996), and Brandenburger and Polak (1996).

The leader's action is *good* with probability $\Pr(A_L = 1) = p$, where $A_L = 1$ if the action is *good* and $A_L = 0$ otherwise. Similarly, the subordinate's action is *good* with probability $\Pr(A_S = 1) = q$. The number of *good* actions is $A = A_L + A_S$. The organization's performance increases with A. The public knows p and q and observes the organization's performance. That is, the public can indirectly observe the number of *good* actions, but not their source.

The leader's utility increases with his reputation, which we measure by the conditional probability that his action was *good*. More specifically, let the leader's expected utility as a function of his reputation be given by the von Neumann-Morgenstern utility function $u : [0, 1] \to [0, 1]$, where $u(0) = 0$, $u(1) = 1$ and $u' > 0$. Because the utility function is defined over the leader's reputation with a given reward structure, it may have any shape, e.g. concave, convex or piecewise defined.

2.1. Claiming strategies

The timing is as follows. The leader and his subordinate work, yielding outcome A that is observed by the public. The leader then decides whether to claim that his action was *good*. Let $m = c$ if he makes a claim and $m = \emptyset$ if he does not. The direct cost of making a claim is zero. Note that if $A = 0$ or $A = 2$ a claim provides no information; in ether case the public correctly infers A_L. Claims may only affect the public's beliefs if $A = 1$. We therefore focus on the leader's choice when $A = 1$, and assume he makes not claims when $A = 0$ or $A = 2$. The leader thus has four pure strategies (or types of credit claiming); (1) never to make a claim (which we call the strategy s^N), (2) to make a claim only if $A_S = 1$ (s^S), (3) to make a claim only if $A_L = 1$ (s^L), or (4) always to make a claim (s^{LS}).

		$A_S = 1$	
		$m = \emptyset$	$m = c$
$A_L = 1$	$m = \emptyset$	s^N	s^S
	$m = c$	s^L	s^{LS}

Table 1: Signalling strategies.

A claim succeeds if it cannot be rejected, or cannot be shown to be false. We assume that a claim succeeds if it is truthful ($A_L = 1$). A claim fails (is shown to be false) with probability $1 - \alpha$; otherwise ($A_L = 0$). The outcome of credit claiming is described by the random variable θ. It has value f with probability

$1-\alpha$ at $(A_L, A_S, m) = (0, 1, c)$ and is $\emptyset$ otherwise. Hence, when the public observes $\theta = f$ it knows that the leader made a false claim. At $\theta = \emptyset$ it learns nothing new. A successful claim therefore does not prove that $A_L = 1$; but an unsuccessful claim proves that $A_L = 0$. Let $\beta \geq 0$ be the cost a leader incurs if his claim fails, that is, if he is revealed to have lied.

2.2. Beliefs

The public's information is $\{A, m, p, q, \theta\}$. It uses this information to form posterior beliefs about the leader's performance. The public believes the leader's action was *good* with probability

$$\pi\left(A, m, \theta, s\right) = \Pr\left(A_L = 1 \mid A, m, p, q, \theta, s\right), \tag{1}$$

where s is the signalling strategy the public believes the leader uses. Note that if the observed signal cannot be explained by s then Bayes Theorem does not apply. Here, $m = c$ cannot be explained by s^N and $m = \emptyset$ cannot be explained by s^{LS}. In any of those situations the public may hold any belief. We shall later consider refinements for these cases.

3. Equilibrium

An equilibrium is a pair (s, π) that satisfies the following conditions: (1) The strategy s maximizes the expected utility of the leader given the public's beliefs π; and (2) π is consistent with s. A strategy s is called an equilibrium strategy if a belief π exists such that (s, π) is an equilibrium. Notice that $\pi(1, c, f, s) = 0$ for all s, since a claim can be rejected only if the subordinate's action was *good.*

Our first result is simple. The strategy of never making a claim $\left(s^N\right)$ is always an equilibrium strategy. In this equilibrium, if the public observes the claim $m = c$ it believes $A_L = 0$, that is, $\pi\left(1, c, \theta, s^N\right) = 0$ for all θ.

