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

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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).
 - That is, an increase in the number of goods produced can result in reductions in a processing firm's average cost.

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

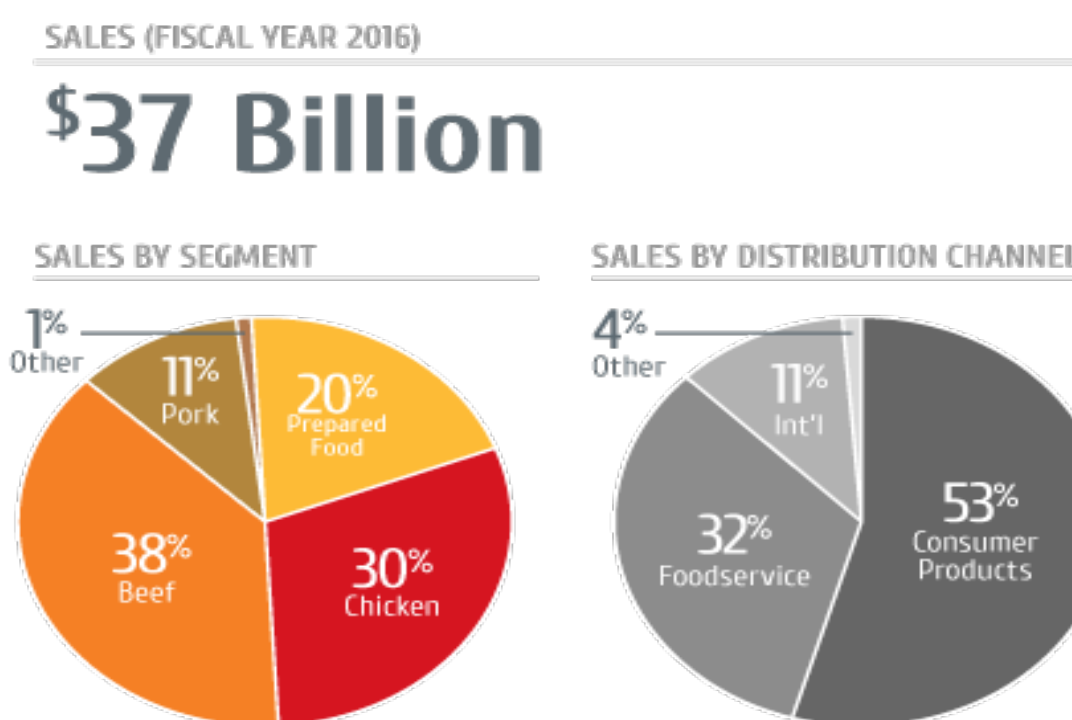
- The four-firm concentration ratio in beef packing has increased from 36% in 1980 to 85% in 2015, and the same ratio in pork processing has risen from 32% in 1985 to 66% in 2015 (Grain Inspection Packers and Stockyards Administration 2016).
- The increasing concentration in food processing has caused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

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.

► Facts About Tyson Foods



Source: Tyson Foods, Inc. 2016

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 product(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 Livestock and Poultry - Federally-Inspected Plants

Year	Total Value Purchases	Steers/Heifers	Cows & Bulls	Hogs	Sheep & Lambs	Broilers	Turkeys
2005	67	80	48	64	70	NA	NA
2006	66	81	54	61	68	NA	NA
2007	66	80	55	65	70	57	52
2008	68	79	55	65	70	57	51
2009	71	86	54	63	70	53	58
2010	67	85	53	65	65	51	56
2011	67	85	53	64	59	52	55
2012	68	85	56	64	62	51	53
2013	67	85	60	64	59	54	53
2014	67	83	57	62	58	51	58
2015	68	85	57	66	57	51	57

Source: USDA, GIPSA. 2016 Packers and Stockyards Program Annual Report

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, consumers, 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.