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Alternative Milk Price Series: Information for Cooperatives

Abstract

Prices generated by the Chicago Mercantile Exchange spot and futures markets were used to estimate and compare with Federal Milk Market Order (FMMO) Class I base, Class III, and Class IV prices. The time period covered 36 months since the FMMO reforms went into effect in January 2000. Substantial monthly differences existed between most estimated prices and their respective FMMO counterparts. Price series covering the entire study period showed little differences between the estimated prices and their corresponding FMMO prices in terms of average price, standard deviation, and coefficient of variation.

Keywords: milk price, spot market, futures market, Federal Milk Market Order, cooperative.

Alternative Milk Price Series: Information for Cooperatives

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Preface

This study sought to answer inquiries by some cooperative managers and dairy producers concerning whether the Chicago Mercantile Exchange (CME) spot and futures market prices could be used to generate prices series that would emulate Federal Milk Market Order (FMMO) prices. The report shows some of the alternative price series as they tracked the FMMO prices over a 36-month period from January 2000--when FMMO reforms went into effect and inaugurated a new set of pricing formulas under the order--through December 2002.

The price series and the methods of estimating them (summarized in table 1) are the author's choices. (Other researchers may choose other price series and estimation methods.) Some of the differences (some may be occasionally large) between the resulting price series and their respective FMMO counterparts may be due to the time series (number of days covered by the monthly calculated prices and the 1-week lag of prices reported by USDA's National Agricultural Statistics Service (NASS)) used and the transaction rules employed in the estimation. However, statistical tests indicate that these alternative price series and their FMMO counterparts were essentially the same (drawn from the same population, statistically speaking).

This report is a straightforward presentation of some basic data for further informed discussions. It does not explain why the prices fluctuated the way they did—many reports regarding the supply-demand market situation over the study period are readily available elsewhere. Nor does it study the interactions between CME prices and the prices reported by NASS. Arduous further research is needed to study the subject.

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Highlights

The year 2000 ushered in a new set of formulas for calculating milk prices under the Federal Milk Market Orders (FMMO). At the same time, some price discovery mechanisms have seen more trading activities. This report used the cash and futures prices at Chicago Mercantile Exchange (CME) to estimate FMMO milk prices and compared the resulting price series with their FMMO counterparts for the 36-month period from January 2000 through December 2002.

When the estimation was done with cash prices, it followed the same formulas for FMMO price calculation. When it was done with the futures prices, the estimation used the simple or weighted average of settling prices. The cash and futures trading data used for each month covered the time period from the first trading day of the month until the day when FMMO prices were announced.

To estimate the monthly Class I base price, the advanced Class III and Class IV prices were calculated. The estimated monthly Class I base price was the higher of the two advanced prices.

When spot market prices were used, the monthly advanced Class III price was estimated with CME cash cheese and butter sales prices and dry whey price reported by USDA's National Agricultural Statistics Service (NASS), while the advanced Class IV price was estimated with CME cash butter sales price and NASS nonfat dry milk price.

When futures market prices were used, the monthly advanced Class III price was the simple or weighted average of settling prices of Class III futures contracts. And the advanced Class IV price was the simple or weighted average of settling prices of Class IV futures contracts. There were two alternatives when futures prices were used. Alternative 1 used the price data for the current month contracts that were traded during the previous month. The second alternative used the price data for the previous month contracts that were traded during the previous month.

The monthly Class III or Class IV price was estimated the same way as the advanced Class III or Class IV price, except that the price data covered the entire month up to the day when the FMMO Class III and IV prices were announced, and the futures price data used were for the current month contracts that were traded during the current month.

The range of monthly differences between most estimated prices and their respective FMMO counterparts was substantial. However, price series covering the entire study period showed the differences between the average estimated prices and their respective FMMO counterparts were small. Measures of price variation (standard deviation and coefficient of variation) did not show much difference as well. Statistical tests indicate that these alternative price series and their FMMO counterparts were from the same population (essentially the same).

Trading at the CME spot and futures markets takes place daily (three times a week for cash butter), while wholesales prices reported to NASS is on a weekly basis. In the short run, market information embodied in the daily prices and the weekly prices may be somewhat different. NASS prices also have a 1-week lag behind the spot and futures price. These time differences may have resulted in substantial monthly differences between the estimated prices and the corresponding FMMO prices. However, in the long term, regardless of the price discovery mechanism used, all prices seem to reflect the same fundamental market forces and the average prices and the measures of price variation show little difference.

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Introduction

The dairy industry entered the 21st century with some new or recently invigorated pricing mechanisms. Most significant are the new price formulas under the Federal Milk Market Orders (FMMO), dairy product prices reported weekly by USDA's National Agricultural Statistics Service (NASS), and dairy futures and cash markets at the Chicago Mercantile Exchange (CME). Comparing the various price series generated by these pricing mechanisms would enlighten dairy market participants in discussing issues regarding milk price discovery.

This report uses CME cash market prices and dairy futures prices to generate several price series that can be compared to the FMMO price series. The FMMO price series serves as the benchmarks for comparison. The time period for this study was 36 months from January 2000--when FMMO reforms went into effect--to December 2002.

Federal Milk Market Order price formulas. The Federal Milk Market Orders promulgated on January 1, 2000, established a new set of formulas for setting minimum prices for milk in various use classes. The FMMO price formulas were modified by the amendments later that year (December 28, 2000). A court order injunction on January 31, 2001, further fine-tuned the amendments. The complete set of the FMMO price formulas in use during 2000 through 2002 is assembled in the reference section and was taken from the USDA Agricultural Marketing Service Dairy Programs website.

The FMMO price formulas closely associate milk prices to the value of milk components in the end products: cheese, butter, nonfat dry milk, and dry whey. The movers of the pricing system are the wholesale prices of these products weekly reported in the Dairy Products Prices by NASS. Data are collected by NASS from manufacturers by fax and electronic mail each week for sales during the previous week. Price information collected is for the (wholesale) point of sale for:

1. Natural, un-aged Cheddar cheese in 40-pound blocks and 500-pound barrels.
2. Boxes of butter meeting USDA Grade AA standards, 80 percent butterfat, salted, fresh or storage.
3. USDA Extra Grade edible non-hygroscopic dry whey.
4. USDA Extra Grade and USPH Grade A, nonfortified, nonfat dry milk.

A transaction is complete when the product is "shipped out" and title transferred. Resales of purchased product, forward pricing, and intra-company sales are excluded. Reporting by manufacturers was made mandatory by law in November 2000; prior to that date, reporting was voluntary. Price data for the prior 4 weeks are subject to revision based on late reports.

CME cash prices. The major dairy products traded on the Chicago Mercantile Exchange (CME) spot markets are:

- Cheddar cheese (40-pound blocks) and Cheddar cheese for manufacturing (barrels): traded daily.
- Grade AA butter: traded on Monday, Wednesday, and Friday.
- Grade A and Extra Grade nonfat dry milk: traded daily, but very few lots were traded during the 2000-2002 period.

Trading activities at the CME as reported in the Dairy Market News were used in the analysis for this report. (Barrel cheese was adjusted to 38 percent moisture beginning with the January 2001 price.)

CME milk futures. For several years prior to 2000, milk futures struggled to establish themselves both at CME and New York Board of Trade. At the beginning of 2000, only CME Class III milk futures were relatively active. CME launched Class IV milk futures on July 10, 2000, with October 2000 contracts. The CME futures settling prices and volumes reported biweekly in the Dairy Market News were used in this study.

Estimating Methods for Class I Base Price

Methods of estimating various FMMO prices used in this report are summarized in table 1. This section explains the procedures for estimating Class I base price.

Estimates using CME cash prices. Weighted average cash sales prices of cheese and butter up to the last Friday on or before the 23rd day of the month (this study follows the FMMO price announcement dates) are used to estimate the advanced Class III or Class IV price. Only actual sales prices are used and are weighted by sales volumes. The higher of the advanced Class III or Class IV price is the estimated Class I base price.

