

ANTITRUST ECONOMICS 2013

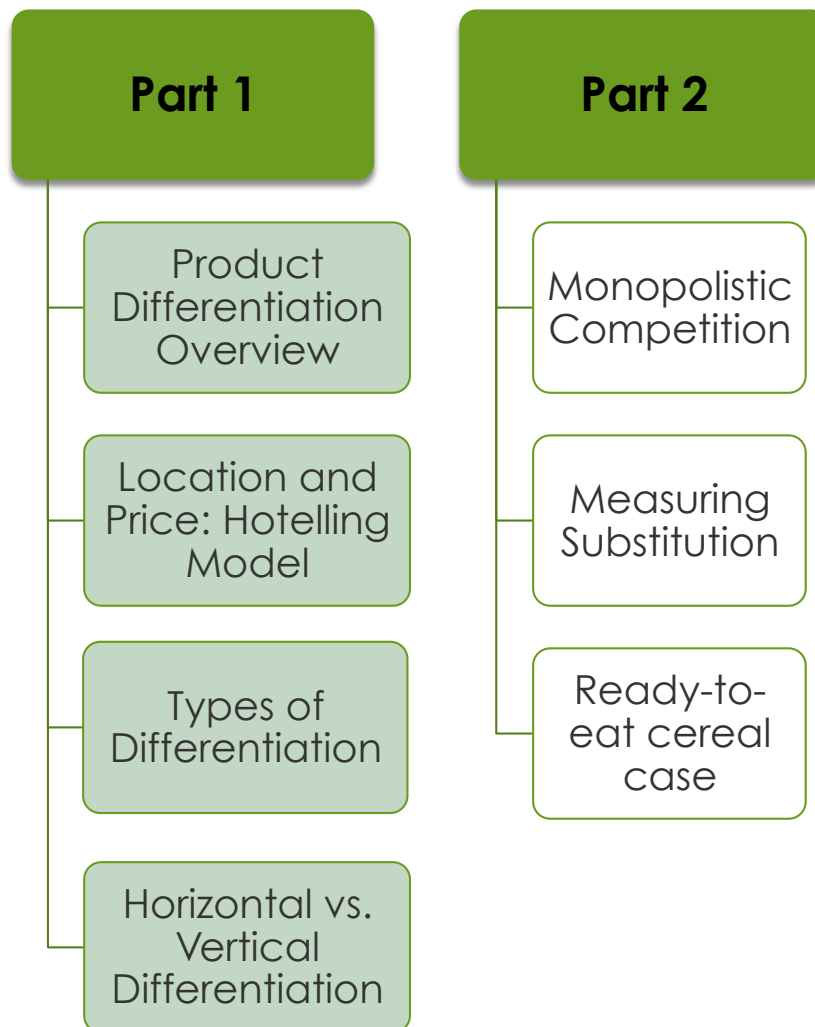
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TOPIC 5: PRODUCT DIFFERENTIATION

Overview

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Product Differentiation Overview

Competition is more than price and quantity

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Theory so far assumes firms chose price and quantity to maximize profits and that in the case of competition, firms are producing exactly the same product.

In fact products involve many dimensions—including product features, reliability, and service—that provide value to consumers and that cost firms to provide. Firms have to choose all these dimensions.

In the real world, firms choose different dimensions even for similar products such as automobiles, cereals, magazines, search engines, and so on.

Product differentiation and competition

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“Differentiated products” refers to products that are imperfect substitutes because there are differences among them that result in some consumers not getting the same value from each product.

Product differentiation is one of the most important aspects of competition in many industries because by “differentiating” a product from rivals’ products a firm can increase demand.

In some cases these dimensions are fixed and hard to change (such as the location of a mall) while in other cases they are easy to change (such as the type of articles in a magazine). Over longer periods of time firms can alter dimensions and therefore “reposition themselves”.

Product differentiation is very common

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Almost any product you buy is differentiated from other seemingly similar products.

Even in a narrow category like sports cars products are differentiated from each other.

