Industrial Organization and Product Differentiation

Ian Sheldon (Ohio State University)

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Introduction

- Early analysis of industrial organization of food industry based on the Bain (1951) SCP paradigm

- Levels of concentration (structure), determine pricing behavior (conduct), which in turn affects profits (performance)

- Key assumption that structure is determined by exogenously given barriers to entry
  - Economies of scale
  - Product differentiation measured by advertising outlays relative to sales
Connor *et al.* (1985) concluded in their study of US food manufacturing:

- Highest rates of advertising intensity in concentrated industries
- Entry barriers high due to cumulative effects of advertising
- SCP paradigm questioned in IO literature:
  - NEIO focus on estimating conduct
  - Focus on *simultaneous* determination of structure and performance
Evolution of Market Structure

- Literature has returned to old question of what determines market structure? (Baumol et al, 1982; Panzar, 1989; Sutton, 1991)

- Focus on cases where product differentiation is determined endogenously as part of industry equilibrium

- Industries split into those with either *exogenous* or *endogenous sunk costs*

- Allows useful classification of food industries as regards product differentiation
Exogenous Sunk Costs and Market Structure

- Product is *homogeneous*, and firms incur sunk cost $\sigma$ of acquiring plant of minimum efficient scale, then compete in price

- Market structure ($C$) function of:
  - Market size $S$ relative to $\sigma$
  - Intensity of price competition
  - Markets contestable if $\sigma = 0$ (Baumol *et al.*)

- With *horizontal* product differentiation, sunk cost of producing specific variety, and price competition mitigated
Exogenous Sunk Costs and Market Structure

- Possibility of *multiple equilibria* if firms can produce several different varieties

- Market structure depends on whether different firms enter each sub-market, same group of firms enter all sub-markets, or firms occupy several niche markets

- Function of: demand effects (*market expansion vs. competition*), costs (*economies of scope*), and possibility of first-mover advantage (*product proliferation*)
Exogenous Sunk Costs and Market Structure

Homogeneous Goods

Differentiated Goods

Lower bound to $C$

Mergers/exit

C

S

C

S
With *vertical* product differentiation, each product has single attribute $u$ – its *brand image*, all consumers having same tastes.

Firms incur sunk cost $\sigma$, but now choose $u$, at an additional sunk cost $A(u)$, before competing in price.

If consumer willingness to pay increases with advertising, $A(u)$ can be thought of as an advertising response function.
Endogenous Sunk Costs and Market Structure

- Link between increased market size $S$ and structure $C$ is broken

- Competitive escalation of $A(u)$, raises equilibrium level of sunk costs $\{\sigma + A(u)\}$ as $S$ increases, offsetting tendency toward fragmentation – advertising is an endogenous barrier to entry

- If saturation level of advertising, $A_\alpha$, fragmentation still occurs as $S$ increases – advertising is as an exogenous barrier to entry
(a) Increased product differentiation dampens price competition for small levels of $S$.

(b) Product differentiation makes advertising more effective, $C$ increases with $S$.

(c) If $A_\alpha$, fragmentation as $S$ increases.
Market Structure, Sunk Costs and Advertising

$X$ Initial market structure

$Y$ Structure with new plant, but ineffective advertising

$Y'$ Structure with new plant and more effective advertising

$\sigma_1 = \text{sunk costs of initial minimum efficient scale}$

$\sigma_2 = \text{sunk costs of new minimum efficient scale}$

$\Sigma \Sigma = \text{separation no-advertising/advertising – function of unit cost of advertising}$
Asymmetric Advertising

- Advertising levels may differ across firms:

  - *Consumer tastes* vary (different levels of $u$), creating dual market structure, e.g., retail markets and non-retail markets

  - *Income effects* such that high (low) income consumers purchase high (low) quality $u$

  - *Sequential entry*, first entrant can “monopolize” by setting $u$ so high that other firms only find it profitable to enter with lower $A(u)$
Strategic Groups in Food Manufacturing

**Producer goods markets**

- Flour (48)*, sugar (85), soybean milling (80), wet-corn milling (72)
- Homogeneous products
- *Exogenous sunk costs?*

**Foodservice market**

- Typically small food manufacturers
- Brands not important – except soft drinks, alcoholic drinks and candy
- Price, quality and service critical
- *Part of dual market structure?*

**Advertised brands**

- Frozen food (31)*, soft drinks (47)(99)**
- RTE cereals (83)(85), chocolate (80), soup (85)(92), coffee (53)(73), beer (90)(82)
- Advertising, product development, issue of shelf-space
- *Endogenous sunk costs?*

**Private-label, generic, and unbranded products sold via retail stores**

- Emphasis on price, advertising and labeling by retailers
- *Part of dual market structure?_

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Does Vertical Structure Matter?

- How do food retailers affect evolution of market structure and product differentiation?

- If there are *vertical externalities* in marketing chain, likely to be *vertical restraints*, e.g., RPM, slotting fees, exclusive dealing/territories.

- Type of vertical restraint depends on who has bargaining power.

- Affects price competition upstream, and role of endogenous sunk costs.
Summary

Recent theory indicates a key connection between evolution of market structure and notion of endogenous sunk costs.

Allows food manufacturing to be divided into producer goods and advertised brands.

As balance of power shifts to food retailers, likely to affect equilibrium expenditures on product differentiation in equilibrium.

Dual market structure will become the norm.