The estimation follows the same FMMO price formulas for calculating the FMMO advanced Class III or Class IV price and the Class I base price. Prices for nonfat dry milk and dry whey used in the estimate are as reported by NASS and as used in FMMO price formulas. There have been no meaningful nonfat dry milk cash trade at CME and dry whey is not traded there. The differences between the estimated advanced Class III or advanced Class IV price and the corresponding advanced prices calculated according to FMMO are entirely attributable to the different time series for butter and cheese (CME cash versus NASS) used in the formula price calculation.

Estimates using CME futures prices. Two alternatives for estimating Class I base price based on CME futures prices are used in this report. Alternative 1 uses the higher of the average Class III or Class IV futures price of daily trading from the first trading day of the month up to the last Friday on or before the 23rd day of the month, of the next month's contracts. For example, the January Class I base price is the higher of the average Class III or Class IV futures price of daily trading, up to the last Friday on or before the 23rd day of December, of the January contracts.

Alternative 2 uses the higher of the average Class III or Class IV futures price of daily trading, from the first trading day of the preceding month up to the last Friday on or before the 23rd day of the preceding month, of the preceding month's contracts. For example, the January Class I base price is the higher of Class III or Class IV futures price of daily trading, up to the last Friday on or before the 23rd day of December, of the December contracts.

For both alternatives, the simple average of Class III or Class IV futures settling prices of daily trading and the average weighted by the trading volume were used in this study. During a month when there was no Class IV price futures contract traded, this report substituted simple average selling price of the month for the weighted average price.

Advanced Class III Prices

FMMO advanced Class III price. During the 36-month period, the FMMO advanced Class III price averaged $11.13 per hundredweight of milk (table 2). The price ranged from a low of $8.64 to a high of $15.93 (a $7.29 difference).

Two measures of fluctuation of the FMMO advanced Class III price were calculated. The standard deviation was $2.03 around the 36-month average price. The coefficient of variation shows that the standard deviation was 18.2 percent of the average price.

Advanced Class III price estimated using CME cash prices. Over the 36-month period, the estimated advanced Class III price using CME cash cheese and butter prices (and NASS whey powder price) averaged $11.15 per hundredweight (table 2). The difference between this average price and the FMMO advanced Class III price was small; the former was $.02 higher than the latter.

Measures of price variation over the 36-month period also show little differences. The estimated advanced Class III price using CME cash prices ranged from a low of $8.75 to a high of $16.00, a $7.25 difference (compared to $7.29 difference for the FMMO advanced Class III price). The standard deviation

Table 1—Methods of estimating various FMMO prices

	Product price used	Number of days covered by the monthly price	Transaction rule
Estimating advanced Class III/Class IV price:			
• Using CME cash prices	CME cheese and butter cash sale prices weighted by sales volumes	First trading day of the month to FMMO price announcement day.	
	Dry whey/NFDM price reported by NASS.	Follow FMMO calculation.	
• Using simple average CME Class III/Class IV futures price (Alternative 1)	CME Class IV milk futures settling price, simple average.	First trading day of the month to FMMO price announcement day.	Current month contracts traded during the previous month.
• Using weighted average CME Class III/Class IV futures price (Alternative 1)	CME Class III/Class IV milk futures settling price weighted by volume traded.	First trading day of the month FMMO price announcement day.	Current month contracts traded during the previous month.
• Using simple average CME Class III/Class IV futures price (Alternative 2)	CME Class III/Class IV milk futures settling price, simple average.	First trading day of the month to FMMO price announcement day.	Previous month contracts traded during the previous month.
• Using weighted average CME Class III/Class IV futures price (Alternative 2)	CME Class III/Class IV milk futures settling price weighted by volume traded.	First trading day of the month to FMMO price announcement day.	Previous month contracts traded during the previous month.
Estimating Class III/Class IV price:			
• Using CME cash prices	CME cheese and butter cash sale prices weighted by sales volumes.	First trading day of the month to FMMO price announcement day.	
	Dry whey/NFDM price reported by NASS.	Follow FMMO calculation.	
• Using simple average CME Class III/Class IV futures price	CME Class III/Class IV milk futures settling price, simple average.	First trading day of the month to FMMO price announcement day.	Current month contracts traded during the current month.
• Using weighted average CME Class III/Class IV futures price	CME Class III/Class IV milk futures settling price weighted by volume traded.	First trading day of the month to FMMO price announcement day.	Current month contracts traded during the current month.

Table 2—Comparison of advanced Class III price, calculated according to FMMO and various estimated series, January 2000-December 2002

Dollars/cwt. of milk	Monthly average price	Estimate price: Higher (lower) than FMMO	Estimate price: Range of difference: From	Estimate price: Range of difference: To	Measures of price variation: Price range: Low	Price range: High	Price range: Range	Standard deviation	Coefficient of variation	*F*-statistic	*p*-value	Details in Appendix I
Advanced Class III price, calculated according to FMMO	11.13				8.64	15.93	7.29	2.03	18.2%			Table 1 & figure 1
Estimated based on CME cash cheese and butter prices	11.15	0.02	(3.32)	1.43	8.75	16.00	7.25	2.05	18.4%	0.0014	0.9706	Table 1 & figure 1
Estimated using simple average CME Class III futures price (Alternative 1)	11.26	0.13	(4.02)	2.07	9.34	15.46	6.12	1.67	14.8%	0.0824	0.7750	Table 4 figure 4
Estimated using weighted average CME Class III (Alternative 1)	11.25	0.12	(4.07)	2.05	9.34	15.44	6.10	1.64	14.6%	0.0779	0.7809	Table 5 figure 5
Estimated using simple average CME Class III futures price (Alternative 2)	11.06	(0.07)	(1.51)	0.35	8.74	15.76	7.02	1.92	17.4%	0.0237	0.8782	Table 6 figure 6
Estimated using weighted average CME Class III futures price (Alternative 2)	11.06	(0.07)	(1.62)	0.36	8.73	15.73	7.00	1.90	17.2%	0.0225	0.8812	Table 7 figure 7

($2.05) and the coefficient of variation (18.4 percent) were very close to those for the FMMO advanced Class III price.

However, when the individual monthly prices were compared, the range of difference between the two price series shows that the estimated advanced Class III price using CME cash prices was from $3.32 lower to $1.43 higher than the FMMO advanced Class III price.

The CME cash prices transmit instantaneous market information in a spot market, while weekly sales reported to NASS carry the market information that has been more fully digested by market participants. Also the time period covered by the CME cash prices as used in the monthly price calculation in this report has more days than represented by the NASS reported prices and the NASS prices have a 1-week lag. As a result, in the short run, the difference between the two price series can be quite substantial, especially when the market is volatile and there are precipitous price changes in the cash market. However, over the long term (36 months in this report), the two price series reflect the same fundamental market forces at work and the average prices and the measures of price variation show little difference. This conclusion applies to all price series estimated in this report vis-à-vis their FMMO counterparts.

Statistical test indicates that there is no significant difference between the estimated price series and its FMMO counterpart. The mean of the estimated price series is an unbiased estimate of the mean of its FMMO counterpart. The *F*-statistic (at 0.0014) is very small, while the *p*-value (at 0.9706) is very large. Statistically speaking, the estimated price series and its FMMO counterpart are from the same population. (They may be said to be not from the same population if the *F*-statistic is greater than 3.9778 and the *p*-value is less than 0.05.)

The relationship between the estimated advanced Class III price and its FMMO counterpart reflects the underlying relationship between the dairy product prices as traded at CME and the prices reported by NASS. Over the 36-month period, the differences between the average CME cash prices used in this report for cheese and butter, respectively, and the average prices reported by NASS were small, although the difference for a particular month could be quite substantial (Appendix I tables 2 and 3).

