Hart and Holstrom on Firm Scope

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The Hart Holmstrom Problem

When do we combine two units into one firm?

Example 1: You own two French restaurants in Bloomington, one on the East Side and one on the West Side. Do you have two managers, one for each, or three, one for each and an overall boss? This is a question separate from ownership.

(We could have the same shareholders holding both firms' shares.)

Example 2: You are in charge of two sections of G201, Microeconomics. Each section has its own TA. Do you require them to teach the same things, or let them each choose what to teach?

The Model

Suppose we have two units, A and B, each requiring its own manager. Each unit has a profit v and a private benefit to its manager of w. We can think of these as the manager's marginal product and his job satisfaction. Reservation payoffs equal zero.

The payoffs are thus $v_A + w_A$ for manager A and $v_B + w_B$ for Manager B.

There might also be a central manager, manager C, whose payoff is $v_A + v_B$. He is paid based on the profits of the firm as a whole.

Each unit either chooses YES to try to coordinate with the other, or NO. These decisions are not contractible. They result in values of profit and satisfaction such as, for example

$$v_A(Y, N) \tag{1}$$

which is the profit of unit A when A says YES and B says NO.

We'll assume that the worst outcome for a unit is to have its manager say YES when the other one says NO, and that that is also the worst outcome for the combined payoffs.

We will also assume that YY has lower total private benefits than NN does:

$$w_A(Y, Y) + w_B(Y, Y) < w_A(N, N) + w_B(N, N) \tag{2}$$

Thus, the private benefits of one or both managers fall a lot if they choose YY. Note that one of them can like cooperation; it's just that the other one must hate it even more.

Why would a manager dislike cooperation? Maybe it simply requires more effort– in addition to looking after his own unit, he must notice what's happening in the other unit. He might have to wait

for memos to come back from the other unit. Maybe he just gets pleasure out of managing the unit a certain way— producing particular products, never having to transfer employees to another unit, not having to yield to anybody's else's desires.

This is in addition to the manager caring about cooperation because of its effect on profits– maybe cooperation raises one unit's profit and lowers the other unit's.

Why would a manager like cooperation? Maybe it makes his job easier Manager A likes cooperation if it means that manager B takes over some of manager A's workload. He also likes it if cooperation means that manager B must come into line with the practices in unit A.

We'll use the notation

$$\Delta v_A \equiv v_A(Y, Y) - v_A(N, N), \tag{3}$$

that is, to represent the change in v_A moving from both players choosing NO to both choosing YES: the change from cooperating. This change can be negative, though: probably $w_A(Y, Y) < 0$, if Manager A's satisfaction goes down when he has to cooperate with Unit B. Our assumption (2) above can be restated as

$$\Delta w_A + \Delta w_B < 0 \tag{4}$$

Cooperation is efficient if and only if:

$$\Delta v_A + \Delta w_A + \Delta v_B + \Delta w_B \geq 0 \tag{5}$$

If $\Delta w_A + \Delta w_B$ is too negative, cooperation is inefficient. The firm would end up having to pay the managers more in extra wages than the extra profit of the units.

Also, if Manager C must be hired, that increases the required wage bill. We will ignore that cost in our efficiency statements, though, since for big organizations it is small.

Three Forms of Organization

NONINTEGRATION: The two units are maanged separately. Manager A chooses YES/NO for unit A to maximize $v_A + w_A$ and Manager B chooses YES/NO for unit B to maximize $v_B + w_B$.

INTEGRATION: The two units are managed jointly. Manager C is boss and chooses YES/NO for unit A and YES/NO for unit B to maximize $v_A + v_B$.

HIERARCHY OF UNITS: (not a Hart-Holmstrom term): The two units are managed jointly. Manager A is boss and chooses YES/NO for unit A and YES/NO for unit B to maximize $v_A + v_B + w_A$.

Under Nonintegration (units independently managed), cooperation will be an equilibrium if and only if

$$\Delta v_A + \Delta w_A \geq 0 \quad AND \quad \Delta v_B + \Delta w_B \geq 0 \tag{6}$$

If both conditions are true, then there will be cooperation and cooperation is efficient. There will never be too much cooperation.

Under Integration (units managed by a central manager), cooperation will be an equilibrium if and only if

$$\Delta v_A + \Delta v_B \geq 0 \tag{7}$$

There would be too much cooperation if $\Delta w_A + \Delta w_B < 0$ and is large. There would never be too little cooperation (that would require $\Delta w_A + \Delta w_B > 0$, which we assumed away earlier).

Under a Hierarchy of Units (units both managed by unit A's manager), cooperation will be an equilibrium if and only if

$$\Delta v_A + \Delta v_B + \Delta w_A \geq 0 \tag{8}$$

There could be too much cooperation if $\Delta w_B < 0$ and is large, or if $\Delta w_A > 0$ and is large (we didn't assume away that case). Then, manager A likes cooperation and chooses it even though manager B hates it.

There could be too little cooperation if $\Delta w_B > 0$, and Δ_A (which would then have to be negative by assumption) is a larger amount. Then manager A hates cooperation and doesn't choose it even though cooperation increases profit a little and manager B enjoys it.

The Tradeoffs across Forms of Organization

Nonintegration

GOOD: If the units and managers are similar enough, so $\Delta v_A + \Delta w_A$ and $\Delta v_B + \Delta w_B$ have the same sign (both positive, or both negative), then nonintegration achieves efficiency.

BAD: Even if coordination increases profits a lot, so $\Delta v_A + \Delta v_B$ is positive and large, if either manager dislikes coordination, it won't happen and that will be inefficient.

Integration

GOOD: If managers don't value independence much, so $\Delta w_A + \Delta w_B$ is small, then we get cooperation and that is efficient.

GOOD: We don't need to worry about an inefficient YY or NN equilibrium being played out.

BAD: If managers do value independence a lot, so $\Delta w_A + \Delta w_B$ is big and negative, then we get cooperation and that is inefficient.

Hierarchy of Units

GOOD: If managers don't value independence much, so Δw_A and Δw_B are both small, then we get cooperation and that is efficient.

GOOD: We don't need to worry about an inefficient YY or NN equilibrium being played out.

BAD: If manager B values independence a lot but manager A likes cooperation for its own sake, then we get cooperation and that is inefficient. This is

What if there are N units instead of two?