

International Business Economics

Lecture Notes

Set #2

Theory of The Firm:
Horizontal & Vertical Boundaries

This document was prepared for HKU SPACE

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MBA in International Management

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October 2009

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Chapter 1

Theory of The Firm

1.1 Neo-Classical Theory of The Firm

- A firm is viewed as a set of feasible production plans (a black box).



- It is a vehicle for its owners, assumed to be rational economic men or women, who seek to maximize their personal wealth.
- The job of a manager is to make buying (inputs) and selling (outputs) decisions that maximize the owner's welfare (usually represented by profit).
- The firm should expand to the point (level of output) where its marginal revenue equals to marginal cost – the profit maximizing condition.
- The neo-classical theory remains the dominant one because
 - elegant and general mathematical models can be built
 - useful for analyzing how a firm's production choices respond to exogenous changes
 - useful for analyzing strategic interaction between firms

1.1.1 What Is Missing?

- It does not explain how production is organized within a firm, and how conflict of interests between its owners, managers, and workers are resolved.
- It begs the question why a firm exists in the first place, and what determines its boundaries.

So there is no actual theory of the firm; it is subsumed by the theory of markets.

1.2 Transaction Costs Theory of The Firm

1.2.1 The Coasian Tradition

Transaction Cost Economics, introduced by Roland Coase in his famous 1937 article, “The Nature of the Firm”, attempts to answer the following three fundamental questions.

- What is a firm?
- Why do firms exist?
- What determines the size of a firm?

To answer the question “What is a firm?”, Coase begins by asking “Why do firms exist?”

Why do firms exist?

What can a firm do better than a market?

- “The main reason why it is profitable to establish a firm would seem to be that there is a cost of using the price mechanism.” (Coase 1937, p.??)
- The costs of using the price system can be reduced, if not eliminated, by using the firm. Coase is more interested in the costs of exchange:
 - Cost of discovering the relevant prices
 - Costs of searching, negotiating and writing enforceable contracts for each transaction (which can be substantial in an uncertain world).
 - Cost of executing separate contracts for each of the multifold market transactions necessary to coordinate some complex production activity.
- Main idea: Firms arise to economize on the costs of using the price system (aka the market), which came to be known as **transaction costs**.
- If there were no transaction costs, there would be no firms as we know it.

What is a firm?

How is a firm different from a market?

- In Coase’s view, transaction costs can be reduced by giving one party authority over the terms of trade – i.e. orders issued by a boss. And it is this authority that defines a firm.
- A Firm, therefore, replaces *contracts for products* with *employment contracts*, effectively substituting a factor market for a product market (Cheung 1983). Within a firm, market transactions are replaced by centralized direction of the owner / manager.
- The difference between a Market and a Firm is the distinction between the price-based and the authority-based modes of resource allocation.

What determines the size of a firm?

What sets the boundaries of a firm?

- The size of a firm is defined not by its output (Q) but by the number of transactions or activities within its boundaries.
- Why doesn't a firm expand forever so that the whole market will be one giant firm? Vladimir I. Lenin: "The whole of society will have become one office and one factory."
- In other words, if transactions are costly, why don't we see "complete vertical integration" so that ALL transactions occur in one big firm?
- **Answer:** Internal (administrative) coordination is subject to diminishing returns. As the number of transactions increases, the ability of management to efficiently allocate resources decreases – i.e. the costs of integration will increase.
- "A firm will tend to expand until the costs of organising an extra transaction within the firm become equal to the costs of carrying out the same transaction by means of an exchange on the open market or the costs of organising in another firm." (Coase 1937, p. 395)

1.3 Extensions of The Coasian Theory

1.3.1 Team Production

(Alchian & Demsetz 1972)

- Alchian & Demsetz based their theory of the firm on joint production and monitoring.
- A firm often involves joint or team production – production with inseparable individual production functions.
- Marginal products of individual works are costly to measure and create free-rider problems (shirking).
- The firm can hire someone to monitor the workers and their productivities (effort). But who monitors the monitor?
- Solution: Give the monitor the rights *i*). to claim the residual income, *ii*). to hire or fire members of the team, and *iii*). to sell the above rights. This arrangement effectively defines OWNERSHIP of the capitalist firm.

1.3.2 Agency Theory

(Ross 1973, Jensen & Meckling 1976)

- Jensen & Meckling extends the theory of Alchian & Demsetz to make the agency problem between owners and managers a central theme.
- An agency relationship is a contract under which one or more persons (the principal) engage another person (the agent) to perform some tasks on their behalf, which may include delegating decision-making authority to the agent.
- Agency Problems arise from *incentive incompatibility* (conflict of interests) between the principal and the agent, and *asymmetries of information*.

- Examples of principal-agent relationship: Employer / Employee, Shareholders / Corporate Executives, Investors / Fund Managers.
- Jensen & Meckling identified three types of agency costs and argue that firms exist to minimize them:
 1. Monitoring Costs – expenses incurred by the principal to monitor the agent’s activities. e.g. cost of writing the contract, cost of verifying and enforcing the provisions of the contract.
 2. Bonding Costs – expenses incurred by the agent to demonstrate that he or she is acting in the principal’s best interest. e.g. cost of gathering and disbursing information (reports), cost of obtaining outside verification of information (audits), opportunity cost or utility loss from pre-commitment to forgo decisions or activities that benefit the agent but not in the best interest of the principal.
 3. Residual Loss – the wealth or welfare loss incur by the principal when the agent’s decisions or activities (presumably maximize the agent’s own utility given the level of bonding and monitoring) do not coincide with the decisions or activities that maximize the principal’s utility.

Chapter 2

Horizontal Boundaries of The Firm

- In some industries, a few large firms dominate the market. In others, the market is shared by a large number of small firms. Yet there are industries where large and small firms co-exist (software, banks, insurance).
- What determines the horizontal boundaries of a firm?
 - Economies of Scale
 - Economies of Scope
 - Learning Curve

2.1 Economies Of Scale

- Economies of scale arise when an increase in output reduces average costs.
- Recall that the average total cost curve is typically U-shape – average costs decline over low levels of output and increase at high levels of output.
- Average costs decline initially because the fixed costs are spread over more units as output increases.
- The *minimum efficient scale* (MES) is the level of output at which the average cost is minimum, i.e. when the economies of scale are *exhausted*. Beyond that point, the average cost curve is either flat (AC is L-shape) or increasing (AC is U-shape).

2.2 Economies of Scope

- Economies of scope exist when there is a cost reduction associated with producing several distinct goods.
- E.g.: Boeing produces both commercial and military jets. It can amortize its R&D costs over both types of aircrafts, thereby reducing the average cost of each type.
- Consider a firm producing Q_x units of good x and Q_y units of good y . The production process exhibits economies of scope if

$$C(Q_x, Q_y) < C(Q_x, 0) + C(0, Q_y)$$

That is, it is cheaper for one firm to produce both x and y than for one firm to produce x and another to produce y .