Advanced Class III price estimated using CME Class III futures price (alternative 1). Under Alternative 1, using the simple average CME Class III futures price for the current month to estimate the advanced Class III price over the 36-month period, it yielded an average price of $11.26 per hundredweight (table 2). The estimated advanced Class III price was $0.13 higher than the FMMO advanced Class III price, with the difference ranging from $4.02 lower to $2.07 higher. The price ranged from a low of $9.34 to a high of $15.46 (a $6.12 difference). The standard deviation of the estimated advanced Class III price was $1.67 and the coefficient of variation was 14.9 percent. The estimated advanced Class III price fluctuated around the average price less than the FMMO advanced Class III price did.

Statistical test indicates that there is no significant difference between the estimated price series and the FMMO advanced Class III price series. The mean of the estimated price series is an unbiased estimate of the mean of its FMMO counterpart. The *F*-statistics (at 0.0824) is very small, while the *p*-value (at 0.7750) is very large. Statistically speaking, the estimated price series and its FMMO counterpart are from the same population. (They may be said to be not from the same population if the *F*-statistic is greater than 3.9778 and the *p*-value is less than 0.05.)

The results were about the same when, in place of the simple average, the monthly weighted average CME Class III futures price for the current month was used to estimate the advanced Class III price.

Advanced Class III price estimated using CME Class III futures price (alternative 2). Under Alternative 2, using the simple average CME Class III futures price for the previous month to estimate the advanced Class III price, the average price over the 36-month period was $11.06 per hundredweight (table 2). The estimated advanced Class III price was $0.07 lower than the FMMO advanced Class III price, with the monthly difference ranging from $1.51 lower to $0.35 higher. The price ranged from a low of $ 8.74 to a high of $15.76 (a $7.02 difference). The standard deviation of the estimated advanced Class III price was $1.92 and the coefficient of variation was 17.4 percent. The estimated advanced Class III price fluctuated around the average price slightly less than the FMMO advanced Class III price did.

Statistical test indicates that there is no significant difference between the estimated price series and the FMMO advanced Class III price series. The mean of the estimated price series is an unbiased estimate of the mean of its FMMO counterpart. The *F*-statistics (at 0.0237) is very small, while the *p*-value (at 0.8782) is very large. Statistically speaking, the estimated price

series and its FMMO counterpart are from the same population. (They may be said to be not from the same population if the *F*-statistic is greater than 3.9778 and the *p*-value is less than 0.05.)

These findings were almost identical to the results when the monthly weighted average CME Class III futures price for the previous month was used to estimate the advanced Class III price.

Among the three estimation methods, using CME cash prices yielded the average price that was closest to the average advanced FMMO Class III price over the 36-month period, and the two price series have almost identical measurers of variation. On the other hand, estimated prices using Class III futures price under Alternative 1 (1) yielded the average price that was farthest from the average advanced FMMO Class III price, (2) had the widest monthly price difference between the estimated price and the advanced FMMO Class III price, but (3) fluctuated the least around the average. Estimated prices under Alternative 2 show the lowest monthly difference with advanced Class III prices.

Under Alternative 1 or Alternative 2, the estimation results were not much different whether simple average or weighted average Class III futures price was used.

Advanced Class IV Prices

FMMO advanced Class IV price. During the 36-month period, the FMMO advanced Class IV price (announced or calculated) averaged $12.15 per hundredweight of milk (table 3). The price ranged from a low of $10.15 to a high of $15.85 (a $5.70 difference). The standard deviation was $1.59 around the 36-month average price, and the coefficient of variation shows that the standard deviation was 13.1 percent of the average price.

The advanced FMMO Class IV price averaged more than $1 higher than the advanced FMMO Class III price, and was less volatile as indicated by the standard deviation and the coefficient of variation.

Advanced Class IV price estimated using CME cash butter price. At $12.21 per hundredweight, the average estimated advanced Class IV price using CME cash butter price (and NASS nonfat dry milk price) was $0.06 higher than the FMMO advanced Class IV price (table 3). The range of monthly difference was from $0.85 lower to $0.93 higher. The estimated price ranged from a low of $10.19 to a high of $15.73 (a $5.54 difference).

The standard deviation of the estimated advanced Class IV price was $1.59 and the coefficient of variation was 13 percent. These two measures of price fluctuation were essentially the same as those for the FMMO advanced Class IV price.

Statistical test indicates that there is no significant difference between the estimated price series and its FMMO counterpart. The mean of the estimated price series is an unbiased estimate of the mean of its FMMO counterpart. The *F*-statistic (at 0.0249) is very small, while the *p*-value (at 0.8751) is very large. Statistically speaking, the estimated price series and its FMMO counterpart are from the same population. (They may be said to be not from the same population if the *F*-statistic is greater than 3.9778 and the *p*-value is less than 0.05.)

The difference between the average estimated advanced Class IV price and the FMMO advanced Class IV price, at $0.06 (table 3), was higher than the difference between the estimated advanced Class III price and its FMMO counterpart ($0.02 in table 2). However, the range of monthly price difference, less than $1 either way, indicates that the estimated advanced Class IV price tracked the FMMO advanced Class IV price more closely. (This may be due to the use of the same price series for the skim portion which accounts for nearly 65 percent of the milk price.)

The relationship between the estimated advanced Class IV price and its FMMO counterpart reflects the underlying relationship between the butter price as traded at CME and the price reported by NASS. The difference between the average CME cash butter price and the average butter price reported by NASS was small (about 1 percent of the average price), although the difference for a particular month could be about $.20 per pound higher or lower (Appendix I table 3).

Advanced Class IV price estimated using CME Class IV futures price (alternative 1). Under Alternative 1 of using the simple average CME Class IV futures price for the current month to estimate the advanced Class IV price, the 27-month period (October 2000 through December 2002; CME started Class IV milk futures trading with October 2000 contracts) yielded an average price of $12.39 per hundredweight, exactly the same as the average FMMO advanced Class IV price for the same time period (table 3). The monthly price difference ranged from $2.20 lower to $0.50 higher. The price ranged from a low of $10.47 to a high of $15.23. The $4.76 difference was almost $1

Table 3—Comparison of advanced Class IV price, calculated according to FMMO and various estimated series, January 2000-December 2002

Dollars/cwt. of milk	Monthly average price	Estimate price: Higher (lower) than FMMO	Estimate price: Range of difference: From	Estimate price: Range of difference: To	Measures of price variation: Price range: Low	Price range: High	Price range: Range	Standard deviation	Coefficient of variation	*F*-statistic	*p*-value	Details in Appendix I
1. Advanced Class IV price, calculated according to FMMO **--36 months**	12.15				10.15	15.85	5.70	1.59	13.1%			Table 8 & figure 8
Estimated based on CME cash butter price	12.21	0.06	(0.85)	0.93	10.19	15.73	5.54	1.59	13.0%	0.0249	0.8751	Table 8 & figure 8
2. Advanced Class IV price, calculated according to FMMO**--27 months**	12.39				10.15	15.85	5.70	1.75	14.1%			Table 9 & figure 9
Estimated using simple average CME Class IV futures price (Alternative 1)	12.39	0.00	(2.20)	0.50	10.47	15.23	4.76	1.64	13.2%	0.0002	0.9885	Table 9 & figure 9
Estimated using weighted average CME Class IV futures price (Alternative 1)	12.39	0.00	(2.25)	0.61	10.42	15.32	4.90	1.63	13.2%	0.0000	0.9949	Table 10 & figure 10
3. Advanced Class IV price, calculated according to FMMO **--26 months**	12.41				10.15	15.85	5.70	1.78	14.3%			Table 11 & figure 11
Estimated using simple average CME Class IV futures price (Alternative 2)	12.44	0.03	(0.57)	0.30	10.30	15.78	5.48	1.70	13.7%	0.0026	0.9595	Table 11 & figure 11
Estimated using weighted average CME Class IV futures price (Alternative 2)	12.45	0.04	(0.59)	0.29	10.30	15.80	5.50	1.69	13.6%	0.0053	0.9423	Table 12 & figure 12

less than the FMMO counterpart.

