Start DF&CF

Friday, January 20, 2017 1:26 PM

EE481 Industrial Economics

Dominant Firm with Competitive Fringes (OR PRICE LEADERSHIP MODEL)

Semester 2/2016

*Carlton D and Perloff J., **Modern Industrial Organization**, 4th Edition, 2015, Pearson.

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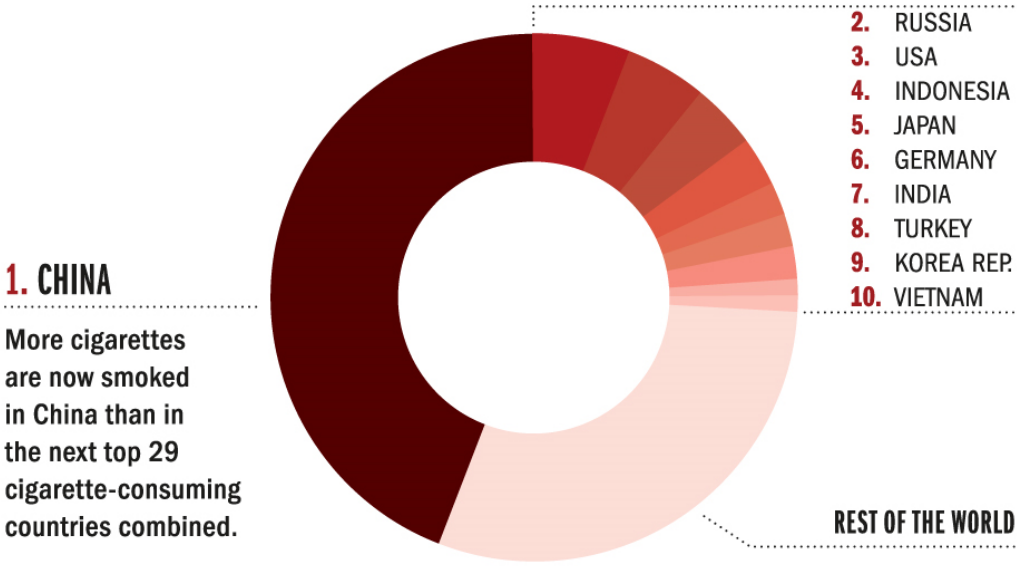

Why some firms are dominant

- Consider market for a single good.
- The perfectly competitive firm is a price taker: it cannot influence the price that is paid for its product.
- This arises due to consumers' indifference between the products of competing firms => for example, buy from store with lowest price.
- Consumers' indifference arises from:
    - Product homogeneity
    - Consumers have perfect information
    - No transactions cost
    - Many firms
- PC firm faces horizontal demand curve at market price p

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The Model (No-Entry)

Assumptions

- One dominant firm with a lower production costs.
- Fringe firms are all price-takers.
- One dominant firm with a lower production costs.
- Fringe firms are all price-takers.
- There are *n* fringe firms (no more entries).
- The dominant firm knows the shape of market demand curve *D(p)*.
- The dominant firm can predict the best action by the fringes.
  (knows the shape of fringes' supply curve *S(p)).*

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The Model (No-Entry)

Fringe Firms' Reasoning

- Since I am a price-taker (behave like perfectly competitive firms), my supply curve is *S(p)* where *p = MC*:

Dominant Firm's Reasoning

- At what price (*p*) and quantity (*q*) should I produce?
- Not the monopoly *p* and *q*.
- If the fringe firms will produce some, then I should maximize profit for the left-over demand (residual demand).

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The Model (No-Entry) - Results

Given that

- p = minimum marginal average cost for the fringes
- MC_f = the fringes' marginal cost.
- $D(p)$ = market demand
- $S(p)$ = the fringe firms' aggregate supply curve
- $D_d(p) = D(p) - S(p)$ = the dominant's residual demand curve
- MC_d = the dominant's marginal cost

We can get 2 types of results

1 If $MC_d < MC_f$, dominant firm charges high price, the fringes get to produce.

2 if $MC_d << MC_f$, dominant firm charges low price, the fringes shutdown.

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DF Vs. CF

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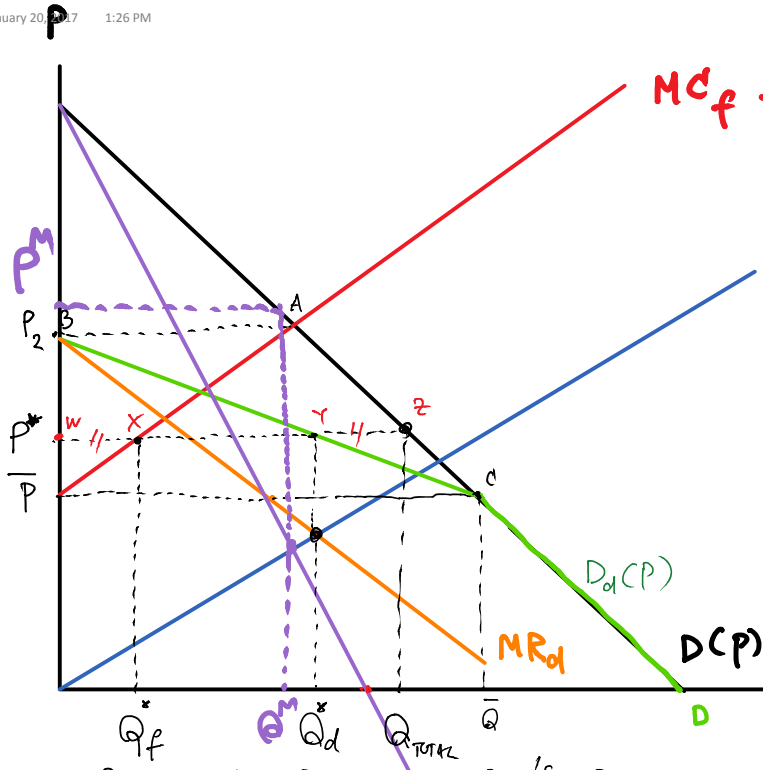


