1. we looked at capacity limits in Bertrand
2. related goods §3.3.3 and Bertrand

    math tedious and parameters don't contribute to intuition

    key is that can take reaction curve approach:

        if firm 1 raised p_1 **then** firm 2 will raise p_2 as well

        therefore the reaction curve will have a positive slope

        hence they will intersect at some p > MC

    hence presence of substitutes mutes competition
3. Herfindahl: variation on our profit margin calculation:

    $(p - c_{avg})/p = H / \varepsilon$ where we look at the weighted average of costs to think about profit margins

    $\Rightarrow$ H is sum of squares of shares. measure of market concentration.

        HHI (Herfindahl-Hirschman Index as alternate jargon)

    widely used, value ranges from 1.0 (monopoly) 0.5 (symmetric duopoly) and so on.

    larger firms sway value more than do (many) smaller firms.

    one firm with a 90% market share with 10 rivals with 1% each gives H = 0.811

    one firm with a 90% market share and 1 rivals with 10% gives H = 0.82
4. n-opoly

    $p = a - b(q + nq^*)$ so looks like our duopoly

    $c = MR = a - 2bq - bnq^* \Rightarrow$ firm level $\Rightarrow q^* = (a-c)/2b - nq^*/2$

    so $q^* = (a-c)/b(n+1)$ and industry $Q^* = nq^* = n(a-c)/b(n+1)$

    and $p^* = a - n(a-c)/(n+1)$ and $p^* - c = (a - c) - n(a-c)/(n+1) = (a-c)/(n+1)$

    thus firm $\pi^* = (p^*-c)q^* = (a-c)^2/(n+1)^2b$

    we need this result to analyze horizontal mergers

    note that $n \rightarrow \infty \Rightarrow p \rightarrow$ perfect competition level with $\pi \rightarrow 0$. it would be most uncomfortable if our model didn't suggest that an industry with a large number of firms looks almost like perfect competition!