The estimated advanced Class IV price fluctuated less around its average than the FMMO advanced Class IV price, as indicated by the standard deviation and the coefficient of variation.

Statistical test indicates that there is no significant difference between the estimated price series and the FMMO advanced Class VI price series. The mean of the estimated price series is an unbiased estimate of the mean of its FMMO counterpart. The *F*-statistics (at 0.0002) is very small, while the *p*-value (at 0.9885) is very large. Statistically speaking, the estimated price series and its FMMO counterpart are from the same population. (They may be said to be not from the same population if the *F*-statistic is greater than 4.0266 and the *p*-value is less than 0.05.)

When the monthly weighted average CME Class IV futures price for the current month was used to estimate the advanced Class IV price, the results were the same or very similar to when simple average CME Class IV futures price was used.

Advanced Class IV price estimated using CME Class IV futures price (alternative 2). Under Alternative 2 of using the simple average CME Class IV futures price for the previous month to estimate the advanced Class IV price, the 26-month period (November 2000 through December 2002; November 2000 was the first month the advanced Class IV price could be estimated using October 2000 Class IV futures price) yielded an average price of $12.44 per hundredweight, $0.03 higher than the FMMO advanced Class IV price for the same time period. The monthly price difference could be from $0.57 lower to $0.30 higher. The price ranged from a low of $10.30 to a high of $15.78 (a $5.48 difference). These and other measures of price variation (standard deviation and the coefficient of variation) indicate that the degree of price fluctuation differed little between the estimated advanced Class IV price and the FMMO advanced Class IV price.

Statistical test indicates that there is no significant difference between the estimated price series and the FMMO advanced Class VI price series. The mean of the estimated price series is an unbiased estimate of the mean of its FMMO counterpart. The *F*-statistics (at 0.0026) is very small, while the *p*-value (at 0.9595) is very large. Statistically speaking, the estimated price series and its FMMO counterpart are from the same population. (They may be said to be not from the same population if the *F*-statistic is greater than 4.0343 and the *p*-value is less than 0.05.)

The results were almost the same when the weighted average CME Class IV futures price for the previous month was used to estimate the FMMO advanced Class IV price.

Class I Base Prices

FMMO Class I base price. FMMO Class I base price is reported in the Dairy Market News. Class I base price estimated in this report is the higher of the advanced Class III and Class IV prices derived from alternative price series. The comparisons between FMMO Class I base price and the estimates are summarized in table 4 with details presented in Appendix II.

During the 36-month period, the FMMO Class I base price averaged $12.28 per hundredweight of milk (table 4). FMMO Class I base price ranged from a low of $10.15 to a high of $15.93, a $5.78 difference. The standard deviation was $1.73 around the 36-month average price, and the coefficient of variation shows that the standard deviation was 14.1 percent of the monthly price.

Class I base price estimated using CME cash prices. The estimated Class I base price using CME cash prices averaged $12.30 per hundredweight, $0.02 higher than the FMMO Class I base price, with the monthly difference ranging from $2.85 lower to $0.93 higher (table 4). The price ranged from a low of $10.19 to a high of $16.00, a $5.81 price difference. The standard deviation of the estimated Class I base price was $1.69 and the coefficient of variation was 13.7 percent. Monthly difference between the estimated Class I base price and the FMMO Class I base price could be substantial; both price series, however, exhibited very similar long-term price variations.

Statistical test indicates that there is no significant difference between the estimated price series and the FMMO Class I base price series. The mean of the estimated price series is an unbiased estimate of the mean of its FMMO counterpart. The *F*-statistics (at 0.0048) is very small, while the *p*-value (at 0.9447) is very large. Statistically speaking, the estimated price series and its FMMO counterpart are from the same population. (They may be said to be not from the same population if the *F*-statistic is greater than 3.9778 and the *p*-value is less than 0.05.)

Class I base price estimated using CME futures prices (alternative 1). Under Alternative 1 of using

Table 4—Comparison of FMMO Class I base price and the "higher of" various estimated series, January 2000-December 2002

Dollars/cwt. of milk	Monthly average price	Estimate price: Higher (lower) than FMMO	Estimate price: Range of difference From	Estimate price: Range of difference To	Measures of price variation: Price range Low	Price range High	Range	Standard deviation	Coefficient of variation	*F*-statistic	*p*-value	Details in Appendix II
1. FMMO Class I base price **--36 months**	12.28				10.15	15.93	5.78	1.73	14.1%			Table 1 & figure 1
Estimated "higher of" using CME cash butter and cheese prices	12.30	0.02	(2.85)	0.93	10.19	16.00	5.81	1.69	13.7%	0.0048	0.9447	Table 1 & figure 1
2. FMMO Class I base price **--27 months**	12.56				10.15	15.93	5.78	1.89	15.0%			Table 2 & figure 2
Estimated using "higher of" simple average Class III or Class IV futures price (Alternative 1)	12.43	(0.13)	(2.56)	0.50	10.47	15.46	4.99	1.68	13.5%	0.0759	0.7840	Table 2 & figure 2
Estimated using "higher of" weighted average Class III or Class IV futures price (Alternative 1)	12.43	(0.13)	(2.57)	0.61	10.42	15.44	5.02	1.66	13.4%	0.0771	0.7824	Table 2
3. FMMO Class I base price **--26 months**	12.59				10.15	15.93	5.78	1.92	15.3%			Table 3 & figure 3
Estimated using "higher of" simple average Class III or Class IV futures price (Alternative 2)	12.52	(0.07)	(1.51)	0.30	10.44	15.78	5.34	1.76	14.1%	0.0016	0.9000	Table 3 & figure 3
Estimated using "higher of" weighted average Class III or Class IV futures price (Alternative 2)	12.53	(0.06)	(1.62)	0.29	10.44	15.80	5.36	1.74	13.9%	0.0138	0.9071	Table 3

the monthly average CME futures price for the current month to estimate Class I base price, the time period covered 27 months. The "higher of" estimates using the simple average Class III or Class IV futures price yielded an average price of $12.43 per hundredweight (table 4). This estimated Class I base price was $0.13 lower than the $12.56 FMMO Class I base price averaged over the same 27 months. The monthly difference varied from $2.56 lower to $.50 higher.

The estimated price was from a low of $10.47 to a high of $15.46 per hundredweight, a $4.99 difference. The price range was narrower than that for the FMMO Class I base price, which was as low as $10.15 to as high as $15.93, a range of $5.78. The estimated Class I base price also fluctuated less than the FMMO Class I base price, as indicated by their respective standard deviations and coefficients of variation.

Statistical test indicates that there is no significant difference between the estimated price series and the FMMO Class I base price series. The mean of the estimated price series is an unbiased estimate of the mean of its FMMO counterpart. The *F*-statistics (at 0.0759) is very small, while the *p*-value (at 0.7840) is very large. Statistically speaking, the estimated price series and its FMMO counterpart are from the same population. (They may be said to be not from the same population if the *F*-statistic is greater than 4.0266 and the *p*-value is less than 0.05.)

When the monthly weighted average CME futures price for the current month was used to estimate Class I base price, the results were about the same as when the simple average price was used.

Class I base price estimated using CME futures prices (alternative 2). Under Alternative 2 of using the monthly average CME futures price for the previous month to estimate Class I base price, the time period covered 26 months. The "higher of" estimates using the simple average Class III or Class IV futures price yielded an average price of $12.52 per hundredweight (table 4). This estimated Class I base price was $0.07 lower than the $12.59 FMMO Class I base price averaged over the same 26 months. The monthly difference varied from $1.51 lower to $.30 higher. The estimated price was from a low of $10.44 to a high of $15.34, a $5.34 difference. The price range was narrower than that for the FMMO Class I base price, which was as low as $10.15 to as high as $15.93, a range of $5.78. The estimated Class I base price also fluctuated less than the FMMO Class I base price did, as indicated by their respective standard deviations and coefficients of variation.

