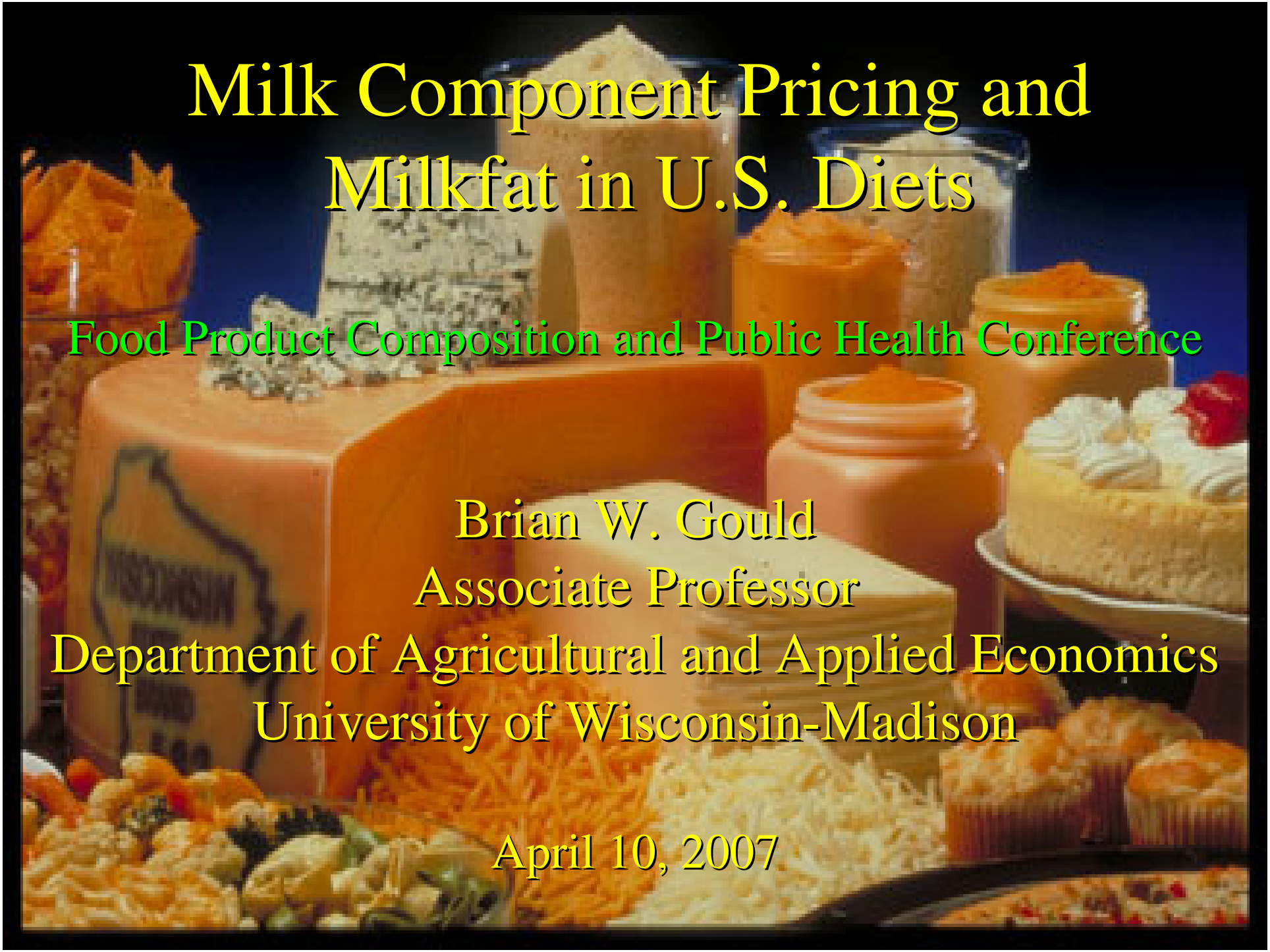

Milk Component Pricing and Milkfat in U.S. Diets

Food Product Composition and Public Health Conference

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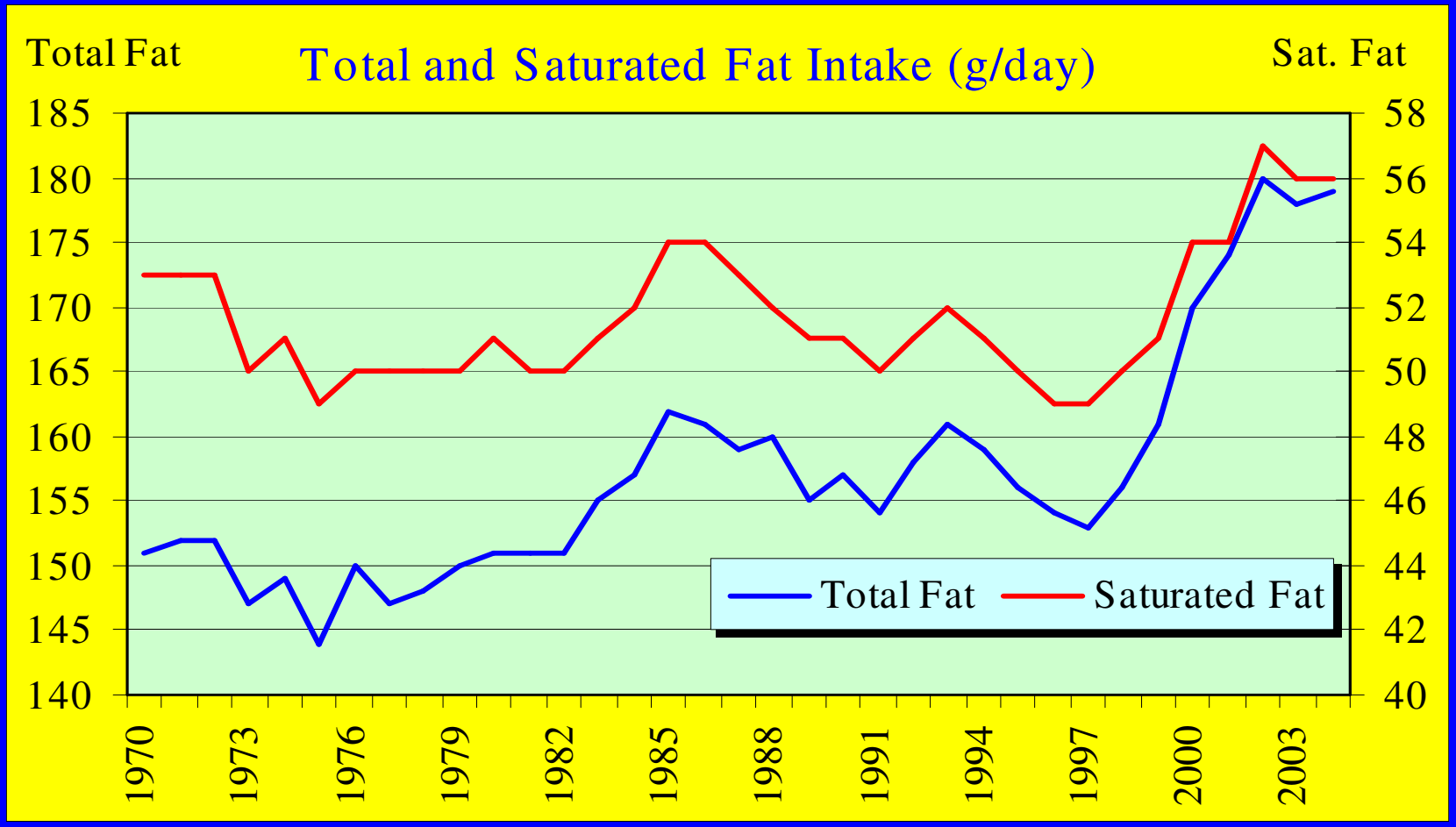
April 10, 2007

Presentation Outline

- Role of Dairy Products as a Source of Dietary Fat
  - Overview of dairy product consumption patterns
  - Importance of specific dairy products
- The Pricing of Milk Under the Federal Order System
  - Pre-1995
  - Federal Order Reform of 2000
- Questions to Think About During Presentation
  - Would reduced demand for fat be reflected in farm gate prices?
  - How does the current pricing system provide appropriate market incentives for fat production?

