

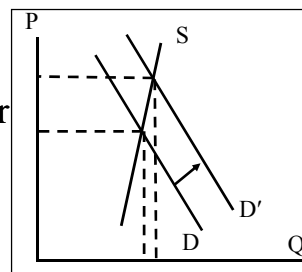
# An Overview of U.S. Fluid Milk Cash and Futures Markets

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## Dairy Price Risk Management

- A Relatively New Phenomenon
  - 1950-1990: Federal Dairy Price Support Program Provided a Relatively High Safety Net to Milk Prices
- Today, Milk Prices are More Volatile than Most Other Agricultural Commodities
  - Milk is Perishable
  - Inelastic Supply and Demand for Significant Components of Dairy Market



## Dairy Price Risk Management



## What is Unique About Milk Production?

- Unlike Grain and Livestock Producers
  - A Dairy Farmer Produces Milk
    - ✓ Every Day
    - ✓ 365 Days/Year
  - The Dairy Farmer Produces a Product with a Short Shelf Life
- Wide Variety of Technologies Used
  - Grazers versus Feedlot Type of Operations
  - Wide Range of Farm Sizes

## What is Unique About Milk Production?

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### Distribution of Wisconsin Dairy Farms by Size

	Herds	% of Herds	% of Production	Average Yield (lbs)
1-29	1,900	13.2	1.5	11,586
30-49	3,600	25.0	10.0	16,092
50-99	6,100	42.4	29.0	17,778
100-199	1,800	12.5	18.5	19,310
200-499	750	5.2	19.0	19,769
500+	250	1.7	22.0	24,750
Total	14,400	100.0	100.0	19,305

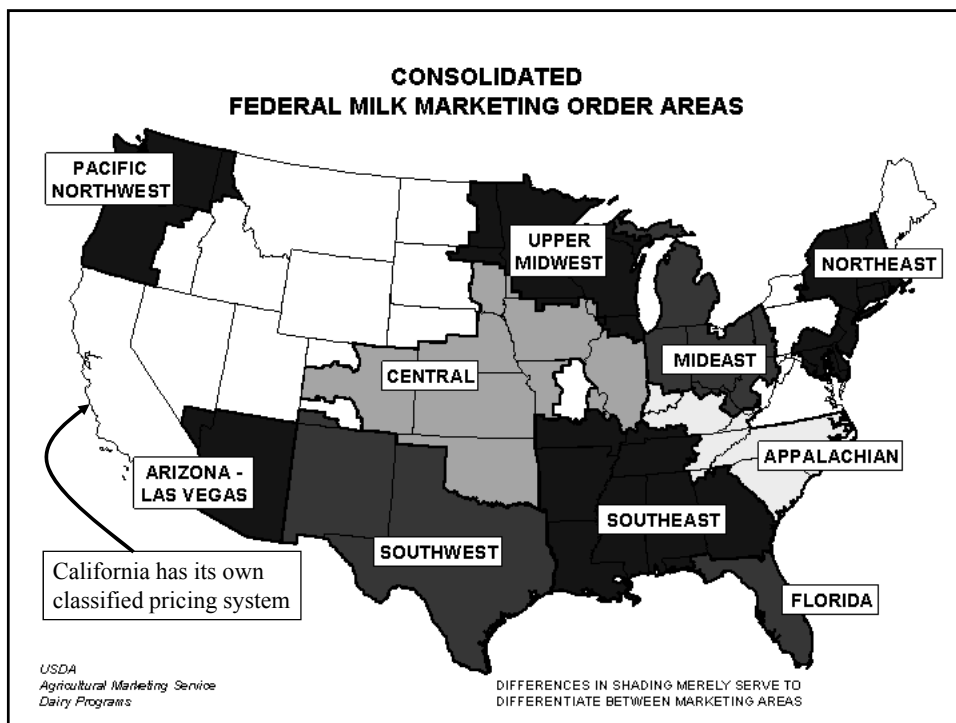
## What is Unique About the Cash Market for Milk