Statistical test indicates that there is no significant difference between the estimated price series and the FMMO Class I base price series. The mean of the estimated price series is an unbiased estimate of the mean of its FMMO counterpart. The *F*-statistics (at 0.0016) is very small, while the *p*-value (at 0.9000) is very large. Statistically speaking, the estimated price series and its FMMO counterpart are from the same population. (They may be said to be not from the same population if the *F*-statistic is greater than 4.0343 and the *p*-value is less than 0.05.)

Using the monthly weighted average CME futures price for the previous month to estimate Class I base price showed very similar results.

Class III Prices

Methods of estimating FMMO Class III prices used in this report are summarized in table 1.

FMMO Class III price. During the 36-month period, the FMMO Class III price averaged $11.09 per hundredweight of milk (table 5). The price ranged from a low of $8.57 per hundredweight to a high of $15.90, a $7.33 difference. The measures of fluctuation of the FMMO Class III price show that standard deviation was $2.00 around the 36-month average price, and the coefficient of variation was 18 percent.

Class III prices estimated using CME cash prices. Class III price is estimated following the FMMO price formulas and using weighted average cash sales prices of cheese (block and barrel) and butter (for calculating butterfat value) up to the last Friday on or before the fifth day of the following month (this study follows the FMMO price announcement dates). Whey price is as reported by NASS and as used in FMMO price calculation.

The estimated Class III price using CME cash prices (and NASS price for whey powder) averaged $11.17 per hundredweight over the 36 months (table 5). The estimated Class III price was $0.08 higher than the FMMO Class III price, with the range of monthly difference being from $2.65 lower to $1.32 higher.

The price ranged from a low of $8.77 to a high of $16.00, a $7.23 difference. The standard deviation of the estimated Class III price was $2.05 and the coefficient of variation was 18.4 percent. These measures of

Table 5—Comparison of Class III prices, FMMO and estimated series, January 2000-December 2002

Dollars/cwt. of milk	Monthly average price	Estimate price: Higher (lower) than FMMO	Estimate price: Range of difference From	Estimate price: Range of difference To	Measures of price variation: Price range Low	Price range High	Price range Range	Standard deviation	Coefficient of variation	*F*-statistic	*p*-value	Details in Appendix III
FMMO Class III	11.09				8.57	15.90	7.33	2.00	18.0%			Table 1 & figure 1
Estimated based on CME cash cheese and butter prices	11.17	0.08	(2.65)	1.32	8.77	16.00	7.23	2.05	18.4%	0.0307	0.8615	Table 1 & figure 1
Estimated using simple average CME Class III futures price	11.07	(0.02)	(0.26)	0.18	8.70	15.81	7.11	1.94	17.5%	0.0009	0.9762	Table 4 & figure 4
Estimated using weighted average CME Class III futures price	11.06	(0.03)	(0.44)	0.20	8.73	15.79	7.06	1.91	17.3%	0.0024	0.9612	Table 5 & figure 5

variation suggest that the degrees of price fluctuation differed very little between the estimated Class III price and the FMMO Class III price.

Statistical test indicates that there is no significant difference between the estimated price series and the FMMO Class III price series. The mean of the estimated price series is an unbiased estimate of the mean of its FMMO counterpart. The *F*-statistics (at 0.0307) is very small, while the *p*-value (at 0.8615) is very large. Statistically speaking, the estimated price series and its FMMO counterpart are from the same population. (They may be said to be not from the same population if the *F*-statistic is greater than 3.9778 and the *p*-value is less than 0.05.)

The relationship between the estimated Class III price and its FMMO counterpart reflect the underlying relationship between the dairy product prices as traded at CME and the prices reported by NASS. Over the 36-month period, the differences between the average CME cash prices for cheese and butter, respectively, and the average prices reported by NASS were very small, although differences for a particular month could be quite substantial (Appendix III tables 2 and 3).

Class III price estimated using CME Class III futures price. Class III price for the current month is estimated using the CME Class III futures prices of daily trading of current month's contracts up to the last Friday on or before the fifth day of the following month. Both simple average and weighted average are used. The weighted average uses actual trading volume as weight.

Using the simple average CME Class III futures price to estimate the Class III price, the 36-month period yielded an average price of $11.07 per hundredweight, $0.02 lower than the FMMO Class III price. The monthly difference was also very small, ranging from $0.26 lower to $0.18 higher (table 5).

The price ranged from a low of $8.70 per hundredweight to a high of $15.81, a $7.11 difference. The standard deviation of the estimated Class III price was $1.94 and the coefficient of variation was 17.5 percent. The estimated Class III price tracked very closely the FMMO Class III price. This should be the case because, as a general rule, the futures price and the market price ought to converge when the futures contracts expire.

Statistical test indicates that there is no significant difference between the estimated price series and the FMMO Class III price series. The mean of the estimated price series is an unbiased estimate of the mean of its FMMO counterpart. The *F*-statistics (at 0.0009) is very small, while the *p*-value (at 0.9762) is very large. Statistically speaking, the estimated price series and its FMMO counterpart are from the same population. (They may be said to be not from the same population if the *F*-statistic is greater than 3.9778 and the *p*-value is less than 0.05.)

When the monthly weighted average CME Class III futures price was used to estimate the Class III price, the results were about the same as using simple average.

Class IV Prices

Methods of estimating FMMO Class IV prices used in this report are summarized in table 1.

FMMO Class IV price. During the 36 months, the FMMO Class IV price averaged $12.13 per hundredweight of milk (table 6). The price ranged from a low of $10.22 to a high of $15.59, a $5.37 difference. The standard deviation was $1.57 around the 36-month average price, and the coefficient of variation shows that the standard deviation was 13 percent of the monthly price.

Class IV price estimated using CME cash butter price. Class IV price for the current month is estimated following the FMMO price formulas and using weighted average cash sales prices of butter up to the last Friday on or before the fifth day of the following month. Nonfat dry milk price is as reported by NASS and as used in FMMO price calculation.

The estimated Class IV price using CME cash butter price averaged $12.20 per hundredweight over the 36-month period (table 6). The estimated Class IV price was $0.07 higher than the FMMO Class IV price, with the range of monthly difference being from $1.08 lower to $.68 higher.

The price ranged from a low of $10.29 to a high of $15.51, a $5.22 per hundredweight difference. The standard deviation of the estimated Class IV price was $1.54 and the coefficient of variation was 12.6 percent. The estimated Class III price tracked closely the FMMO Class III price.

Statistical test indicates that there is no significant difference between the estimated price series and the FMMO Class VI price series. The mean of the estimated price series is an unbiased estimate of the mean of its FMMO counterpart. The *F*-statistics (at 0.0320) is very small, while the *p*-value (at 0.8586) is very large.

Table 6--Comparison of Class IV prices, FMMO and estimated series, January 2000-December 2002

Dollars/cwt. of milk	Monthly average price	Estimate price: Higher (lower) than FMMO	Estimate price: Range of difference From	Estimate price: Range of difference To	Measures of price variation: Price range Low	Price range High	Range	Standard deviation	Coefficient of variation	*F*-statistic	*p*-value	Details in Appendix III
1. FMMO Class IV **--36 months**	12.13				10.22	15.59	5.37	1.57	12.9%			Table 6 & figure 6
Estimated based on CME cash butter price	12.20	0.07	(1.08)	0.68	10.29	15.51	5.22	1.54	12.6%	0.0320	0.8586	Table 6 & figure 6
2. FMMO Class IV **--27 months**	12.33				10.22	15.59	5.37	1.75	14.2%			Table 7 & figure 7
Estimated using simple average CME Class IV futures price	12.36	0.03	(0.44)	0.48	10.30	15.76	5.46	1.71	13.8%	0.0042	0.9489	Table 7 & figure 7
Estimated using weighted average CME Class IV futures price	12.38	0.05	(0.50)	0.48	10.31	15.80	5.49	1.71	13.8%	0.0122	0.9126	Table 8 & figure 8

Statistically speaking, the estimated price series and its FMMO counterpart are from the same population. (They may be said to be not from the same population if the *F*-statistic is greater than 3.9778 and the *p*-value is less than 0.05.)

