

Econ 243 September 26, 2018 Notes

= 2x2 game representation of strategic interaction: last time

= this time: graphical representation of strategic interaction: reaction curve

= algebra → "hard" solution

reaction curve: **graph as per textbook.**

think beer: how big to build a brewery? Budweiser vs Miller vs Coors?

if firm 2 produces nothing, firm 1 produces the monopoly level. as firm 2 increases its output, firm 1 looks at the remaining "residual" demand and chooses monopoly output. but once firm 2 is producing where $p = MC$ there's no incentive to produce. so we have a line from p^M to 0.

symmetric. can solve when isn't, just messy and same qualitative outcome.

converges to equilibrium = intersection of reaction curves.

qualitative results are hard to see, except with hindsight.

clearly each firm produces less than the monopoly level.

in addition, the intersection is to the right of $q^M/2$ so we know that total output is more than the monopoly level

price is thus lower. and surely profits are lower

so reaction curves are useful, if what we want is the intuition. they are hard to use when we add complications that better reflect the real world, e.g., fixed costs and differential marginal costs, goods that aren't perfect substitutes, and so on.

algebra

monopoly: reminder of baseline – a firm can't do better than this

$$p = a - bq \Rightarrow MR = a - 2bq \text{ and with } MR = MC = c \Rightarrow c = a - 2bq$$

so $(a - c) = 2bq$ and

$$q^{\text{Monopoly}} = (a - c)/2b \Rightarrow$$

$$p^{\text{Monopoly}} = a - b(a - c)/2b = (a + c)/2$$

$$\text{and } \pi = (p - c)q = [(a + c)/2 - c] * (a - c)/2b = (a - c)^2/4b$$

ditto for Cournot duopoly:

$$p = a - b(q + q^*) \Rightarrow TR = pq = aq - bq^2 - bq q^* \Rightarrow MR = a - 2bq - bq^*$$

$$MC = c = MR \rightarrow c = a - 2bq - bq^* \text{ and } q = (c - a)/2b - q^*/2 \text{ [monopoly level less } q^*/2]$$

but symmetry so $q^* = q$ and $q^* = (c - a)/b * 2/3$ and $\pi = 2/9$ [industry]

→ each firm produces 1/3 with $\pi = 1/9$ [relative to monopoly of 1/2 and 1/4, respectively]

key:

as intuition suggests, total market output is higher and price and profits lower than in the monopoly case. but the models also generate results that are easy to compare – the π terms all have $(a - c)^2/b$ times some constant.