Moral hazard, leadership and organization

KPMG M&A Forum
Oct 20, 2011

Roger Myerson

THE UNIVERSITY OF CHICAGO

http://home.uchicago.edu/~rmyerson/research/kpmg.pdf

Introduction

In a search for new models to better understand the essentials for successful organizations, I have come to focus on ***the vital role of leadership in allocating moral-hazard rents***.

In transactions where people rely on each other to act in certain ways, the problem of giving agents an incentive to act appropriately is called *moral hazard*.

Rewards to motivate good behavior are called *moral-hazard rents*.

Questions about leadership are timeless. Which aspect is primary?

Many see leaders primarily as visionary strategic planners.

But I will emphasize the view of leaders as reliable paymasters, a view which goes back at least to Xenophon (c. 430-354 BC).

Plan: One ancient story, one modern model, insights based on both.

From Xenophon's *Education of Cyrus*

Cyrus founded the Persian Empire with one essential quality of leadership: a reputation for reliably rewarding good service.

When at dinner with his daughter and [her son] Cyrus, Astyages [King of Media] wished the boy to dine as pleasantly as possible. He thus put before him fancy side dishes and all sorts of sauces and meats.

Astyages said, "Does it not seem to you that this dinner is much finer than among the Persians?"

To this Cyrus answered, "No, grandfather, for the road to satisfaction is much more simple and direct among us [Persians] than among you [Medes]."

Astyages said, "Feast at least upon these meats, so that you may go home a vigorous youth."

Cyrus said, "Are you giving me all this meat, grandfather, to use however I want?" "Yes, my child, by Zeus I am," he said.

Then Cyrus, taking the meat, distributed it to his grandfather's servants and said to each, "This is for you, because you teach me to ride with enthusiasm; for you, because you gave me a javelin; for you, because you serve my grandfather nobly; for you, because you honor my mother."

He proceeded like this until he had distributed all the meat that he received.

(Cyrus later usurped the throne of Media.)

An economic model of moral hazard

An investment I of between 1 & 10 million$ can be managed by a skilled manager, and will produce wI widgets if it succeeds.

If the manager behaves well, the probability of success is q=0.8.

If the manager acts corruptly, she gets private benefits worth 20% of the investment I but decreases the probability of success to 0.4.

A failed investment returns no value. Corrupt behavior has no observable consequences except the lower probability of success.

What is the lowest price p at which widgets are worth producing?

To deter corruption, the manager must get rewards from success worth some amount R such that $0.8R \geq 0.4R + 0.2I$. So $R \geq 0.5I$.

$r = 0.2/(0.8-0.4) = 0.5$ is the *moral hazard rent* per unit invested.

If the manager only serves once, then p must satisfy $q(pwI-rI) \geq I$, and so $\mathbf{pw \geq 1/q + r} = 1/0.8 + 0.5 = 1.75$

The minimal price just covers the expected cost of invested funds (at interest rate 0) plus the moral-hazard rent per unit invested.

Back-loading moral-hazard rents

Now suppose managers can handle investments in 2 periods.

The opportunity to earn a moral-hazard rent from a 2nd-period investment can be the reward to motivate good behavior in the 1st.

With one moral-hazard rent motivating good behavior in 2 periods, investors can profitably make widgets at any price p such that

$\mathbf{pw \geq 1/q + r/2} = 1/0.8 + 0.5/2 = 1.50$.

Investors' optimal incentive plan for pw just above 1/q+r/2:

In the 2nd period, if the manager succeeded in the 1st period, she manages the maximal investment $I_2 = 10$, and if that succeeds then she gets final reward $rI_2 = 0.5 \times 10 = 5$.

An 80% chance of getting 5 in the 2nd period is worth $0.8 \times 5 = 4$ to the manager in the 1st period, which can be used to motivate good behavior with investment $I_1 = 4/r = 8 = 0.8\, I_2$.

Investors' expected profit is $-I_1 + 0.8[pwI_1 - I_2 + 0.8(pwI_2 - rI_2)]$

$= (0.8)^2 \times I_2 \times (2pw - 2 \times 1/0.8 - 0.5) \geq 0.$

Back-loaded career rewards cut the cost of moral hazard

Now suppose managers can handle investments in up to T periods.

