# EE481

Product Differentiation : SALOP's Linear City Model



# Salop's Circle Model

**Monopolistic Competition with Outside Goods**

Steven C. Salop

*The Bell Journal of Economics*, Vol. 10, No. 1 (Spring, 1979), 141-156.

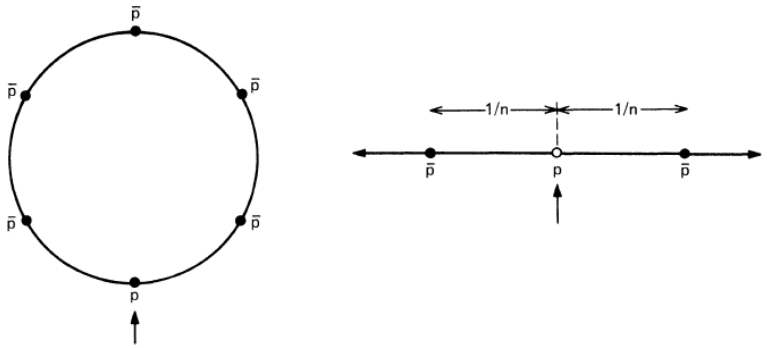
Stable URL:
http://links.jstor.org/sici?sici=0361-915X%28197921%2910%3A1%3C141%3AMCWOG%3E2.0.CO%3B2-M

*The Bell Journal of Economics* is currently published by The RAND Corporation.





FIGURE 2
THE CIRCULAR MARKET






# Salop's Circle Model

- Salop uses consumers' geographical locations to represent their preference locations. **BUT** Salop's city has no end point (a circle).
- Salop's model allows us to consider "the outside options."
- Consumers are located on the circumference of a circle.
- Each consumer chooses one product that is the closet to them.

## Salop's Circle Model: The Consumers

- Let us analyze an ice-cream market.
- Consumers maximize their utility which takes the form:

where



## Consumer's Utility Function (Graph)



## Salop's Circle Model: A Consumer

- This model allows consumers to have *an outside option*.
  - e.g. they can choose not to buy any ice-cream, but choose cake instead.
  - Let the NET utility from choosing an outside option (let's say, cake) or surplus from the cake = $\underline{u}$
- So, a consumer would **only** buy a scoop of the best buy brand, *i* of ice-cream if its surplus is ***at least*** equal to $\underline{u}$ :
- Suppose a consumer gets to buy their most favorite ice-cream (located at $t^*$), and sold at $p^*$ the max utility would be obtained



## Salop's Circle Model: A Consumer

- meaning that, this consumer will buy ice-cream if
  $u - p^* \geq \underline{u}$ or, rearranging, $u-\underline{u} \geq p^*$
  So, the consumer has *a reservation price*, $v = u-\underline{u}$
- Put it differently, a consumer buys a scoop of ice cream only if the net surplus from the best-buy brand = the surplus from the best-buy brand minus the surplus from cake, is positive:

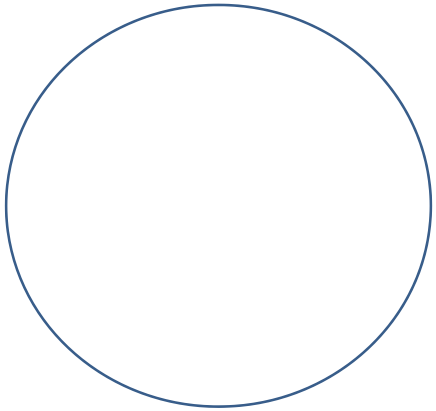
# Salop's Circle Model: Firms' Behavior

- **Basic idea:**

- Salop assumes that firms (or brands) already locate themselves around the circle.
- So, if the circle circumference = 1 and there are *n* firms located at equal distances around the circle, the distance between two firms is ……



# Salop's Circle Model: Circular Market





# Salop Circular Model : Deriving $X_m$

- Consider a consumer located a distance $x = |t - t^*|$ from the brand at $t$ with price $p$.



# Salop Circular Model : Monopoly Region

# Salop Circular Model : Competitive Region



# Demand in Salop's Circle Model



# Product Proliferation

## Entry deterrence in the ready-to-eat breakfast cereal industry

**RICHARD SCHMALENSEE**

*Howard W. Johnson Professor of Management, Emeritus*

Professor of Economics, Emeritus

Dean Emeritus

Office: E62-525
Tel: (617) 253-2957
Fax: (617) 258-6786
Email: rschmal@mit.edu
Website: http://web.mit.edu/~rschmal

**Richard Schmalensee**
Associate Professor of Applied Economics
Sloan School of Management
Massachusetts Institute of Technology

- "Entry Deterrence in the Ready-to-Eat Breakfast Cereal Industry."
  Schmalensee, Richard. *Bell Journal of Economics* Vol. 9, No. 2 (1978): 305-327.

*This paper presents an analysis of the ready-to-eat breakfast cereal industry based on and related to the current antitrust case involving its leading producers. A spatial competition framework is employed, with brands assumed relatively immobile. It is argued that the industry's conduct, in which price competition is avoided and rivalry focuses on new brand introductions, tends to deter entry and protect profits. Entry into a new segment of the market in the 1970s is discussed. Relevant welfare-theoretic issues are analyzed, and it is argued that the remedy proposed by the FTC is likely to improve performance.*



# Product Proliferation

# Product proliferation: market characteristics

- Schmalensee (1978) product proliferation in the US breakfast cereals market between 1950 and 1970.
- Characteristics of the breakfast cereals market:
  - Relatively small minimum efficient scale
  - Low technological requirements

→ From the technological viewpoint: entry is relatively easy

- The four incumbent firms (Kellogs, General Mills, General Foods, Quaker Oats) were obtaining large profits

→ Attractive entry

- What do we observe between 1950 and 1970?
  - Entrance did not happen
  - The established firms increased the number of brands from 25 to 180.



# 2. Product proliferation: concluding remarks

- Product proliferation strategy in the breakfast cereals market: :
  - Before any other firm enters the market, the incumbent firm introduces a variant in the location that could choose the potential entrant: the aim is to remove any incentive to enter the market

↓

If the potential entrant enters the market, the demand it obtains is not enough to compensate entry costs

- Proliferation is rational only if the aim is deterring entrance, in any other case the incumbent firm is better off producing just one variant.
- Other example: banks, home-delivery pizzas→ higher density of locations.