The small difference between average estimated Class IV price and its FMMO counterpart reflects the small difference between average CME cash butter price and the average butter price reported by NASS (Appendix III table 3). (This may be due to the use of the same price series for the skim portion which accounts for nearly 65 percent of the milk price.)

Class IV price estimated using CME Class IV futures price. Class IV price for the current month is estimated using the CME Class IV futures prices of daily trading of current month's contracts up to the last Friday on or before the fifth day of the following month. Both simple average and weighted average are used. The weighted average uses actual trading volume as weight.

Using the simple average CME Class IV futures price to estimate the Class IV price, the 27-month period yielded an average price of $12.36 per hundredweight, $0.03 higher than the average FMMO Class IV price of $12.33. The monthly difference was also small, ranging from $0.44 lower to $0.48 higher (table 6).

The price ranged from a low of $10.30 per hundredweight to a high of $15.76, a $5.46 difference. The standard deviation of the estimated Class IV price was $1.71 and the coefficient of variation was 13.8 percent. The degree of price fluctuation differed little between the estimated Class IV price and the FMMO Class IV price.

Statistical test indicates that there is no significant difference between the estimated price series and the FMMO Class VI price series. The mean of the estimated price series is an unbiased estimate of the mean of its FMMO counterpart. The *F*-statistics (at 0.0042) is very small, while the *p*-value (at 0.9489) is very large. Statistically speaking, the estimated price series and its FMMO counterpart are from the same population. (They may be said to be not from the same population if the *F*-statistic is greater than 4.0266 and the *p*-value is less than 0.05.)

When the monthly weighted average CME Class IV futures price was used to estimate the Class IV price, the results were about the same as using simple average.

Conclusions

Over the study period, the differences between the average prices estimated using prices reported by various price discovery mechanisms and their respective FMMO counterparts were small. Measures of price variation (standard deviation and coefficient of variation) did not show much difference as well. Statistical tests indicate that the estimated price series and their respective FMMO counterparts were from the same population. (The mean of an estimated price series is an unbiased estimate of the mean of its FMMO counterpart.) However, when the individual monthly prices were compared, the range of difference between most estimated prices and their FMMO counterparts were quite substantial.

Trading at the CME spot and futures markets takes place daily (three times a week for cash butter), while wholesales prices reported to NASS is on a weekly basis. In the short run, market information embodied in the daily prices and the weekly prices may be somewhat different. NASS prices also have a 1-week lag behind the spot and futures price. These time differences may have resulted in substantial monthly differences between the estimated prices and the corresponding FMMO prices. However, in the long term, regardless of the price discovery mechanism used, all prices seem to reflect the same fundamental market forces and the average prices and the measures of price variation show little difference.

Reference

Federal Milk Order Price Information
(http://www.ams.usda.gov/dyfmos/mib/cls_prod_cmp_pr.htm)

Price Formulas - 2000

Note: Milk prices are per 100 pounds or cwt., rounded to the nearest cent. Component prices are per pound, rounded to nearest one-hundredth cent. Cheese, dry whey, butter, and nonfat dry milk prices are weighted averages of weekly NASS survey prices.

Class I:

Class I Price = (Class I skim milk price x 0.965) + (Class I butterfat price x 3.5).

Class I Skim Milk Price = Higher of advanced Class III or IV skim milk pricing factors + applicable Class I differential.

Class I Butterfat Price = Advanced butterfat pricing factor + (applicable Class I differential divided by 100).

Note: Advanced pricing factors are computed using applicable price formulas listed below, except that product price averages are for two weeks.

Class II:

Class II Price = (Class II skim milk price x 0.965) + (Class II butterfat price x 3.5).

Class II Skim Milk Price = Advanced Class IV skim milk pricing factor + $0.70.

Class II Butterfat Price = Butterfat price + $0.007.

Class II Nonfat Solids Price = Class II skim milk price divided by 9.

Class III:

Class III Price = (Class III skim milk price x 0.965) + (Butterfat price x 3.5).

Class III Skim Milk Price = (Protein price x 3.1) + (Other solids price x 5.9).

Protein Price = ((Cheese price - 0.1702) x 1.405) + ((((Cheese price - 0.1702) x 1.582) - Butterfat price) x 1.28).

Other Solids Price = (Dry whey price - 0.137) divided by 0.968.

Butterfat Price = (Butter price - 0.114) divided by 0.82.

Class IV:

Class IV Price = (Class IV skim milk price x 0.965) + (Butterfat price x 3.5).

Class IV Skim Milk Price = Nonfat solids price x 9.

Nonfat Solids Price = (Nonfat dry milk price - 0.137) divided by 1.02.

Butterfat Price = See Class III.

Producer Prices:

Butterfat Price = See Class III.

Protein Price = See Class III.

Others solids Price = See Class III.

Somatic Cell Adjustment Rate = Cheese price x 0.0005, rounded to fifth decimal place. Rate is per 1,000 somatic cell count.

Price Formulas - 2001

Note: Milk prices are per 100 pounds or cwt., rounded to the nearest cent. Component prices are per pound, rounded to nearest one-hundredth cent. Cheese, dry whey, butter, and nonfat dry milk prices are weighted monthly averages of weekly NASS survey prices, rounded to the nearest one-hundredth cent.

Class I: (January and February)

Class I Base Price (3.5%) = Higher of advanced Class III or IV pricing factors.

Base Skim Milk Price for Class I = Advanced skim milk pricing factor used to compute the Class I base price.

Base Butterfat Price for Class I = Advanced butterfat pricing factor used to compute the Class I base price.

Class I Price = Class I base price + applicable Class I differential.

Class I Butterfat Price = Base butterfat price for Class I + (applicable Class I differential divided by 100).

Class I: (March to date)

Class I Price = (Class I skim milk price x 0.965) + (Class I butterfat price x 3.5).

Class I Skim Milk Price = Higher of advanced Class III or IV skim milk pricing factors + applicable Class I differential.

Class I Butterfat Price = Advanced butterfat pricing factor+ (applicable Class I differential divided by 100).

Note: Advanced pricing factors are computed using applicable price formulas listed below, except that product price averages are for two weeks.

Class II:

Class II Price = (Class II skim milk price x 0.965) + (Class II butterfat price x 3.5).

Class II Skim Milk Price = Advanced Class IV skim milk pricing factor + $0.70.

Class II Butterfat Price = Butterfat price + $0.007.

Class II Nonfat Solids Price = Class II skim milk price divided by 9.

Class III:

Class III Price = (Class III skim milk price x 0.965) + (Butterfat price x 3.5).

Class III Skim Milk Price = (Protein price x 3.1) + (Other solids price x 5.9).

Protein Price (Jan./Feb. Advance Prices only.) = (Cheese price – 0.165) x 1.405.

Protein Price = ((Cheese price – 0.165) x 1.405 + ((((Cheese price – 0.165) x 1.582) - Butterfat price) x 1.28).

Other Solids Price = (Dry whey price – 0.14) divided by 0.968, snubbed at zero.

Class III Butterfat Price (Jan./Feb. Advance Prices only.) = (Cheese price – 0.165) x 1.582.

Butterfat Price = (Butter price – 0.115) divided by 0.82.

Class IV:

Class IV Price = (Class IV skim milk price x 0.965) + (Butterfat price x 3.5).

Class IV Skim Milk Price = Nonfat solids price x 9.

Nonfat Solids Price = Nonfat dry milk price - 0.14

Class IV Butterfat Price (Jan./Feb. Advance Prices only.) = (Butter price - 0.115) divided by 0.82.