In addition firms produce different variations of their own products. You don't have to get a sports car in red, with a hard top, with manual shift, ...



Even the textbook “wheat” market is differentiated

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“One of the major strengths of the U.S. grain production and marketing system is the **variety of grades, classes, and prices** that it can offer customers around the world. Dramatic differences in topography, soils, and climate from one region to another make this variety possible. By building on these natural advantages, seed breeders, researchers, farmers, grain handlers, and merchandisers are continually seeking to **expand both the type and quality of wheat** the United States can make available to its customers.” www.wheatflourbook.org

Economic textbooks often describe the market for wheat as
A “perfectly competitive industry” with “homogenous” products. It isn’t.

Products differ because consumers differ

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If all consumers were **exactly** the same in terms of preferences, income, and everything else that affected their purchasing decisions there would be **no** product differentiation. All products would be the same.

Firms engage in product differentiation to satisfy customer demand. They make blue cars because some consumers prefer blue to red and they make convertibles because some people live in sunny places and like to drive with the top down. They make luxury cars because some consumers are willing (and able) to pay for better cars.

Vive la difference!

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Different consumers have different preferences: faster, safer or roomier cars?

Consumers may also want variety: restaurant for romance, celebration, hanging out with friends, or business

Consumer preferences may change with income, age, and so on



www.toywonders.com

Regular Taxis



Hailo Taxis

Consumers can view similar products as different

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Consumers value different combinations of characteristics differently. There are material differences in these characteristics.

- E.g. Cars: Speed, power, space, reliability, design.
- E.g. Ice creams: sweetness, texture, color.

Consumers value images or other ephemeral qualities of a product perhaps shaped by advertising.

- E.g. Fashion fads (Burberry cap).
- E.g. Social status (luxury cars).

A Simple Economic Model of Product Differentiation

Competing on price and location

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Focus on a model (due to Harold Hotelling) of physical location and price in which consumers place different values on a location based on how far away they are.

Step 1: We'll start by focusing on choice of location with price as given —so a firm is maximizing profit only by choosing location.

Step 2: Then we'll show what happens when the firm gets to choose both price and location.

“Location” is just an example of a product dimension firms choose. We could replace with any other dimension that consumers value differently

Ice cream stand: Competition on the beach

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Two competing ice cream stands decide where to locate

- Consumers are evenly distributed along the beach.
- They all like the same kind and amount of ice cream.
- They don't like to walk though.
- Since consumers all want the same kind and amount of ice cream both stores offer the same kind and amount.
- Assume price is given (\$1 a scoop)
- The only thing left for stores to decide on is **where to locate** to maximize profit.



Ice cream stand: Location at the end of the beach

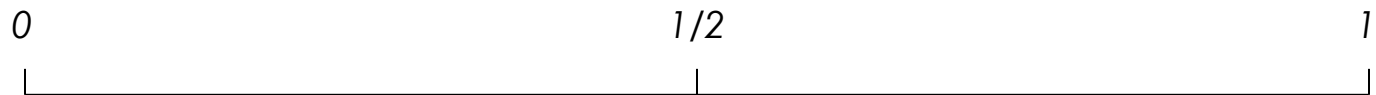
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Customers want to minimize the cost of transport.

Therefore, each consumer will buy from the closest vendor.

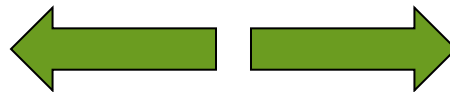
Question: ***Where will the ice cream sellers locate?***

Suppose the two stands' locations are fixed at the end of the lines.



