Market Structure and Market Power

- In this chapter we'll explore the relationship between the degree of market concentration and the degree of market power.
- We got some flavor of this in the previous chapter when we saw market outcomes under oligopolies lay between the extremes of perfect competition and monopoly.
- We'll begin by considering the Cournot model with more than 2 firms.
- We'll repeat the graphical approach of chapter 7.
- As we'll see, this won't be too difficult because things won't be that different.

Market Structure and Market Power

- Recall Firm 1's profit was given by

$$\pi_1 = P(Q)q_1 - cq_1$$

- Q was total industry output.
- So all that matters matters from this firm's perspective is the total output produced by other firms, independent of the number of firms.
- π_1 depends on Q, not n, nor q_i, $i \neq 1$.
- So all we'll do is replace q_2 in our previous analysis with

$$Q_{-1} \equiv \sum_{i=2}^{n} q_i$$

- We will still assume(for now) a symmetric oligopoly in the sense that all firms will produced the same output in equilibrium.

Market Structure and Market Power

- $$q_i^N = q^N$$
- We'll solve for q^N, first by graphing Firm 1's reaction curve, noting this time the x axis denotes Q_{-1} instead of q_2. The line is $q_1^*(Q_{-1})$.
- Unlike before, we'll now add the line beginning at the origin, and with slope $\frac{1}{n-1}$.
- Algebraically, this line is denoted by

$$q_1 = Q_{-1}/(n-1)$$

- Why do we need this line?
- Because an equilibrium output must satisfy two properties.

Market Structure and Market Power

- Firm 1 chooses optimal output given what the rivals choose, and
- other firms choose the same output as Firm 1, $q_i = q_1$.
- If all other firms choose the same output level as Firm 1 it must be that

$$Q_{-1} = (n-1)q_1$$

- Therefor, the equilibrium is found by the intersection of the reaction curve and the line

$$q_1 = Q_{-1}/(n-1)$$

- Notice that equilibrium output per firm declines as the the number of firms increases.
- We are also interested in total industry output as the number of firms increases.

Market Structure and Market Power

- The axes on the graph give the value of Q_{-1} and q_1.
- So total industry output is $Q_{-1} + q_1$.
- Therefore lines of slope -45 degrees represent points where industry output is the same.
- We'll refer to these as iso-output lines.
- Iso-output lines further away from the origin represent higher values of output.
- These iso-output lines allow us to draw three conclusions under Cournot equilibrium with n firms.

Market Structure and Market Power

- Total output is greater than under monopoly but less than perfect competitions, as we showed before.
- As the number of firms increases, industry output increases.
- As the number of firms gets arbitrarily large, total output converges to the value under perfect competition.
- The number of firms for the Cournot equilibrium to be close to the perfect competition model varies with the cost function, elasticity of demand, etc.

Market Concentration and Market Power

- Previously we measured market power by price cost margin, $P - MC$ and market concentration by the number of firms.
- Those measures are only useful when the firms have identical cost functions and are the same size.
- In such heterogeneous settings we need alternative measures.
- For market power we'll use the weighted average of each firm's margin, with weights being market share.
- This is known as the Lerner index:

$$L = \sum_{i=1}^{n} s_i \frac{p - MC_i}{p}$$

Market Concentration and Market Power

- For concentration, there are various measures.
- Popular are the C_m coefficients:

$$C_m = \sum_{i=1}^{m} s_i$$

  where firms are ordered by market shares.
- An alternative market measure is the Herfindahl index:

$$H = \sum_{i=1}^{n} s_i^2$$

- As we'll see later on, H is a better measure of market concentration.