Structural Change and Competition In the U.S. Dairy Industry

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Presentation Outline

- Industry structure at the farm level
  - Farm size and location
- Classified pricing of farm milk in the U.S.
  - Pricing practices of dairy manufacturers
  - Implications of a thin market
- Industry structure in the marketing of farm milk
  - Emergence of regional/supra-regional cooperatives
- Industry structure in milk processing/distribution
  - Suiza → Dean Foods

Dairy Farm Structure

- Milk production has shifted westward

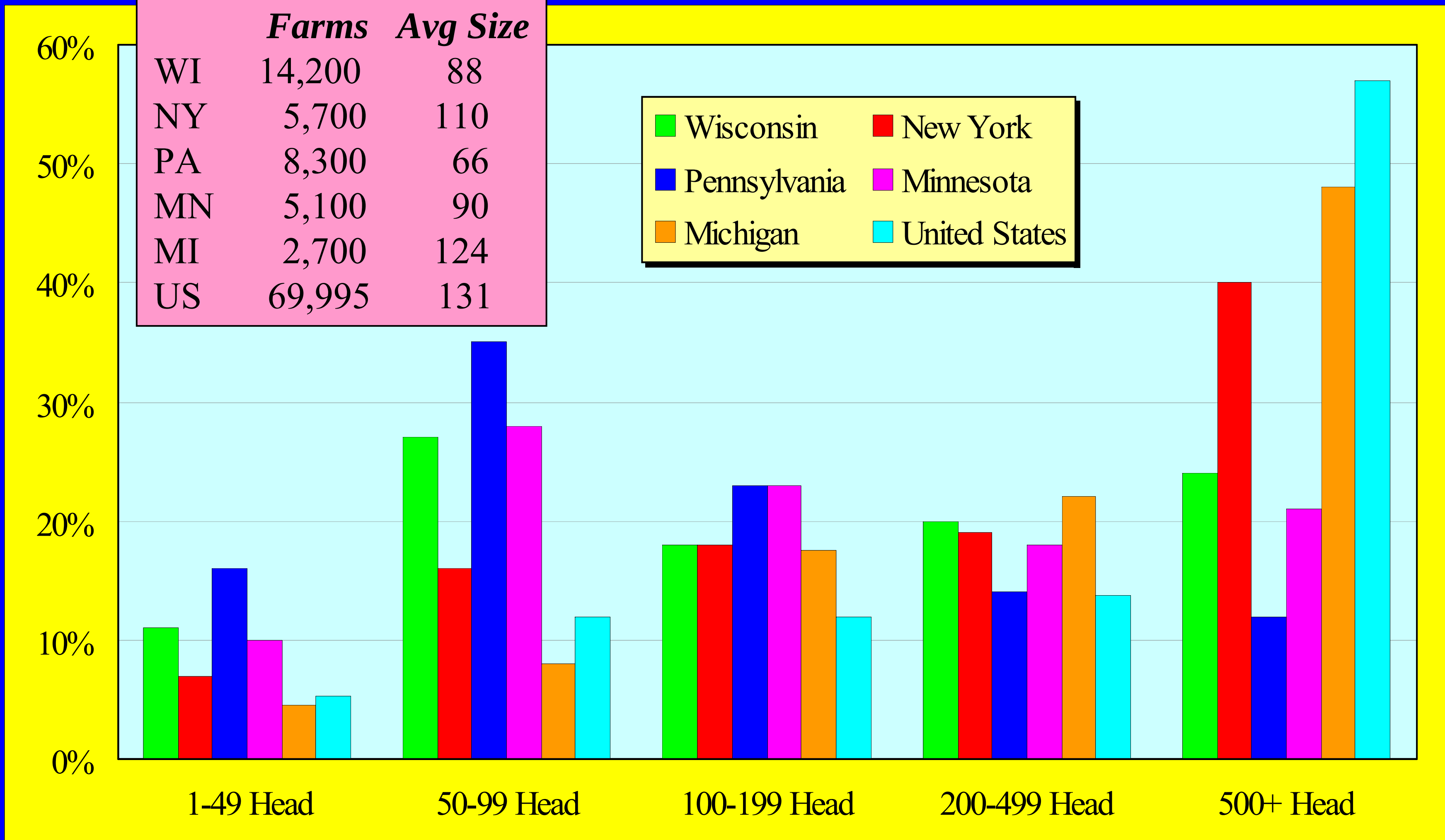
1970		1980		1990		2000		2008	
State	Prod	State	Prod	State	Prod	State	Prod	State	Prod
WI	18,435	WI	22,380	WI	24,187	**CA**	32,245	**CA**	41,203
NY	10,341	**CA**	13,577	**CA**	20,947	WI	23,259	WI	24,472
MN	9,636	NY	10,974	NY	11,067	NY	11,921	NY	12,432
CA	9,457	MN	9,535	MN	10,030	PA	11,156	**ID**	12,315
PA	7,124	PA	8,496	PA	10,014	MN	9,493	PA	10,575
IA	4,670	MI	4,970	**TX**	5,539	**ID**	7,223	MN	8,782
MI	4,602	OH	4,310	MI	5,234	**TX**	5,743	**TX**	8,416
OH	4,420	IA	3,994	OH	4,667	MI	5,705	**NM**	7,865
TX	3,065	**TX**	3,625	**WA**	4,392	**WA**	5,593	MI	7,763
MO	3,012	**WA**	2,942	IA	4,233	**NM**	5,236	**WA**	5,696