Our second result is that if the cost of exposure as a liar is sufficiently high then the truth-telling strategy $s^L$is an equilibrium strategy. The leader whose action was *bad* is then deterred from falsely claiming as his own the subordinate's *good* action.

Third, if the cost of exposure as a liar is sufficiently low, then the pooling strategy $s^{LS}$is an equilibrium strategy.

Fourth, if the cost of exposure is intermediate then neither truth-telling nor pooling are equilibrium strategies. A semi-separating equilibrium exists in which the leader always claims his own *good* action, and with probability λ falsely claims the *good* action of his subordinate.

Lastly, reversed truth telling s^S is never an equilibrium strategy. If a leader has an incentive to make a false claim, then he also has an incentive to make a truthful claim.

Proposition 1. *(i) Never to make a claim* $\left(s^N\right)$ *is always an equilibrium strategy; reversed truth telling* $\left(s^S\right)$ *is never an equilibrium strategy.*
(ii) If $\beta > \alpha/\left(1-\alpha\right)$ *then truth telling* $\left(s^L\right)$ *is an equilibrium strategy.*
(iii) If $\beta < \alpha u\left(\pi\left(1, c, \emptyset, s^{LS}\right)\right)/\left(1-\alpha\right)$ *then pooling* $\left(s^{LS}\right)$ *is an equilibrium strategy.*
(iv) Let λ *solve*

$$\pi\left(1, c, \emptyset, s^{\lambda}\right) = u^{-1}\left(\left(1-\alpha\right)\beta\right). \tag{2}$$

If

$$\frac{\alpha}{1-\alpha}u\left(\pi\left(1, c, \emptyset, s^{LS}\right)\right) < \beta < \frac{\alpha}{1-\alpha}. \tag{3}$$

then the semi-separating strategy $s^{\lambda} = \lambda s^{LS} + \left(1-\lambda\right)s^L$ *is an equilibrium strategy*

Proof. See Appendix.

Proposition 1 is illustrated in Figure 1.

3.1. Reasonable Equilibria

Here we argue that never to claim a *good* action is an unreasonable equilibrium strategy, because it requires out-of-equilibrium beliefs that are unreasonable. We use an approach in the literature named the Intuitive Criterion (Cho and Kreps (1987))..

The Intuitive Criterion supposes that players are not quite sure how their opponents will play outside the equilibrium path. A player who observes a deviation tries to "explain" this deviation by asking himself which types of the other player would gain from making this deviation if it is met with some "reasonable" response rather than the equilibrium response. He will then attach zero probability to those types who cannot do better, and form his beliefs over the remaining types. In signalling games, this will typically eliminate some non-reasonable equilibria.

The Intuitive Criterion cannot be directly applied here since the public is not a player and does not choose an action. Its behavior is captured in the utility function u, which formally makes the model a decision problem, not a game. We shall, however, adopt a related approach.

Consider the never-claim equilibrium. After having observed $m = c$ out-of-equilibrium, the public must assign zero probability to $A_L = 1$; that is $\pi\left(1, c, \emptyset, s^N\right) = 0$. Deviating then induces a punishment for both types of leader, making the deviation unattractive. A leader whose action was *good*, however, has at least as strong motive to make a claim as a leader whose action was *bad* and who risks having his claim rejected. This, in combination with non-rejection of the claim, should make the public assign a probability to the event $A_L = 1$ exceeding the corresponding probability along the equilibrium path. That is, $\pi\left(1, c, \emptyset, s^N\right) > \pi\left(1, \emptyset, \emptyset, s^N\right)$. Then a leader who did *good* always gains by deviating: the no-claim equilibrium breaks down.[2]

In the truth-telling equilibrium and in the semi-separating equilibrium no out-of-equilibrium beliefs exist, and the equilibria survive the refinement. The pooling equilibrium also survives. Here, no type of leader can gain from such a deviation and the refinement does not rule out the assumed out-of-equilibrium beliefs. We say that the truth-telling-, pooling-, and semi-separating equilibria are *reasonable*. Ruling out the non-reasonable never-claim equilibrium, we can find a unique equilibrium strategy for every combination of parameter values.