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- Minimum Cash Price for Milk Determined Via Predefined Formulas Established by USDA
  - Relate Milk Value to Wholesale Prices of Commodities Made from Milk
  - Milk Value Based on the Valuation of Milk's Components: *Fat, Protein, Other Solids* and *Solids-Not-Fat*
  
- In Spite of Milk Being Produced Every Day, Minimum (and Actual) Prices Determined *Once a Month*

## What is Unique About the Cash Market for Milk

- Minimum Price Formulas Vary Depending on the Type of Products Manufactured from that Milk
  - Referred to as *Classified Pricing* of Milk
  
- Majority of Milk Produced Under 2 Pricing Systems:
  - California
  - Federal Milk Marketing Order System (FMMO)



## What is Unique About the Cash Market for Milk

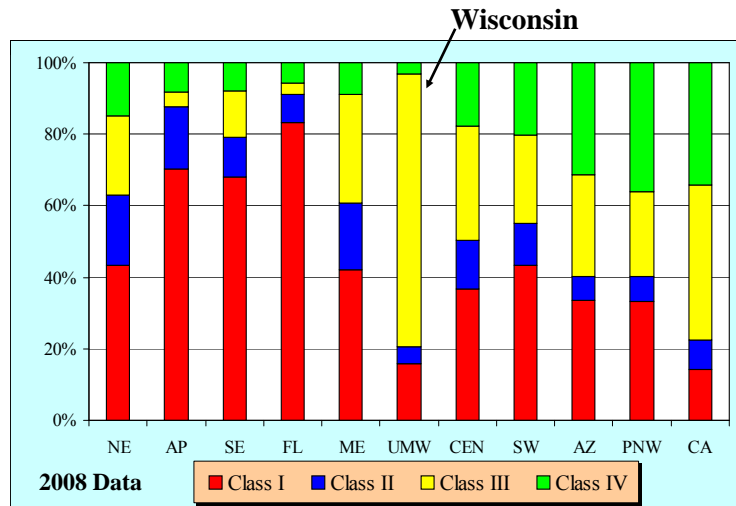
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- Under current FMMO system
  - Milk Classified According to Four Uses:
    - ✓ *Class I*: Beverage Milk
    - ✓ *Class II*: Soft Manufactured (e.g., Ice Cream, Cottage Cheese and Cream)
    - ✓ *Class III*: Hard Cheese and Cream Cheese
    - ✓ *Class IV*: Butter and Dry Milk Prod. (NFDM)

## What is Unique About the Cash Market for Milk

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- Dramatic Differences in Regional Milk Utilization



## What is Unique About the Cash Market for Milk

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- Class Prices Determined Via Component Valuation Derived from Wholesale Prices
  - FMMO Class III Milk Component Valuation:
    - ✓ *Protein Value*: Cheddar Cheese and Butter
    - ✓ *Fat Value*: Butter
    - ✓ *Other Solids Value*: Dry Whey
  - FMMO Class IV Milk Component Valuation:
    - ✓ *Fat Value*: Butter
    - ✓ *Other Nonfat Solids Value*: Non-Fat Dry Milk