Note: Top ten states. Production is in terms of millions of lbs

Dairy Farm Structure

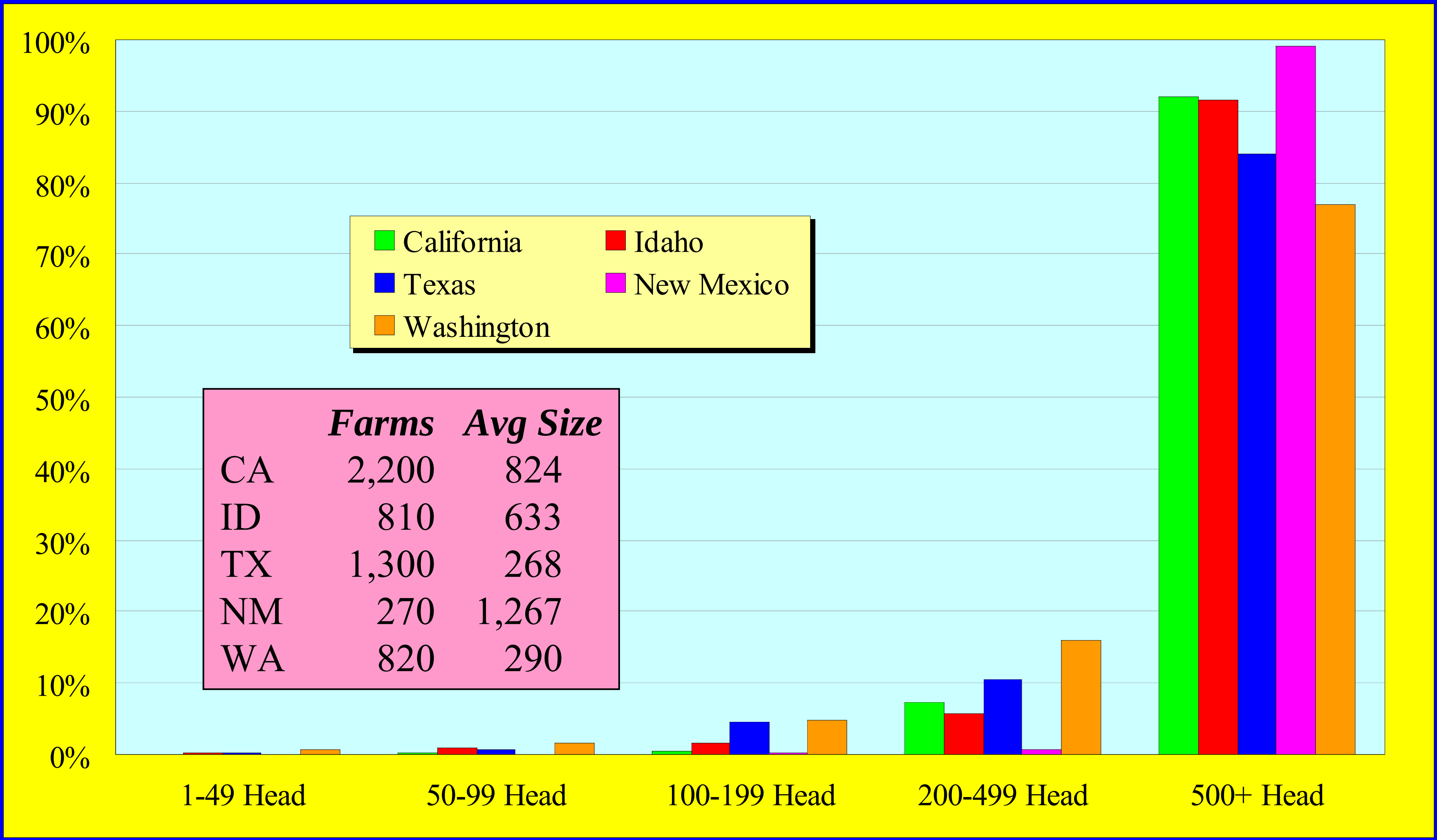
- Distribution of milk production by herd size, 2007

	Farms	Avg Size
WI	14,200	88
NY	5,700	110
PA	8,300	66
MN	5,100	90
MI	2,700	124
US	69,995	131



Dairy Farm Structure

- Distribution of milk production by herd size, 2007



	Farms	*Avg Size*
CA	2,200	824
ID	810	633
TX	1,300	268
NM	270	1,267
WA	820	290

Classified Pricing of Farm Milk

- A majority of the milk produced in the U.S. takes place under Federal and State marketing orders
  - CA and Federal Milk Marketing Order (FMMO) system account for 83% of U.S. milk in 2008

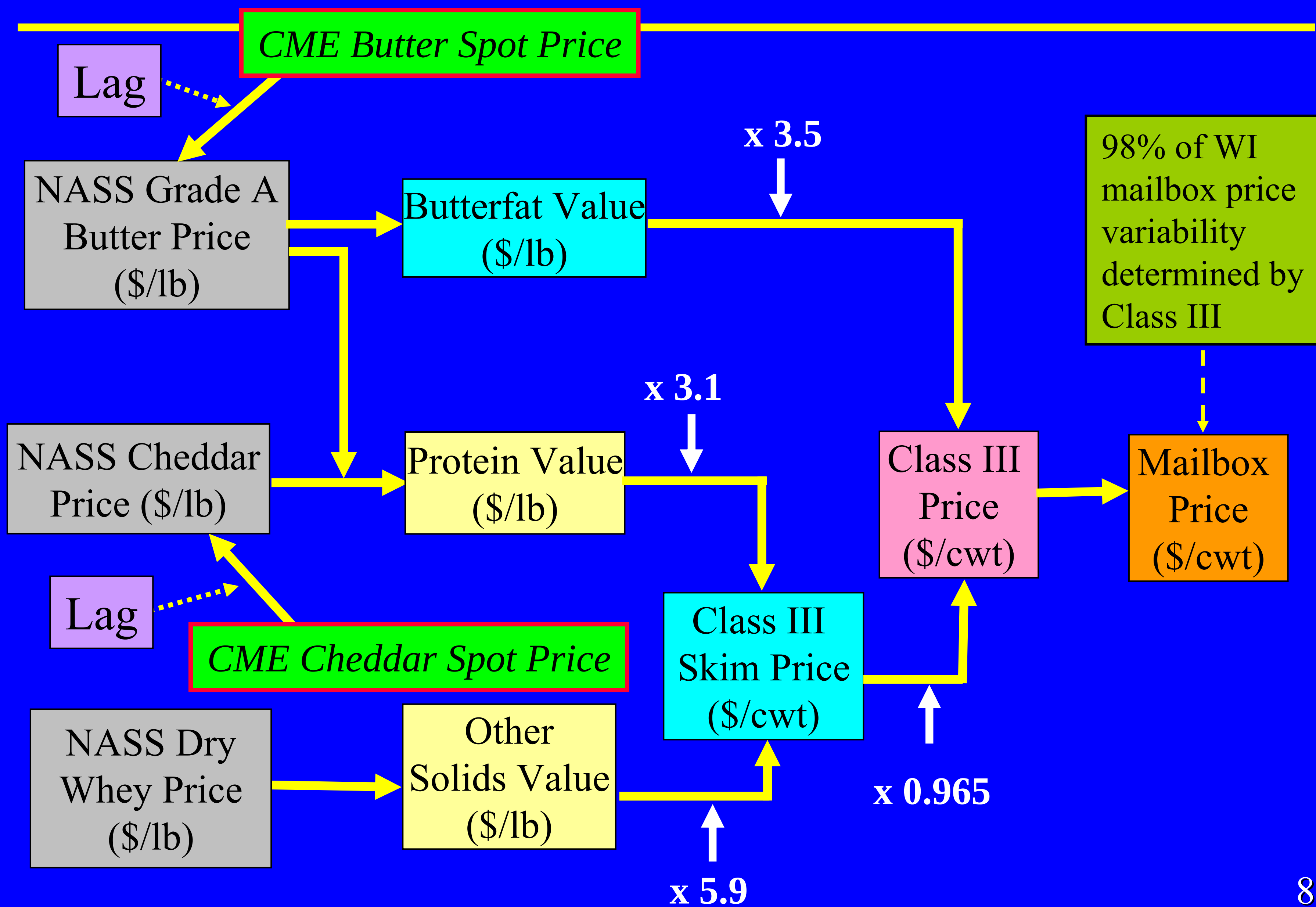
- Formulas used to set *minimum* milk prices
  - Prices determined by use of milk (i.e., milk class)
  - Wholesale commodity prices→milk component value
    - ✓ Milk Class minimum price = sum of component values at standard milk composition

