

## **ECON 321, Assignment 4: BP, Chapter 3: 3.1**

1. Read the Intro to Part II and 3.1.1 which we already did in class.
2. Read 3.1.2 quickly. The observation about Amazon Marketplaces at the end is quite interesting.
3. Section 3.1.3 and 3.1.4 use the Hotelling model, which we'll come back to in a few classes. But read them over for the intuition about differentiated products and about asymmetric competition. Notice that all the demand systems are just versions of  $q_1 = a - bp_1 + dp_2$  with some specific values of the  $a$ ,  $b$ , and  $d$  parameters, so we are still basically in the same territory.

4. Now fire up Mathematica and start with our familiar demand system

$$q_1(p_1, p_2) = a - bp_1 + dp_2 \quad q_2(p_1, p_2) = a - bp_2 + dp_1$$

And to keep things simple, just make the marginal costs equal:  $C'_1(q_1) = C'_2(q_2) = c$ .

5. Suppose firms 1 and 2 compete à la Bertrand. Set up each firm's profit function, then find each firm's reaction function, and finally find the Nash equilibrium.
6. Consider the same parameter values from the handout for class 3:  $b = 2, c = 1$  and trying out  $a = 10, d = 0$  then  $a = 7, d = 1$ , and finally  $a = 13, d = -1$ . Find the Bertrand equilibrium prices and quantities, and find the profits. Note how they compare to the results for monopoly at the end of the Assignment 3 notebook (my value added portion). What do these comparisons say about the social desirability of differentiated Bertrand competition versus monopoly?
7. What is an example of a real-world merger or proposed merger that

may correspond to the outcomes in part 6? (If you can't think of any mergers, just search "merger" at Google News or The Economist.) Remember, though, that not all mergers actually correspond to this model.

8. Some ideas for value-added, which you do not have to do: look at asymmetric firms where either  $a_1 > a_2$  or  $c_1 < c_2$ . In both cases, firm 1 is "better" than firm 2. What does this do to the outcome of the game? What would have to change to achieve the social optimum?