Butterfat Price = See Class III.

Somatic Cell Adjustment Rate = Cheese price x 0.0005, rounded to fifth decimal place. Rate is per 1,000 somatic cell count difference from 350,000.

Price Formulas - 2002

Note: Milk prices are per 100 pounds or cwt., rounded to the nearest cent. Component prices are per pound, rounded to nearest one-hundredth cent. Cheese, dry whey, butter, and nonfat

dry milk prices are weighted monthly averages of weekly NASS survey prices, rounded to the nearest one-hundredth cent.

Class I:

Class I Price = (Class I skim milk price x 0.965) + (Class I butterfat price x 3.5).

Class I Skim Milk Price = Higher of advanced Class III or IV skim milk pricing factors + applicable Class I differential.

Class I Butterfat Price = Advanced butterfat pricing factor+ (applicable Class I differential divided by 100).

Note: Advanced pricing factors are computed using applicable price formulas listed below, except that product price averages are for two weeks.

Class II:

Class II Price = (Class II skim milk price x 0.965) + (Class II butterfat price x 3.5).

Class II Skim Milk Price = Advanced Class IV skim milk pricing factor + $0.70.

Class II Butterfat Price = Butterfat price + $0.007.

Class II Nonfat Solids Price = Class II skim milk price divided by 9.

Class III:

Class III Price = (Class III skim milk price x 0.965) + (Butterfat price x 3.5).

Class III Skim Milk Price = (Protein price x 3.1) + (Other solids price x 5.9).

Protein Price = ((Cheese price – 0.165) x 1.405 + ((((Cheese price – 0.165) x 1.582) - Butterfat price) x 1.28).

Other Solids Price = (Dry whey price – 0.14) divided by 0.968, snubbed at zero.

Butterfat Price = (Butter price – 0.115) divided by 0.82.

Class IV:

Class IV Price = (Class IV skim milk price x 0.965) + (Butterfat price x 3.5).

Class IV Skim Milk Price = Nonfat solids price x 9.

Nonfat Solids Price = Nonfat dry milk price - 0.14

Butterfat Price = See Class III.

Somatic Cell Adjustment Rate = Cheese price x 0.0005, rounded to fifth decimal place. Rate is per 1,000 somatic cell count difference from 350,000.

Appendixes

Appendix I—FMMO and estimated advanced Class III and advanced Class IV prices, tables 1-12 and figures 1-12

Appendix II—FMMO and estimated Class I base prices, tables 1-3 and figures 1-3

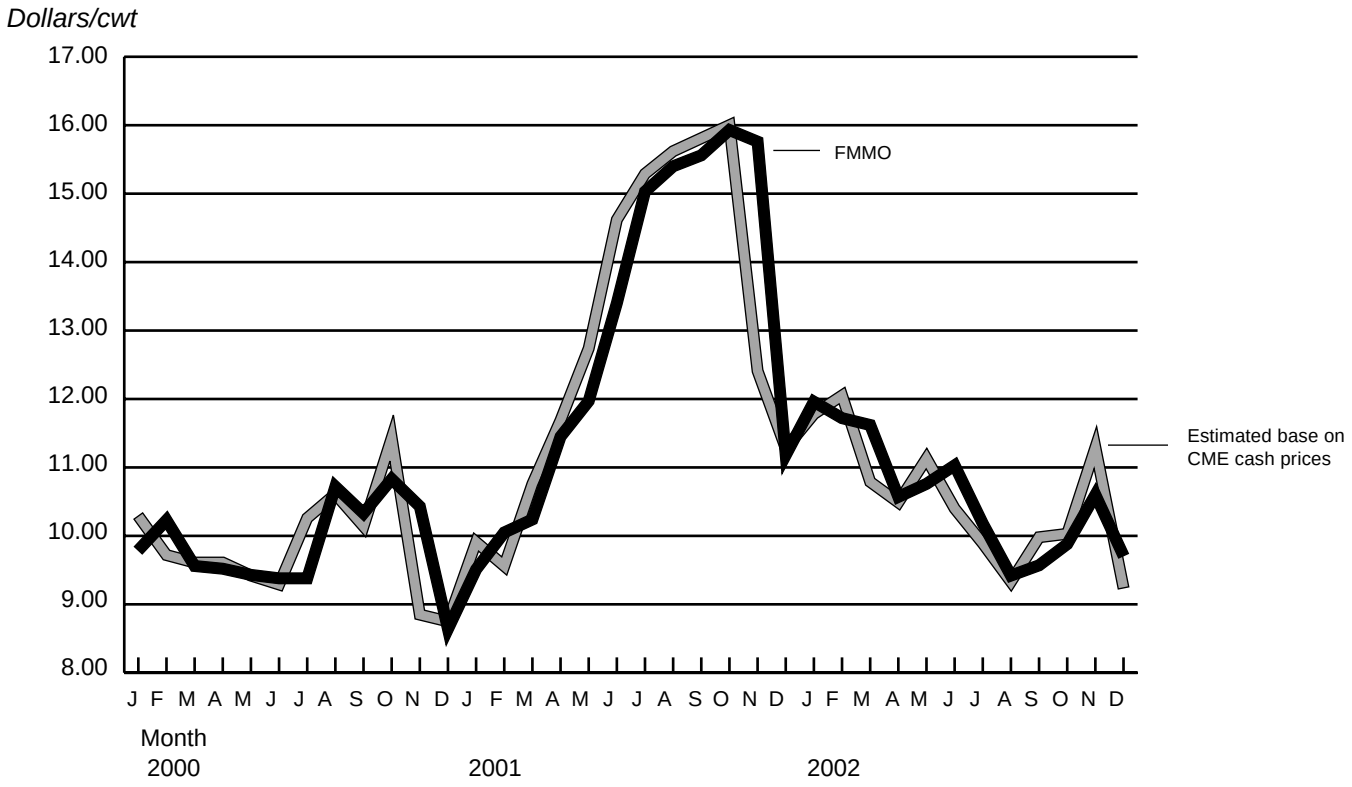
Appendix III—FMMO and estimated Class III and Class IV prices, tables 1-8 and figures 1-8

Appendix I table1—**FMMO advanced Class III price and estimate using CME cash cheese and butter prices and NASS dry whey price**

		Advanced Class III price (dollars/cwt)			Cheese (thousand pounds)	
Year	Month	FMMO	Estimated based on CME cash prices	Estimated over (under) FMMO	NASS survey[1]	CME[2]
2000	January	9.79	10.29	0.50	25,633	1,848
	February	10.23	9.72	(0.51)	26,835	924
	March	9.56	9.61	0.05	28,707	1,050
	April	9.52	9.61	0.09	31,765	1,344
	May	9.43	9.42	(0.01)	32,087	588
	June	9.38	9.29	(0.09)	32,676	1,176
	July	9.38	10.26	0.88	34,609	2,352
	August	10.72	10.61	(0.11)	29,329	3,486
	September	10.33	10.14	(0.19)	28,193	10,080
	October	10.83	11.43	0.60	24,740	12,348
	November	10.43	8.85	(1.58)	25,593	1,974
	December	8.64	8.75	0.11	25,022	1,890
2001	January	9.51	9.95	0.44	28,314	1,344
	February	10.05	9.57	(0.48)	26,155	1,260
	March	10.24	10.76	0.52	31,720	462
	April	11.45	11.80	0.35	29,026	420
	May	11.97	12.81	0.84	31,056	1,596
	June	13.40	14.83	1.43	31,347	1,302
	July	15.03	15.37	0.34	33,837	2,226
	August	15.40	15.65	0.25	30,964	966
	September	15.56	15.93	0.37	28,837	1,386
	October	15.93	16.00	0.07	32,174	840
	November	15.76	12.44	(3.32)	33,176	3,066
	December	11.18	11.38	0.20	35,037	4,956
2002	January	11.96	11.81	(0.15)	35,040	2,982
	February	11.72	12.07	0.35	38,080	1,428
	March	11.62	10.81	(0.81)	40,683	1,680
	April	10.57	10.58	0.01	36,255	294
	May	10.76	11.19	0.43	41,095	588
	June	11.03	10.45	(0.58)	38,802	546
	July	10.18	9.90	(0.28)	42,436	630
	August	9.42	9.36	(0.06)	36,326	2,436
	September	9.57	10.05	0.48	37,479	2,604
	October	9.88	10.08	0.20	37,633	5,418
	November	10.60	11.33	0.73	35,806	6,048
	December	9.71	9.28	(0.43)	37,610	1,512
	Simple average	11.13	11.15	0.02	32,613	2,363
	Range—low	8.64	8.15	(3.32)		
	Range—high	15.93	16.00	1.43		
	Standard deviation	2.03	2.05			
	% of average	18.2%	18.4%			
	F-statistic		0.0014			
	p-value		0.9706			

[1] Product pounds reported up to the price calculation date; may not be the same as the NASS final numbers.
[2] Converted from the number of lots of cheese traded, assuming 42,000 pounds per lot.