Classified Pricing of Farm Milk

- **How can market structure either at the milk procurement or processing stages impact farm milk prices given above system?**

- Lets examine the valuation of FMMO Class III milk
  - 76.4% of Upper Midwest milk in 2008
  - 36.0% of U.S. milk
  - 3.1% of Florida milk

FMMO Pricing of Class III Milk



Milk Pricing and Market Structure

- The Chicago Mercantile Exchange (CME) spot cheese market
  - 1997: Spot cheese market moved to CME after allegations of price manipulation on the Green Bay National Cheese Exchange
    - *Cheese Pricing: A Study of the National Cheese Exchange*, Mueller, W.F., B.W. Marion, M. Sial and F.E. Giethman, Dept. of Ag & Applied Economics, Univ. of WI-Madison (www.aae.wisc.edu/fsrg/finalFolder/All Chapters File.pdf)
    - Good review of NCE history

Milk Pricing and Market Structure

- Cheese producers generally use the CME in setting sales prices even though not part of FMMO system
  - Carlson and Gould (1996) study of Wisconsin Cheese plant managers
    - ✓ Typical statement: "2¢ over the Friday's CME"
    - ✓ Lag effect on NASS prices used in formulas
  - Impacts all cheese varieties not just cheddar
    - ✓ 2008: Cheddar was 31.7% of U.S. cheese prod.

- The Commodity Futures Trading Commission (CFTC) has regulatory oversight

Milk Pricing and Market Structure

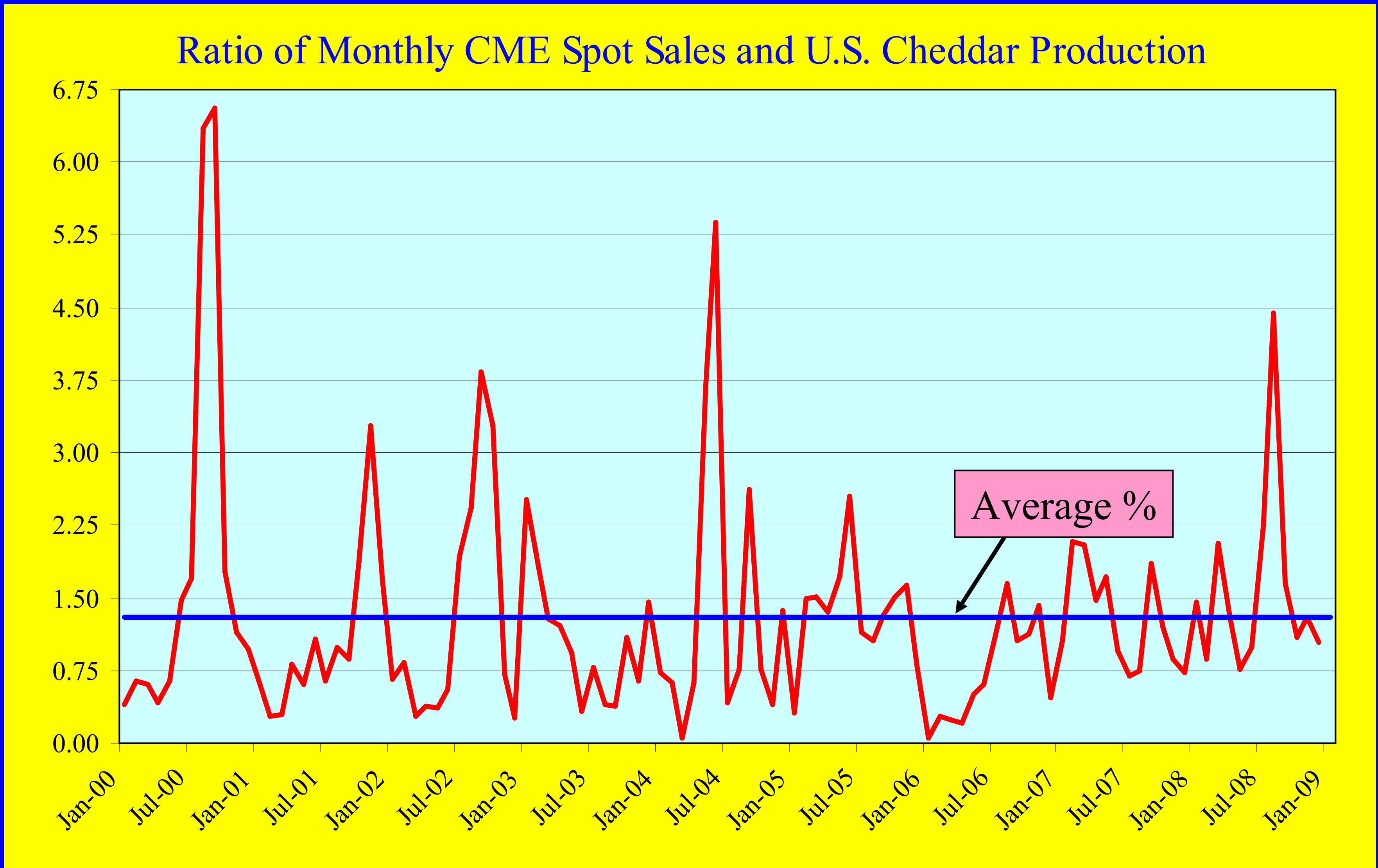
- *Spot Cheese Market: Market Oversight Has Increased, but Concerns Remain About Potential Manipulation*
  - GAO-07-707, July 2007
  - A comparison of CME and NCE
  - General findings
    - ✓ Daily anonymous trading
    - ✓ Same products and participants as at the NCE
  - Markets have characteristics associated with manipulation potential
    - ✓ Low trading volume
    - ✓ Small number of traders undertake majority of trades