Corollary 2. *In a reasonable equilibrium the leader always claims his own* good *action. If the punishment is relatively low compared to the highest possible reward (that is, if* $\alpha u(1) > (1-\alpha)\beta$*) then he also claims a* good *action of his subordinate.*

Proof. Follows from Proposition 1 and the refinement outlined above. ■

4. The Subordinate

Thus far the quality of the subordinate has been assumed to be fixed. But leaders can often choose their subordinates, so it is useful to endogenize q. Here we treat α (the probability a lie is detected) and β (the penalty for lying) as constants, but let the leader choose the quality of his subordinate. As a starting point, we treat

[2] The assumption $\pi\left(1, c, \emptyset, s^N\right) = 0$ is unnecessarily strong. Instead, $\pi\left(1, c, \emptyset, s^N\right) < \pi\left(1, \emptyset, \emptyset, s^N\right)$ suffices for supporting the s^N-equilibrium. Any such belief, however, is just as sensitive to the refinement as the assumed belief.

the equilibrium strategy as given. Eventual inconsistencies between equilibrium conditions and the quality of the subordinate are sorted out below. In the following we restrict the analysis to a linear utility function.

Let s be the assumed equilibrium strategy. Then the leader's maximization problem is

$$\max_{q} pq + p(1-q) \sum_{j\in\{\emptyset,c\}} \Pr(m=j \mid A_L=1,s)\,\pi(1,j,\emptyset,s) \tag{4}$$
$$+q(1-p) \sum_{j\in\{\emptyset,c\}} \Pr(m=j \mid A_S=1,s)\Pr(\theta=\emptyset \mid j,A_S=1)\,\pi(1,j,\emptyset,s)$$
$$-q(1-p)\Pr(m=c \mid A_S=1,s)\,pr(\theta=f \mid c,A_S=1)\,\beta.$$

Examining the first-order condition to 4 in the different equilibria shows how the expected utility of the leader depends on the quality of his subordinate.

Lemma 3. *When utility is linear, the expected utility of the leader declines with the quality of the subordinate in the s^{LS} equilibrium and in the s^{λ} equilibrium; his utility is constant with respect to the quality of the subordinate in the s^{N} equilibrium and in the s^{L} equilibrium.*

Proof. See Appendix.

In the s^L-equilibrium the leader truthfully reveals his action. His expected utility is consequently independent of the quality of the subordinate. In the other three equilibria an increase in the quality of the subordinate reduces the conditional probability $\pi(1,m,\emptyset,s)$, which harms the leader. On the other hand, it increases the probability of $A=2$, which benefits the leader. With linear utility these effects cancel and the expected utility of the leader is constant with respect to q in the s^N-equilibrium. In the s^{LS} equilibrium and in the s^{λ} equilibrium false claims are more often rejected, since the higher value of q allows for more false claims. The expected punishment increases, making the expected utility decrease in q.

Focusing on reasonable equilibria, if $\beta \geq \alpha/(1-\beta)$ we should expect the leader to be indifferent about his subordinate's quality. We should expect a low-quality subordinate if $\beta < \alpha/(1-\alpha)$, that is, in the s^L-equilibrium. Recall that with linear utility, the semi-separating equilibrium exists only if $\alpha\pi\left(1,c,\emptyset,s^{\lambda}\right)/(1-\alpha) < \beta < \alpha/(1-\alpha)$. However, $\pi\left(1,c,\emptyset,s^{\lambda}\right) = 1$ at $q=0$, eliminating the semi-separating equilibrium.