U.S. Dietary Fat Intake

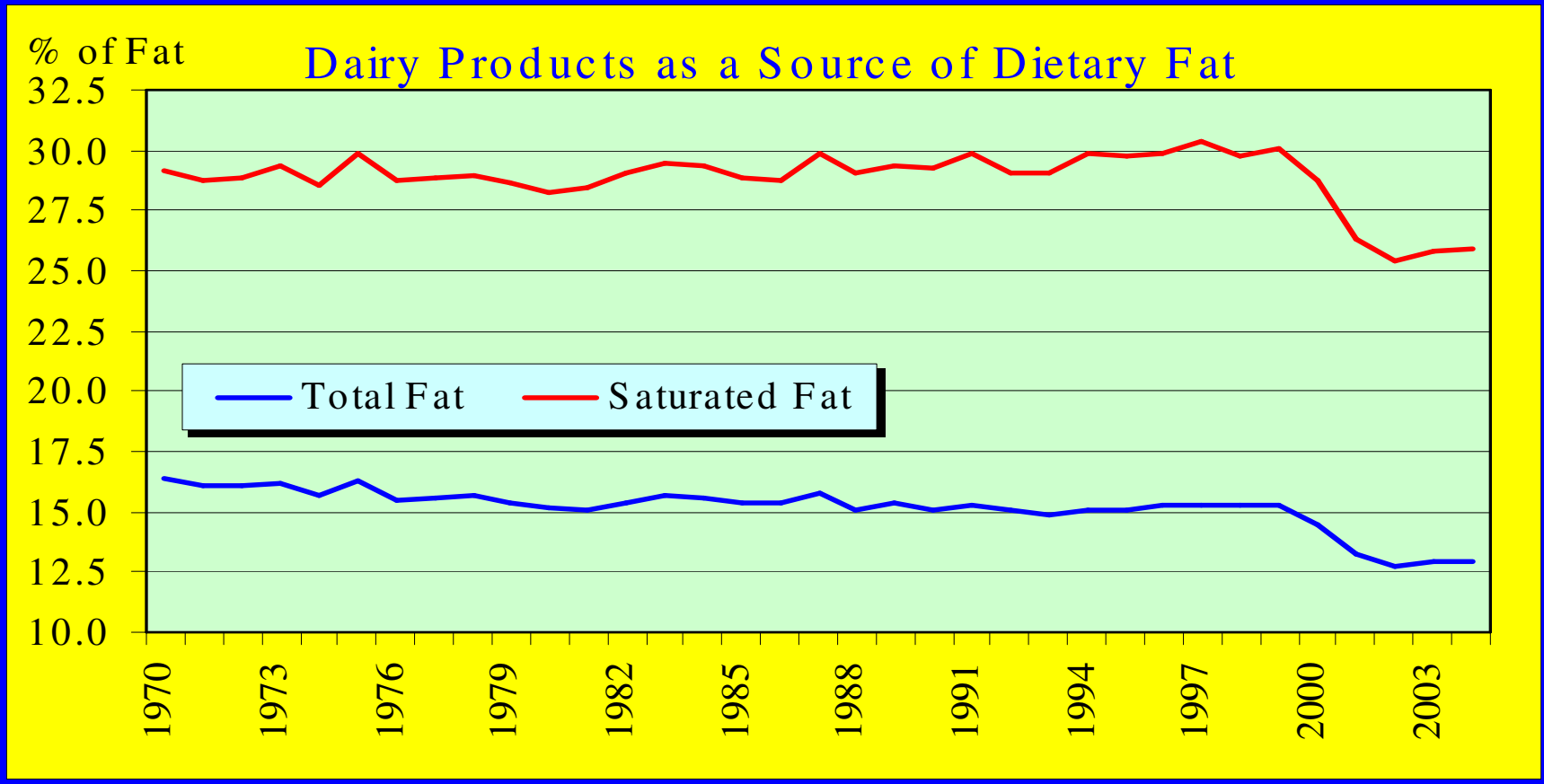
- Dietary fat intake increasing in the U.S.



Source: USDA, CNPP, Nutrient Content of U.S. Food Supply Database, 1909-2004 (Preliminary Version)

Dairy Products as a Source of Dietary Fat

- Dairy products are a significant source of total fat (≈15%) and saturated fat (≈ 29%)



Source: USDA, CNPP, Nutrient Content of U.S. Food Supply Database, 1909-2004 (Preliminary Version)

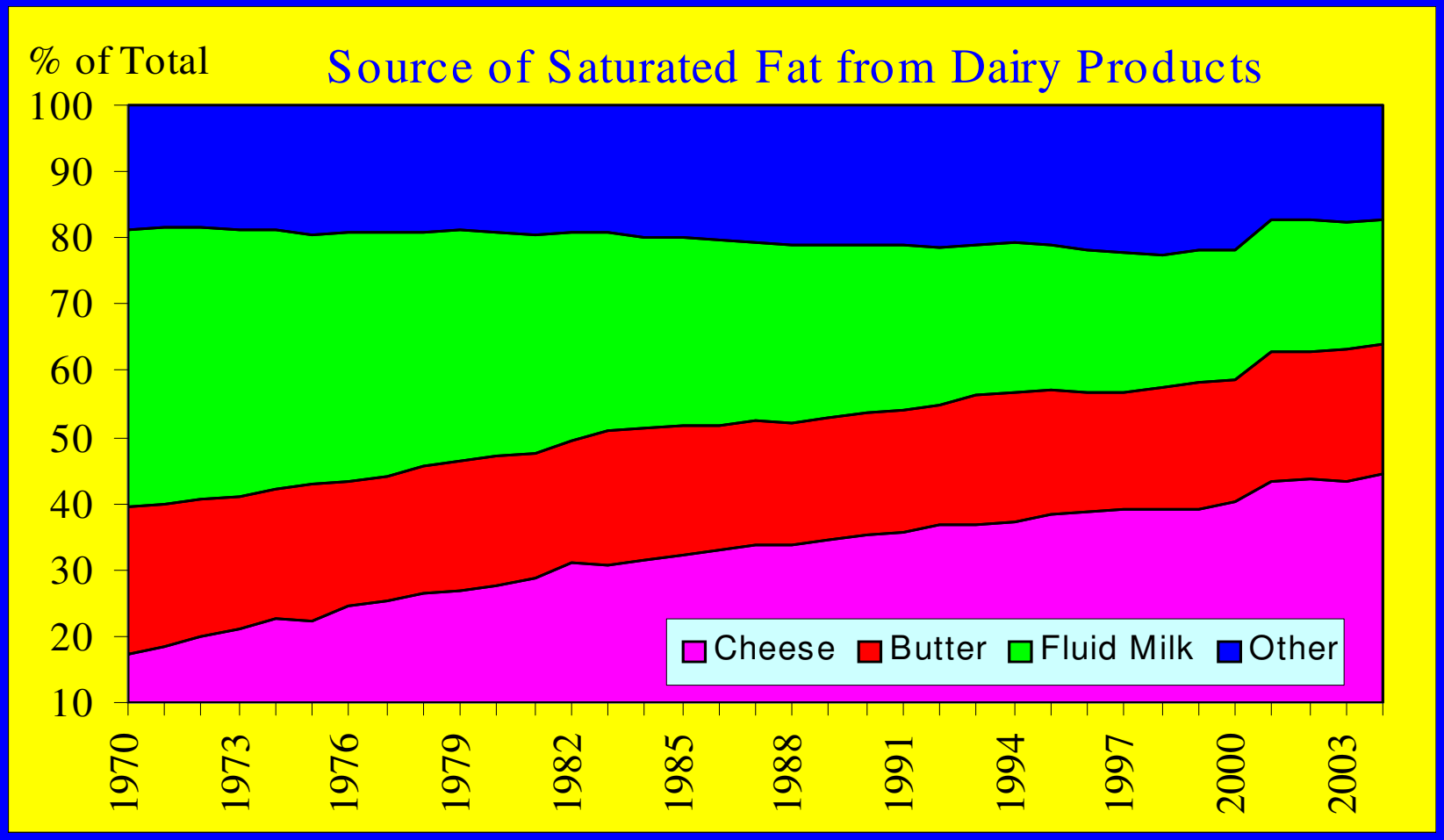
Dairy Products as a Source of Dietary Fat