Milk Pricing and Market Structure

- *Spot Cheese Market: Market Oversight Has Increased, but Concerns Remain About Potential Manipulation*
  - Between Jan. 1, 1999 – Feb 2, 2007 closing price determined by unfilled bids and uncovered offers:
    - ✓ Blocks: 17% of trading days
    - ✓ Barrels: 28% of trading days
  - % of Trades: Jan 1, 1999 – Feb 2, 2007

Blocks	Barrels
Largest 2 Buyers: 74%	Largest 4 Buyers: 56%
Largest 3 Sellers: 67%	Largest 2 Sellers: 68%

Milk Pricing and Market Structure

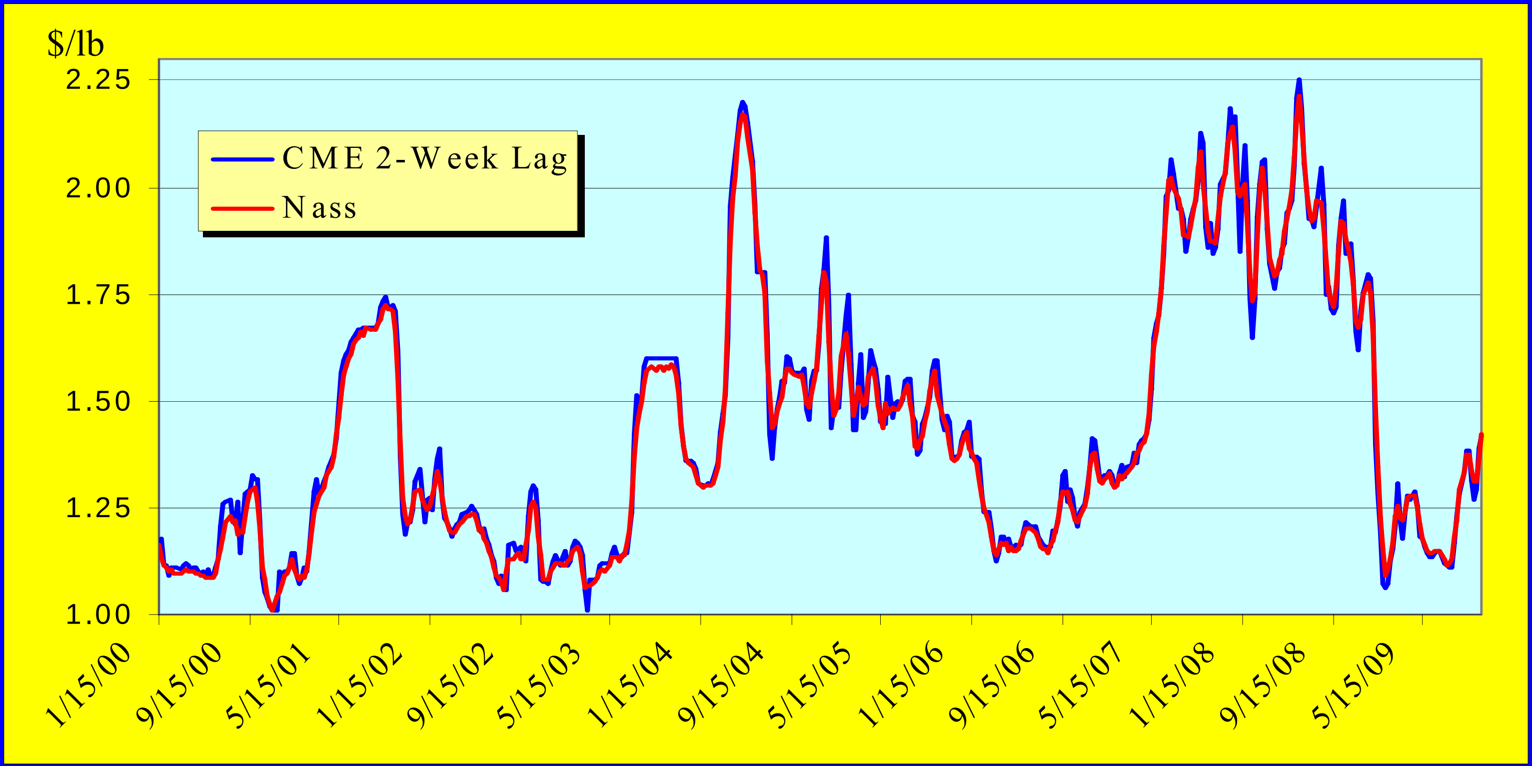


Milk Pricing and Market Structure

- Relationship between weekly average CME Spot and NASS Cheddar Block prices

NASS Cheddar Block Price =

$$\underset{(0.006)}{0.017} + \underset{(0.004)}{0.982}\,\text{CME Spot Price}(-2) \qquad \bar{R}^2 = 0.990$$



