

Lecture 2

Investment, technology & concentration



Industrial
Economics

Model: Vertical relationship

- ★ A **seller** and a **buyer** consider trading **one good**
- ★ The **cost** for the **seller** is $c(I)$
 - ◆ I is the level of **investment** and $c' < 0$, $c'' > 0$
- ★ The **value** of the good for the **buyer** is $v > c(0)$
 - ◆ trade will be **efficient** because **total benefit**, $v - c(I) \geq 0$
- ★ Assume **for now** that $I = 0$; and they **trade** at price p
 - ◆ The benefit for the **buyer** is: $v - p$
 - ◆ The benefit for the **seller** is: $p - c(0)$
- ★ **Under complete information**, depending on the **bargaining power**, $p \in [c(0), v]$.

Asymmetric information

- ★ Suppose now, that the **seller**
 - ◆ **Knows** own cost, $c(0)$
 - ◆ **Knows** that v is distributed in $[v, \bar{v}]$ according to $f(v)$
- ★ The **buyer** **knows** I , $c(0)$ and v
- ★ The **seller** has the **right** to make a take-it-or-leave-it **offer** for the price
- ★ **Transaction** will occur if the seller offers: $p \leq v$
- ★ The **probability** of this is

$$P(v \geq p) = \int_p^{\bar{v}} f(s) ds = 1 - F(p)$$

Trade outcome

- ★ Seller's **expected gain** is then

$$E\Pi = (p - c(0))(1 - F(p)) = p - c(0) - F(p)p + c(0)F(p)$$
- ★ The seller **maximizes** $E\Pi$ w.r.t. p

$$\partial E\Pi / \partial p = 1 - F(p) - (p - c(0))f(p) = 0 \Rightarrow$$

$$1 - F(p) = (p - c(0))f(p) \Rightarrow p > c(0)$$
- ★ The FOC **does not** rule out the case $p > v > c(0)$
 - ◆ **Trade does not occur** even though $v > c(0)$
 - ◆ **Market fails** because the uninformed seller makes an offer the buyer cannot accept
 - ◆ **Buyer** has the **info** BUT **seller** has the **bargaining power**.

Contracting

- ★ The informational inefficiency could be prevented if a **contract** is signed ex ante and settles what happens ex post
- ★ The contract would simply **give the power** of price setting to the informed party: the buyer
- ★ In this case the buyer would set $p = c$ and acquire all the benefit **net of** the contract payment to the seller for the **right** to set the price.

Investment

- ★ Now lets allow for I to be a **choice variable**
- ★ Assuming **equal bargaining power**

$$v - p = p - c(I) \Rightarrow p^* = \frac{v + c(I)}{2}$$
- ★ At p^* the seller's profit is

$$\Pi_S = \frac{v + c(I)}{2} - c(I) - I$$
- ★ Maximizing with respect to I

$$\partial \Pi_S / \partial I = -0.5 \cdot c'(I) - 1 = 0 \Rightarrow c'(I_S^*) = -2 \quad (1)$$

First-best investment

Model

- ★ The **joint gains** are

$$\Pi_{S+B} = v - c(I) - I$$

- ★ Again, maximizing w.r.t. I

$$c'(I_{S+B}^*) = -1 \quad (2)$$

- ★ From (1) and (2)

$$c'(I_S^*) < c'(I_{S+B}^*)$$

- ★ Because of the **convexity** of $c(\cdot)$:

$$I_S^* < I_{S+B}^*$$

- ◆ The seller does **not capture** all savings from investment
- ◆ This is a dis-incentive to **invest**

Authority

Model

- ★ If the **power to resolve** unspecified contingencies is given to one of the concerned parties the incompleteness will be **alleviated**

- ★ Grossman and Hart (1986) note that that **authority rights** will ease the issue of suboptimal ex-ante investment
authority changes that status quo point in the bargaining process

- ★ Moreover, authority is a property right that may result into **benefit** even if it is **not exercised**

From failure to concentration

Model

- ★ The **problem** of vertical business organization is the, **asymmetry** in the division of the **surplus ex post** and the level of **investment ex ante**

this may lead the upstream industry to **moderate investment** below the economy **efficient level**

- ★ **Policy** can likely be a functioning remedy for this failure
- ★ Alternatively, firms may choose to **vertically integrate**
internalization of the externality
- ★ Market **organization** led to **failure**, which induces increase in the **size** of firms

Choice of scale

- ★ “**Size**” of firms mainly refers to the **scale** of production
 - ◆ **Large firms** produce at a **large scale**
 - ◆ **Small firms** produce at a **smaller scale**
- ★ Thus, **size** of firms s mainly affected by the **cost structure**
- ★ **Another** issue affected by the cost structure is the **timing** of firm decisions