Year	Group	Total Fat (%)	Saturated (%)
1970	Dairy	16.4	29.5
	Total Meat	34.8	37.8
	Fats/Oils	39.7	26.9
1987	Dairy	15.8	29.9
	Total Meat	27.5	30.4
	Fats/Oils	46.7	32.8
2004	Dairy	12.9	25.9
	Total Meat	20.3	22.5
	Fats/Oils	56.4	44.0

Source: USDA, CNPP, Nutrient Content of U.S. Food Supply Database, 1909-2004 (Preliminary Version)

Dairy Products as a Source of Dietary Fat

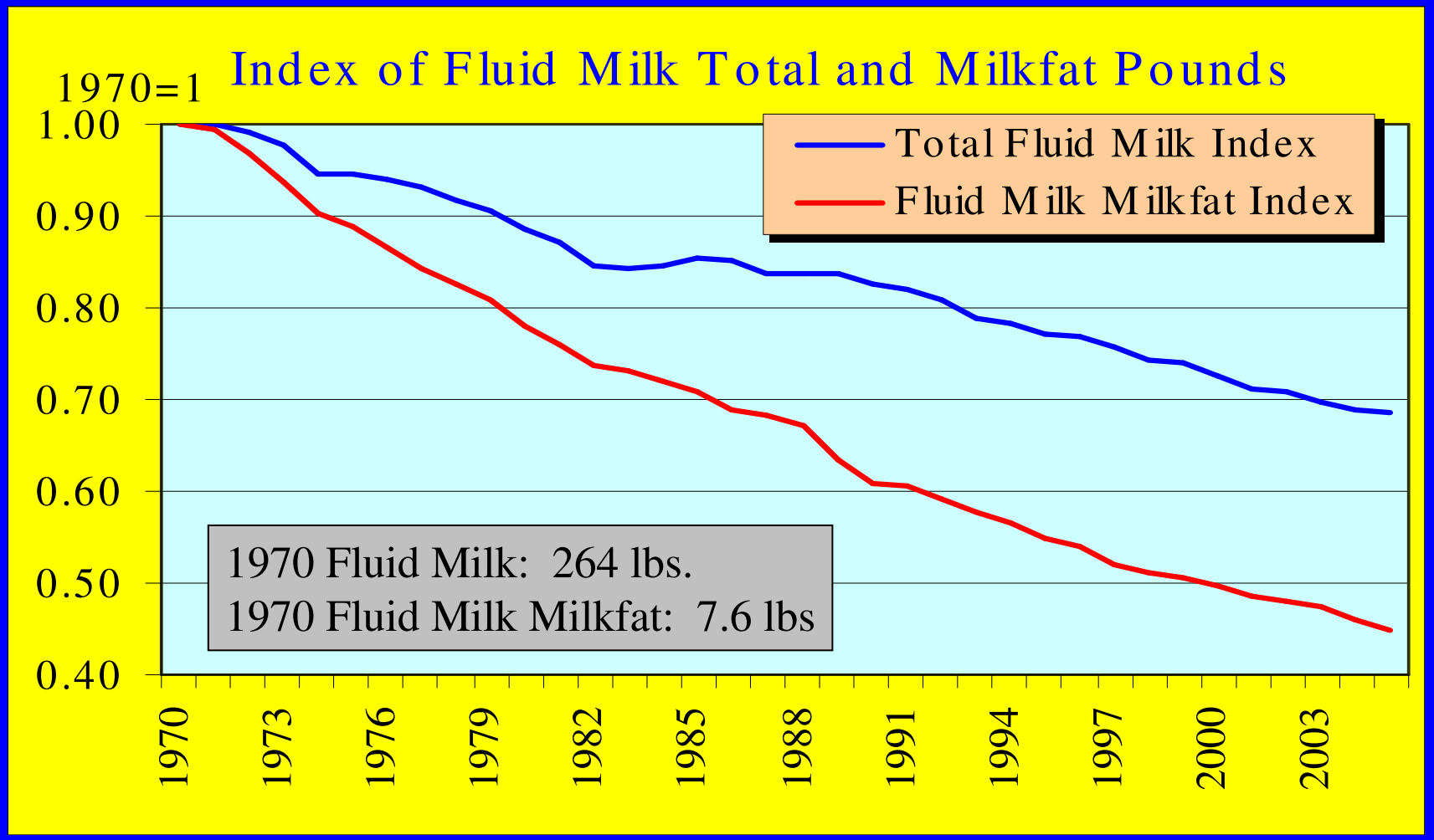
- Contribution of dairy products has changed



Source: USDA, CNPP, Nutrient Content of U.S. Food Supply Database, 1909-2004 (Preliminary Version)

Dairy Product Consumption Trends

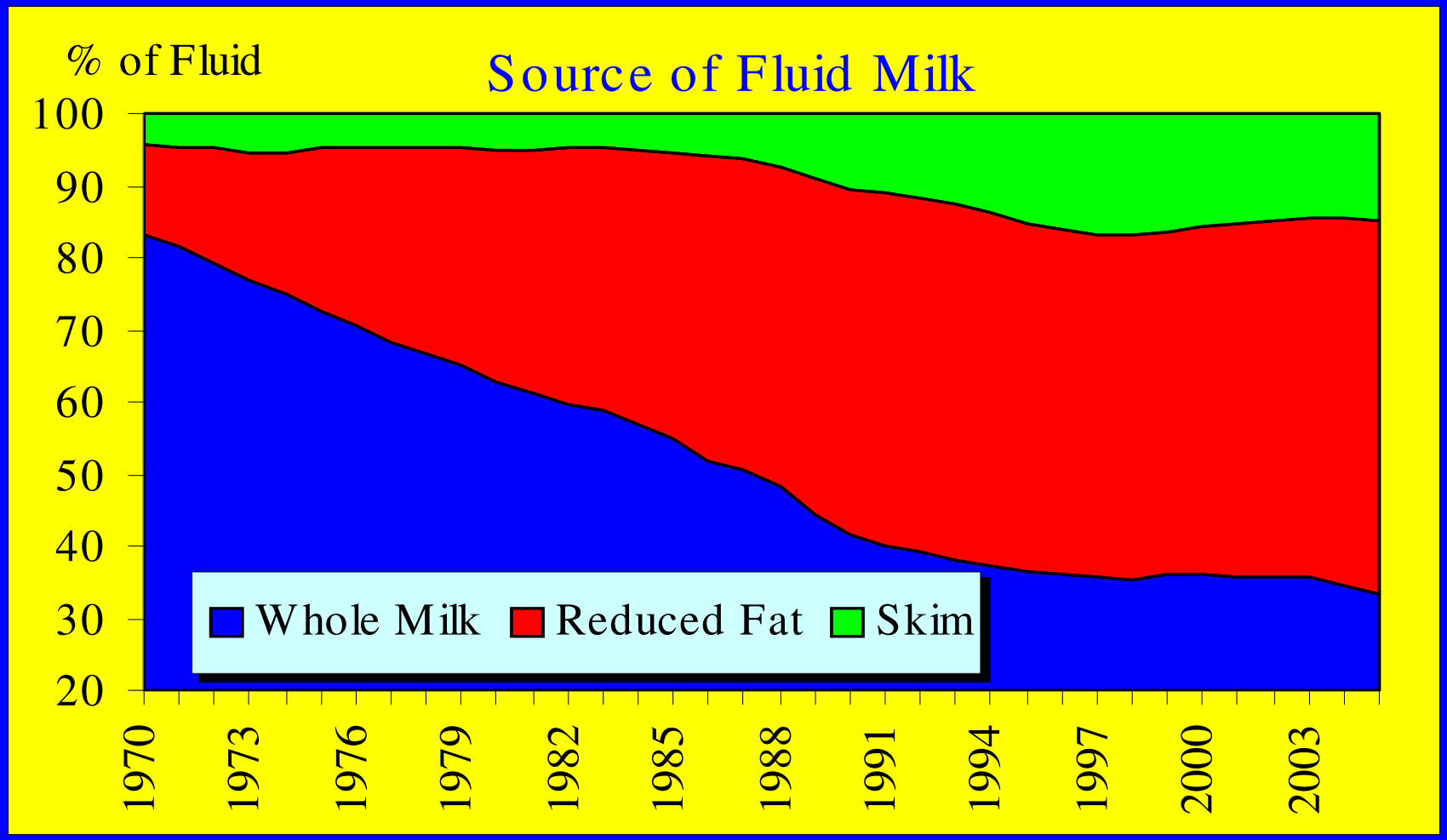
- The U.S. consumer is purchasing less fluid milk