Proposition 4. *With linear utility and the leader choosing the subordinate's quality,*
(i) s^N *with* $q \in [0,1]$ *is an equilibrium strategy for all* α, β*,and* p*.*
(ii) If $\beta \geq \alpha/(1-\alpha)$ *then for all* p s^L *with* $q \in [0,1]$ *is an equilibrium strategy.*
(iii) If $\beta \leq \alpha/(1-\alpha)$ *then for all* p s^{LS} *with* $q = 0$ *is an equilibrium strategy.*

Proof. Follows from Proposition 1 and Lemma 3. ■

When the leader chooses the quality of his subordinate, his expected utility is identical in all the equilibria. Intuitively, it must be identical in the s^L- and s^{LS}-equilibria since in both equilibria the leader is rewarded only if his action was *good*. The public then knows for sure that his action was *good* and the conditional probability thus equals 1. His action is *good* with probability p, and this is also his expected reputation or expected utility. A leader who hires a subordinate with $q = 0$ in the s^N-equilibrium enjoys the same utility. By Lemma 3 the expected utility is constant with respect to q. We conclude that the expected utility must equal p also in the s^N-equilibrium. Notice the similarity between the s^L equilibrium and the s^{LS} equilibrium. In both equilibria the leader claims only his own *good* action. In the s^L equilibrium this is his strategy; In the s^{LS} equilibrium the low quality of the subordinate leads the leader to claim only his *good* actions.

Corollary 5. *With linear utility and the leader choosing the subordinate*
(i) The expected utility of the leader is p *in any equilibrium.*
(ii) In any reasonable equilibrium the leader claims only his own action if it was good.

Proof. Follows from Proposition 4. ■

4.1. Non-Linear Utility

When utility is non-linear, the only results in Lemma 3 and Proposition 4 that continue to hold concern the s^L equilibrium: for any type of utility function the payoff is constant with respect to q, and if $\beta \geq \alpha/(1-\alpha)$ then s^L is an equilibrium strategy for all p and $q \in [0,1]$. In the s^N equilibrium with u convex, expected utility is maximized by $q \in \{0,1\}$. If u is concave, the leader's optimal choice of q lies in $(0,1)$. In the s^{LS}- and the s^{λ}- equilibria with u convex the leader's expected utility is maximized at $q = 0$. If u is concave the results are ambiguous.

5. Discussion

We have seen that one equilibrium has the leader appoint a subordinate who accomplishes nothing. This supports Fiorina's claim that congressmen may purposely prefer incompetent bureaucracies.

But other equilibria involving credit claiming, which have higher quality bureaucrats, can also arise. In all but one of these equilibria the leader earns the same expected reputation, equal to the likelihood that he indeed did *good*. That is, credit claiming yields no benefit to the leader. Why then does he engage in it? The reason is that if people expect untruthful credit claiming, then a leader who claims credit truthfully will be judged even worse than he really is.

Our analysis focused on the utility of the leader, because he makes the choices about the subordinate and about credit claiming. The interests of the public, however, differ from the leader's: they would prefer the appointment of a higher-quality subordinate, and would prefer to know how well the leader and the subordinate performed. Some institutional rules may lead in that direction. Civil Service rules may lead to the appointment of better bureaucrats. Stiff penalties for lying, as may implicitly arise from media publicity or the activities of special prosecutors, can induce truthful credit claiming. This may sound obvious; what is less obvious is that such rules can benefit the public without reducing the utility of the leaders.

Our analysis applies beyond credit claiming by politicians. It can appear within firms, with a manager taking credit for the successes of his subordinate. Similarly, a scientific researcher may claim primary authorship for a paper written by his graduate student, and a physician take credit for care provided by an intern. The subordinate need not even be animate: a craftsman may downplay the contribution of a new machine, and generals may claim that sophisticated weapons systems contributed little to victory.