2.3 Sources of Scale and Scope Economies

- Economies of scale and economies of scope are closely related concepts, except that the former is a cost advantage in *producing more units of the same product* and the later is a cost advantage in *producing multiple products*.
- Economies of scale is usually defined in terms of average cost, whereas economies of scope is usually defined in terms of the *relative* total cost of producing a variety of goods or services in one firm vs. producing them in two or more firms.

1. Indivisibilities and The Spreading of Fixed Costs

- All production processes involve some set-up or fixed costs, such as special equipment, R&D expenses, special training expenses etc. *Indivisibility* simply means that there is certain minimum “fixed factors” necessary to start production.
- **Short-run:** Spreading of product-specific fixed costs
Indivisibilities are more likely when production is capital intensive, i.e. when fixed capital cost is a significant percentage of total costs.
- **Long-run:** Cost reduction by switching to a higher fixed cost technology and moving the MES to a higher level of output.

2. Increased Productivity of Variable Input

- Up-front investment made by an individual to develop special skills cannot be recouped unless subsequent demand is large enough \Rightarrow individuals will not make the investment to become a specialist unless demand is sufficiently high.
- “The division of labor is limited by the extend of the market.” (Adam Smith)
Specialization (division of labor) \Rightarrow higher productivity

3. Inventories

- Firms carry inventory to minimize the chances of running out of stock (“stock-out”). But carrying inventory can be costly, including the cost of producing and holding the inventory, and the risk that it will depreciate in value or obsolete.
- The need to carry inventory creates economies of scale because firms doing high volume of business can usually maintain a lower ratio of inventory to sales without increasing its probability of stock-outs.
- Example: Two firms in the same industry usually do not experience stock-outs at the same time. Merging the two firms can reduce the probability of a stock-out, given their combined inventory \Rightarrow the merged firm can lower its inventory and have the same probability of stock-out as before.

4. The Cube-Square Rule – Physical Properties of Production

- The Cube-Square Rule: The volume of a structure (say, a tank) increases with the cube of its linear dimension (length of its sides), whereas its surface area increases with the square of its linear dimension.
Implication: The ratio of surface area to volume decreases as capacity increases.
- In many production processes, the output capacity is proportional to the volume of the production “vessel”, whereas the total cost is proportional to the surface area of the “vessel”.

- Economic Implication: Average cost (surface area to volume) decreases as production capacity increases.
- Examples: Oil pipeline (Doubling the diameter of the pipeline more than doubles the flow capacity through it), brewing tank, warehousing.

2.4 Special Sources of Scale & Scope Economies

Sources of scale and scope economies in areas other than production:

2.4.1 Economies of scale and scope in purchasing

- Larger buyers can get volume discounts
 - lower transaction costs for the seller
 - large volume buyers are more price sensitive and can bargain more aggressively
 - sellers offer volume discount to assure steady flow of business
- Alternatives to “bigness”
 - small firms can form “purchasing alliances”
 - price sensitive firms may get better discounts even if they are small

2.4.2 Economies of scale and scope in advertising

- Effectiveness of advertising is measured as:

$$\begin{aligned}
 & \text{Cost} / \text{Actual Customer} \\
 &= (\text{Cost} / \text{Potential Customers}) \times \frac{\text{Potential Customers}}{\text{Actual Customers}} \\
 &= \frac{\text{Cost per Potential Customers}}{\text{Proportion of Potential who become actual Customers}} \\
 &= \frac{\text{“Efficiency”}}{\text{“Reach”}}
 \end{aligned}$$

- Larger scale increases “efficiency” (fixed cost factor)
- Larger scale usually results in better “reach” as well (Example: McDonald’s vs. Wendy’s)
- “Umbrella Branding” Effects: Sony advertising its plasma TV can help promote its DVD players.

2.4.3 Economies of scale and scope in R&D

- There is minimum feasible size (scale) for R&D projects and R&D departments.
- There is economies of scope in R&D also: one project can benefit from ideas of another other.
- Size and Innovation: Are bigger firms (size) more innovative than small firms?

Studies show no clear relationship. “Bigness” reduces the AC of innovation while “smallness” may be more suitable for motivating researchers.

2.5 Sources of Diseconomies of Scale

Beyond a certain size, bigger is not necessarily better.

2.5.1 Labor Costs and Firm Size

- Larger firms generally pay higher wages.

Possible Reasons:

- Larger firms are more likely to be unionized
- It may be more enjoyable to work in a smaller firm
- Large firms may have to attract workers from greater distances
- BUT larger firms tend to have lower worker turnovers. So the savings in recruiting and training costs may partially offset the higher labor costs.

2.5.2 Incentive and Bureaucracy Effects

Larger firms usually have more complex organizational structures

- more difficult to monitor and communicate with workers
- more difficult to evaluate and reward individual performances
- more detailed work rules that may stifle creativity of workers and make them feel detached

2.5.3 Spreading Specialize Resources Too Thin

Specialized resources cannot be easily or readily replicated. Growth and expansion will come at the expenses of lower quality because the resources are spread too thin.

2.5.4 “Conflicting Out”

Conflict of interests is a potential problem for firms in professional services industries experiencing growth and consolidation.

- Examples: Accounting, Consulting, Law, Marketing
- “Is the firm already doing business with one of my competitors?” If yes, sensitive information may leak out.
- “Conflicting out” – a potential client may take its business somewhere else.

2.6 Example (October 2007, Q.4)

A firm produces two products X and Y . The production technology displays the following costs, where $C(X_i, Y_j)$ represents the total cost of producing i units of X and j units of Y : $C(0, 100) = 200$; $C(10, 0) = 300$; $C(0, 150) = 310$; $C(20, 0) = 560$; $C(10, 100) = 520$; $C(0, 0) = 50$; $C(21, 0) = 563$. Remember to explain your answers clearly!

- a). What are the fixed costs of this firm? What is the average cost of producing 100 units of good Y ? What is the average cost of producing 10 units of good X ? (20 marks).

Since $C(0, 0) = 50$ – i.e. the cost of the firm are 50 even when it is producing nothing – implies that its fixed costs are 50.

The average cost of producing 100 units of good Y is $C(0, 100)/100 = 200/100 = 2$.

The average cost of producing 10 units of good X is $C(10, 0)/10 = 300/10 = 30$.

- b). What is the marginal cost of producing the 21th unit of good X ? (20 marks)

The marginal cost of producing the 21st unit of good X is simply

$$C(21, 0) - C(20, 0) = 563 - 560 = 3$$

- c). Are there economies of scale in the production of good X ? (20 marks)

Yes. Since $C(10, 0) = 300$, the existence of economies of scale would suggest that $C(20, 0) < 600$. Because $C(20, 0) = 560$, we can conclude that there exists economies of scale in the production of good X .

