What Happens if Demand is Interdependent[1]

What happens if the amount that an individual demands depends, in part, on the amount of the good consumed by others. That is, if D is the market demand, then we can write:

$$D = \sum d^i(p,D) = F(p,D)$$
$$F_p \equiv \frac{\partial F}{\partial p} < 0, \quad F_D \equiv \frac{\partial F}{\partial D} > 0 \tag{1}$$

It turns out that lots of interesting things can happen. First of all, we need to understand how this could come about. If, for example, one of the reasons I watch Seinfeld is to be able to talk about it over the office water cooler, the more others watch Seinfeld, the more likely I am to watch it.

We do not need to worry about the individual d^i, so lets just work with a sample *D,*

$$D = -50 - 5P + 20\sqrt{D}$$
$$D - 20\sqrt{D} = -50 - 5P \tag{2}$$

I leave it to you to solve for P when D takes on values between 10 and 150. You will see that the price actually rises for D<100, and then declines. That is, for quantities less than 100 *increases* in price go with *increased* demand. For quantities greater than 100 higher quantities are associated with lower prices, as one would expect.

Now consider a simple observation, namely that often, for things like concerts, there is excess demand at the given price. Look at the diagram on the next page. If there is a fixed supply (S) and a normal, downward sloping, demand curve, D_1, this situation is represented by the combination P_0, d_0, and-as we all know-there is excess demand. The question asked is why the supplier doesn't simply raise the price to P_e,which would produce more revenues.

However, if there are sufficiently strong interdependencies, the fact that there is excess demand at the stated price does *not* mean that the supplier is not profit maximizing. This situation is presented by the demand curve D_0, which also intersects the supply curve at the price P_e. In the region of P_e the demand curve is upward sloping. Thus, a raise in price will *not* reduce demand and the profit maximizing price is given by P_{max}. Of course, at that price there is excess demand so tickets must be rationed in some other way, say by a lottery, or by people lining up early in freezing weather. So, in this case, at the profit maximizing price, there is excess demand.

Of course, this is not the only possible outcome with interdependent utilities. If the interdependencies are weak, the demand curve may be downward sloping everywhere, and the normal rules of the market apply. Another possibility is that the

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[1] This analysis is taken from the first part of Gary Becker, A Note on Restaurant Pricing and Other Examples of Social Influence on Price, 99 Journal of Political Economy 1109 (1991)

demand curve may actually oscillate and have a number of upward and downward sloping sections. All this does is raise the possibility that setting price so people wait in line is not always irrational.

Later on we will read a paper that offers another explanation for this observation, namely that by having different classes to tickets (orchestra and balcony, first-class and coach) the provider is segmenting the market and thus increasing profits.