

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

Brian W. Gould
 Associate Professor
 Department of Agricultural and Applied Economics
 University of Wisconsin-Madison

April 21, 2009

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

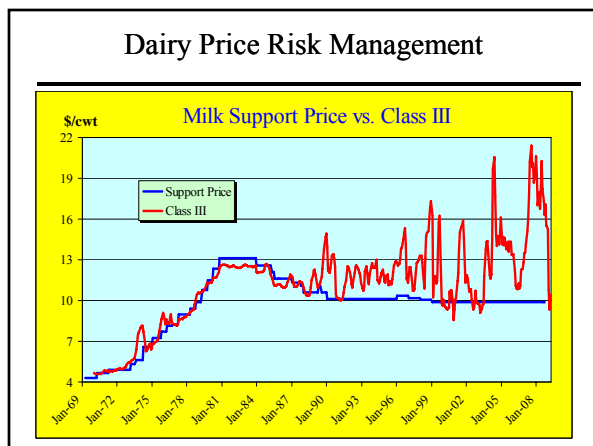
Dairy Price Risk Management

- 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

What is Unique About Milk Production?

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

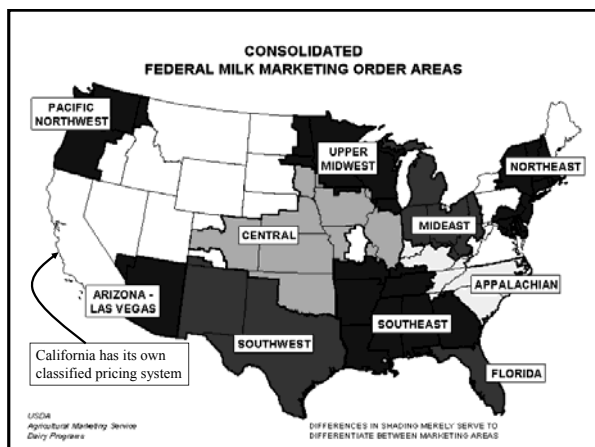
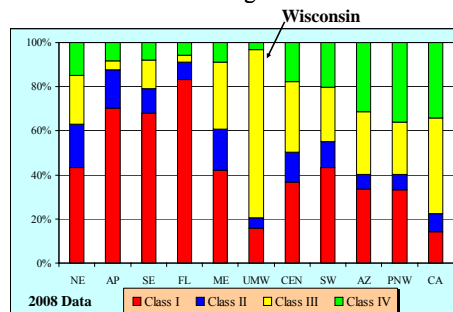
- Minimum Cash Price for Milk Determined Via Predefined Formulas Established by USDA
 - Relate Milk Value to Wholesale Prices of Commodities Made from Milk
 - Milk Value Based on the Valuation of Milk's Components: *Fat, Protein, Other Solids* and *Solids-Not-Fat*
- In Spite of Milk Being Produced Every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

- Dramatic Differences in Regional Milk Utilization



What is Unique About the Cash Market for Milk

- 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

- 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. (NFDN)

What is Unique About the Cash Market for Milk

- 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:

$$\text{Class III} = -3.1710 + 9.6393 * \text{Cheese Price} + 0.4238 * \text{Butter Price} + 5.8643 * \text{Whey Price}$$

lbs. cheese/cwt lbs. butter/cwt lbs. other solids/cwt

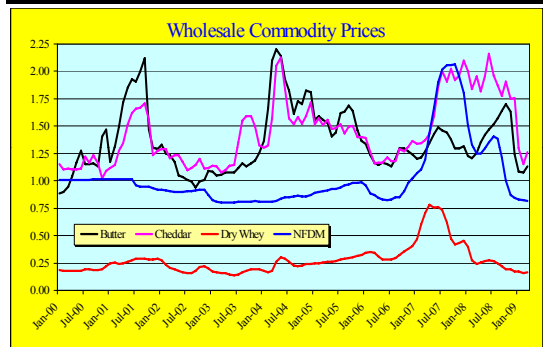
$$\text{Class IV} = -2.1697 + 4.2385 * \text{Butter Price} + 8.59815 * \text{NFDM Price}$$