- d). Are there economies of scale in the production of good Y ? (20 marks)

Yes. Since $C(0, 100) = 200$, the existence of economies of scale would suggest that $C(0, 150) < 300$. Because $C(0, 150) = 310$, we can conclude that there does not exist economies of scale in the production of good Y .

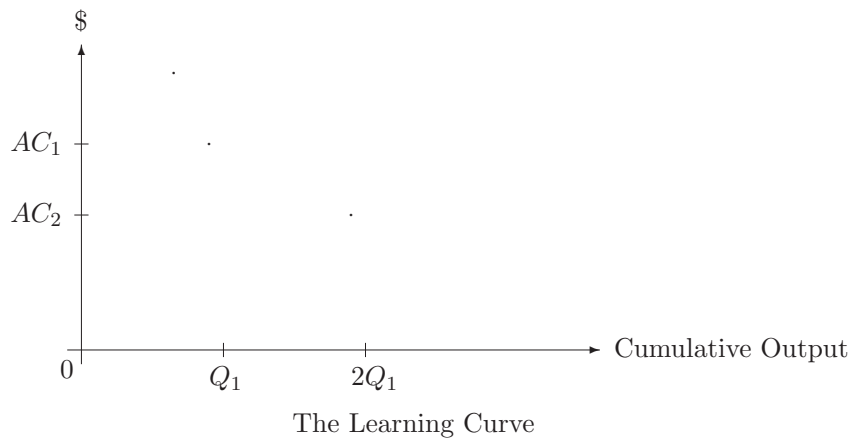
- e). Are there economies of scope in the production of good X and Y ? (20 marks)

No. Since $C(0, 100) = 200$, $C(10, 0) = 300$, economies of scope would entail $C(0, 100) + C(10, 0) < 500$. Since $C(10, 100) = 520$ we cannot infer that economies of scope are present in this production process. In fact producing the products together increases the total (joint) cost of production (e.g. organic and GM (genetically modified) products – the efforts involved in protecting organic field from GM contamination would make the joint production ineffective).

2.7 The Learning Curve

- Learning curves refer to cost advantages which accrue over time – a dynamic version of economies of scale.
- Suppose a firm has cumulative output of Q_1 with average cost AC_1 . And if the firm's cumulative output doubles to Q_2 , its average cost drops to AC_2 .
- The “magnitude of learning” is measured by the “progress ratio” = AC_2/AC_1 , i.e. the slope on the AC curve of the **cumulative** output (instead of output during a particular time period).
- If the progress ratio is < 1 (i.e. the slope of the learning curve is downward sloping), the firm is lowering its per unit costs over time.
- Why quantify the effect of “learning on costs”? Because it is the only way to know the precise benefit of today's production on tomorrow's costs.
- Learning Cost Strategy: over-produce now for lower costs in the future.

Sometimes a firm may want to pursue a “learning curve strategy” by producing more than the optimal ($MC = MR$) level of output in order to exploit the available “learning economies”.



2.7.1 Economies of Learning Vs. Economies of Scale

- Learning Economies: lowering of unit costs (cost savings) that arise from repetition, practice or experience over time.
Learning effects: shifts of the AC curve.
- Scale Economies: lowering of unit costs when producing on a larger scale.
Scale effects: movements along the AC curve.
- Capital intense industries can offer scale economies even when there is no “learning”.
- Complex, labor intense processes may offer “learning” even when there is no scale economies.

2.7.2 Example (May 2006, Q.8 a.)

Firms that seek a cost advantage should adopt a learning curve strategy; firms that seek to differentiate their products should not. Comment on both of these statements.

Hint: your answers should briefly explain the theoretical framework underlying your answer.

A learning curve strategy is one way in which a firm seeks to reduce costs by learning. This is but one of many ways in which a firm can achieve a cost advantage. Other cost drivers include: economies of scale, economies of scope, capacity utilization, economies of density, process efficiency, government policy, and a firm’s location. Learning curves can also confer quality advantages. If there is a first mover advantage in establishing a particular quality position (say the goods are experience goods), then it may pay to push aggressively down the learning curve to gain that quality advantage. Therefore, pursuing a learning curve strategy could be advantageous to both firms that seek a cost advantage and firms that seek to differentiate their products.

2.7.3 Example (May 2009, Q.1 c.)

Growth strategies based on the learning curve are generally risky. Critically assess this statement. (4 marks)

This is generally the case. Why? Because they [growth strategies] rely on the firm ‘over’ producing in the earlier stages of the product’s life cycle in order to rapidly go down the learning curve. Typically a firm’s average cost will decrease by 20% when it doubles its accumulated output. This is mainly due to labour improving their efficiency in producing a certain good – i.e. gaining experience and making fewer errors. Such a strategy implies capitalising on the gains in efficiency the firm will make relative to others that may be slower

moving down their curve. This over-production in the early stages needs to be financed at some stage in the future. If demand falls or does not expand as predicted then the firm makes losses. Borrowing on this basis is risky – which is why learning curve strategies are often easier to adopt by firms with ‘deeper’ pockets. Learning curve diagram required here.

Chapter 3

Economics of Vertical Integration I

- The production of any goods or services usually requires a wide range of activities organized in a vertical chain.
- The Vertical Chain: all activities associated with the flow of production from inputs to output.
- “Upstream” refers to the earlier part of the supply chain
“Downstream” refers to the later part of the supply chain
- Support services like accounting, payroll, IT, human resources etc. are not obviously up- or down-stream, but are subject to make-or-buy decisions.

3.1 The Make-or-Buy Decision

- The fundamental question of vertical integration is the make-or-buy decision.
 - Make: “vertically integrate” or performs the activity in-house
 - Buy: “outsource” or obtain from an outside firm (market specialist)
- Make-or-buy is not an all-or-nothing proposition. The more a firm makes its inputs, the more vertically integrated it is.

3.1.1 Common Fallacies

1. “Make if it is a source of competitive advantage”

If it is cheaper to buy than to make it in-house, then the firm should buy it whether or not it is a source of competitive advantage.

But if “it” is readily available in the market, then it cannot really be a source of competitive advantage for the firm.

2. “Buy to avoid paying the costs of making”

While it is true that you could avoid paying for the set-up and maintenance costs of an in-house production (say, buying the trucks and hiring staff for delivery services) by buying or out-sourcing, someone has to pay the production costs and you will simply get charged for them.

The real question is: Can you make it better and cheaper than an outside firm?

3. “Make to avoid paying a profit to other independent firms”

First, a firm making accounting profits does not necessarily mean it is making economic profits.

If the market firm is making normal profits – the return necessary to attract the investment – it means you won’t be able to do better by internalizing the activity.