6. Appendix

Proof 1. (i) To show the first part, suppose s^N is an equilibrium strategy. At $m = \emptyset$ the belief $\pi\left(A, m, \theta, s^N\right)$ is determined by Bayes' rule, but Bayes' rule does not apply for $m = c$. Therefore, let $\pi\left(1, c, \theta, s^N\right) = 0$ for all θ. Consider the deviations s^N, s^S, and s^{LS}. Then

$$E\left[u \mid s^N\right] - E\left[u \mid s^S\right] = q\left(1-p\right)\left(u\left(\pi\left(1, \emptyset, \emptyset, s^N\right)\right) - u\left(0\right) + \left(1-\alpha\right)\beta\right) > 0,$$

$$E\left[u \mid s^N\right] - E\left[u \mid s^L\right] = p\left(1-q\right)\left(u\left(\pi\left(1, \emptyset, \emptyset, s^N\right)\right) - u\left(0\right)\right) > 0,$$

and

$$E\left[u \mid s^N\right] - E\left[u \mid s^{LS}\right] = q\left(1-p\right)\Bigg(\quad u\left(\pi\left(1, \emptyset, \emptyset, s^N\right.\right.$$

By assumption is $(1-\alpha)\beta-\alpha>0$ and 5 and 6 are unambiguously positive. Hence, s^{L} is an equilibrium strategy.
(iii) Suppose s^{LS} is an equilibrium strategy and let $\beta<\alpha u\left(\pi\left(1,c,\emptyset,s^{LS}\right)\right)/(1-\alpha)$. Here the public's beliefs are given by $\pi\left(1,c,\theta,s^{LS}\right)$. Bayes' rule does not apply for $m=\emptyset$, in which case we assume $\pi\left(1,\emptyset,\theta,s^{LS}\right)=0$. Then

$$\begin{aligned}E\left[u\mid s^{LS}\right]-E\left[u\mid s^{N}\right] &= p(1-q)\left(u\left(\pi\left(1,c,\emptyset,s^{LS}\right)\right)-u(0)\right)\\ &\quad+q(1-p)\begin{pmatrix}\alpha u\left(\pi\left(1,c,\emptyset,s^{LS}\right)\right)\\ +(1-\alpha)(u(0)-\beta)-u(0)\end{pmatrix}\\ &= p(1-q)\,u\left(\pi\left(1,c,\emptyset,s^{LS}\right)\right)\\ &\quad+q(1-p)\left(\alpha u\left(\pi\left(1,c,\emptyset,s^{LS}\right)\right)-(1-\alpha)\beta\right)\end{aligned}$$

$$E\left[u\mid s^{LS}\right]-E\left[u\mid s^{S}\right]=p(1-q)\left(u\left(\pi\left(1,c,\emptyset,s^{LS}\right)\right)-u(0)\right)>0$$

and

$$\begin{aligned}E\left[u\mid s^{LS}\right]-E\left[u\mid s^{L}\right] &= q(1-p)\left(\alpha u\left(\pi\left(1,c,\emptyset,s^{LS}\right)\right)+(1-\alpha)(u(0)-\beta)-u(0)\right)\\ &= q(1-p)\left(\alpha u\left(\pi\left(1,c,\emptyset,s^{LS}\right)\right)-(1-\alpha)\beta\right)>0.\end{aligned}$$

No deviation is beneficial and π is consistent with s^{LS} which is an equilibrium strategy.
(iv) Suppose $s^{\lambda}=\lambda s^{LS}+(1-\lambda)s^{L}$ where λ solves

$$\pi\left(1,c,\emptyset,s^{\lambda}\right)=u^{-1}\left((1-\alpha)\beta\right)$$

is an equilibrium strategy. Beliefs are given by $\pi\left(A,m,\theta,s^{\lambda}\right)$ and Bayes' rule applies for all events. By assumption is

$$\frac{\alpha}{1-\alpha}u\left(\pi\left(1,c,\emptyset,s^{LS}\right)\right)<\beta<\frac{\alpha}{1-\alpha}.$$