Source: USDA, ERS, Food Consumption Database

Dairy Product Consumption Trends

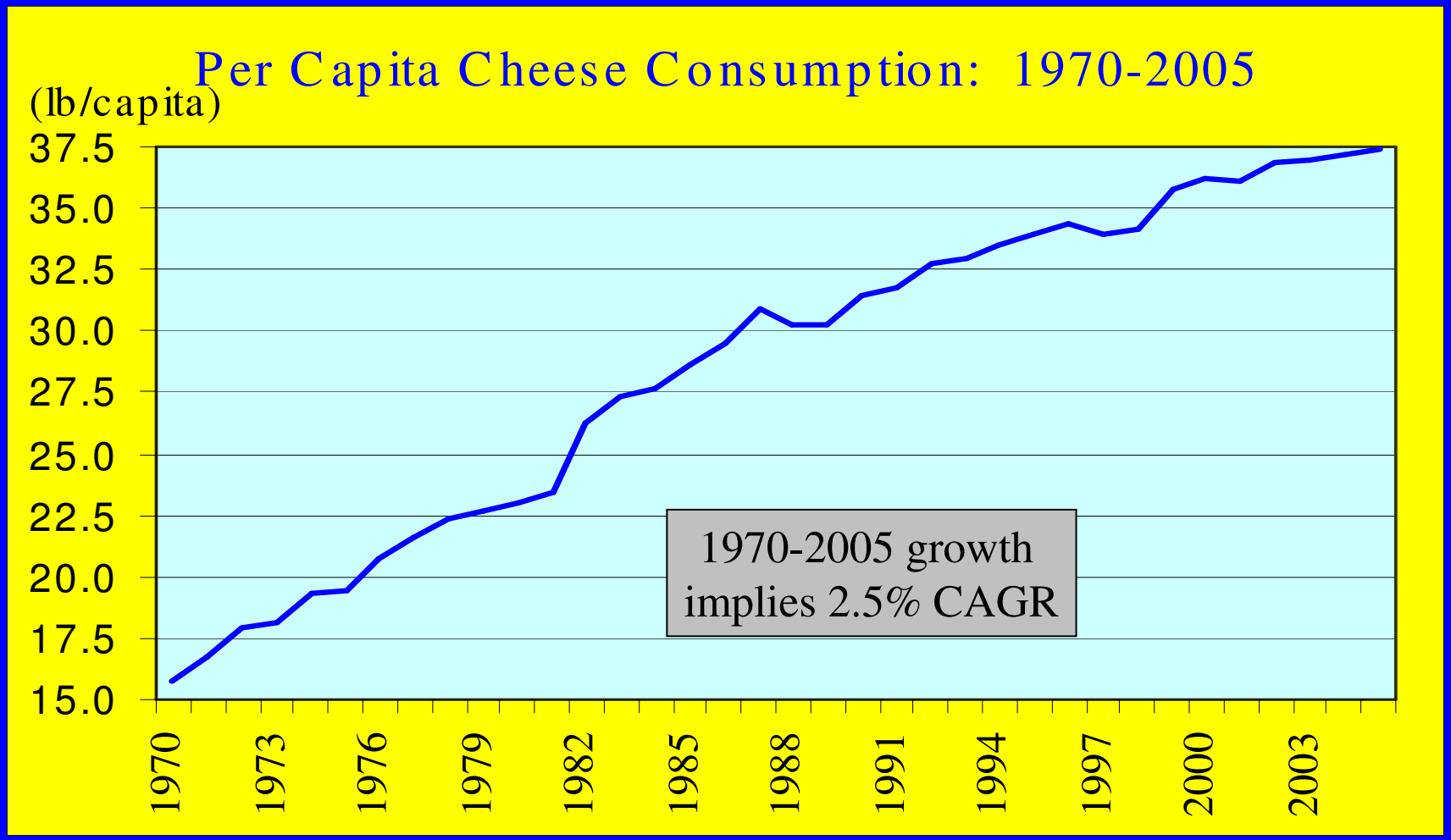
- The U.S. consumer is purchasing less fluid milk