Store 1

Store 2



Consumers to the left of $\frac{1}{2}$
go to Store 1

Consumers to the right of $\frac{1}{2}$
go to Store 2



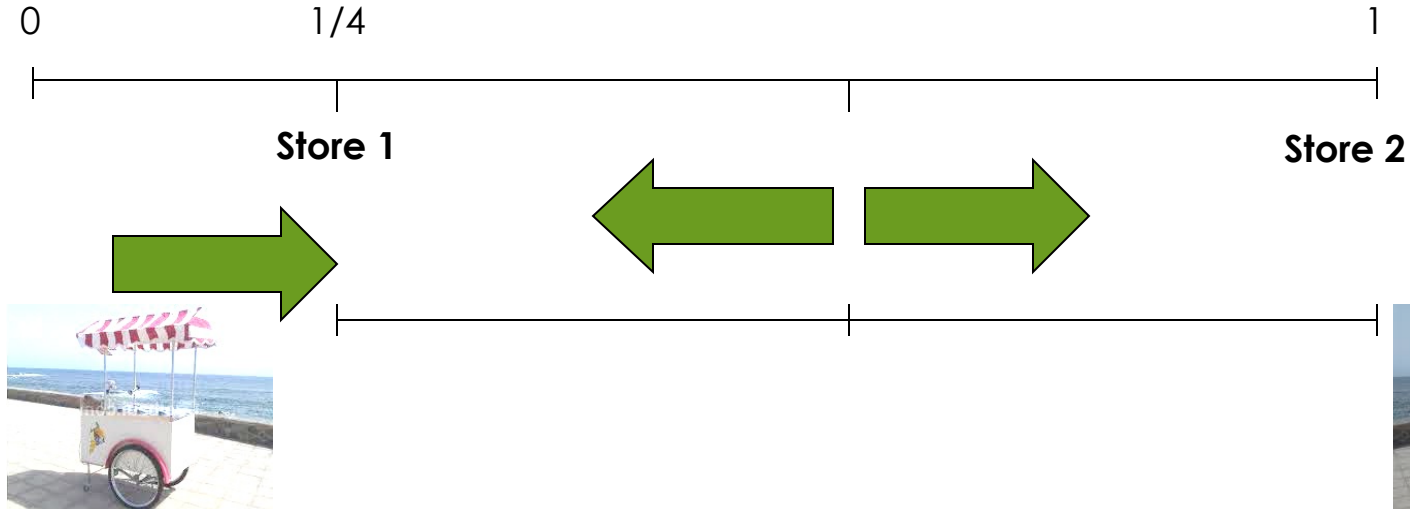
Ice cream stands can do better by moving closer

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Each ice cream stand gets half of the consumers if they locate at either end of the beach.

However, is this situation an **equilibrium** (where nothing more changes)? NO, IT IS NOT.

- Assume Store 1 Moves to the right



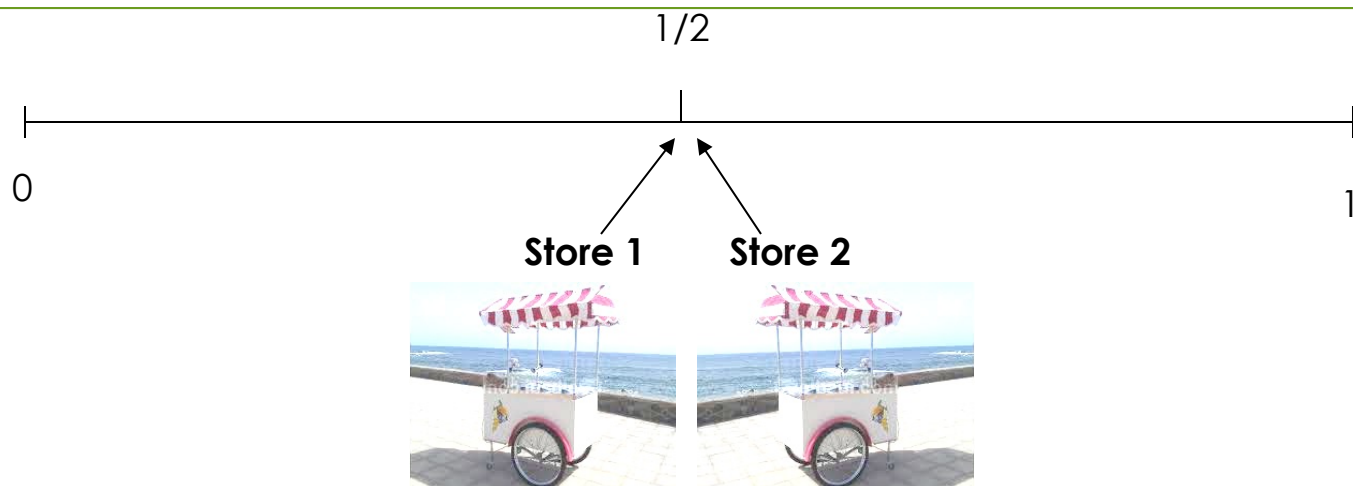
By moving to the right, Store 1 gets more than half of the consumers
Therefore, Store 1 has incentives to move: NOT an equilibrium