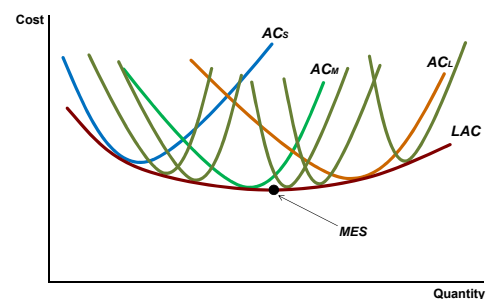
Decision timing

Scale

- ★ The S-R / L-R **distinction** has less to do with time and more with the **adjustability** of production factors
 - ◆ S-R is the period when some factor cannot be changed
 - ◆ L-R is the period when all factors can be adjusted
- ★ Contrary to the usual misconception, firms make **L-R decisions first** and **S-R decisions later**
- ★ Initially, **nothing is fixed**, the firm can select **any scale**
probably the one that yields **min AC** at the anticipated output, \hat{q}
- ★ If later $\hat{q} \pm x$ is realized, the firm **can still produce it** by adjusting variable factors
cannot change the scale for a “long” time

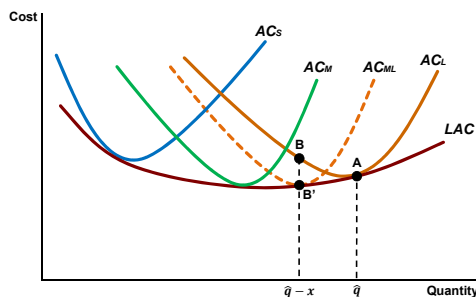
Cost and scale

Scale



Economies vs. returns

Scale



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Reasons for economies of scale

Scale

1. **Specialization**: producing at a large scale allows acquiring specialized machines or workers
2. **Engineering** reasons: the square-cube law (surface increases by the square of dimensions but volume by the cube) for buildings, factories, pipelines, ships, airplanes
3. **Quantity discounts** when buying inputs
4. **Risk handling**: the law of large numbers, diversification, difference in risk attitude for firms and individuals
5. **High fixed costs** requirement
6. **Indivisibilities**

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Economies of scope

Scale

- ★ Economies of scope in the two-good case exist iff

$$C(q_1, q_2) < C(q_1, 0) + C(0, q_2)$$

it is cheaper to produce the two products **together in one firm** than to produce them in **single-product firms**

- ★ Economies of scope are mainly due to **indivisibilities**

there exist **common costs** or there is a **pure public input**

- ★ Examples:

- ◆ iPad, iPhone and iPod share the same **home button**
- ◆ VW, Audi and Skoda share the same **patents**
- ◆ Word, Excel and PowerPoint have shared **code components**
- ◆ Fashion designers **advertise** the brand, not specific models

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Efficiency and size of firms

- ★ Firms grow in size in order to improve **efficiency**

- ◆ By achieving **technological** advantage
- ◆ To avoid **transactions costs**
- ◆ To resolve bounded rationality by adjusting **property rights**

- ★ There are also **market power motives** for being big but, for now, we focus on efficiency

- ★ Can efficiency explain the market structure?

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Constant economies & concentration

Efficiency and size

- ★ Under constant economies to scale there is **no advantage** or disadvantage to being either small or big

- ★ We cannot say much about seller concentration but we can say something about the **equilibrium price**

- ◆ A market price above LAC will yield **L-R economic profits**
- ◆ Since there are no disadvantages to producing at a small scale, this should **invite entry**
- ◆ **Price will fall** to LAC and profits will eventually be competed away

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Diseconomies & concentration

Efficiency and size

- ★ Maximum efficiency requires **many small firms**, each producing **small amounts** of output

- ★ In fact, it is hard to see why firms would **exist** in this case

- ◆ This case corresponds to **household production**
- ◆ Each consumer produces her own requirements and a **market does not exist**

- ★ **Example** brushing your teeth (!)

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Economies & concentration

- ★ Obvious **cost advantages** to being large
 - ◆ Even if the industry has **initially** many small firms
 - ◆ They will experience **losses** so that they have a strong **incentive to merge**
 - ◆ Firms will keep merging till **losses vanish**
 - ◆ Even then there is tendency to **keep merging**
- ★ This market may become a **natural monopoly**.

U-shaped LAC & concentration

- ★ Equilibrium concentration depends on the relationship between the **MES** and the **size of the market**
- ★ If the **MES is relatively small**, the market is likely to be similar to perfect competition
 - ◆ **many firms** competing and equilibrium price driven to minimum average costs
- ★ If the **market is small relative to the MES**, only a few firms can remain viable
 - ◆ we expect to see some form of **oligopolistic competition**, if not **monopoly**.

Limits to firm size

- ★ Organizing in firms **eliminates** transaction costs and reduces the cost of production
- ★ Then, why are there **any** market transactions at all?
- ★ What are the factors that **limit the size of a firm**, so that an entrepreneur elects not to organize one more transaction internally?
- ★ Why don't firms keep merging till we make **one big firm**?

The reason is... incentives

- ★ Merging results in a **loss** of high-powered **incentives** for one of the two merged firms
 - ◆ One of the previous owners now becomes an **employee** of the larger firm
 - ◆ As a **residual claimant** she had appropriate incentives to invest in cost minimization
 - ◆ As an **employee** she does not.

ευχαριστώ!
(thank you!)

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