Economies of Scope in Food Processing: the Competitive Implications for Agricultural Producers and Consumers

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Introduction

1. Food processing companies usually provide multiple food products to consumers.
   - For example, Tyson Foods Inc. is the largest U.S. processing firm of beef, chicken, and pork. The three products accounted for 38% (beef), 30% (chicken), and 11% (pork) of the firm’s total sales in the fiscal year of 2016 (Tyson Foods, 2016).
   - The multi-product nature in food processing gives companies an opportunity to enjoy cost efficiency due to economies of scope (e.g., Schroeder 1992; Bouras and Azzam 2013).

2. U.S. food processing industries have become increasingly concentrated in the past several decades.
   - The four-firm concentration ratio in beef packing has increased from 32% in 1985 to 66% in 2015 (Grain Inspection Packers and Stockyards Administration 2016).
   - The increasing concentration in food processing has caused significant amount of academic concerns on potential anticompetitive effects on agricultural producers and consumers. Significant amount of academic studies and reports have examined the concentration and market power issues in agricultural markets (e.g., Azzam and Schroeter 1991; Math and Wolgenant 1999; Zheng and Vukina 2009; Crespi, Saitone, and Sexton 2012).
   - The multi-product nature in food processing gives companies an opportunity to enjoy cost efficiency due to economies of scope when we examine the competitive implications of increasing concentration in agricultural markets.

Objectives

- This paper uses a simple conceptual framework to study how scope economies in food processing influence buyer power’s effects on farmers and seller power’s effects on consumers.
  - Both economies of scope and rising concentration may exist in some food processing industries.
  - It is essential to have a thorough understanding on the impact of economies of scope when we examine the competitive implications of increasing concentration in agricultural markets.

- Analyze the relationship between the benefits of economies of scope and the degree of substitutability/complementarity among the finished products.

The Model

- Consider the markets of two food products (A and B). There is an integrated processing-retailing sector.
  - The number of processing/retailing firms is \( N \) (\( N \geq 2 \)) for product A and M for product B. Among those firms, firm 1 and 2 process both product A and B while the other firms process only one product.
  - Each processing firm procures one or two agricultural raw materials from a large number of agricultural producers, converts the raw materials into finished food products, and sells the finished products(s) to price-taking consumers.

- Two scenarios of the cost efficiency in processing are examined and compared: (1) when there are no economies of scope and (2) when scope economies exist.
  - For those comparisons, we consider three cases of the substitutability/complementarity between product A and B: (i) the two goods are substitutes; (ii) they are complements; and (iii) they are unrelated goods.

Table 5. Four-Firm Concentration in Livestock Slaughter by Type of Farm

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Value Purchases</th>
<th>Beef</th>
<th>Pork</th>
<th>Chicken</th>
<th>Hogs</th>
<th>Sheep &amp; Lambs</th>
<th>Turkeys</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>Source: USDA, AMS. 2011 Packers and Stockyards Program Annual Report</td>
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Results

- Economies of scope in food processing can reduce anticompetitive price effects of market power on agricultural producers and consumers.
  - Economies of scope in food processing will reduce the anticompetitive effects of market power by a larger amount when there is a higher degree of market power in the markets.
  - When the two products (A and B) are complements, the benefits of scope economies in food processing on consumers and farmers will be larger than those in the case when the two products are unrelated goods or substitutes.

Conclusions

- Both economies of scope and rising concentration are important characteristics in modern food processing. Rising concentration has made producers, researchers and policy makers to be concerned about the possible anticompetitive effects on farmers and consumers.
- However, the impact of scope economies on the effects of market power has not received adequate examination in academic studies and government investigations.
- The analysis on the impact of scope economies on the competitive implications for farmers and consumers can help improve the assessment of market power’s price effects and provide sound policy suggestions.

Economies of Scope in Food Processing:
the Competitive Implications for Agricultural Producers and Consumers

Tian Xia and Xianghong Li, Kansas State University

Facts About Tyson Foods


Source: USDA, GIPSA. 2010 Packers and Stockyards Program Annual Report

Table 5. Four-Firm Concentration in Livestock Slaughter by Type of Farm and Facility - Federally-Inspected Plants

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Source: USDA, GIPSA. 2010 Packers and Stockyards Program Annual Report

Conclusion

- The analysis on the impact of scope economies on the competitive implications for farmers and consumers can help improve the assessment of market power’s price effects and provide sound policy suggestions.

1. U.S. food processing industries have become increasingly concentrated in the past several decades.

2. The four-firm concentration ratio in beef packing has increased from 36% in 1980 to 85% in 2015, and the same ratio in pork processing has risen from 32% in 1985 to 66% in 2015 (Grain Inspection Packers and Stockyards Administration 2016).

The increasing concentration in food processing has caused significant amount of academic concerns on potential anticompetitive effects on agricultural producers and consumers. Significant amount of academic studies and reports have examined the concentration and market power issues in agricultural markets (e.g., Azzam and Schroeter 1991; Math and Wolgenant 1999; Zheng and Vukina 2009; Crespi, Saitone, and Sexton 2012).

One important issue: how economies of scope in food processing influence the effects of market power on farmers and consumers?