Source: USDA, ERS, Food Consumption Database

Dairy Product Consumption Trends

- The U.S. consumer is purchasing more cheese



Source: USDA, ERS, Food Consumption Database

Dairy Product Consumption Trends

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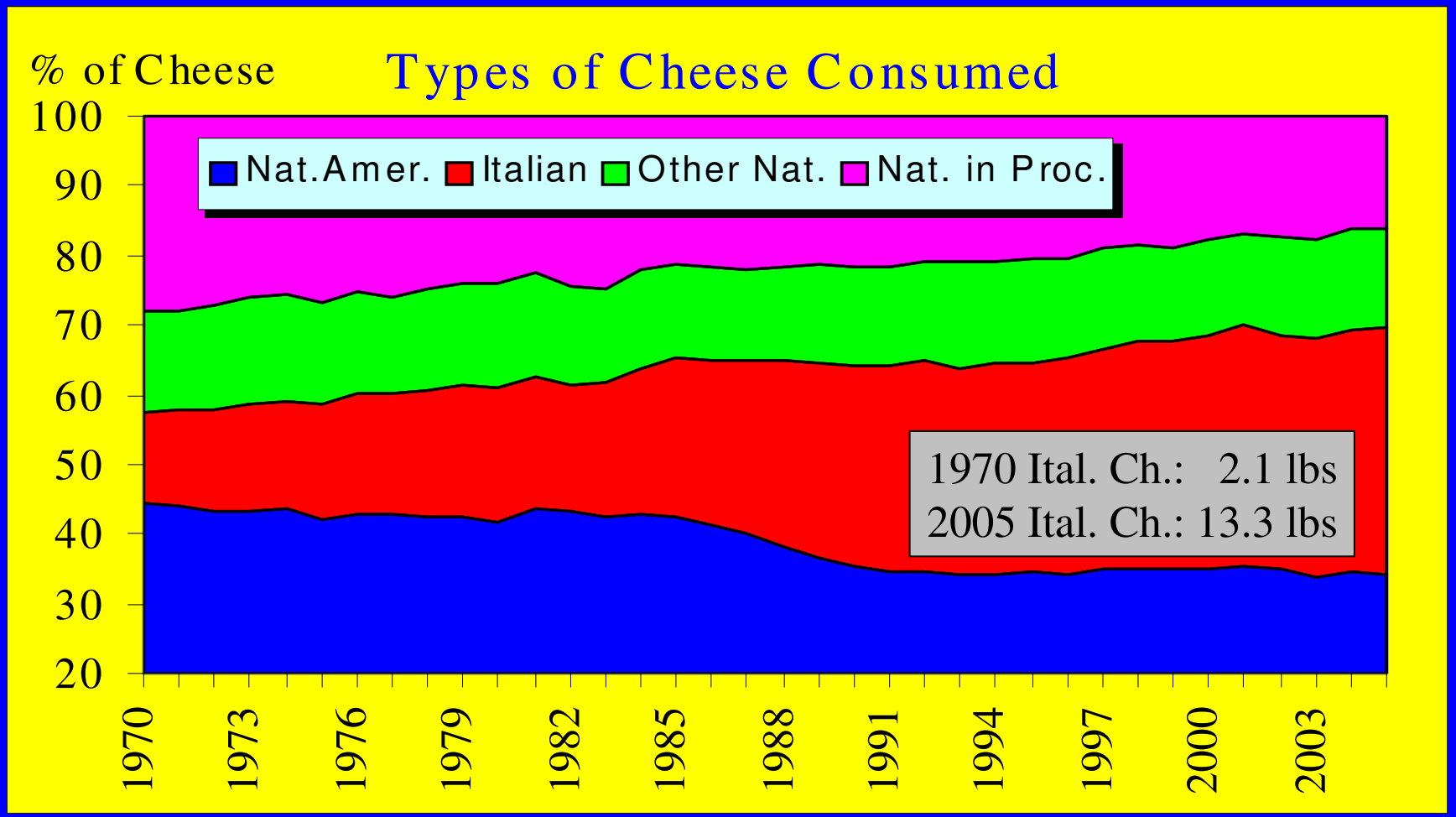
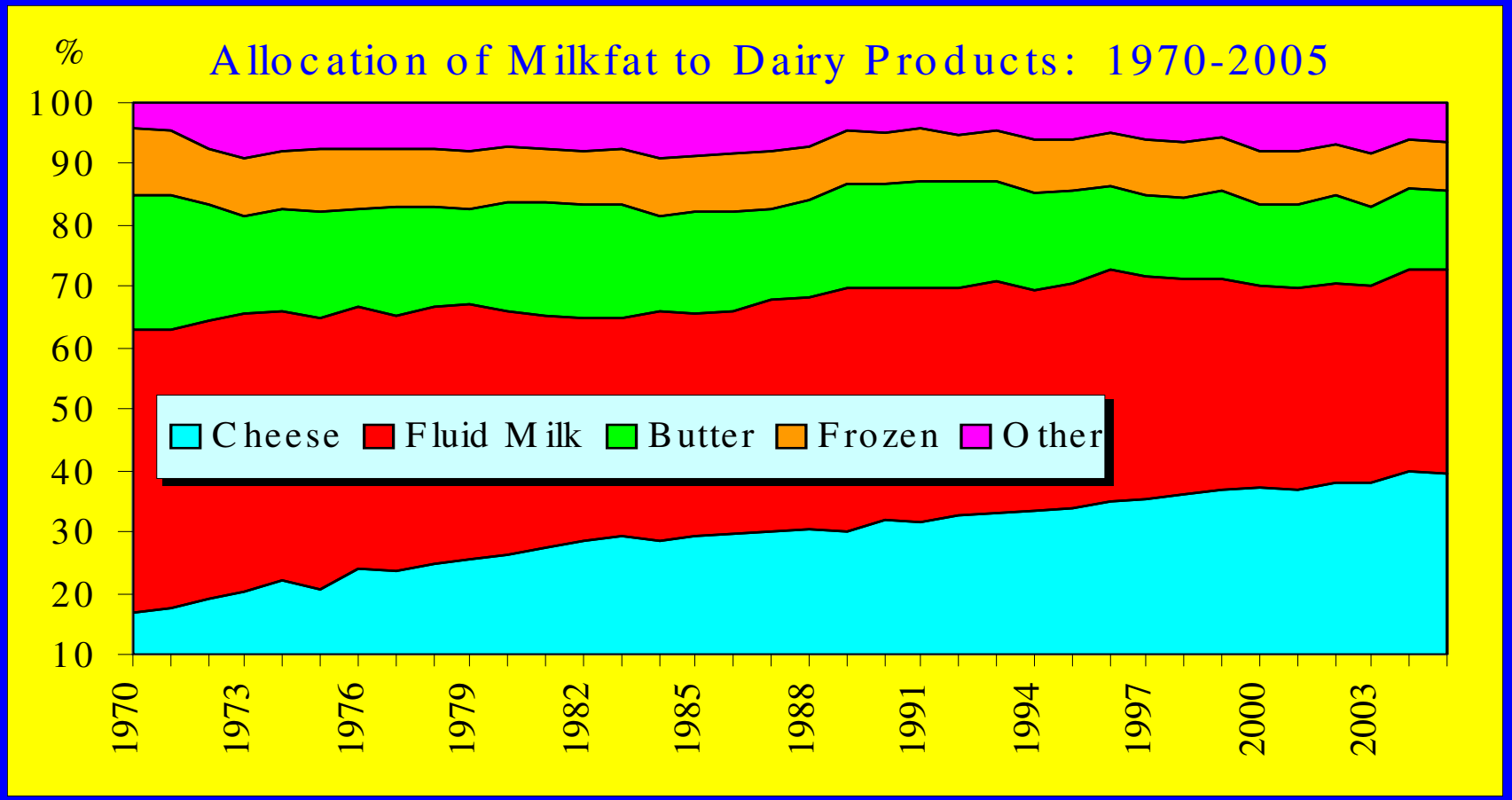


Source: USDA, ERS, Food Consumption Database

Dairy Product Consumption Trends

- The above trends in dairy product consumption imply a change he allocation of the U.S. supply of milkfat



Source: IDFA, Milk Facts, Various Issues

The Valuation of Milk Components

- We have reviewed in general terms
  - The consumption of dairy products in the U.S.
  - The significance of these products in meeting U.S. demand for dietary fat
- How can consumer valuation for milk and its components (fat, protein, other solids) be transmitted to farm level milk prices?
- For a majority of the milk produced in the U.S., the pricing of farm milk takes place under Federal and State marketing orders with administered milk prices

The Valuation of Milk Components

- In 2006, California and states comprising Federal Milk Marketing Order (FMMO) system accounted for approximately 85% of U.S. milk
  - California accounts for more than 20%
- The following concerned solely with valuation of milk under FMMO system
  - Easily extended to the California situation
- The FMMO system enabled by Agricultural Marketing Agreement Act of 1937
  - Not mandatory
  - Dairy producers request and approve *via* referenda

The Valuation of Milk Components

- Main objectives:
  - Assure consumers adequate beverage (fluid) milk supply at reasonable price
    - ✓ Promote producer price stability
    - ✓ Provide sufficient producer prices to guarantee adequate Grade A milk supply
- Objectives achieved via a number of mechanisms one of which is *Classified pricing*
  - *Minimum* pay prices established for milk (and components)
  - Final farm price varies according to products manufactured from this milk

The Valuation of Milk Components

- Prior to 1995 the value of manufacturing grade milk (grade B), obtained by surveying dairy processing plants in Minnesota and Wisconsin
  - Minnesota-Wisconsin (*M-W*) milk price
  - Competitive market price
  - Thought to reflect supply/demand conditions for milk in the U.S.