lbs. butter/cwt lbs. NFDM/cwt

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

What is Unique About the Cash Market for Milk

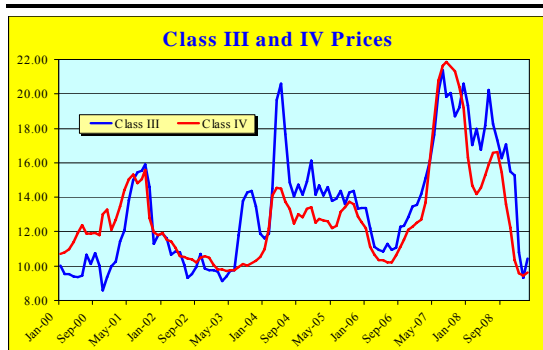


Dairy Price Risk Management

- 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

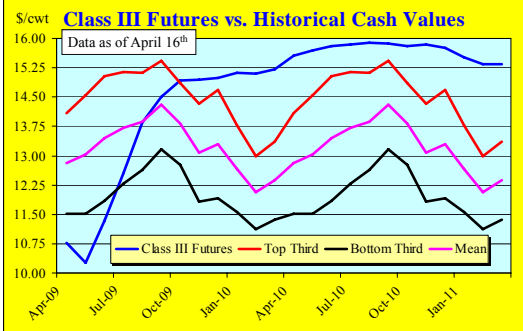
What is Unique About the Cash Market for Milk



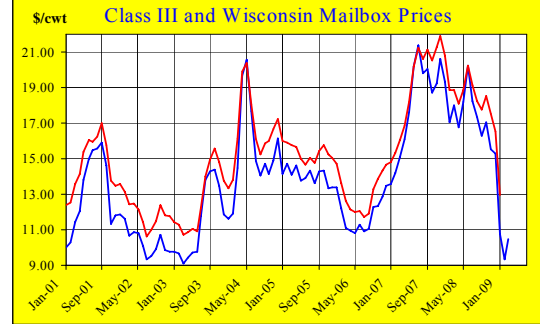
Dairy Price Risk Management

- 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 5th of the Following Month if that Date is a Friday
 - Otherwise, Release Date Will be the Nearest Friday Before the 5th
 - Futures Trading is Stopped the Day Before the Announced Prices are Made Public

Dairy Price Risk Management



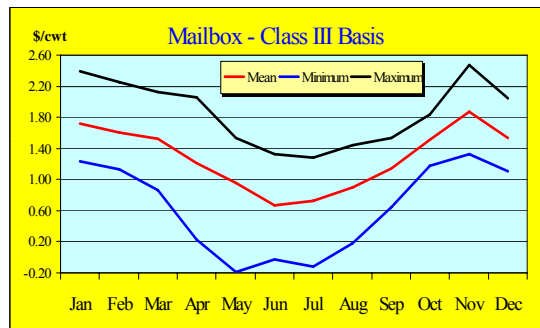
Use of Class III Futures as Mailbox Price Indicator



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



Use of Class III Futures as Mailbox Price Indicator

- Strong relationship Between Announced Class III and Wisconsin *Mailbox Prices*, Price Producers Receive

Class III Value: Lbs. Butterfat x Butterfat Value + Lbs. Protein x Protein Value + Lbs. Other Solids x Other Solids Value ± Somatic Cell Adjustment + Local Producer Price Differential + Plant Over-Order Premium + Other Quality/Volume Premiums - Deductions (e.g, hauling, advertising)	}	Federal Order Payments Plant Payments and deductions
---	---	---

Total Divided by CWT = *Mailbox Milk Price*

Use of Class III Futures as Mailbox Price Indicator

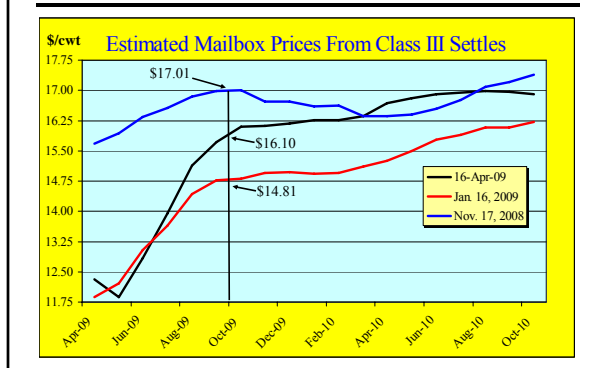
- Strong relationship between Announced Class III and Wisconsin Mailbox prices
 - Over 98% of variability in Mailbox explained solely by Class III

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

(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>