By the choice of λ is $E\left[u\mid s^{\lambda}\right]-E\left[u\mid s^{L}\right]=0$ and $E\left[u\mid s^{\lambda}\right]-E\left[u\mid s^{LS}\right]=0$. The remaining two pure deviations gives

$$\begin{aligned}E\left[u\mid s^{\lambda}\right]-E\left[u\mid s^{N}\right] &= p(1-q)\left(u\left(\pi\left(1,c,\emptyset,s^{\lambda}\right)\right)-u(0)\right)\\ &\quad+q\lambda(1-p)\begin{pmatrix}\alpha u\left(\pi\left(1,c,\emptyset,s^{\lambda}\right)\right)\\ +(1-\alpha)(u(0)-\beta)-u(0)\end{pmatrix}\\ &= p(1-q)\,u\left(\pi\left(1,c,\emptyset,s^{\lambda}\right)\right)>0\end{aligned}$$

and

$$E\left[u \mid s^{\lambda}\right] - E\left[u \mid s^{S}\right] = p\,(1-q)\left(u\left(\pi\left(1, c, \emptyset, s^{\lambda}\right)\right) - u\,(0)\right) > 0.$$

Hence, s^{λ} is an equilibrium strategy. ■

Proof 3. First, consider the s^{L}-equilibrium. The maximization problem 4 is here

$$\max_{q} pq + p\,(1-q)$$

which can be simplified to p. The leaders expected utility is thus constant with respect to q.

Next, consider the s^{λ}-equilibrium. The maximization problem is

$$\max_{q} pq + (p\,(1-q+\lambda\alpha q\,(1-p)))\,\frac{p\,(1-q)}{p\,(1-q)+\lambda\alpha q\,(1-p)} - \lambda\,(1-\alpha)\,q\,(1-p)\,\beta$$

and the FONC is

$$\begin{gathered} p + (\lambda\alpha - (1+\alpha)\,p)\,\tfrac{p(1-q)}{p(1-q)+\lambda\alpha q(1-p)} - \tfrac{\lambda\alpha p(1-p)}{p(1-q)+\lambda\alpha q(1-p)} \\ -\lambda\,(1-\alpha)\,(1-p)\,\beta = 0 \end{gathered}$$

$$\Rightarrow$$

$$\begin{gathered} \tfrac{p}{p(1-q)+\lambda\alpha q(1-p)}\,(\lambda\alpha\,(1-q)\,(1-p) - \lambda\alpha\,(1-q)\,(1-p)) \\ -\lambda\,(1-\alpha)\,(1-p)\,\beta = 0 \end{gathered}$$

$$\Rightarrow$$

$$-\lambda\,(1-\alpha)\,(1-p)\,\beta = 0 \tag{7}$$

But in equilibrium are $0 < \lambda, \alpha, p < 1$ and $\beta > 0$. The FONC is therefore negative for all q and the expected utility of the leader decreases in equilibrium.

The FONC of the s^{LS}-equilibrium is obtained from 7 by setting $\lambda = 1$ showing that the leader's expected utility decreases in q also in the s^{LS}-equilibrium. Lastly, the information structure in the s^{N}-equilibrium is the same as in the s^{LS}-equilibrium if we set $\alpha = 1$. This makes the left-hand side of 7 equal zero for all q. Hence, in the s^{N}-equilibrium the expected utility of the leader is constant with respect to q. ■

7. Notation

A Outcome

m Message by leader

p Probability leader's action was *good*

q Probability subordnate's action was *good*

s leader's claiming strategy

α Probability claim succeeds.

β Cost to leader of claim being shown false.

π Belief by the public that leader's action was *good*

θ Indicator of whether claim succeeded ($\emptyset$) or failed (f)

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