Milk Pricing and Market Structure

- Class III futures and spot prices linked via
  - FMMO pricing rules
  - Class III futures cash settle to Announced Class III

- Dec. 2008 CFTC Sanctioning of DFA
  - May 21- June 23, 2004 cheese spot market activity
  - DFA attempted to manipulate June, July and Aug. 2004 Class III futures
    - ✓ Long in Class III futures
    - ✓ Futures started to decline

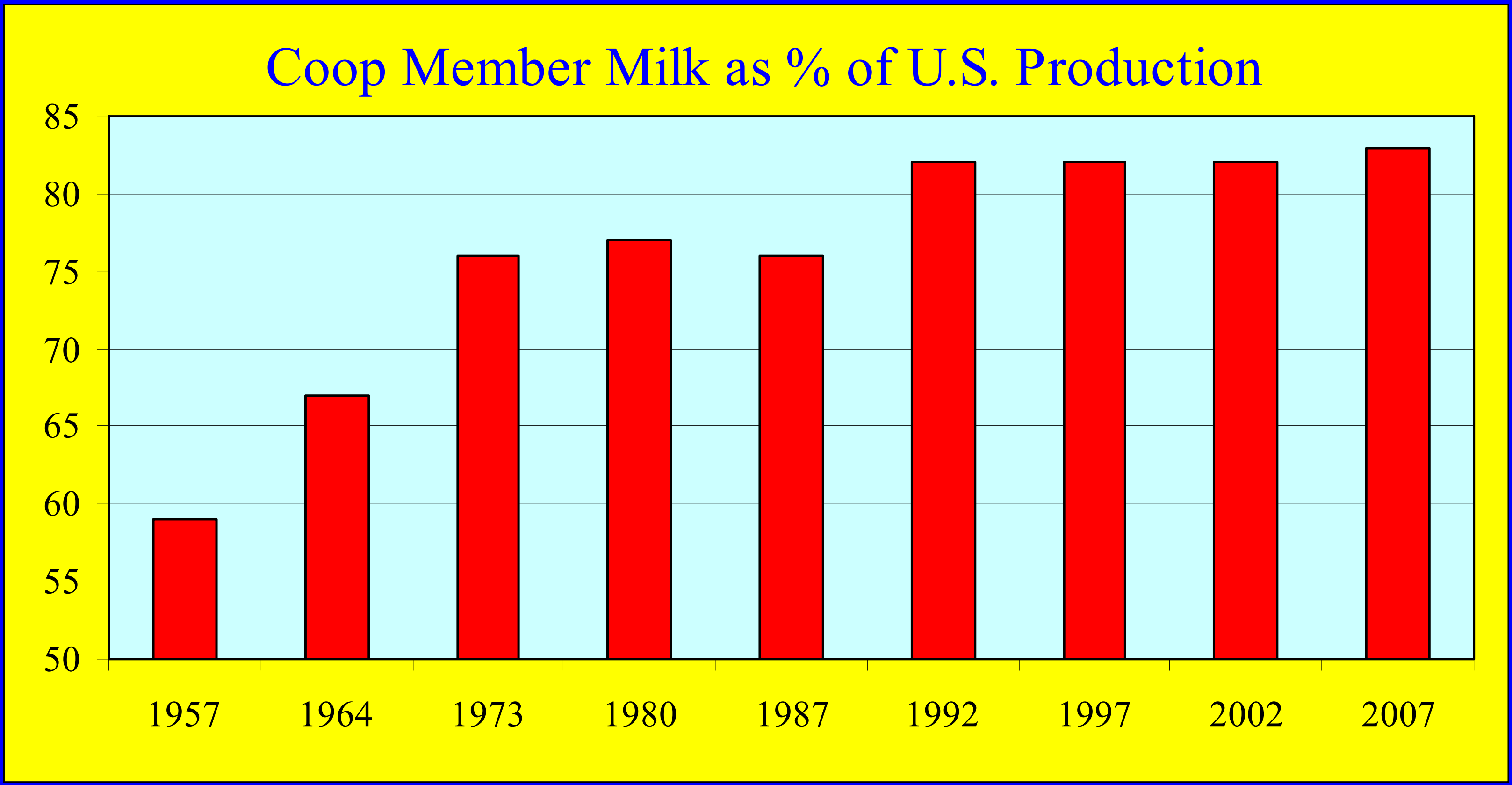
Milk Pricing and Market Structure

- "*…attempted to manipulate Class III milk futures contract prices through purchases of cheddar cheese blocks on the CME Cheese Spot Call market in an effort to minimize potential losses from DFA's speculative long Class III milk futures positions…*" (CFTC, 2008)
  - Hanman (CEO) and Bos (CFO) found guilty
    - ✓ Fined $12,000,000
    - ✓ Cannot trade for 5 years
  - http://future.aae.wisc.edu/pubs/pubs/show/408

