Perfect Competition
ECON 212 Lecture 13

Tianyi Wang
Queen’s University

Winter 2013
We can analyze firm’s supply decision.

Firm faces two constraints: technology and market.

Market constraint is summarized by the demand curve.

Demand curve facing the firm differs from market demand curve.

- one firm, two firms, ...
- see graphs later.

We start with the simplest market environment: perfect competition.
Market is perfectly competitive if there are large number of firms so that each one is too small to influence market price.

Firm’s problem: how much to produce taken price as given.

Strong assumption, works well.

See class notes for graph of Demand facing a Competitive firm.
Supply Decision of a Competitive Firm

- Here we take the cost structure as given.

- Competitive firm’s problem is

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  \max_{q} pq - c(q)
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- FOC is

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p - c'(q) = 0
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\[ p = MC(q) \]

\[ MR(q) = MC(q) \]
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- Competitive firm’s supply curve is its MC curve.
Here we take the cost structure as given.

Competitive firm’s problem is

$$\max_q pq - c(q)$$

Note we can backup input demands after solving for $q$.

FOC is

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or

$$p = MC(q)$$

$$MR(q) = MC(q)$$

Competitive firm’s supply curve is its $MC$ curve.

However there are two issues.
Competitive Firm’s Supply Curve

- We derived supply curve from FOC. It could either be a max or a min.
- See class notes graph where two output levels satisfy FOC.
- Note we can avoid $q_1$ by checking SOC.
- Graphically this happens on declining portion of MC.
- So firm’s supply curve is only the upward sloping portion of MC.
Second issue is if price is so low that not profitable to produce.

See class notes for shutdown condition.

Note: shutdown is different from exit.

So only upward sloping portion of MC above AVC is competitive firm’s supply curve.
Long-run Supply of Competitive Firm

- Long-run curve intersects short-run curve at output \( q^* \) where fixed factor is optimal.

- See class notes for graph.
Long-run Supply of Competitive Firm

- Long-run curve intersects short-run curve at output $q^*$ where fixed factor is optimal.
- See class notes for graph.
- LR curve is more responsive to price.

Thus long-run supply curve is the upward sloping portion of LRMC above LRAC.

See class notes for constant returns to scale technology.
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- Firm can exit in the long-run. Thus profit has to be greater than zero.

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pq - c(q) \geq 0 \\
p \geq \frac{c(q)}{q}
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Short-run Industry Supply

- Suppose there are n firms, let $S_i(p)$ be firm i’s supply curve. Then the industry/market supply is

$$S(p) = \sum_{i=1}^{n} S_i(p)$$

- If firms are identical, $S(p) = nS_i(p)$
- Market demand and market supply determines equilibrium price and output level.
Long-run Industry Equilibrium

- If no barriers to entry, firms enter and exit in the long-run.
- Firms entry and exit affect output produced and therefore equilibrium price.
- We can get market supply by adding up individuals.
- Will get an approximation. See class notes.
- Note LR industry supply looks the same as firm supply with CRS technology.
In Competitive Equilibrium, we have Demand = Supply and each firm max profit.

1. Firm max profit: \( p^* = LMC(q^*) \)
2. Perfect competition: \( p^* = LAC(q^*) \)
3. Market clears: \( Q^D(p^*) = Q^S(p^*) = n^* q^* \)
Suppose entry is limited in some industries (Agriculture) due to limited fixed factors (Land).

It might look like farmer earns positive profit $\pi$.

This not correct, we do not measure opportunity cost of Land.

Whenever a fixed factor is preventing entry, a rental rate for that factor exists.

This is Economic Rent: payments to a factor of production in excess of the minimum necessary to have that factor supplied.
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Directly write profit max problem:

\[
\max_q pq - (wL + rK)
\]

s.t. \( q = Q(L, K) \)

How to solve? sub constraint into objective by eliminating \( q \).

\[
\max_{K,L} pQ(L, K) - (wL + rK)
\]

FOC for \( K \) and \( L \) respectively are

\[
\begin{align*}
pQ'_K &= r \\
pQ'_L &= w
\end{align*}
\]

Take the ratio, we get the optimality cond’t for cost-min.

\[
\frac{MP_K}{MP_L} = \frac{r}{w}
\]