If the market firm is making positive economic profits, you need to ask yourself “why aren’t its potential competitors enter the market?” and “can I overcome the barriers to entry better than its potential competitors?”

4. “Make to avoid paying high input market prices during periods of low supply or high demand”

If the market price of an input you have internalized (chosen to “make”) is currently high and you choose to USE it instead of SELLING it, your opportunity cost of using it is EXACTLY the higher market price! (Internal transfer prices should equal the external market price.)

If your concern is to minimize profit fluctuations due to variable input prices, you can use either long-term contracts or futures contracts to hedge the risk.

3.2 Benefits of Using the Market: Reasons to “Buy”

1. Economies of Scale

- Market firms can achieve economies of scale that an in-house department may not have enough quantity to do so.

A useful guideline: If $Q < MES$, buy; if $Q > MES$, make (See Example 3.2: Self-insurance by BP).

- Market firms may possess proprietary technology or information that allows it to produce at lower costs.
- Why not produce enough to achieve economies of scale and sell the rest? Your prospective buyers may be your competitors who would worry about hold-up problems.

2. Economies of Learning

- Market firms are in a better position to achieve economies of learning that may take an in-house firm a long time to achieve.

3. Transaction Costs

Firms are subject to two classes of costs when transactions are organized internally: **Agency Costs** and **Influence Costs**.

3.2.1 Agency Costs

- Agency costs are costs associated with “slacking” and the administrative control needed to deter the behavior. (see Agency Theory, § 6.3.2 in Theory of The Firm)
- An internal unit (e.g. laundry service in a hotel, copy center of a corporation) is often a [joint] cost center created to perform an activity solely for the firm.

Since cost centers generate no revenue from outside the firm, they are often insulated from competition because they have a captured customer base, and it is difficult to measure their performance.

3.2.2 Influence Costs

- Influence costs are costs of activities devoted to influence allocation of internal resources.
- This is known as “rent-seeking” – departments lobby for a greater share of resources allocated by the top management.
- Rent-seeking can be costly because
 - time spent politicking is time not spent on task
 - politics can cause decision-making to be based on inappropriate criteria
 - can lead to destructive internal competition

3.2.3 Exposing Internal Divisions to Market Forces

- Market discipline is ongoing and consistent
- Provides an opportunity to compare the capabilities of internal sources with what is available in the market. Hence, assists in the “make-or-buy” decision.

3.3 Costs of Using the Market: Reasons to “make”

There are three (3) major costs associated with using the market:

- Coordination costs within the vertical chain

Coordinations rely on contracts to ensure a good “fit” – timing, attributes (size, quality, color, critical specifications), sequence etc.
- Leakage of private information

Private information includes production know-how, product design, or consumer information.

When firms use the market to obtain supplies or distribute products, they risk losing control of valuable private information.
- Transactions costs: the costs of negotiating, monitoring, and consummating a contractual arrangement

The existence of relationship-specific assets can greatly affect the bargaining situation between the firm and its suppliers and buyers.

This can lead to costly hold-up problems and increase negotiation costs.

These problems all have something to do with the costs of writing and enforcing contracts.

3.4 Examples

- Vertical integration allows firms to obtain inputs for production at cost, protecting them from high input prices. (October 2007, Q.2, Part b.)

This is false. A firm can protect itself from the threat of hold-up (transactions costs) by vertically integrating but it may not be able to have access to the secure sources of inputs that outside suppliers or other firms may have.

- Why is vertical integration unlikely to be efficient if the target input is a frequent purchase and is supplied by a competitive industry? (May 2009, Q.5, Part c.)

In its make or buy decision the firm will consider the transaction costs, amongst others, of using arms length exchange mechanisms. We are told that the target input is a frequent purchase. This means that the negotiations are repeated – if the supplier holds up the firm, he is unlikely to keep it as a future customer as its reputation and trust will be harmed. Hence frequent purchases are likely to reduce transaction costs and the probability of hold up. We are also told that the firm is purchasing from a competitive industry – this means that the firm can switch suppliers or threaten to switch suppliers during negotiations. We do not know the extent of the relationship specific investment to be made but, other things equal, having more suppliers tends to improve outside options and hence reduce the risk of hold-up and transactions costs. For these reasons, the firm is likely to be in a fairly good position to ‘buy’ this input as oppose to making it as would be the case under vertical integration.

3.5 Economic Foundation of Contracts

- A contract is an agreement between two or more parties, and it defines the terms and conditions of an exchange.
- Contracts protect transacting parties from opportunistic behavior which can impose significant transaction costs in trade and exchange.
- The effectiveness of contracts depends on *i*). their degree of completeness, and *ii*). the proper enforcement of contract laws.
- Not only it is prohibitively costly, if not impossible, to specify all contingencies in a contract, the marginal benefit also gets increasing smaller.

3.5.1 Complete Vs. Incomplete Contracts

In an ideal world with perfect information, there will be no difficulties in writing a complete contract in which performance can be precisely measured, every action under every contingency can be clearly spelled out. Contracts are typically incomplete because of:

1. Bounded Rationality

We have limited capability to process information – we can’t think of every possible contingency.

2. Performance Measurement

It is often difficult to come up with an unambiguous way to specify and measure the agreed-upon outcome. Quality, for example, is quite difficult to specify and measure.

3. Information Asymmetry / Hidden Actions

Information is asymmetric when the parties involved don't have **equal access** to all information relevant to the contract.

When one party knows something the other does not, that party may distort or misrepresent the information to his/her advantage.

Also, actions that affect performance may not always be observable.

3.5.2 The Role of Contract Law

- A well-developed body of contract law is necessary for transactions to occur smoothly when contracts are incomplete.
- However, contract law is not a perfect substitute for complete contract because
 - The doctrines of contract law are phrased in broad language (such as “reasonable time” or “reasonable price”) which are open to interpretations when applied to specific transactions.
 - Litigation can be a costly way to “complete” contracts, and can weaken or even destroy business relationships.

3.6 Asset Specificity & Holdup Problem

While Coase focuses on the *ex ante* costs of searching, negotiating, writing and enforcing contracts as an explanation for the existence of firms, Williamson (1985) focuses on *ex post* transaction costs arise from inability to enforce contracts. The emphasis of his model is on design of contract and ownership right to mitigate *ex post* opportunism.

3.6.1 Asset Specificity

- Williamson recognizes that transaction costs are particularly important in situations where economic agents make relationship-specific investments.
- Asset specificity refers to investment in physical or human assets that are specific to an exchange relationship – a relation-specific investment.