- Similar relationship found between NASS and CME butter spot price

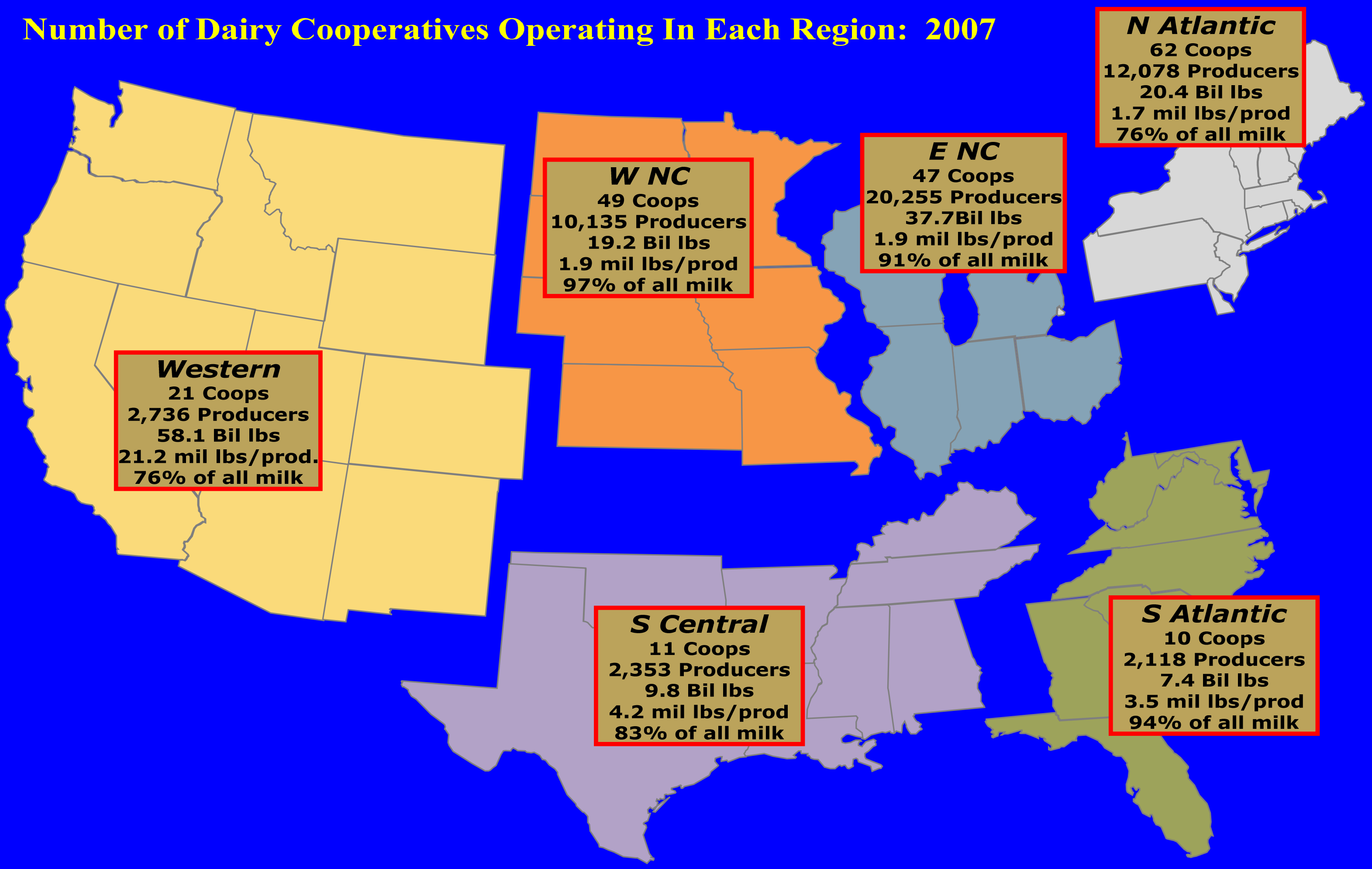
Concentration in the Marketing of Farm Milk

- In marketing of farm milk dairy cooperatives have played a major role and has increased over time



Source: Ling, Marketing Operations of Dairy Cooperatives, various issues

Concentration in the Marketing of Farm Milk



Source: Ling, Marketing Operations of Dairy Cooperatives, various issues

Concentration in the Marketing of Farm Milk

- Dairy cooperative unification efforts in 1960's – 1970's resulted in regional cooperatives

- Continued unification resulted in creation of multi-regional cooperatives
  - Account for a significant percentage of U.S. milk
  - Example of Dairy Farmers of America (DFA) and Land O'Lakes (LOL)

Concentration in the Marketing of Farm Milk

Cooperatives Forming DFA	1996		
	Processing Rank	Processing Sales ($ Mil)	% of Top 100
AMPI-Southern Region	35	386	0.8
Mid-America Dairymen, Inc	4	1,410	3.1
Western Dairymen, Inc	96	102	0.2
Milk Marketing Inc.	37	353	0.8
	Milk Marketing Coop Rank	Milk Marketings (Mil. Lbs)	U.S. Prod. %
AMPI-Southern Region*	7	5,236	3.4
Mid-America Dairymen, Inc	1	17,193	11.2
Western Dairymen, Inc	13	3,089	2.0
Milk Marketing Inc.	3	7,000	4.5

Note: *Estimated. AMPI marketed 11,800 mil. lbs of farm milk and was the 2nd largest cooperative. The Southern Unit accounted for 32% of dairy processing sales.

Concentration in the Marketing of Farm Milk

- Dairy Farmers of America after formation, 1997:

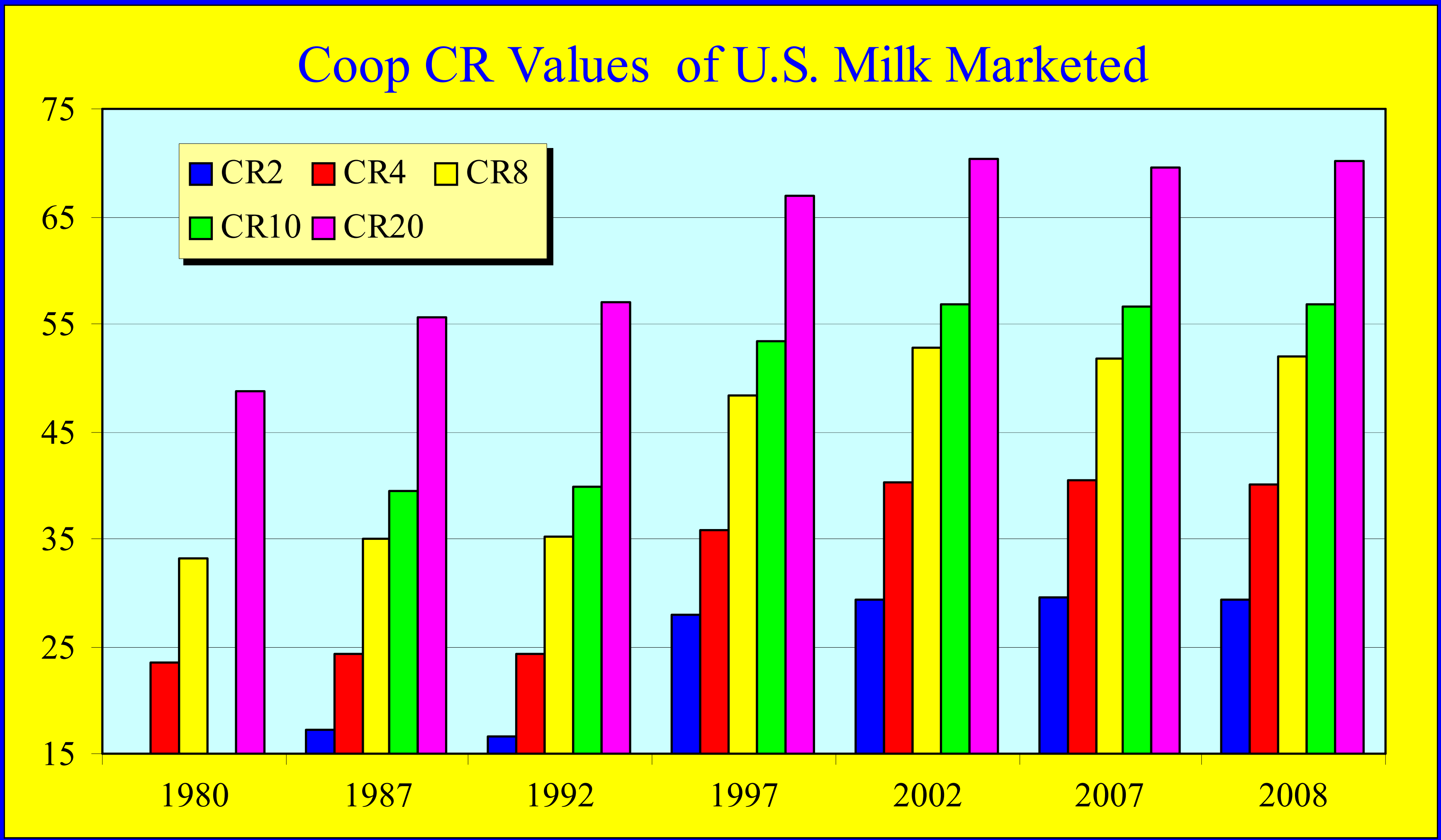
Milk Marketed (Mil. lb)	31,500
% of U.S. Production	20.2
% of Coop Marketed Milk	25.2
Number of Farms	18,543
% of U.S. Farms	15.0
% of Coop Farms	26.2

Concentration in the Marketing of Farm Milk

Land O'Lakes and Dairymen's Cooperative	1997		
	Processing Rank	Processing Sales ($ Mil)	% of Top 100
Land O' Lakes	5	1,800.0	3.8
Dairymen's Cooperative Creamery Association	30	499.4	1.1
	Milk Marketing Rank	Milk Marketings (Mil. Lbs)	U.S. Prod. %
Land O' Lakes	2	12,200	7.8
Dairymen's Cooperative Creamery Association	9	4,212	2.7

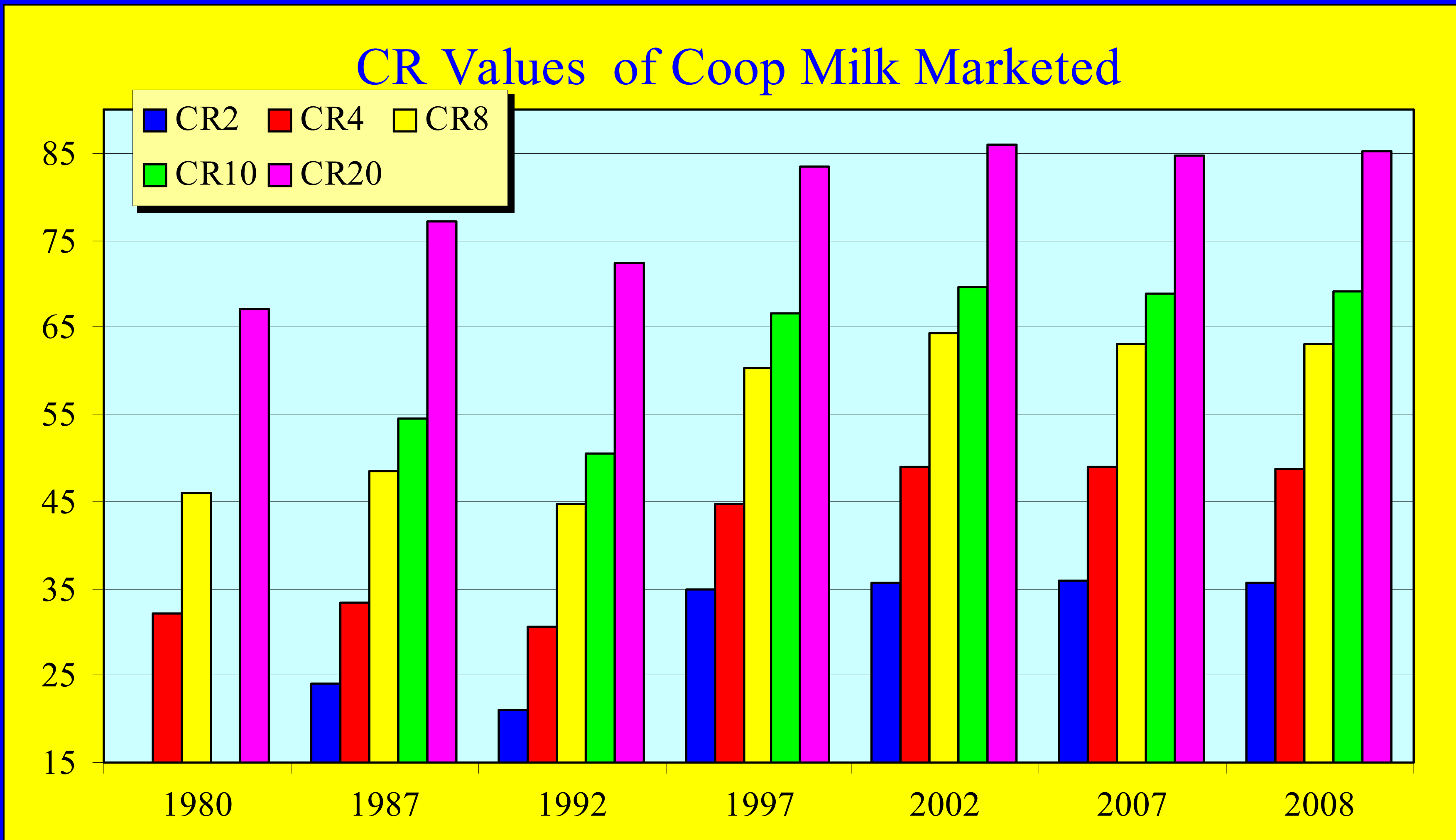
Merger effective July 1, 1998

Concentration in the Marketing of Farm Milk



Source: Ling, Marketing Operations of Dairy Cooperatives, Various Issues
Hoard's Dairymen, Various Issues