When the prospect of a big reward in the last period T motivates good behavior in all earlier periods, investors can profitably make widgets at any price p such that **$pw \geq 1/q + r/T$** = 1/0.8+0.5/T.

The competitive price is $pw = 1/q+r/T$ even if investors and managers discount future periods by some discount factor $\delta \leq 1$.

With q=0.8 and r=0.5, this competitive yield per dollar invested is pw=1.75 if T=1, pw=1.35 if T=5, pw=1.30 if T=10.

In an efficient contract, the manager is responsible for investments that gradually grow, as long as she is successful, to the maximum that she can handle I_T=10 in her last period of service.

If she always succeeds then she gets final reward rI_T after period T; but if she ever fails then she is dismissed without any such reward.

For a firm to achieve this efficient cost, its managers must trust that these deferred rewards for success will be appropriately paid.

Leaders must ensure the distribution of moral-hazard rents

Efficient production with back-loaded rewards requires long-term relationships between a firm and its responsible agents.

Midcareer job assignments are not anonymous transactions. (Contrast the usual economic assumption that everybody can trade at the same prices.)

Ex post, re-investments with midcareer managers may appear inefficient for the firm, compared to new long-term contracts with younger managers.

Back-loaded rewards are debts that the firm would have a short-term incentive to deny, by falsely finding fault.

Thus, to efficiently motivate responsible managers, a firm needs a reputation for reliably judging and rewarding long-term performance.

At each level, individuals' rewards depend on judgments of their superiors in the managerial network, so incentives ultimately depend on top leaders.

Successful firms need leaders, like Xenophon's Cyrus, whom the responsible managers can trust to reliably reward good service.

Implications of the moral-hazard leadership theory

The top leaders' reputation among responsible managers for reliably judging and rewarding their service is a vital asset of any successful organization.
(What can credibly deter misjudgment at the top? Threat of lawsuits?)

Top leaders have an incentive to maintain this reputation when the managers all monitor the distribution of promotions and rewards, identifying with each other, so that misjudging one manager could demoralize them all.
Demotions and dismissals must be broadly justified to the managerial team, in team meetings or in office gossip. Corporate culture is essential.

In the medieval vassals' oath to give their lord "aid & counsel," counsel meant attending the lord's court to judge his treatment of other vassals.
Each vassal could trust the lord more when others monitored his judgments.

Implications for M&A depend on whether the target firm's current leadership has a weak or strong reputation for judging managerial performance.
If weak: extending leadership from acquirer can provide value in the merger.
If strong: should ask how autonomy can be assured after merger.

Other factors

Unforgiving treatment of failures and full back-loading of rewards here are due to a simplifying assumption of risk-neutral managers.
In a bigger model with **risk aversion**, managers would get some earlier rewards, and failures may just decrease responsibilities.
But a substantial component of responsible managers' rewards would still be back-loaded to late in their careers.

Learning and **identification of talent** can also explain back-loading of rewards, but with different incentives for cross-firm recruitment.

Firms could further reduce the cost of moral-hazard rents if managers would prepay for value of their job or **post a performance bond**.
But the firm's promise to repay the bond for good performance would still depend on its reputation for reliably judging performance.

Formal characterization of the T-period incentive plan

Here q is the probability of success if manager behaves well (q=0.8),
r is the required moral-hazard rent per unit invested (r=0.5),
δ is the per-period discount factor (δ=0.9)
and T is the number of periods in a manager's career.

Let I_T be the maximal investment that a manager can handle (I_T=10).

In an efficient contract, at any period t from 1 to T, if the manager has not failed yet then she handles investment $I_t = (q\delta)^{T-t} I_T$;
if she always succeeds then she gets final reward rI_T after period T;
but if she ever fails then she is dismissed without any such reward.

The expected discounted value of investors' operating profit from each period t is then $(q\delta)^{T-t}(-I_t + qpwI_t) = (q\delta)^{T-1}(qpw-1)I_T$.

Expected discounted cost of manager's reward is $(q\delta)^{T-1}(qrI_T)$.

So investors' overall expected present discounted profit when the manager is hired is $T(q\delta)^{T-1}(qpw-1)I_T - (q\delta)^{T-1}(qr)I_T \geq 0$,
when $pw \geq 1/q + r/T$.