There are four types of asset specificity:

- Site Specificity: assets that are located next to each other to economize on transportation or inventory costs, or to improve processing efficiency.
e.g. locating a power plant next to a coal mine that supplies fuel for its electricity generators (Hart 1989)
- Physical Asset Specificity: assets whose physical or engineering properties are specifically tailored to a particular transaction.
e.g. a mold made for the plastic casing of a particular model of a printer.
- Dedicated Assets: investment in plant and equipment made specifically for a particular buyer.
e.g. a firm investing in machines that make components for the space shuttle
- Human Asset Specificity: skills and/or information acquired that are more valuable inside a particular relationship than outside of it.
e.g. a worker learning to operate a computer program tailor-made for a company

3.6.2 Rents and Quasi-Rents

The concept of RENT is based on the concept of opportunity cost.

- Rent, or economic rent to be exact, is the difference between the income earned from a factor of production and its opportunity cost.
- The opportunity cost of a factor is the income it can earn from its next best use, i.e. the minimum income necessary to keep it in a particular use.
- **Economic Rent** is simply the income over and above the minimum payment necessary to keep a factor in its current use.
- Example: You are currently making \$40,000 a month and the best job offer you have out there only pays \$32,000 a month. The \$8,000 is your economic rent. For most professional athletes, a big part of their earning is in the form of economic rent.

The concept of QUASI-RENT is more subtle but not as difficult as the textbook says it is.

- Many capital investments are highly specialized and take the form of sunk costs. Once a sunk cost investment is made, its next best use may not pay much if it is highly specialized. So much of its earning is considered a kind of rent.
- A sunk cost investment will only be made if the *expected* income is sufficient to cover the cost of creating that factor.
- But once a sunk cost investment is made, the *expected* earning necessary to induce the factor to be created is NOT relevant anymore! The cost of investment is SUNK and therefore does not affect decision making.
- Here is the subtle part: What is the earning you can get from the factor's next best alternative use AFTER the investment cost is sunk?
- **Quasi-rent** is the income earned in excess of post-investment opportunity cost by a sunk cost investment.
- (Try to work through the "cup holder" example in your text, p.124-27.)

3.6.3 Holdup Problem

- There may be plenty of alternatives **before** the investments are made, but once the investments are **sunk** (and therefore cannot be easily deploy to other uses) the party who undertook the specific investment is **locked-in**.
- Example: Consider two parties enter into a transaction. One party owns a generic asset which has high value outside the transaction. The other owns a highly specific asset which has low (say, close to zero) value outside the transaction.
 - Suppose the joint transaction nets \$50,000 (the quasi-rent) and the parties agreed to a 50-50 split.
 - Once the contract is signed, the party with the generic asset threatens to pull out of the contract and demands a 99-1 split (post-contractual opportunism).
- This is call what Williamson calls **fundamental transformation** – Incentives change once the contract is signed and the relationship-specific investment is made.

- Anticipating the potential holdup, the party with the specific asset either will not enter the contract in the first place, or will choose a less specialized but therefore less efficient technology.
- The holdup problem raises transaction costs in the following ways (pp.127-129):
 1. More difficult contract negotiations and more frequent renegotiations
 2. Investments to improve *ex-post* bargaining positions.
 3. Distrust
 4. Under-invest in relationship-specific investments

A Solution: Vertical Integration

- Bringing a transaction from the market (external contact) into the firm (owning all specific assets) can mitigate opportunistic behavior and improve investment incentives. i.e. By vertical integrating its partners a firm can remove the threat of a holdup.
- Sometimes markets can solve hold-up problems without integration if the cooperating parties can make credible commitments **before** the contract is signed.

Chapter 4

Economics of Vertical Integration II

4.1 Introduction

When evaluating the merits of vertical integration, we have to consider:

- Balancing transactions costs
- The role of market imperfections
- The role of asset ownership

There are also alternatives to vertical integration

- Tapered Integration
- Strategic Alliances & Joint Ventures
- Networks / Collaborative Relationships
- Implicit contracts

4.2 Technical Vs. Agency Efficiency

There are two major efficiency concerns in any “make-or-buy” decision.

- Technical Efficiency – Efficiency in production
 - Key determinant: Economies of scale and scope
 - Objective: to adopt the most efficient (or least-cost) method of production
- Agency Efficiency – Efficiency in transactions
 - Key determinant: Transaction costs
 - Objective: to reduce the transactions costs of exchange

To the extent that the market is superior in achieving technical efficiency (minimizing production costs) and that vertical integration is superior in improving agency efficiency (minimizing transaction costs), tradeoffs exist between the two.

4.3 The Asset Specificity Model

The choice to vertically integrate (“make”) or to outsource (“buy”) depends upon

- Technical Efficiency
- Agency Efficiency
- Asset Specificity

Williamson argues that the optimal vertical organization minimizes the sum of technical and agency efficiencies. His diagram (Fig. 4.1 in your text) provides a useful way to think about the interplay between the two in a situation where the quantity of the good being exchanged is fixed. The vertical axis measures the difference between the costs of vertical integration and costs of outsourcing. The horizontal axis measures the degree of asset specificity k .

(see Technical vs. Agency Efficiency.ppt for illustration)

4.3.1 Technical Efficiency (Reflected in ΔT)

- ΔT is the difference in the minimum production cost between producing an item in-house and acquiring the item from a market specialist.
- Characteristics of ΔT
 - $\Delta T > 0$ for all k because market firms always have the economies of scale and scope advantages.
 - ΔT decreases as k increases because asset specificity “narrows the market” thereby reducing the available economies of scale and scope.

4.3.2 Agency Efficiency (Reflected in ΔA)

- ΔA is the difference in transaction / exchange costs between producing an item in-house and acquiring the item from a market specialist.
- Transaction costs when produced in-house are agency costs and influence costs.
- Transaction costs when acquired from a market supplier: direct costs of contracting, safeguard against hold-up, breakdowns in coordination etc.
- Characteristics of ΔA

$\Delta A > 0$ at low levels of asset specificity because

- hold-up is not a significant problem
- the market for the product is likely to be competitive so *i*). production costs are held down and *ii*). there are pressures to innovate

$\Delta A < 0$ at high levels of asset specificity because it will

- require more detailed contracts
- increase the likelihood of hold-up problems
- “narrow the market” thereby reducing competitive pressures

4.3.3 $\Delta C = \Delta T + \Delta A$

- ΔC is the vertical summation of the cost differences between vertical integration and reliance upon market specialists.

- Characteristics of ΔC

If $\Delta C > 0$ (when $k < k^{**}$): “buy”

- Costs of vertical integration > Costs of outsourcing
- the firm should outsource the product

If $\Delta C < 0$ (when $k > k^{**}$): “make”

- Costs of vertical integration < Costs of outsourcing
- the firm should vertically integrate and bring the production in-house

4.3.4 Three important conclusions

- Scale and Scope Economies

Less to gain from vertical integration when scale and scope economies are strong.