The Valuation of Milk Components

- June, 1995 a new Basic Formula Price (BFP) replaced the M-W
  - Wholesale dairy product prices determined gross milk value via formula
  - Based on value of manufactured products and assumed product yields from milk
    - 40 lb. Block Cheddar
    - NFDM
    - Buttermilk powder
    - Grade AA/A butter

- Starting in April, 2000 a major change in method used to value milk under the FMMO system

The Valuation of Milk Components

- Under the current system (post-2000), four milk classes
  - Class I: beverage products
  - Class II: soft manufactured products (*e.g.*, ice cream, cottage cheese and creams)
  - Class III: hard cheese and cream cheeses
  - Class IV: butter and dry milk products (*e.g.*, non-fat dry milk)

- Under Federal pricing system, formulas used to set monthly *minimum* pay prices for each class of milk
  - Proprietary plants are required to pay
  - Coops are exempt but pay at-least the minimum

The Valuation of Milk Components

- Class specific minimum prices
  - Based on product formulas relating milk component values (*e.g.*, fat, protein, solids-not-fat and other solids) to:
    - ✓ Wholesale dairy product prices
    - ✓ Assumed Product yield
    - ✓ Assumed manufacturing (non-milk) costs (i.e., make allowances)

- Minimum price for a specific milk class: multiply component volumes/cwt of milk at standard composition by derived component values

The Valuation of Milk Components

- Farm milk assumptions used in pricing formulas:
  - *Farm Milk*:
    - ✓3.5% fat
    - ✓3.1% of skim is *true protein* (3.3% total protein)
      → 2.9915% of farm milk (3.1*.965)
    - ✓82.2% of true protein is casein
    - ✓5.9% other solids (8.685% total non-fat solids)

- There is significant variability in farm milk composition across breeds, farming practices and farm size
  - Not a problem as milk value determined by the value of components (e.g., $/lb milkfat, $/lb protein)

The Valuation of Milk Components

- Product assumptions used in pricing formulas:
  - *Cheddar Cheese*
    - ✓90.0% fat retention, 95.9% casein retention
    - ✓38% moisture
    - ✓*Van Slyke* cheese yield formula
    - ✓"Gross" cheese yield of 9.685 lb/cwt (9.662 lb/cwt net after farm-plant losses)
  - *Dry Whey*: 1.03 lbs. of dry whey/lb of other solids
  - *Butter*
    - ✓80% BF
    - ✓1.20 lbs of butter/lb of BF (after losses)
  - *NFDM*: 0.99 lbs. NFDM/lb. non-fat solids

The Valuation of Milk Components

- As noted above, there are 4 classes of milk
  - I would like to walk you through the determination of the valuation of one class, Class III
  - In 2005, Class III products accounted for 39.6% of total supply of U.S. milkfat
  - Can use this a pattern for other classes
    - ✓Different commodities used
    - ✓Different product yields
    - ✓Different make allowances

The Valuation of Milk Components

- Class III: Cream Cheese and Hard Cheeses
  - Based on Cheese, Butter and Dry Whey product prices

(1) Class III Butterfat Price/lb =
(NASS Monthly AA butter price – 0.1202) X 1.20

Make Allowance

National Agric. Statistical Service

Lbs. Butter Per Lb Milk fat

(2) Other Solids Price/Lb. =
(NASS Monthly Dry Whey Price – 0.1956) x 1.03

Make Allowance

Lbs. OS Per Lb OS

The above cheese price refers to 40 lb Cheddar blocks and 500 lb barrels

The Valuation of Milk Components

(3) Protein Price/Lb. =

(NASS Monthly Cheese Price – 0.1682) x 1.383 +

{[(NASS Monthly Cheese Price – 0.1682) x 1.572]

– 0.9 x Butterfat Price} x 1.17

Protein-Based Cheese Yield

Fat Retention

Fat-Protein Ratio

Make Allowance

Fat-Based Yield

(4) Class III Skim Milk Price = 3.1 x Protein Price +

5.9 x Other Solids Price

Assumed Composition/Cwt

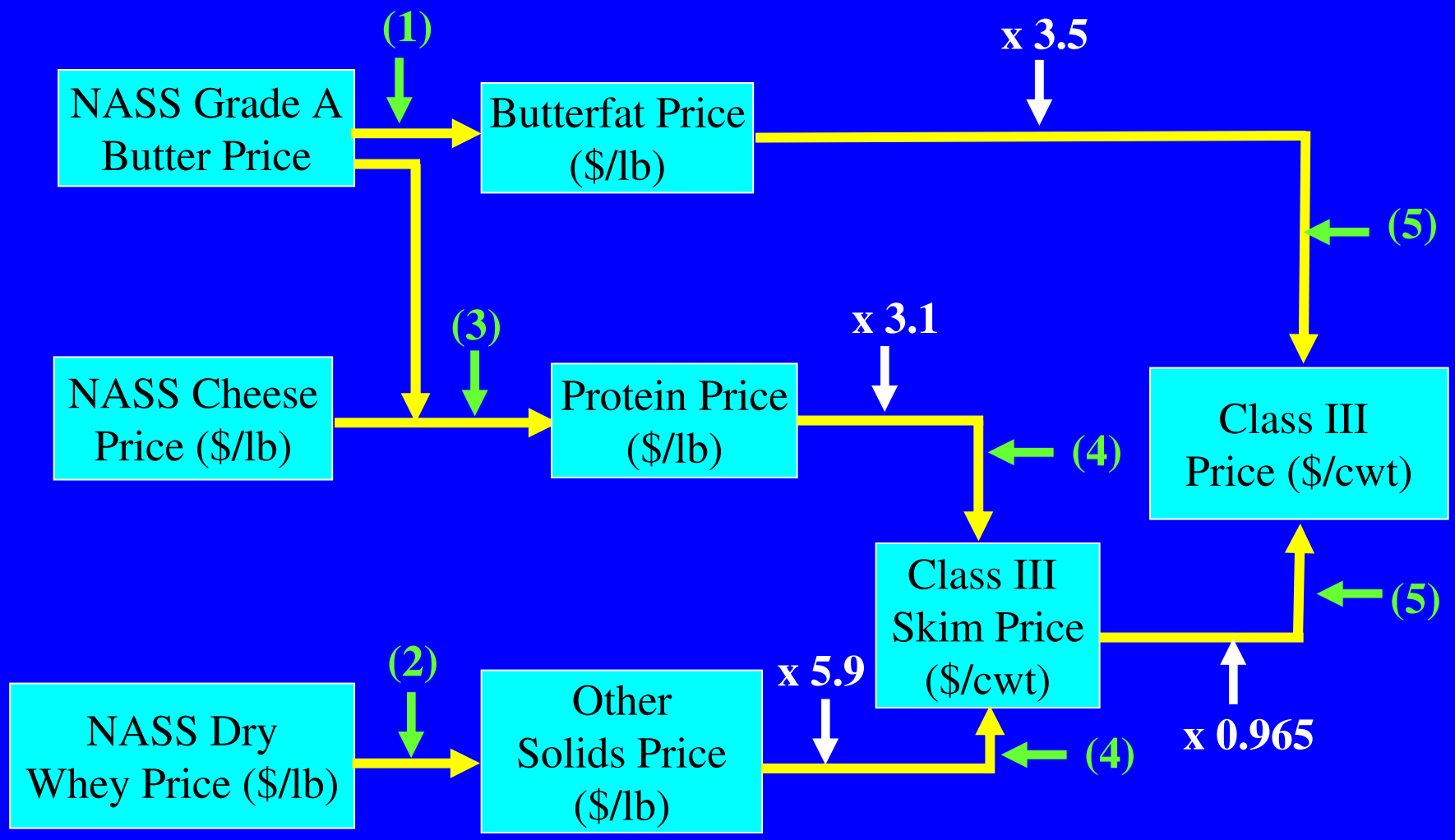
Lbs. Fat/Cwt

(5) Class III Price = 3.5 x Class III Butterfat Price +

0.965 x Class III Skim Milk Price

% Skim/100

The Valuation of Milk Components



Note: The numbers in parentheses identify product price formula

The Valuation of Milk Components

- After Substituting (1), (2), (3), and (4) into (5) results in (6) Class III Price =

  9.64 x NASS Cheese Price
  + 0.42 x NASS Butter Price
  + 5.86 x NASS Dry Whey Price
  - 2.82

  Combined Make Allowance

- Similarly for Class IV we have:

  4.20 x NASS Butter Price
  + 8.60 NASS NFDM Price – 1.85

  Combined Make Allowance

The Valuation of Milk Components

Impact of a 10¢ Increase in Product Prices On Class III Milk Price (¢/cwt)

Milk Type	Cheese	Butter	Whey	NFDM
Class III	96.4	4.2	58.6	-----
Class IV	-----	42.0	-----	86.0

- To place this in perspective:
  - 2006 average FMMO Class III price: $11.89/cwt
    2006 average FMMO Class IV price: $11.06/cwt
  - 2006 NASS commodity prices:
    - Cheese: $1.25/lb
    - Butter: $1.22/lb
    - Dry Whey: $0.33/lb
    - NFDM: $0.88/lb

The Valuation of Milk Components

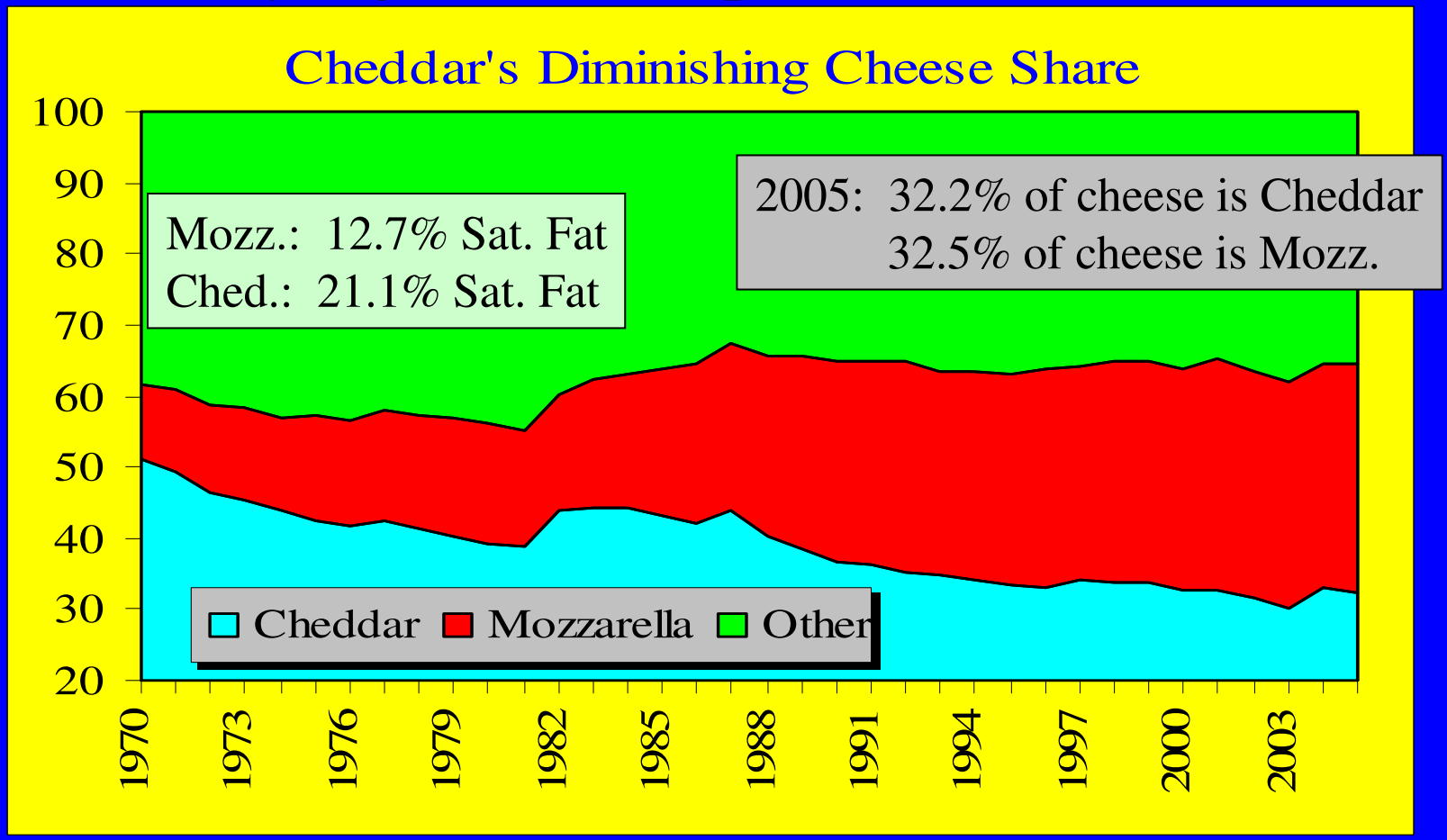
- Now lets get back to the valuation of milkfat (and other milk components) with administered prices
  - It should be recognized that under the FMMO system values are minimum values
    - ✓ Over-order premiums are allowed
  - Dairy products operate within a national (and international market for dry products)
    - ✓ Regions are at a disadvantage if over-premiums offered only locally

Implications for Market Incentives

- Now lets get back to the valuation of milkfat (and other milk components) when one has administered prices
  - Current system is very limited in terms of how consumer preferences for milk components translated to milk valuation
    - ✓ Only a few commodities used in formulas
    - ✓ Administratively difficult to change to meet changing consumer demands
  - Changes in Milkfat valuation
    - ✓ Direct impact via butter price
    - ✓ Indirect impact via cheddar cheese production

Implications for Market Incentives

- Cheddar less important as source of cheese consumption
  - Relatively high in fat compared to Mozzarella



Source: USDA, ERS, Food Consumption Database

Implications for Market Incentives

Type of Cheese Product	Year of Introduction					
	2001	2002	2003	2004	2005	2006
	Number of Brands Introduced					
Total Cheese	257	343	286	350	369	454
Low/No/Reduced Fat	25	7	11	37	50	27
Low/No/Reduced Transfat	0	0	0	0	9	10

Source: Mintel Group, Global New Products Database.

Implications for Market Incentives

Sales of Reduced Fat Versions of Full Fat Cheese Varieties

Cheese Type	2001	2002	2003	2004	2005	2006
Total Cheese	2,119	2,131	2,217	2,249	2,227	2,248
Non-Imitation Cheese	2,073	2,088	2,173	2,204	2,186	2,214
Reduced Fat Varieties	8.8%	8.6%	8.1%	8.4%	8.7%	9.0%
Fat Free	2.5%	2.3%	2.1%	2.1%	1.9%	1.9%
Light/Reduced	4.7%	4.7%	4.5%	4.8%	5.2%	5.7%
Low Fat	1.6%	1.6%	1.5%	1.5%	1.6%	1.5%
Regular Fat	91.2%	91.4%	91.9%	91.6%	91.3%	91.0%

Data for reduced fat versions of full fat varieties. Sales are in Million lbs. %'s are percent of non-imitation.