Stores move to the middle and next to each other

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When would neither store have an incentive to move (SO THERE IS AN EQUILIBRIUM)?

Consider the following location for the ice cream sellers.



Both sellers get half of the consumers and do NOT have incentives to move. Neither could benefit from a further move: there is an equilibrium.

With only one dimension of competition firms choose to be the same

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With both ice cream stands in the middle of the beach, there is no product differentiation. Each consumer is indifferent between the two.

Median Location Result: Firms will move to the median location, 50% of the market on either side.

- Is this socially efficient?
- Is this what the social welfare maximizing “beach planner” would choose?

Price *and* location competition

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Suppose locations are fixed in the middle of the beach and firms compete in prices.

Each stand will have an incentive to undercut the other: Being lower priced by a penny gets you all the sales (later we will see this is “Bertrand competition”)

The two firms will undercut each other’s prices until they cannot do so any more: price=marginal cost, and neither makes any profit.

With price competition, ice cream stands have a strong incentive to differentiate their products, which now means they will move away from each other. By moving they can make profits by catering to consumers who want a shorter walk.

Lots of ways besides location to differentiate

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Firms have an incentive to increase product differentiation so that they can avoid competition against other firms to some extent.

They must figure out something that can't be duplicated (that was the problem with moving to the center).

Could be property rights, e.g. leasing a franchise at an airport or buying land, building a store or shopping mall.

Could be Intellectual property such as a patent, copyright, trademark, trade secret.

Could be many things such as reputation, service, and so on



Consumer demand and cost limits differentiation

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Consumer demand limits differentiation. Need to be where the consumers are—it they are in the center of the beach that's where ice cream stores need to be; if there are two clusters though, each could support a separate store that caters to them.

Costs limit differentiation—it costs money to produce multiple variations of products and not every set of consumer tastes can be supported profitably. Part of this depend on whether there are enough consumers to support a product variation.

Hotelling model and its implications

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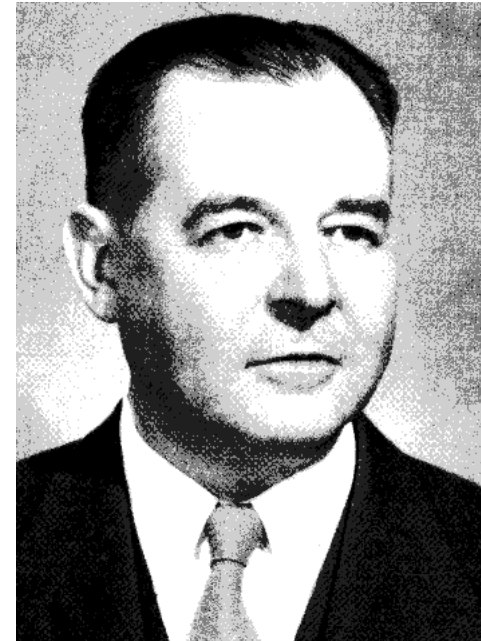
Hotelling's model shows that if there is a single dimension of competition (e.g. location) firms will try to be very similar to each other and divide the market.

With price competition though they can't make any more than a competitive profit.

They therefore have an incentive to figure out a way to be "less similar" to each other—for example by figuring out some way to locate in different parts of a beach, through property rights, or by developing a new flavor that cannot be copied.

Key result: firms have an incentive to "soften competition" through product differentiation.

