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# Agricultural Outlook Forum


## A New Horizon: The Future of Agriculture

February 23-24, 2017 • Crystal Gateway Marriott Hotel, Arlington, Virginia

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93<sup>rd</sup> Annual Agricultural Outlook Forum  
“A New Horizon: The Future of Agriculture”

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# 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

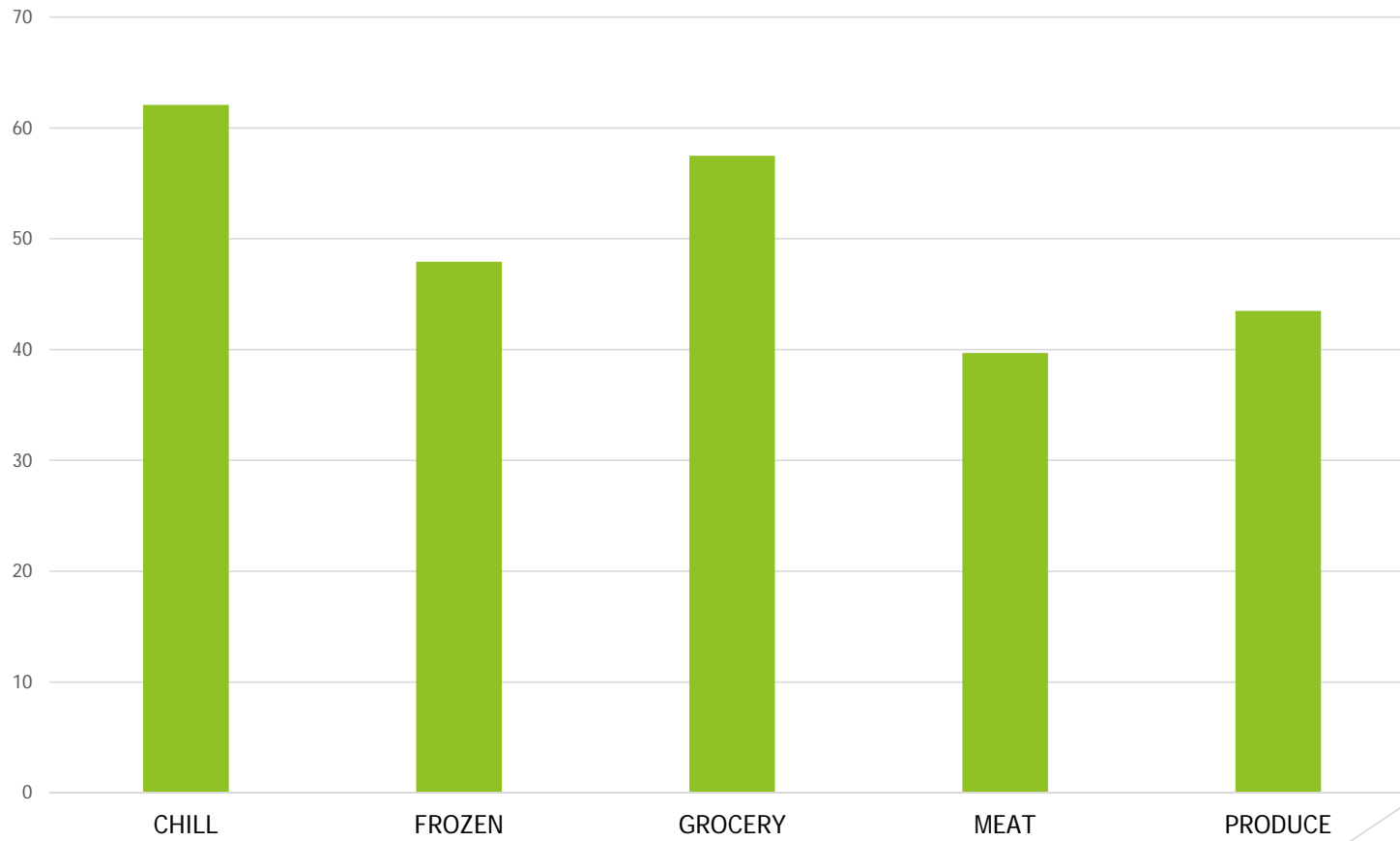




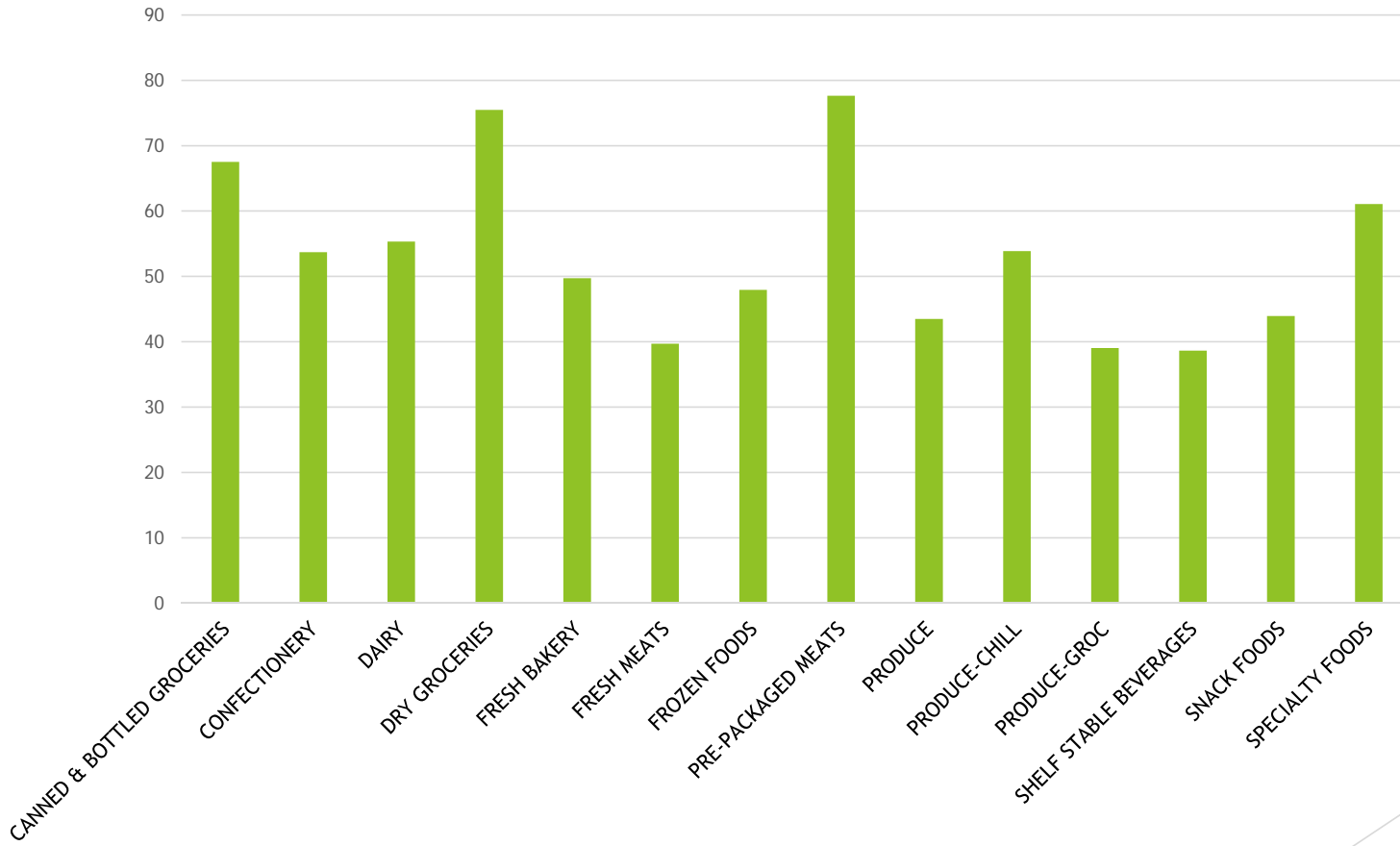
# Data

- ▶ 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

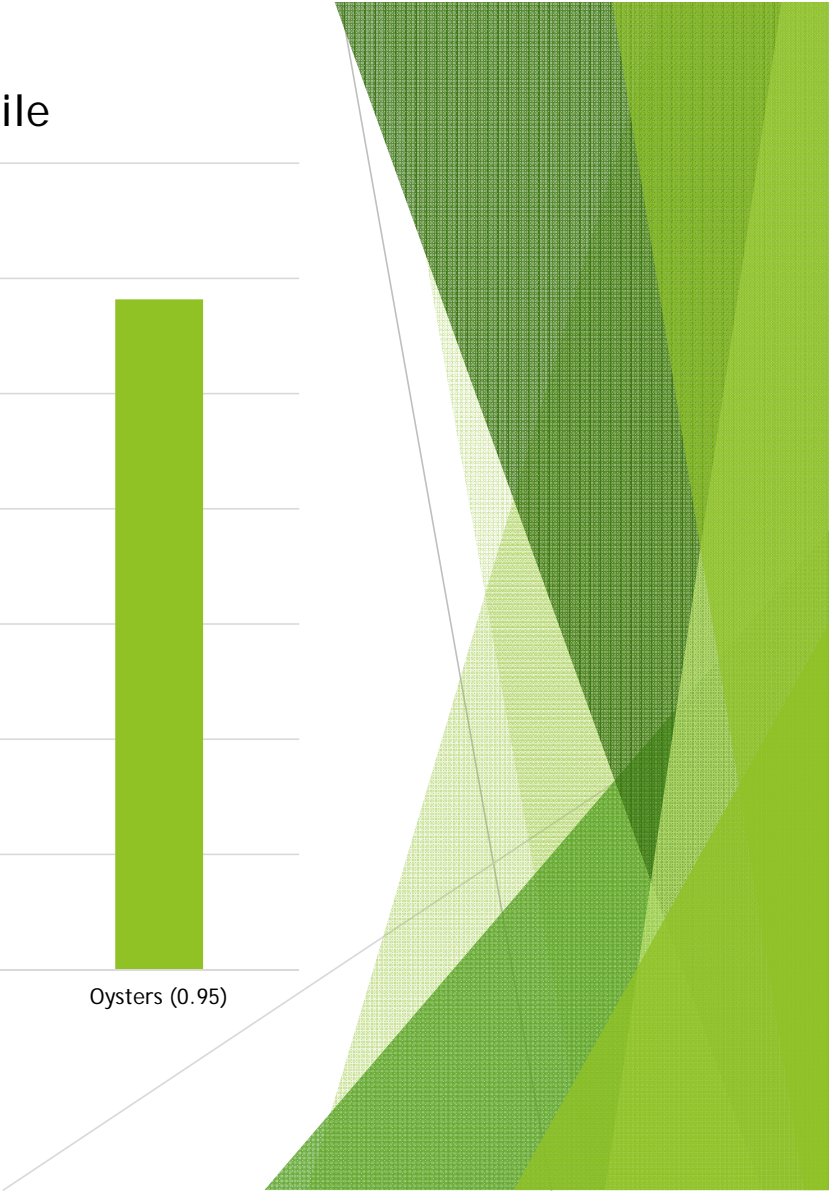
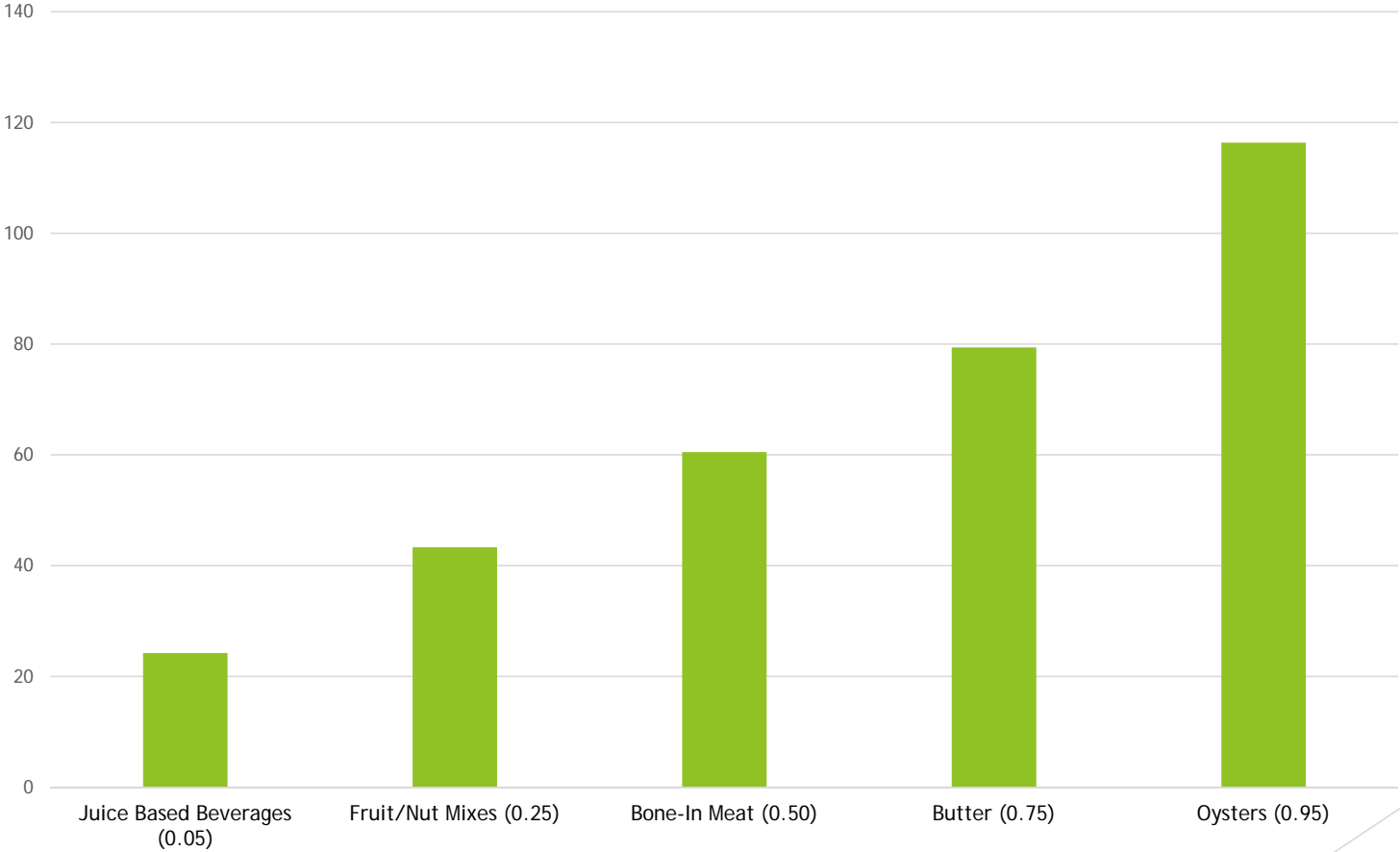
## Average Markup by Department



Average Markup by IRI Commodity



# Average Margins by Product Category Percentile



# 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 =  $f(\text{HHI}, \text{Year Effects}, \text{Month Effects}, \text{Income}, \text{Food Assistance}, \text{Food Prices}, \text{Department Effects})$
- ▶ (2) Margins =  $f(\text{HHI}, \text{Year Effects}, \text{Month Effects}, \text{Income}, \text{Food Assistance}, \text{Food Prices}, \text{Department Effects}, \text{Chain Effects})$

# Results (1)

Variable	Parameter Estimate	Standard Error	t Value	Pr >  t
Intercept	95.61922	2.23613	42.76	<.0001
<b>HHI</b>	<b>5.04977</b>	<b>0.08274</b>	<b>61.03</b>	<b>&lt;.0001</b>
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 markets
- ▶ 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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