- Product Market Share and Growth

More to gain from vertical integration in large and growing markets

- Asset specificity

More to gain from vertical integration when production involves investment in relationship-specific assets.

The theory is consistent with much real-world evidence (see examples on pp.140-143).

4.3.5 Managerial Implications

1. Pay attention to asset specificity

- Rely on markets to produce routine, standardized items (market provision is best when asset specificity is low)
- Produce in-house when design, engineering, production expertise, and specific investments are required (VI is best when asset specificity is high).

2. Pay attention to economies of scale

- Rely on markets for items that require high upfront investments in physical capital or organizational capabilities that outside firms have already developed.
- Rely on market provision when outside specialists can capture substantial economies of scale in production that you cannot – they have the advantage of aggregating demand from a number of firms/industries.

3. Vertical Integration tends to be more efficient for large firms than for small firms

- Vertical Integration is best when large scale in-house production is taking place.

- Market provision is best when in-house production is on a small scale.

4. Pay attention to coordination costs

- Vertical Integration is best when coordination costs are high.
- Market provision is best when low coordination costs are low.

Caution: Technological advances – tele-communications, data processing, CAD, and computer-controlled machinery – tend to lower coordination costs, making reliance on market production more attractive.

4.4 Vertical Integration and Asset Ownership

(Grossman & Hart 1986, Hart & Moore 1990)

- Central Idea: emphasizes ownership rights to maximize *ex ante* investment incentive.
 - In the legal domain, ownership is the possession of **residual rights of control** – rights to control the use of assets under contingencies not specified in the contract.
 - The rights of control also means the ability to exclude other agents from deciding on the use of certain assets.
 - With incomplete contracts, ownership affects decisions to invest in relationship-specific assets.
 - If the agent who undertakes a relationship-specific investment does not own the asset, he or she may be subject to a holdup \Rightarrow incentive to under-invest.
 - Possession of residual control, on the other hand, improves both bargaining power over operating decisions and ability to capture more of the economic value created \Rightarrow more incentive to invest in relationship specific assets.
 - Asset ownership can reduce, if not eliminate, incentives for opportunistic behavior.
- ** The vertical boundaries of a firm is determined by its decisions on which control rights to own (“make”) and which control rights to not own (“buy”).
- What determines ownership rights? Efficiency dictates that residual control should be exercised by the agent whose investment in a relationship-specific asset has the greatest impact on value creation.
- ** Under the property rights approach, a firm is a collection of jointly owned assets resulted from the resolution of its make-or-buy decisions.
- Having said all that, where does it leave us? A firm should choose the ownership arrangement in such a way that can minimize the consequences of opportunism.
 - Further implication: partial vertical integration is possible
e.g. retain ownership of specialized machinery, dies used by outside contractors
- ** Example: Vertical Integration of the Sales Force in the Insurance Industry (p. 146 of your textbook)

4.5 Process Issues in Vertical Mergers

- A **vertical merger** is a merger between two companies producing different products or services for a specific finished product. Typically a company merges with a supplier or distributor. Example: a car manufacturer purchases a tire company.
- The net balance between technical and agency efficiencies in vertical **integration** is a useful basis for evaluating the desirability of a vertical **merger**.
- But a vertical merger is not a simple make-or-buy decision because it is *buying an opportunity to make*. How productive a merger will be is affected by governance issues.
- Specialized human capital – managers and workers – of the acquired firm may be crucial to the success of the merger, but the ownership (governance) rights of these “assets” cannot be simply transferred with the merger.
- The GHM Theory suggests a criterion for an efficient governance arrangement.
 - Managers of the acquired unit may have to cede control after merger, but they must be given decision-making power commensurate with their control over specialized resources, e.g. human capital.
 - Decision-making rights should be given to managers with the greatest influence in performance and profitability.
 - if success depends on synergies associated with physical assets, centralize
 - if success depends on specialized knowledge of acquired managers, decentralize
- The governance structure that emerges may well exhibit **path dependence**
 - Past circumstances determine post-merger governance structure ⇒ may need to exclude certain possible governance arrangements: immediate post-merger conflict undermines the potential for future cooperation.
 - Same consideration in disintegration: instead of operating as an autonomous entity, a spun-off unit continue to rely on parent company and maintain long-term informal association.
 - A merger affects capacity to sell outside the vertically integrated unit
 - * Internal division does not usually have this expertise: the external market is a distraction
 - * An acquired supplier does have this expertise: it had marketing capacity prior to acquisition

4.6 Strategic Motives for Vertical Integration

- Foreclosing of input and output markets to competitors, or at least raising their costs by reducing the number of suppliers / customers available to them.
- Cross-subsidisation of one stage of the value chain by another in order to “squeeze out” more focused competitors.
- To increase barriers to entry by upping the ante and reducing the threat of potential entrants.
- To acquire or retain control over proprietary knowledge so as to prevent suppliers / customers from becoming competitors.

4.7 Alternatives To Vertical Integration

4.7.1 Tapered Integration – “make some, buy some”

- A mixture of vertical integration and market exchange: produce some internally and purchase the remainder.

Example: Coca-Cola and Pepsi own some bottlers and contract out the rest

- Potential Benefits
 - Expands input and/or output channels without substantial capital outlays
 - Can use internal costs and profits to influence external negotiations and use external supplier as a yardstick to control internal division
 - Protect against potential holdup
- Potential Costs
 - May have to sacrifice scale economies
 - Coordination problems more difficult
 - Monitoring and Compliance information problems
 - * A less efficient internal production unit may be used as a benchmark for external providers
 - * Reintroduction of agency costs and influence costs associated with vertical integration.

4.7.2 Strategic Alliances

- Collaboration on a project
- Share information/productive resources
 - Horizontal between firms in the same industry (Ford and Mazda)
 - Vertical between a supplier and buyer (TI and ACER in chip production)
 - Across industries (Toys “R” Us and McDonalds in Japan)
- Features (of transactions) that make alliances desirable
 - Impediments to comprehensive contracting in an evolving relationship
 - Transaction is too complex for comprehensive contracting
 - Involves creation of relationship-specific assets by both parties
 - Costly for either party to develop the expertise of the other
 - Market opportunity is transitory or uncertain
 - Market opportunity arises in a regulatory environment with unique features that require a local partner
- Drawbacks of alliances
 - Risk of leakage of information and loss of control of proprietary information (alliance usually requires extensive information sharing)

- Efficient coordination may be difficult to achieve: no formal mechanism for resolving disputes.
- Suffers from agency and influence costs
 - * Effort split across independent firms
 - * Potential free-rider problem: neither party has the incentive to monitor effectively because they do not keep all the benefits.

4.7.3 Joint Ventures

- A particular type of strategic alliance in which two or more firms create and jointly own a new, independent organization.
- Example: Coca-Cola and Cadbury-Schweppes arrangement to sell Coke in the UK.