Principle of maximal differentiation: firms avoid the toughness of price competition by differentiating themselves as much as possible



(Hotelling, 1875-1973)

Types of Differentiation

Physical differentiation

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Features: A company determines which if any features to provide for a product. E.g. automobile makers offer electric windows, air bags, automatic transmission, air conditioning, etc. as standard or optional.

Durability: A company decides how long its product will last. Buyers will generally pay more for durable products. Cheap versus expensive shoes, rock concerts, cars.

Style and design: Consumers value style and design and firms compete on this dimension. Functional versus stylish. Classic versus contemporary.

Service differentiation

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Firms often bundle service with their products. Manufacturers of durable goods offer after-services. Retailers offer service in their stores.

- Ordering ease: how easy is it to place an order
- Delivery: how well and how timely is the product delivered
- Installation: The work done to make the product operational
- Customer training: How manufacturer or retailer trains customer's employees to use the product
- Maintenance and repair

Providing service costs money. Firms differentiate on whether to provide little service or a lot and obviously charge for this.

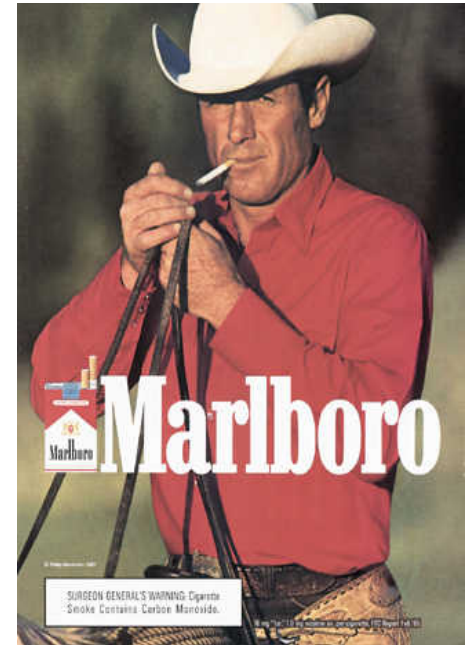
Image differentiation

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Even when competing products and services are similar, buyers may respond differently to them due to the company's image or brand perception.

Marlboro developed a distinctive personality through its "macho venerable cowboy" image.

Lucky Strike positions itself more on current fads, running trendy advertisements and sponsoring a Formula 1 team.



Coffee break questions

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What are the economic reasons for the large variety of similar products that we see in the market?

Why do some product configurations get produced while others don't?

Is there too much, too little, or just the right amount of varieties produced for the average consumer or in terms of social welfare?

What are the implications for competition?

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Horizontal vs. Vertical Differentiation

Horizontal Differentiation

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Products differ according to characteristics.

Different consumers have different preferences—e.g., some consumers prefer Pepsi to Coke; some prefer Indian to Italian food; Macs to PCs.

No one product is clearly better than the others objectively. Different people just like different features.



Apple iMac

HP TouchSmart IQ770 PC



Vertical Differentiation

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Consumers agree on which goods are better even if some consumers value quality more than others.

- Cashmere wool over Shetland wool;
- Rothschild 1995 vs. Yellowtail 2013.
- Mercedes Sedan vs. Camry Sedan

Consumers generally more interested in paying for quality as their incomes increase

- People graduate from cheap wine to expensive wine over time
- From second-hand cheap cars to new better cars over time

Different consumers though may not be willing to pay as much for higher quality even at the same income level.

- Warren Buffett doesn't have a big house even though he could

Differentiation and personal Computers

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Example: Personal Computers

- Computer A:
 - Fast microprocessor
 - Small memory capacity
- Computer B:
 - Small microprocessor
 - Large memory capacity

Everyone agrees that more of each of the characteristics is better (vertical).

However, consumers have different preferences for memory and microprocessor speed: ranking of relative merits of each PC will differ (horizontal).

Market for breakfast cereals

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Assume consumers have preferences for only two attributes, crunchiness and sweetness.