## What is Unique About the Cash Market for Milk

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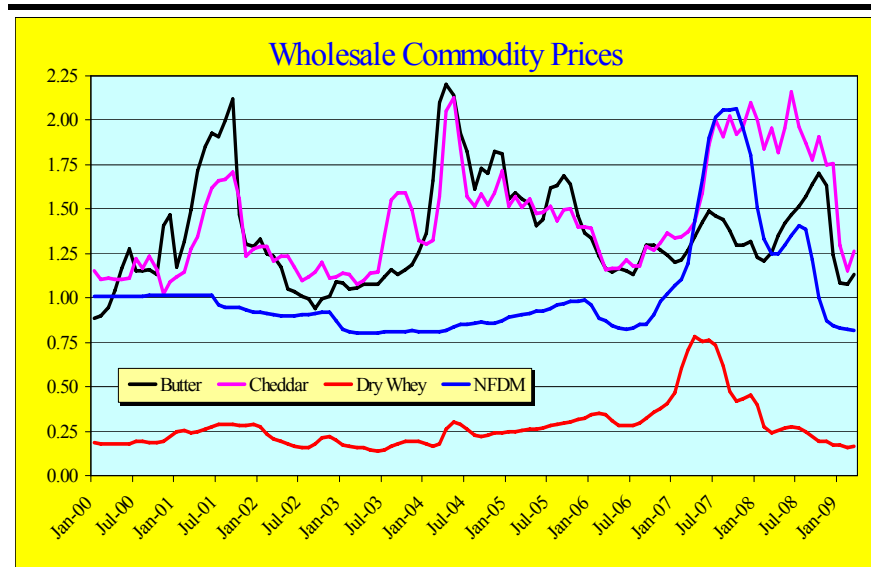
- Calculation of Class III and IV Milk Prices (\$/cwt)
  - Class III = Fat Value + 0.965 x Skim Milk Value
    - ✓ 3.5% Fat, 96.5% Skim Milk
    - ✓ Skim Milk Value = 3.1 x Protein Value + 5.9 x Other Solids Value
    - ✓ Fat Value = 3.5 x Butterfat Value
  - Class IV = Fat Value + 0.965 x Skim Milk Value
    - ✓ Fat Value = 3.5 x Butterfat Value
    - ✓ Skim Value = 9 x Other Nonfat Solids Value

## What is Unique About the Cash Market for Milk

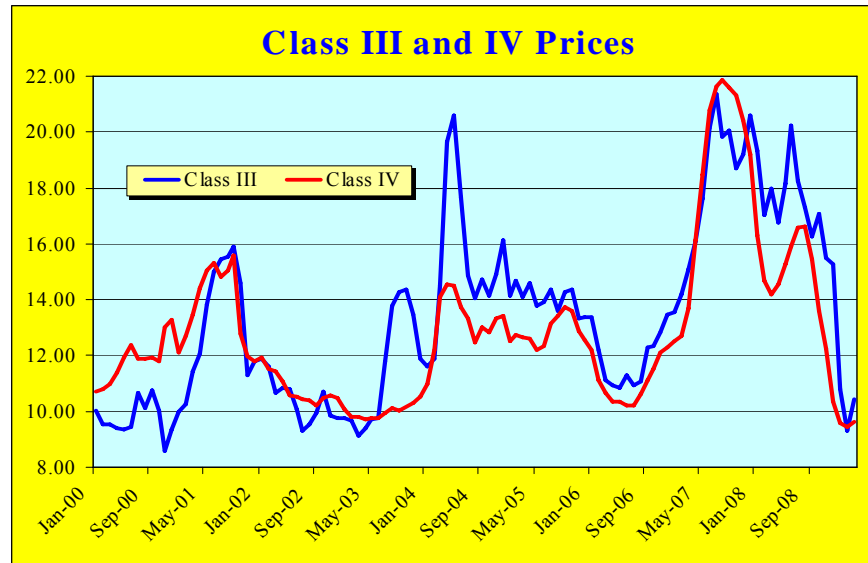
- The FMMO Pricing Formula Imply the Following Impact of Wholesale Commodity Prices:

$$\begin{aligned} \text{Class III} = & -3.1710 + 9.6393 * \text{Cheese Price} + \\ & \text{lbs. cheese/cwt} \nearrow \\ & 0.4238 * \text{Butter Price} + 5.8643 * \text{Whey Price} \\ & \text{lbs. butter/cwt} \nearrow \qquad \text{lbs. other solids/cwt} \nwarrow \\ \text{Class IV} = & -2.1697 + 4.2385 * \text{Butter Price} + \\ & \text{lbs. butter/cwt} \nearrow \\ & 8.59815 * \text{NFDM Price} \\ & \text{lbs. NFDM/cwt} \nearrow \end{aligned}$$

