Product Differentiation

- There are many industries that seems to have the features of (near) perfect competition.
- These features are many firms, apparently homogeneous goods, large number of consumers, not much market concentration, no barriers to entry, no explicit price fixing.
- One particular example is the credit card industry.
- Though this industry has features inconsistent with perfect competition.
- One is that prices do not change much with marginal costs.
- The other is that profits (rates of returns) are significantly higher than average.

- There are two possible explanations for this that we'll consider.
- The first is switching costs the consumer faces when buying one good versus the other, which usually arises from having to obtain new information.
- The other is that the products in the industry aren't exactly homogeneous- usually the products vary in quality.
- It will often be the case where not only are the products different, but consumers value their merits differently.
- Furthermore, consumers tastes are negatively correlated.
- We'll refer to this situation as horizontal differentiation.

- In contrast cases where all consumers prefer one product over another, will be referred to as a situation of vertical differentiation.
- These differences will make us rethink how we model consumer demand.
- The characteristics approach will assume that consumer demand will not be directed towards products but product characteristics.
- The demand for each good is derived from the demand for its characteristics.
- To allow for horizontal and vertical product differentiation, we will consider a discrete choice model making the assumption of rational consumer behavior.
- Specifically, we will assume that each consumer chooses the product that provides the highest net utility.

- Algebraically, we'll denote utility for consumer i from buying product k as:

$$u_{ik} = b_{i1}c_{k1} + ...b_{i4}c_{k4} - p_k$$

- where b_{ij} is how much consumer i values characteristic j, and c_{kj} is how much product k has of characteristic j.
- This model will allow us to encompass both types of product differentiation.
- As we consider each characteristic individually we see a case of vertical product differentiation.
- That's because each c_{kj} will vary with k and does not depend on i, so every consumer will think it is better for one product vis a vis the other.
- But when we look at all characteristics, we can have horizontal product differentiation.

- That's because b_{ij} varies with i, so net utilities of products can vary across consumers.
- We can now explore some of the implications of product differentiation on oligopoly competition.
- We'll first consider a model of horizontal differentiation, which as we'll see, will result in less competitive behavior.
- To illustrate, consider a model with two vendors, selling an identical product at each extreme of a mile long road.
- Even if the product is identical, very few consumers will be indifferent from buying from one vendor versus the other.
- That's each consumer will prefer the vendor that is closer to the consumer's location.

- So generally, consumers do not see the vendors as the same.
- This is an example of a situation where sellers offer products that differ by some characteristic, and buyers differ amongst themselves by how they value that characteristic.
- How do oligopolists compete in prices when products are differentiated this way?
- We'll address this with the Hotelling model.
- Suppose there are a large number of buyers distributed evenly along a segment of length 1.
- There are two sellers, each located at the endpoints of the segments, and compete by simultaneously setting prices (Bertrand).

- Buyers choose which seller to buy from.
- A buyer located at x must travel a distance of x to buy from Firm 1.
- Travel costs t per unit of distance so the cost of buying from Firm 1 at price p_1' is $p_1' + tx$.
- A consumer located at Firm 2's location ($x = 1$) would pay a cost of $p_1' + t$.
- Analogously, a buyer located at x must travel $1 - x$ to buy from Firm 2.
- So total costs from buying from Firm 2 at price p_2' is $p_2' + t(1 - x)$.

- Contrary to Firm 1, the cost from buying from Firm 2 is downward sloping in x.
- To simplify analysis, assume all consumers purchase one unit, so the only decision they face is whom to buy from.
- Because the goods sold by the firms are identical consumers will choose the firm that minimizes total cost plus transportation costs.
- We can get an idea of what the demand curves look like by examining properties of the graph.
- For example, if firms set different prices, $p_1 = p_1'$, $p_2 = p_2'$, a consumer located at a particular location, say x' will be indifferent between purchasing from either of the two firms.
- A consumer located to the left of x' will have a strict preference to purchase from Firm 1.

- Whereas a consumer located to the right of x' will have a strict preference to purchase from Firm 2.
- Recall we are assuming that consumers are distributed uniformly across locations, so with prices sets as p_1', p_2',
- so Firm 1's demand is given by x' and Firm 2's by $1 - x'$.
- This is interesting because although Firm 1's price is set higher than Firm 2, it still receives positive demand.
- This is in contrast to Bertrand equilibrium we had before.