Market Concentration and Retail Markups: Evidence from Commissary Data

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What is the Issue?

- Food retail has become much more concentrated in the U.S.
- Four-firm concentration ratio (CR4) in the U.S. (USDA-ERS)
  - 1992: 16.8%
  - 2013: 36.4%
- Average MSA-level CR4 as of 2014: 63%
Prices and Concentration

- Many studies have found a positive and significant price-concentration relationship in food retail
  - Lamm, 1981; Cotterill, 1986; Connor and Peterson, 1992; Yu and Connoer, 2002; Stiegert and Sharkey, 2007
- Mergers have been found to result in higher food prices
  - Ashenfelter and Hosken, 2008; Davis, 2010
- These findings are often attributed to market power in action
- But it is almost impossible to observe wholesale prices and margins
Objectives

- Create a novel dataset of estimated price-cost margins for food retailers and measures of market structure
- Estimate the relationship between market concentration and markups at the UPC level
If it’s not Market Power...

- Cost efficiencies/economies of scale (Clarke et al., 1984; Azzam, 1997; Wood, 2013)
- “Demsetz Critique,” Demsetz, 1973
  - Services and quality are related to concentration, leading to higher prices
- Wholesale prices
  - Input prices vary systematically with concentration
Data

- 2009-2011 EmpowerIT Military Commissary data
  - Weekly UPC-level prices for all U.S. commissaries
  - All national brands
  - Promotional activity removed
  - Prices set to wholesale + 5% to cover costs

- 2009-2011 Symphony IRI Store Scanner Data
  - UPC-level prices for >40,000 supermarkets and supercenters in the U.S.

- Nielsen TDLinx Data
  - Store-level data, 2004-2014
  - Revenues, ownership structure
Average Markup by Department

- CHILL: 60
- FROZEN: 40
- GROCERY: 50
- MEAT: 40
- PRODUCE: 40
Average Markup by IRI Commodity
Average Margins by Product Category Percentile

- Juice Based Beverages (0.05)
- Fruit/Nut Mixes (0.25)
- Bone-In Meat (0.50)
- Butter (0.75)
- Oysters (0.95)
Commissaries and Supermarkets

- USDA-ERS Rural-Urban Continuum county codes
  - 1: Metro area with > 1 million people
  - 9: Rural area with <2,500 people

- Radius of mergers widened with the Continuum codes
  - 1: 5 miles
  - 9: 50 miles

- California
  - 279 supermarkets, 7 chains (including independents)
  - 23 military commissaries
  - N = 8.8 million
Market Concentration

- Herfindahl-Hirschman Index (HHI)
- By zip code and year
- Mean = 0.317, St. Dev. = 0.149
Model

(1) Margins = f(HHI, Year Effects, Month Effects, Income, Food Assistance, Food Prices, Department Effects)

(2) Margins = f(HHI, Year Effects, Month Effects, Income, Food Assistance, Food Prices, Department Effects, Chain Effects)
## Results (1)

| Variable   | Parameter Estimate | Standard Error | t Value | Pr > |t| |
|------------|--------------------|----------------|---------|------|---|
| Intercept  | 95.61922           | 2.23613        | 42.76   | <.0001 |
| HHI        | 5.04977            | 0.08274        | 61.03   | <.0001 |
| y2009      | -1.06880           | 0.02883        | -37.07  | <.0001 |
| y2010      | -1.12319           | 0.02878        | -39.03  | <.0001 |
| jan        | 1.80470            | 0.05752        | 31.37   | <.0001 |
| feb        | 0.16261            | 0.05737        | 2.83    | 0.0046 |
| mar        | 0.66553            | 0.05744        | 11.59   | <.0001 |
| apr        | -2.50139           | 0.05808        | -43.07  | <.0001 |
| may        | -1.49277           | 0.05769        | -25.88  | <.0001 |
| jun        | -0.65924           | 0.05732        | -11.50  | <.0001 |
| jul        | -0.35361           | 0.05730        | -6.17   | <.0001 |
| aug        | -1.49385           | 0.05719        | -26.12  | <.0001 |
| sep        | -1.10234           | 0.05813        | -18.96  | <.0001 |
| oct        | -0.89915           | 0.05839        | -15.40  | <.0001 |
| nov        | 0.15721            | 0.05797        | 2.71    | 0.0067 |
| income     | 0.00023085         | 0.00000172     | 134.14  | <.0001 |
| PCT_SNAP09 | -4.19796           | 0.29634        | -14.17  | <.0001 |
| MILK_PRICE10 | -30.98897      | 0.34161        | -90.71  | <.0001 |
| produce    | -3.59145           | 0.10377        | -34.61  | <.0001 |
| grocery    | 5.91454            | 0.03489        | 169.54  | <.0001 |
| meat       | -7.01430           | 0.36150        | -19.40  | <.0001 |
| chill      | 13.58050           | 0.04565        | 297.48  | <.0001 |
### Results (2): With Chain Effects

| Variable       | Parameter Estimate | Standard Error | t Value | Pr > |t| |
|----------------|--------------------|----------------|---------|------|---|
| Intercept      | -4.59500           | 2.33718        | -1.97   | 0.0493 |
| hhifood        | -1.47065           | 0.08697        | -16.91  | <.0001 |
| y2009          | -1.01460           | 0.02834        | -35.80  | <.0001 |
| y2010          | -1.09704           | 0.02829        | -38.78  | <.0001 |
| income         | 0.00005384         | 0.00000202     | 26.68   | <.0001 |
| PCT_SNAP09     | 2.70140            | 0.30147        | 8.96    | <.0001 |
| MILK_PRICE10   | 30.75041           | 0.47585        | 64.62   | <.0001 |
| produce        | -3.61682           | 0.10202        | -35.45  | <.0001 |
| grocery        | 6.00777            | 0.03430        | 175.16  | <.0001 |
| meat           | -7.43519           | 0.35535        | -20.92  | <.0001 |
| chill          | 13.66051           | 0.04488        | 304.39  | <.0001 |
Discussion

- Markups share the expected positive relationship with concentration in (1)
- Sign flips in (2)
- In both cases, findings are very robust
  - By department and year
  - Outliers
Market Effects vs. Firm Effects

- Markups are higher in more concentrated markets
- Large chains more likely to operate in concentrated markets
- But chains have smaller markups in more concentrated markups
- Recall we are unable to observe other variable costs that contribute to margins
  - Transportation, labor, overhead, etc.
Market Effects vs. Firm Effects

- Markets can be highly price competitive with 3-5 firms (Bresnahan and Reiss, 1991)
- Results are consistent with cost efficiencies at large chains
- Keeping markups low to remain price competitive and preserving margins via lower operating costs
Next Steps

- Incorporate VA, GA, NC, SC for more variation and firms
- Incorporate controls
  - Ag land value
  - Property value
  - Energy costs
- Identify concentration impacts separately on retail and wholesale prices
- Examining changes in the product mix across markets
Thank you!
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