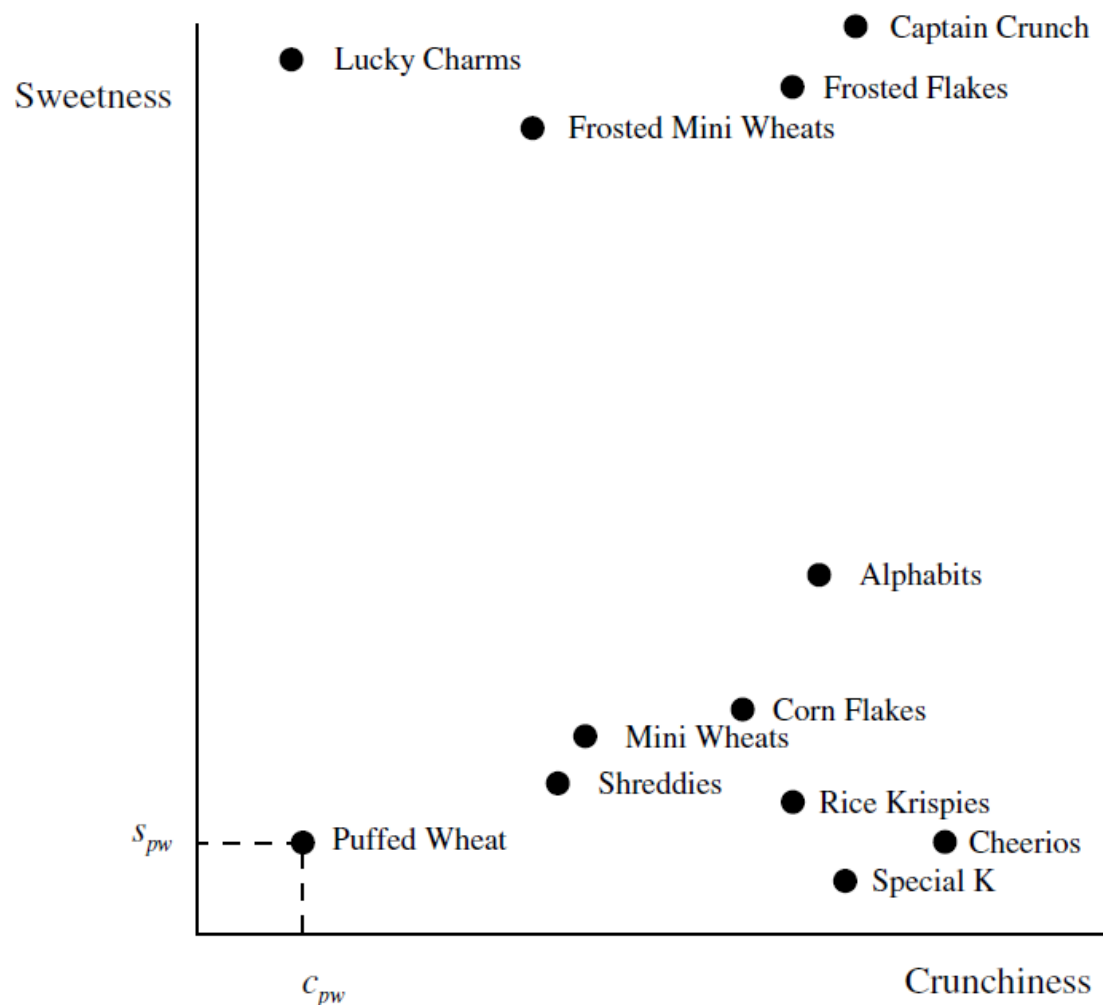
Then, the relevant product space is two dimensional and the set of possible products correspond to every potential combination of crunchiness and sweetness.

The locations of the products indicate that Puffed Wheat is neither very sweet or crunchy, while Captain Crunch is both very sweet and crunchy.

The distance (difference) between attributes of two products provides some indication of whether two products are similar.

Product map of breakfast cereals

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Consumers are more likely to substitute between products that are “close” in the attribute’s location

End Part 1, Next Class Part 2

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