4.7.4 Collaborative Integration

Subcontracting Networks

Many Japanese manufacturers tend to be less vertically integrated than US counterparts.

- Rely on networks of subcontractors
 - Long-term relationships: can persist for decades
 - Extensive information sharing and collaboration (e.g. product development)
 - Delegation of sophisticated responsibilities (e.g. component design)
- Subcontractors invest in relationship-specific assets

Contrast with US/European approach

- short-term, narrowly defined
- Mediated by contractual rather than informal arrangements

Keiretsu

- Formal institutional relationship with complex linkages: cross-holding of equity, place directors on each other's board.
- Also linked by informal personal relationships: club memberships and social networks.
- Advantages: close connections eliminate many coordination problems and reduce chances of holdup.

4.7.5 Long-term Implicit Contracts

Understandings between parties with implicit recognition of the consequences of violation on the part of each party

- Implicit, so unenforceable in court
- Enables coordination through formal planning and development of relationship-specific assets
- Enforced by the underlying long-term nature of the relationship

Chapter 5

Exam Questions

5.1 May 2005, Q.7

What are transactions costs? How do they relate to the “completeness” of contracts? Why are contracts often incomplete?

- Transactions costs generally refer to the cost of organizing and transacting exchanges between arms-length partners in the market.
- An important element of transaction costs is the cost of negotiating, writing, and enforcing contracts. These costs in turn depend on the possibility of costs resulting from the holdup problem which are in turn related to the incompleteness of contracts.
- Contracts cannot entirely eliminate opportunism – they cannot always be complete for the following reasons:
 1. Bounded rationality – there are limits to our capacity to process information, deal with complexity, and rationally pursue our objectives. Contracts, therefore, often include such terms as “acceptable to publisher” rather than spelling out exactly what is acceptable.
 2. Difficulty specifying / measuring performance – another reason why many contracts use such terms as “acceptable” is that it may be difficult to specify a set of objective criteria that constitute “acceptable”.
 3. Hidden information – occurs when one party knows more than the other about the conditions under which the transaction will occur. These conditions might determine the optimal contract, but the party with privileged information may choose not to divulge it.
 4. Hidden Action – actions that affect performance but can’t be observed. Examples of market relationships that may be distorted by hidden action: CEO compensation contracts, franchise relationships.

5.2 October 2005, Q.7

- a. Contracts cannot entirely eliminate opportunism. Name and explain the reasons why they cannot always be complete. (hint: there are 4). Provide examples to support your answer.

(see above)

- b. Each year professors order case packets to be copied and delivered to the university bookstore. When packets are delivered late, students and hence the professors suffer. Discuss this situation using the transaction costs perspective. What could be done to remedy the situation? What are the costs associated with your solution?

When packets are delivered late, this is an example of “hold-up” because there is nothing the professors can do when packets are late. To remedy the situation, Professors could write contracts with the vendors that included a penalty for each day late. Professors could also move the copying in-house to have more control over the process. (What are the costs of doing this? Students come unprepared to class, etc.) A good answer would of course include a definition of transaction costs, opportunism, and hold-up costs.

- c. Suppose that Arnold Schwarzenegger (AS) pays Besanko, Dranove, and Shanley (BDS) an advance of \$5 million to write the script to *Incomplete Contract*, a movie version of their immensely popular text on business strategy. The movie contract includes certain script requirements, including the stipulation that AS gets to play a strong, silent business strategist with superhuman analytic powers. BDS spend \$100,000 worth of their time to write a script that is tailor-made for the ex-Terminator (AS, that is). After reviewing the script, AS claims that it fails to live up to the contractual requirement that he have several passionate love scenes, and he attempts to renegotiate. Given the ambiguity over what constitutes “passion”, BDS are forced to agree.

- i). What was BDS’s rent?

BDS’s Rent = Actual Revenue – Minimum Revenue BDS requires to enter the contract = \$5,000,000 – \$100,000 = \$4,900,000

- ii). What was their quasi-rent?

Ex Post Opportunity Cost of the Script = 0

Variable Costs (time spent writing the script) = \$100,000 which is a sunk cost.

Minimum Revenue BDS Requires to Prevent Exit

= Ex Post Opportunity Cost + Variable Costs

= 0 + 0 = \$0

Quasi-rent = Actual Revenue – Minimum Revenue to Prevent Exit

= \$5,000,000 – \$0 = \$5,000,000

- iii). What assumptions did you make to compute the latter?

To compute quasi-rent, we need to assume that the script has no alternative value (ignoring the recycling value of the actual paper used) because it is tailor-made for Schwarzenegger. *We also assume that the time cost of \$100,000 DBS spent on writing the script is sunk and therefore not recoverable.*

5.3 May 2006, Q.5

- a). If transactions are costly why isn’t the economy just one big firm?

This is because there are gains to contracting out mainly through the realisation of technical efficiency gains – by contracting out the firm can avoid some of the internal influence and agency costs and profit from economies of scale, learning, and scope. This is illustrated by the diagram in b).

- b). Using a clearly labelled diagram, explain and comment on the following statement. “*The advantages and disadvantages of relying on the market versus relying on the internal organization can be expressed in terms of a trade-off between technical efficiency and agency efficiency.*”

See Figure 4.1, p.138 in Besanko et al. (4th ed.)

- c). In the above diagram, why is the technical efficiency line above the x-axis? Why does the agency efficiency line cross the x-axis?

See Figure 4.1, p.138 in Besanko et al. (4th ed.)

- d). Provide and discuss an example of a firm located to the left of this diagram and an example of a firm located to the right of this diagram along the x-axis.

See Figure 4.1, p.138 in Besanko et al. (4th ed.)

- e). Discuss the following statement: *It make sense for big firms to make a higher percentage of their activities “in-house” than is the case for small firms.* Refer to the diagram in b) to illustrate your answer.

The technical vs. agency efficiency diagram above illustrates that a firm gains less from vertical integration the greater the ability is of outside market specialists to take advantage of economies of scale and scope relative to the firm itself. A small firm might not be able to take advantage of the economies of scale and scope because its level of production would not offset the significant, up-front setup costs or meet the demands of a large market outside the firm. A large firm might be able to produce a sufficient level of output and achieve the same economies of scale and scope that an outside firm would have. Some will fall in the trap of stating that small firms cannot afford to outsource their activities – they have to pay either way but the overall price tag may be influenced by size. On the above diagram all else equal a larger firm the difference in technical efficiency from producing inside versus outside the firm would be smaller (and hence closer at an earlier stage to the x-axis) implying that more contracts will be done in-house.

5.4 May 2006, Q.8

- a). “Firms that seek a cost advantage should adopt a learning curve strategy; firms that seek to differentiate their products should not.” Comment on both of these statements. Hint: your answers should briefly explain the theoretical framework underlying your answer.

