LECTURE 12.4

VERTICAL INTEGRATION VERSUS

LONG-TERM CONTRACTS

VERTICAL INTEGRATION VS. LONG TERM CONTRACTS

Consider a firm (AutoCorp) that wishes to purchase car bodies.

- Should they vertically integrate or write a long-term contract?

There are several factors to consider

- contracts may be incomplete

- ownership and investment incentives

- specific assets

- asset ownership

VERTICAL INTEGRATION VS. LONG TERM CONTRACTS

Consideration 1: Incomplete contracts

If a complete contract was possible, then it would not matter if AutoCorp made their own car bodies or wrote a long term purchase contract.

But contracts are often incomplete. Possible problems include:

- difficulty in specifying all possible contingencies

- the cost of negotiating contracts

- the difficulty and cost of contract enforcement

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Consideration 2: Ownership and Investment incentives.

Recall the Property Rights theory of the firm: ownership determines the residual use of an asset

- vertical integration ensures that asset ownership stays within the firm

- long term contracts allow ownership to reside outside the firm

- asset ownership influences investment incentives

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Consideration 3: Specific Assets

Specific investments place the investor in a tenuous position.

Consider the problem faced by the potential supplier to AutoCorp (a producer of new autos), BodyWorks (which makes the chassis).

- BodyWork may have to construct a plant near AutoCorp's factory.

- Once the plant is built, AutoCorp has an incentive to rewrite the contract

- This reduces the incentive for BodyWorks to make investments

It is also possible that the hold up problem goes the other way

- e.g. AutoCorp makes a specific investment to tailor production to the chassis made by BodyWorks

This example is related to the classic case of GM and Fisher Body

VERTICAL INTEGRATION VS. LONG TERM CONTRACTS

When is it better to use long term contracts?

- When assets are less specific, markets are more likely to produce efficient outcomes

- When there is greater uncertainty, specific assets pose greater problems. Contingencies become more important, and these may be difficult to contract for.

To vertically integrate, AutoCorp could buy BodyWorks, or BodyWorks could buy AutoCorp

- the ownership structure matters!

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Consideration 4: Asset Ownership

AGT manufactures modems, and CCC makes circuit boards (an important input)

- AGT is CCC's only customer

- CCC is the sole supplier of circuit boards for AGT

- assume circuit boards are firm specific

The value that each party gets from the transaction depends on their investment or effort

- investment by AGT could increase the value of the modem

- investment by CCC could reduce the cost of the circuit board

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The realised surplus from the transaction is:

$$S = V - C - 10x^2 - 10y^2$$

where V is the value to AGT, C is the cost of CCC, x is the investment of AGT, and y is the investment of CCC.

Investment by AGT determines V:

$$V = \begin{cases} 40 & \text{with probability } x \\ 20 & \text{with probability } 1-x \end{cases}$$

Investment by CCC determines C:

$$C = \begin{cases} 10 & \text{with probability } y \\ 30 & \text{with probability } 1-y \end{cases}$$

The outcome depends on the effort of the two firms. If CCC puts in lots of effort, the cost is likely to be lower. If AGT puts in lots of effort in the redesign of the circuit, the benefits from the improved circuit is likely to be higher.

Note that we have assumed that both firms (or their owners) experience a cost of effort equal to $10x^2$ or $10y^2$

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First, consider socially optimal investment. Expected joint surplus is:

$$S_J = (40 - 10)xy + (40 - 30)x(1 - y) + (20 - 10)(1 - x)y - 10x^2 - 10y^2$$
$$= 30xy + 10x(1 - y) + 10(1 - x)y - 10x^2 - 10y^2$$
$$= 10xy + 10x + 10y - 10x^2 - 10y^2$$

The FOCs for optimal investment are:

$$\frac{dS_J}{dx} = 0 = 10y + 10 - 20x$$

$$\frac{dS_J}{dy} = 0 = 10x + 10 - 20y$$

Solving simultaneously gives $x = y = 1$, $S_J = 10$.

[Note that in determining the expected joint surplus, if $V < C$, the firms decide not to produce.

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In practice, both x and y are privately observable, and therefore not contractible. Suppose they are privately chosen, and assume the surplus is split equally. We will look for Nash equilibrium investments. First consider AGT. Their surplus is:

$$S_A = (40-10)xy/2 + (40-30)x(1-y)/2 + (20-10)(1-x)y/2 - 10x^2$$
$$= 15xy + 5x(1-y) + 5(1-x)y - 10x$$

The first order conditions for optimal investment are

$$\frac{dS_A}{dx} = 0 = 15y + 5(1-y) - 5y - 20x$$

This leads to a reaction function for AGT:

$$x = y/4 + 1/4$$

Similarly, for CCC:

$$y = x/4 + 1/4$$

Solving simultaneously gives $x = y = 1/3$, $S_J = 50/9 = 5.6$.

VERTICAL INTEGRATION VS. LONG TERM CONTRACTS

If investment is not contractible, each firm underinvests:

• each firm incurs the full cost of effort, but receives half of the benefits

• free riding leads to suboptimal investment

Could vertical integration solve the problem? Suppose AGT buys CCC

• AGT obtains all residual rights, CCC has no residual rights

• if effort is not contractible, the workers at CCC have no incentive to exert effort → y = 0

AGT has surplus

$$S_A \;=\; (40-30)x - 10x^2 \;=\; 10x \;-\; 10x^2$$

Optimal investment is x = 1/2 and surplus is S_A = 5/2.

• vertical integration does not solve the problem!

• if CCC buys AGT, the same problem remains

VERTICAL INTEGRATION VS. LONG TERM CONTRACTS

Key lesson: vertical integration is not always superior to a long term contract

• separate ownership actually gives more value in this example

• investments (or effort) are impacted by organisational structure

When might it be better to give stronger incentives to one party?