MC_f = SUM OF MARGINAL COST OF COMPETITIVE FRINGE

MC_d = MARGINAL COST OF THE DOMINANT FIRM

$$D_d(P) = D(P) - S_f(P)$$

DOMINANT FIRM'S RESIDUAL DEMAND

BCD → RESIDUAL DEMAND CURVE OF DOMINANT FIRM.

D(P) = TOTAL OR MKT DEMAND CURVE

- BCD IS DOMINANT FIRM'S RESIDUAL DEMAND CURVE

NOTICE THAT WHEN P IS ABOVE $\bar{P}$, RESIDUAL DEMAND CURVE OF DF IS BELOW THE MKT DEMAND CURVE.

BUT WHEN $P < \bar{P}$, THE RESIDUAL DEMAND CURVE AND THE MKT DEMAND CURVE ARE COINCIDENT.

- TO MAX Π, DF PRODUCES Q_d^* AND SETS PRICE = P^*.
- GIVEN $P = P^*$, CF WILL PRODUCE Q_f^*.
- SO TOTAL OUTPUT = $Q_d^* + Q_f^* = Q_{TOTAL}$

NUMERICAL EXAMPLE

$P = 100 - Q$ → MARKET DEMAND CURVE

$P = 10 + 4Q$ → SUM OF THE MARGINAL COSTS OF THE COMPETITIVE FRINGE

$MC = 18$ → MARGINAL COST OF THE DOMINANT FIRM

(1) FIND THE DOMINANT FIRM'S RESIDUAL DEMAND CURVE

OBSERVE THAT THE PRICE AT WHICH THE MARKET DEMAND CURVE INTERSECTS THE FRINGE MARGINAL COST CURVE WILL GIVE US THE VERTICAL INTERCEPT OF THE RESIDUAL DEMAND CURVE:

SO $100 - Q = 10 + 4Q$

$5Q = 90$

$Q = 18$

$P = 100 - Q = 100 - 18 = 82$

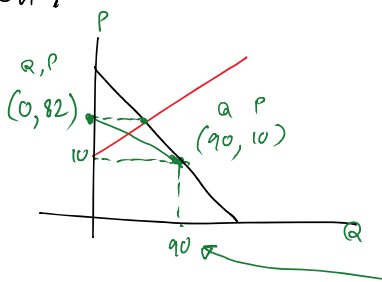
THE VERTICAL INTERCEPT = 82

THE RESIDUAL DEMAND CURVE WILL JOIN W/ THE MARKET DEMAND CURVE EXACTLY AT THE PRICE WHERE CF SUPPLY NOTHING

$P = 10 + 4Q$

IF $Q = 0$, P MUST BE EQUAL TO 10 $(P = 10)$

WHEN $P \leq 10$, THE RESIDUAL DEMAND CURVE AND THE MARKET DEMAND CURVE ARE COINCIDENT.



WHEN $P = 10$, QUANTITY DEMANDED (TOTAL)

$\Rightarrow P = 100 - Q$

$10 = 100 - Q$

$Q = 90$

SO FAR, WE GET 2 POINTS ON THE RESIDUAL DEMAND CURVE OF DF:

$P = 82$ & $Q = 0$

$P = 10$ & $Q = 90$

WE CAN CALCULATE SLOPE $= \frac{(82-10)}{(0-90)} = \frac{72}{-90} = -\frac{4}{5} = -0.8$

SO, TOP PART OF THE RESIDUAL DEMAND CURVE: $P = 82 - 0.8Q$!!!

$MR = 82 - 1.6Q$

THE DOMINANT FIRM WILL PRODUCE Q^* WHERE $MR = MC$:

$82 - 1.6Q = 18$

$Q_d^* = 40$

$P^* = 82 - 0.8(40) = 50$

THE CF WILL PRODUCE: $50 = 10 + 4Q$

$Q_f^* = 10$.

TOTAL OUTPUT $= Q_d^* + Q_f^* = 40 + 10 = 50$ #

$= 10.$

TOTAL OUTPUT $= Q_d^* + Q_f^* = 40 + 10 = 50.$ #

A Numerical Example

- Assume that the overall industry demand curve is $P = 100 - Q$
- The sum of the marginal costs of the competitive fringe is $P = 10 + 4Q$
- The marginal cost of the dominant firm is constant at $MC = 18$

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