A learning curve strategy is one way in which a firm seeks to reduce costs by learning. This is but one of many ways in which a firm can achieve a cost advantage. Other cost drivers include: economies of scale, economies of scope, capacity utilization, economies of density, process efficiency, government policy, and a firm’s location. Learning curves can also confer quality advantages. If there is a first mover advantage in establishing a particular quality position (say the goods are experience goods), then it may pay to push aggressively down the learning curve to gain that quality advantage. Therefore, pursuing a learning curve strategy could be advantageous to both firms that seek a cost advantage and firms that seek to differentiate their products.

b). What is meant by the statement that “quality is not free”?

There are two reasons why quality is not free: a quality good is typically more expensive to produce and marketing a high quality goods takes a lot of marketing resources.

1. Making a higher quality product per se is expensive and requires more human and capital resources. A firm should engage in higher quality production only if this will give her a competitive advantage on its rival firms either because a group of consumers is willing to pay more for quality goods and/or because the firm has found a technology that can produce quality at a relatively lower costs than others.
2. Establishing a brand name is very costly for firms. Large sums of capital must be invested continually over a long period of time before a firm earns a significant brand identity. In the sale of experience goods-goods whose quality cannot be assessed before they are purchased and used-the reputation for quality that a firm establishes can be a significant advantage. Consumers can reason that a firm who has invested continually in its brand identity is unlikely to chisel on quality and risk depreciating its precious brand image. In other words, incurring the cost of establishing a brand identity is a means for firms to signal to consumers that the firm offers quality products. Hence, the expectation is that branded (highly advertised) products are of higher quality than generic products and should, therefore, garner higher prices. For certain goods consumers may be much more price sensitive than quality sensitive. A firm who incurs costly marketing may find itself unable to pass this cost on to customers who do not sufficiently value the signal that the firm is selling a higher quality product. Moreover, even if consumers are willing to pay more for quality to be successful a firm has to offer the good at a relatively lower price or higher quality than its rival firms.

5.5 October 2006, Q.6

a). Xerox underwent a radical reorganization in 1992 in order to stem its decline (its earnings, market share, and earnings per share of stock had all fallen in the 1980's). The reorganization left the information management (IM) division stranded; it was not an integral part of the other divisions. As a result, it could not gather the data necessary to support the various business divisions. Would it make sense to outsource IM? List all the costs and benefits you can for keeping the IM function in-house and for outsourcing the IM function. (PS: You don't have to be an IM expert to answer this question – simply use common sense.)

Adapted from W. Boyes, *The New Managerial Economics*, 2004:37.

A good answer would begin by listing the pros and cons of the make vs. buy decision each modern firm faces. This cost/benefit analysis should include a clear discussion of transactions costs and how these are driven by opportunism and the risk of holdups, coordination costs, and leakage of private information. It should obviously discuss the agency and influence costs of producing the good in-house as well as the lost of technical efficiency available in the market (in terms of economies of scale, scope, learning). It would present the technical vs. agency efficiency diagrams discussed in class. It clearly highlights the important role asset specificity has in determining what activities are done in-house and which are done in the market. The IM division is

very specific to the firm and as such is associated with a high k . Yes the firm could tap into learning economies and the experience of outside consultants but it would be vulnerable to hold-ups and experience high transactions costs. The IM division would also house a lot of private and sensitive information and be crucial in coordinating the firm's activities. It would not be good long-term business sense to outsource this function.

- b). Consider an industry whose demand fluctuates over time. Suppose that this industry faces high supplier power. Briefly state how this high supplier power will affect the variability of profits over time.

Given an industry whose demand fluctuates over time and an input supplier with high supplier power the industry's variability of profits would decrease. High supplier power exists when an input supplier is able to negotiate prices that extract profits from their customers. In this case, the supplier's power would be reflected in his/her ability to charge prices to reflect demand within the customer's industry over any given period of time. For example, if the industry is doing well, the supplier could raise prices to extract a share of the industry's profits. Conversely, if the industry was doing poorly, the supplier could lower prices. The underlying demand volatility would be reflected in the supplier's profits rather than the industry's profits. The industry's profits would stabilize (at a low level).

5.6 October 2007, Q.5

A recent economic report suggests that global warming has become a major threat and that unless we changed our way of life dramatically and rapidly we will be heading towards a major world crisis with millions dying, floods of immigrants and one of the worse global economic recessions encountered yet. The report urges governments around the world to impose tough new regulations and incentives to promote cleaner production and consumption. The report implicitly suggests that 'richer' countries should set an example by moving first.

- a). Using the agency versus technical efficiency diagram, show how such a policy may affect the contracting out behaviour of firms located in rich countries. This diagram should be accompanied by an explanation. (25 marks)

If firms in rich countries are subject to tougher regulations, this will increase the production costs. Firms may be encouraged to contract out some of their activities to countries where regulations were less severe. This would move the technical efficiency curve to the RIGHT. This will in turn shift the ΔC curve to the RIGHT, thereby moving K^{**} to the RIGHT indicating a higher proportion of activities contracted out. This highlights the difficulty of implemented country-based environmental policy and the need for international cooperation and policy coordination.

[Agency vs. Technical Efficiency diagram]

- b). Transport is a major focus of the proposed reforms. Discuss how changes in transport prices are likely to impact upon the size of the firm. Could it also affect its vertical integration? Why or why not? (25 marks)

The transport infrastructure is an important determinant of firm size. If the infrastructure is poor, a firm will find it difficult to reach its markets and obtain the relevant supplies including labour. For this reason, firms will tend to be smaller when transport infrastructure is poor. Poor transport could also impact upon vertical integration by increasing coordination costs. This would reduce the extent of contracting out.

- c). Governments are increasingly imposing environmental taxes. They can do so by charging a fixed annual corporate tax that would account for industry characteristics (a bit like a council tax) or impose a rate that would vary with the volume of output produced by the firm. How would these two methods impact upon the production decision of the firm? You should use a clearly labelled diagram to support your arguments. (50 marks)

A firm will maximise profits by producing at $MR = MC$. A corporate tax on the firm will increase its fixed costs but will not affect its variable and marginal costs. So the tax will NOT change the position of the MC curve, hence have no impact upon its optimal production levels. The firm will produce the same output as before but it will be subject to higher average total costs.

[Diagram: AC shifts up, but MC unchanged
(Reminder: MC cuts AC at its minimum)]

A tax that is a function of the number of units produced, on the other hand, will increase the MC of the firm (shifting it to the left) thereby reducing its optimal level of output. If the purpose of the tax is to internalise pollution costs then the latter is more effective.

[Diagram: AC & MC both shift up and to the left
(MC cuts AC at its minimum)]