## What is Unique About the Cash Market for Milk



## What is Unique About the Cash Market for Milk



## Dairy Price Risk Management

- Since the Mid-1990's There has been a Viable Futures and Option Market for Several Dairy Products
  - Class III Milk, Futures and Options - Very Active
  - Class IV Milk, Futures and Options - Thin Market
  - Butter (Delivery and Cash Settle Futures, Options)
  - Dried Whey (Cash Settle, Futures Only)
  - Non-Fat Dry Milk (Cash Settle and Delivery Futures, Options)
- These Markets Used by Dairy Producers, Dairy Product Manufactures and Users of Dairy Products for Ingredient Use

## Dairy Price Risk Management

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### ■ Class III Futures Contract Specifications

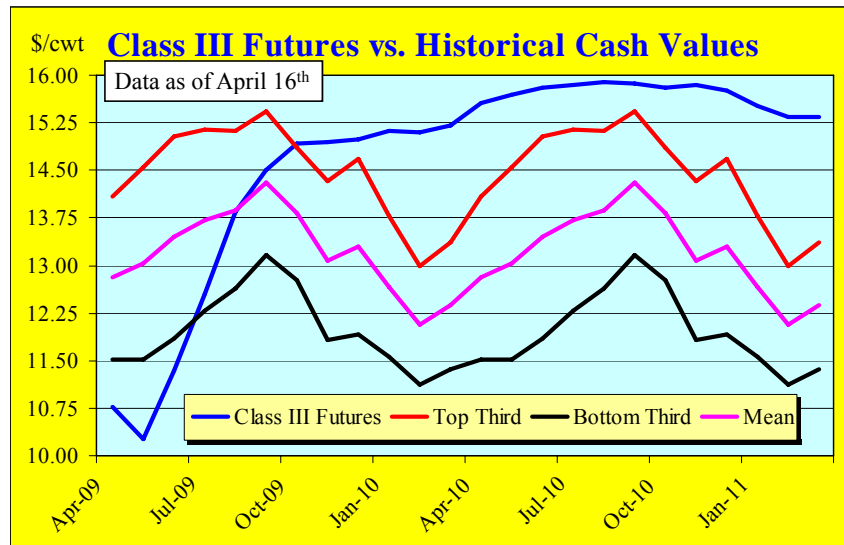
Contract Size	200,000 lbs (2,000 cwt)
Price Quotation	\$/cwt
Min. Price Move	\$0.01/cwt (\$20/contract)
Daily Price Limit	\$0.75/cwt (\$1,500/contract)
Months Traded	All Months
Open Contracts	24 Months
Position Limits	1,500 contracts/month (125 in expiration month)
Last Trading Day	Day before cash price announcement
Settlement	USDA Class III Cash Price

## Dairy Price Risk Management

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- As Noted Above, the Class III Contract is Cash Settled to the Announced Cash Class III Price
  
- Class III Announcement Date
  - Released at 10:00 am EST
  - No Later than the 5<sup>th</sup> of the Following Month if that Date is a Friday
    - ✓ Otherwise, Release Date Will be the Nearest Friday Before the 5<sup>th</sup>
  - Futures Trading is Stopped the Day Before the Announced Prices are Made Public