Concentration in the Marketing of Farm Milk



Source: Ling, Marketing Operations of Dairy Cooperatives, Various Issues
Hoard's Dairymen, Various Issues

Concentration in the Marketing of Farm Milk

- Concentration in the marketing of farm milk: 2008

		Milk Marketed (Mil Lbs)	No. of Farms	Milk /Farm (Mil Lbs)	% of U.S. Prod.
1	DFA	37,900	10,178	3.72	20.0
2	California Dairies	17,700	589	30.05	9.3
3	Land 'O Lakes	12,706	2,965	4.29	6.7
4	NW Dairy Assoc.	7,900	532	14.85	4.2
5	Dairylea Cooperative	5,914	2,264	2.61	3.1
6	AMPI (North Central)	5,800	3,500	1.66	3.1
7	Family Dairies	5,751	3,563	1.61	3.0
8	Foremost Farms	4,990	2,356	2.12	2.6
9	Manitowoc Milk Prod.	4,857	2,945	1.65	2.6
10	Select Milk Producers	4,629	79	58.59	2.4
	All Cooperatives	156,399	43,448*	3.47*	82.3

Note: * values for top 50 dairy cooperatives

Concentration in the Marketing of Farm Milk

Share of Milk Delivered by Four Largest Dairy Coops

Market Area	Dec '97	Dec '98	Dec '99
Atlanta	61.5	69.9	71.5
Boston	68.5	70.4	69.6
Charlotte	77.6	79.5	85.2
Cincinnati	61.6	63.9	63.8
Dallas	96.5	98.2	97.1
Milwaukee	63.1	62.7	64.7
Minneapolis	59.3	57.0	63.5
New Orleans	61.5	69.9	71.5
Salt Lake City	85.4	89.0	93.2
Seattle	84.8	84.2	85.0
Washington D.C.	77.1	77.0	76.8
11 Mkt Average	72.4	74.7	76.5

U.S. CR4
1997: 35.8
2002: 40.2
2008: 40.1

Source: 2001, GAO

Concentration in Dairy Manufacturing

- *Dairy Industry: Information on Milk Prices and Changing Market Structure*
  - GAO-01-561, June 2001

- Dairy processing firms have become dominant wholesale level players
  - Similar to milk marketing business strategy
    - ✓ Acquire regional dairy processing plants

Concentration in Dairy Manufacturing

- An argument has been made that another reason for processing consolidation is the response to retail level consolidation
  - Dean Foods proposed 2009 purchase of 2 fluid bottling plants from Foremost Farms in WI

    "As food retailers consolidate to gain market share and operating efficiencies, Foremost Farms has been challenged to efficiently supply customers who have a significant regional or national presence and prefer to have a sole supplier."--- Dave Fuhrmann, President, Foremost Farms, 4/7/2009

Concentration in Dairy Manufacturing

- Dairy processing firms have become dominant wholesale level players
  - Suiza Foods and Dean Foods purchase more than 50 dairy processors over the 1997-2000 period
  - Importance of Dean Foods and Suiza prior to merger

	Suiza		Dean Foods	
	Mil $	Rank	Mil $	Rank
1995	379	40	1,400	5
1996	469	32	1,600	2
1997	1,720	4	2,100	3
1998	2,820	3	3,000	2
1999	4,237	2	3,200	3
2000	5,365	1	3,255	3

Concentration in Dairy Manufacturing

- April 2001, Suiza acquires Dean Foods
  - Combined company processes 33% of U.S. fluid milk
  - Combined company keeps Dean's name and headquartered in Dallas
- Dean Foods recent major acquisitions

Year	Company Acquired
2002	White Wave, Inc.
2004	Horizon Organic Holding Co.
2009	Alpro division of Vandemoortele N.V.
2009	Foremost Farms 2 Bottling Plants

Concentration in Dairy Manufacturing

- National concentration ratios in dairy processing

Year	CR2	CR4	CR10	CR20
1995	14.6	21.8	36.9	55.0
1999	15.9	26.8	44.9	64.5
2001	17.4	28.5	46.5	66.1
2008	18.9	28.2	46.1	67.3

Source: Dairy Foods, Top 100, various issues.

- National values hide concentration within local areas and commodities

Concentration in Dairy Manufacturing

Percentage of Fluid Milk Marketed by Four Largest Processors

Area	Dec '97	Dec '98	Dec '99	Area	Dec '97	Dec '98	Dec '99
Atlanta	38.5	47.8	52.4	Milwaukee	81.6	80.3	75.9
Boston	66.2	85.4	88.1	Minneapolis.	84.0	89.3	83.4
Charlotte	64.4	74.7	73.9	New Orleans	38.5	47.8	52.4
Cincinnati	66.8	79.3	81.9	Phoenix	90.3	87.6	97.4
Dallas	85.0	84.3	79.4	S.L. City	87.7	90.4	92.5
Denver	69.3	68.1	66.9	Seattle	59.0	63.4	63.3
Miami	89.4	96.5	96.3	Wash. D.C.	45.7	43.7	54.5
				14-Market Average	69.0	74.2	75.6

Source: 2001, GAO

1999 U.S. CR4: 26.8

Concentration in Dairy Manufacturing

- *Antitrust suit filed against DFA, Dean Foods* -- Cheese Market News, October 9, 2009
  - Private class action lawsuit
  - Dean and Hood bottle 90% of fluid milk in the Northeast
  - Suite alleges unlawful agreements between Dean, DFA, Dairy Marketing Services and Hood to reduce farm prices

- *DFA says recent allegations are without basis* -- Cheese Market News, October 16, 2009
  - Background story can be found at: http://future.aae.wisc.edu/publications/dfa_suit.pdf

Contact Information

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