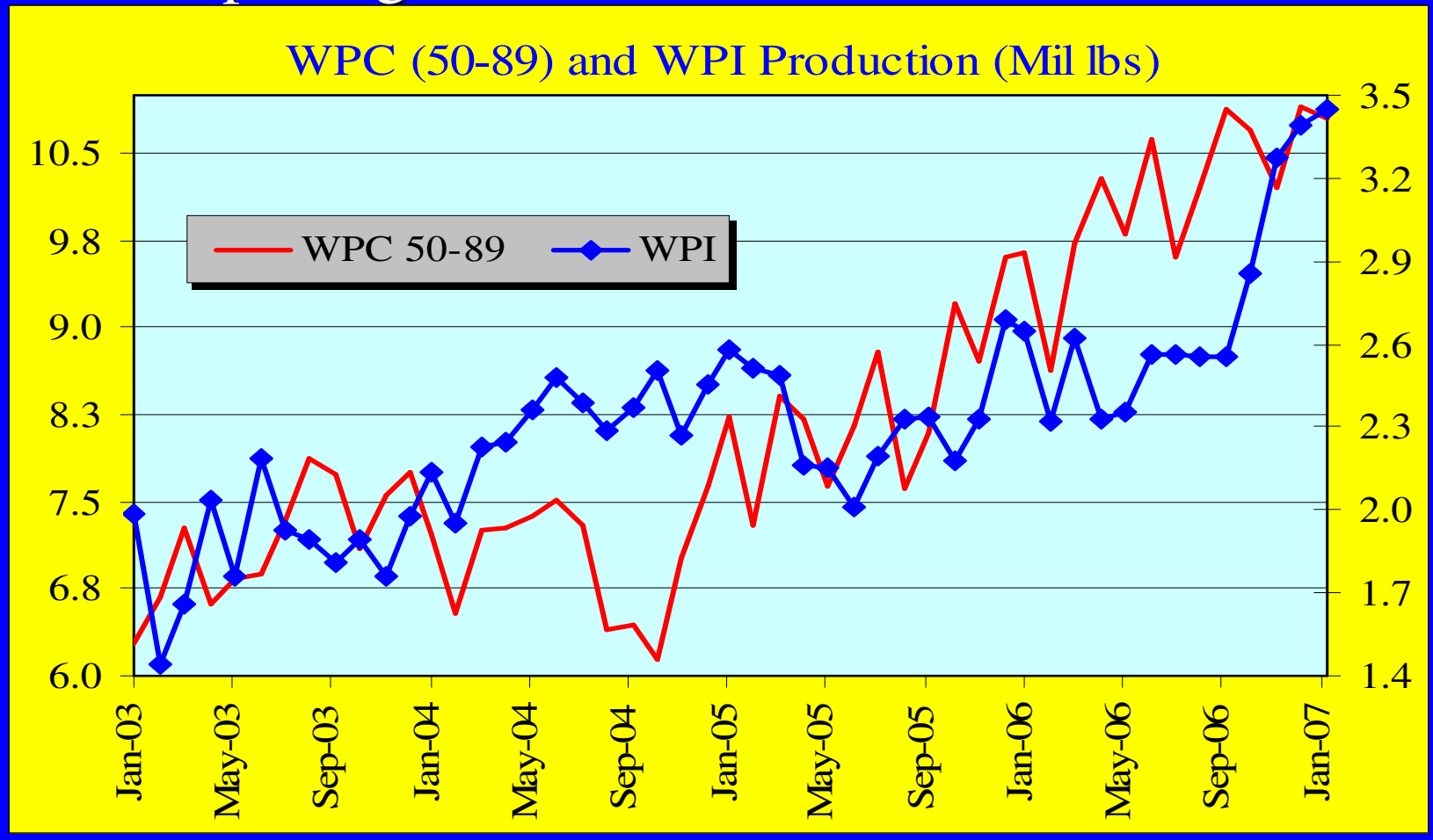
Source: Information Resources, Inc. 2007

Implications for Market Incentives

- New dairy products beings developed both for direct consumption and as an ingredient
  - Example: ↑ use of whey and its derivatives
    - ✓ Until recently, whey a by-product with a negative value from cheese production
    - ✓ ↑ demand for use in sports nutrition and dietary supplements, infant formula and functional foods
  - Whey protein concentrates (WPC) and isolates (WPI) and other whey protein products >20% annual growth rates
  - Only method for these to enter formulas is via dried whey valuation

Implications for Market Incentives

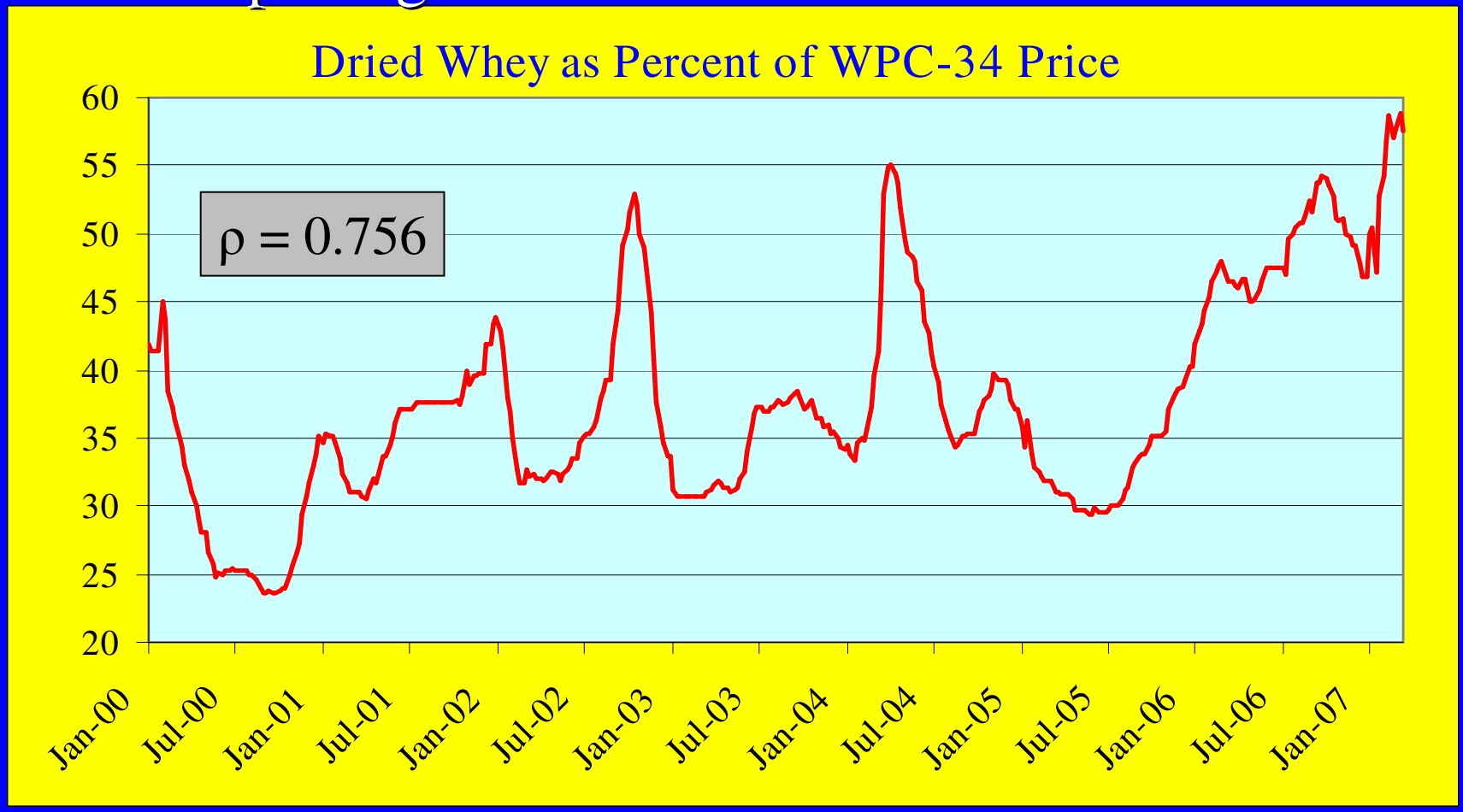
- Increasingly important markets not directly accounted for within pricing formulas



Source: USDA, Dairy Products Report, Various Issues

Implications for Market Incentives

- Increasingly important markets not directly accounted for within pricing formulas



Source: Derived from data contained in USDA, AMS, Dairy Market News

Implications for Market Incentives

- Would reduced demand for fat be reflected in farm gate prices
  - Direct effect: equilibrium price for butter
  - Indirect effect: equilibrium price for full-fat cheddar
- How does the current pricing system provide appropriate market incentives for fat production
  - Does classified pricing based on limited commodities damper innovation?
    - ✓ Current example of increased value of whey
  - Would increasing commodities associated with formulation solve problem or is it a moving target?
    - ✓ Should we eliminate formulas altogether?


Thanks for Your Time
Any Questions?