## Dairy Price Risk Management

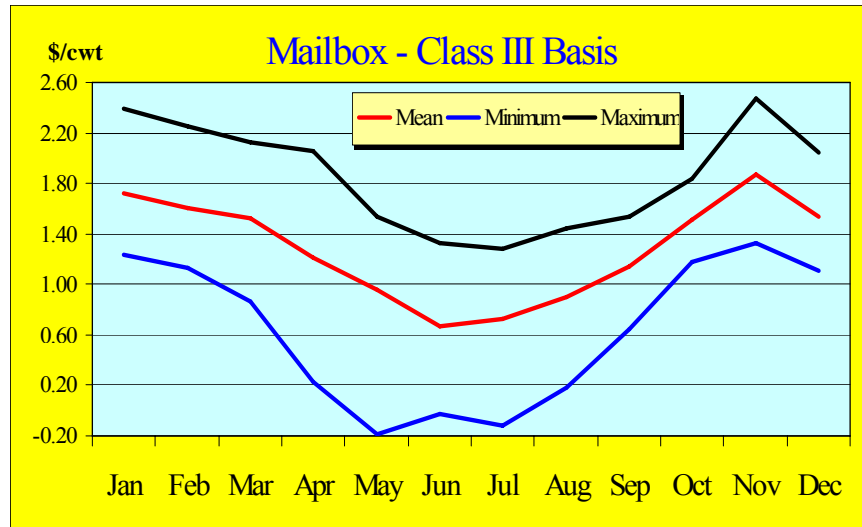


## Dairy Price Risk Management

- Class III Futures/Options Used to Manage Risk
  - Dairy Farm Operator: Output Price Risk
    - ✓ Forward Contracts with Cheese Plants
    - ✓ Minimum Price Contracts with Cheese Plants
    - ✓ Plant Does Hedging or Use of Puts on Behalf of Dairy Farm Operator
  - Cheese Plant: Input Price Risk Management
    - ✓ 70-80% of Cheese Manufacturing Costs are the Cost of Milk
    - ✓ Use Call Options to Control Milk Costs
  - Approximately 3% of U.S. Annual Milk Production Represented by Daily Futures Open Interest



## Use of Class III Futures as Mailbox Price Indicator



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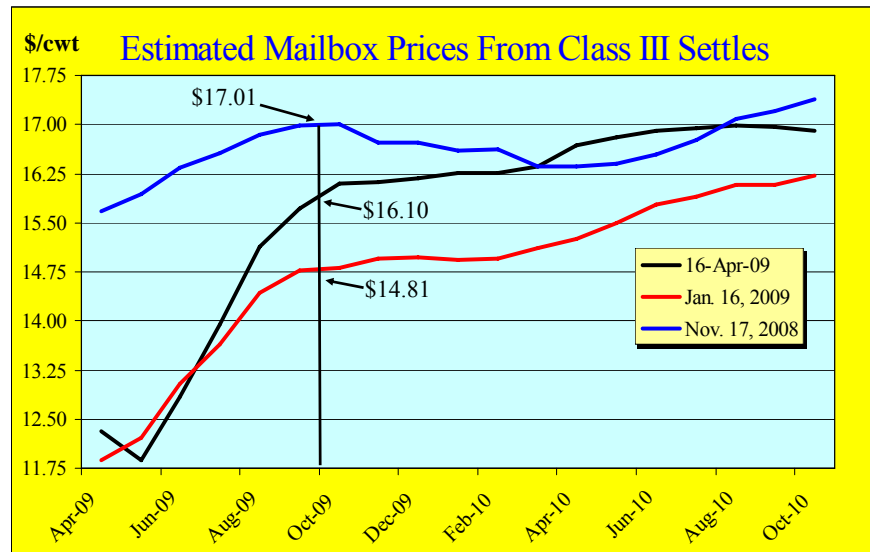
- Strong relationship between Announced Class III and Wisconsin Mailbox prices
  - Over 98% of variability in Mailbox explained solely by Class III

$$\text{WI Mailbox} = 2.535 + 0.909\text{Class III} \quad \bar{R}^2 = 0.975$$

(11.65)      (59.56)

- Use futures market settle prices to generate an estimate of future Wisconsin Mailbox values

## Use of Class III Futures as Mailbox Price Indicator



## More Information on Dairy Markets

- More Information on U.S. and International Dairy Markets can be Obtained from the University of Wisconsin's *Understanding Dairy Markets* website:

*<http://future.aae.wisc.edu>*