Appendix I figure 1— **FMMO Advanced Class III price and estimate using CME cash cheese and butter prices.**

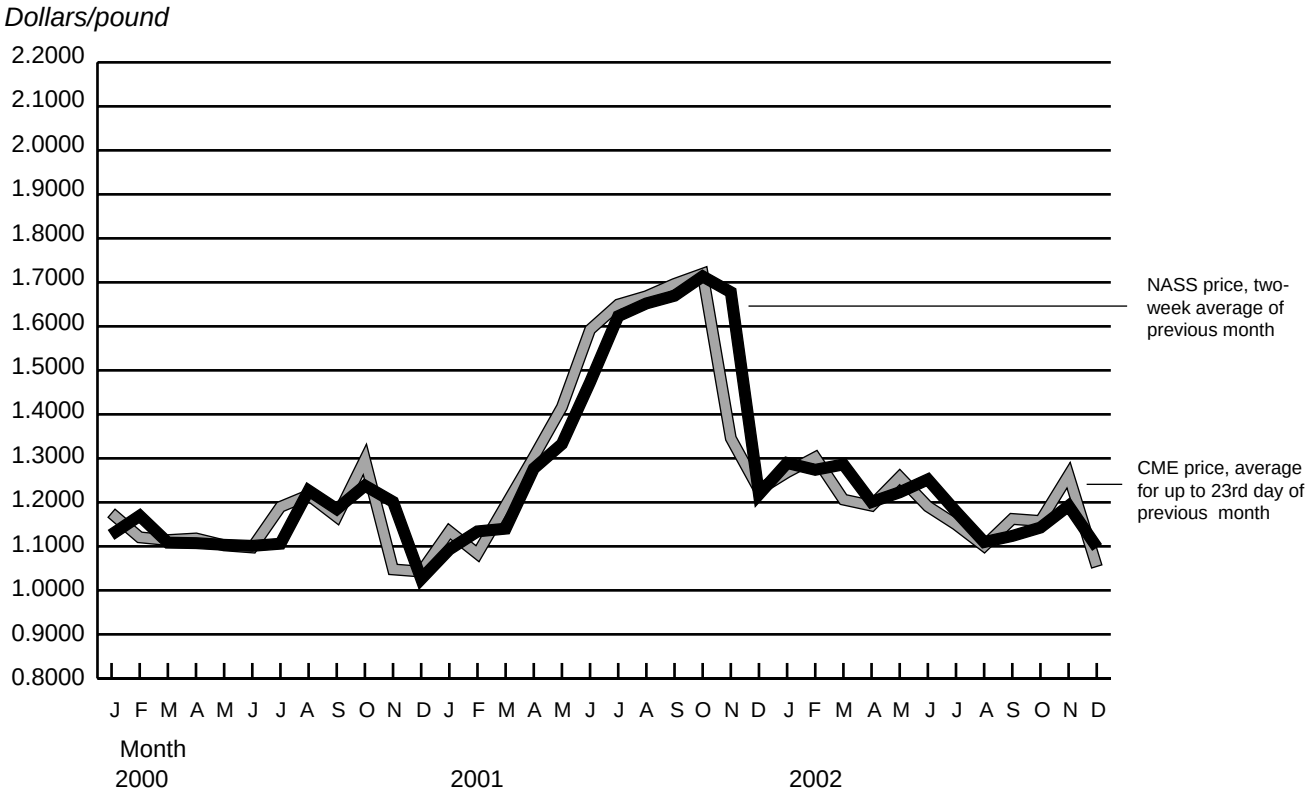


Appendix I table 2—**NASS and CME cheese prices for calculating advanced Class III price**

Year	Month	Cheese price (dollars/pound)			Cheese (thousand pounds)	
		NASS price, two-week average of previous month	CME price, average for up to 23rd day of previous month	CME price over (under) NASS	NASS survey[1]	CME[2]
2000	January	1.1268	1.1753	0.0485	25,633	1,848
	February	1.1696	1.1205	(0.0491)	26,835	924
	March	1.1084	1.1142	0.0058	28,707	1,050
	April	1.1073	1.1179	0.0106	31,765	1,344
	May	1.1035	1.1023	(0.0012)	32,087	588
	June	1.1011	1.0975	(0.0036)	32,676	1,176
	July	1.1060	1.1898	0.0838	34,609	2,352
	August	1.2269	1.2164	(0.0105)	29,329	3,486
	September	1.1847	1.1674	(0.0173)	28,193	10,080
	October	1.2380	1.2975	0.0595	24,740	12,348
	November	1.2012	1.0476	(0.1536)	25,593	1,974
	December	1.0259	1.0427	0.0168	25,022	1,890
2001	January	1.0930	1.1388	0.0458	28,314	1,344
	February	1.1340	1.0844	(0.0496)	26,155	1,260
	March	1.1402	1.1932	0.0530	31,720	462
	April	1.2769	1.3135	0.0366	29,026	420
	May	1.3326	1.4234	0.0908	31,056	1,596
	June	1.4731	1.6132	0.1401	31,347	1,302
	July	1.6232	1.6576	0.0344	33,837	2,226
	August	1.6521	1.6707	0.0186	30,964	966
	September	1.6696	1.7078	0.0382	28,837	1,386
	October	1.7136	1.7195	0.0059	32,174	840
	November	1.6777	1.3488	(0.3289)	33,176	3,066
	December	1.2182	1.2394	0.0212	35,037	4,956
2002	January	1.2895	1.2749	(0.0146)	35,040	2,982
	February	1.2740	1.3092	0.0352	38,080	1,428
	March	1.2862	1.2082	(0.0780)	40,683	1,680
	April	1.2008	1.2007	(0.0001)	36,255	294
	May	1.2229	1.2635	0.0406	41,095	588
	June	1.2521	1.1952	(0.0569)	38,802	546
	July	1.1792	1.1509	(0.0283)	42,436	630
	August	1.1098	1.1035	(0.0063)	36,326	2,436
	September	1.1237	1.1692	0.0455	37,479	2,604
	October	1.1427	1.1627	0.0200	37,633	5,418
	November	1.1921	1.2653	0.0732	35,806	6,048
	December	1.0985	1.0577	(0.0408)	37,610	1,512
	Simple average	1.2521	1.2545	0.0024	32,613	2,363
	Range—low	1.0259	1.0427	(0.3.289)		
	Range—high	1.7136	1.7195	0.1401		
	Standard deviation	0.1892	0.1917			
	% of average	15.1%	15.3%			
	F-statistic		0.0028			
	p-value		0.9581			

[1] Product pounds reported up to the price calculation date; may not be the same as the NASS final numbers.
[2] Converted from the number of lots of cheese traded, assuming 42,000 pounds per lot.

Appendix I figure 2— **NASS and CME cheese prices for calculating advanced Class III price**

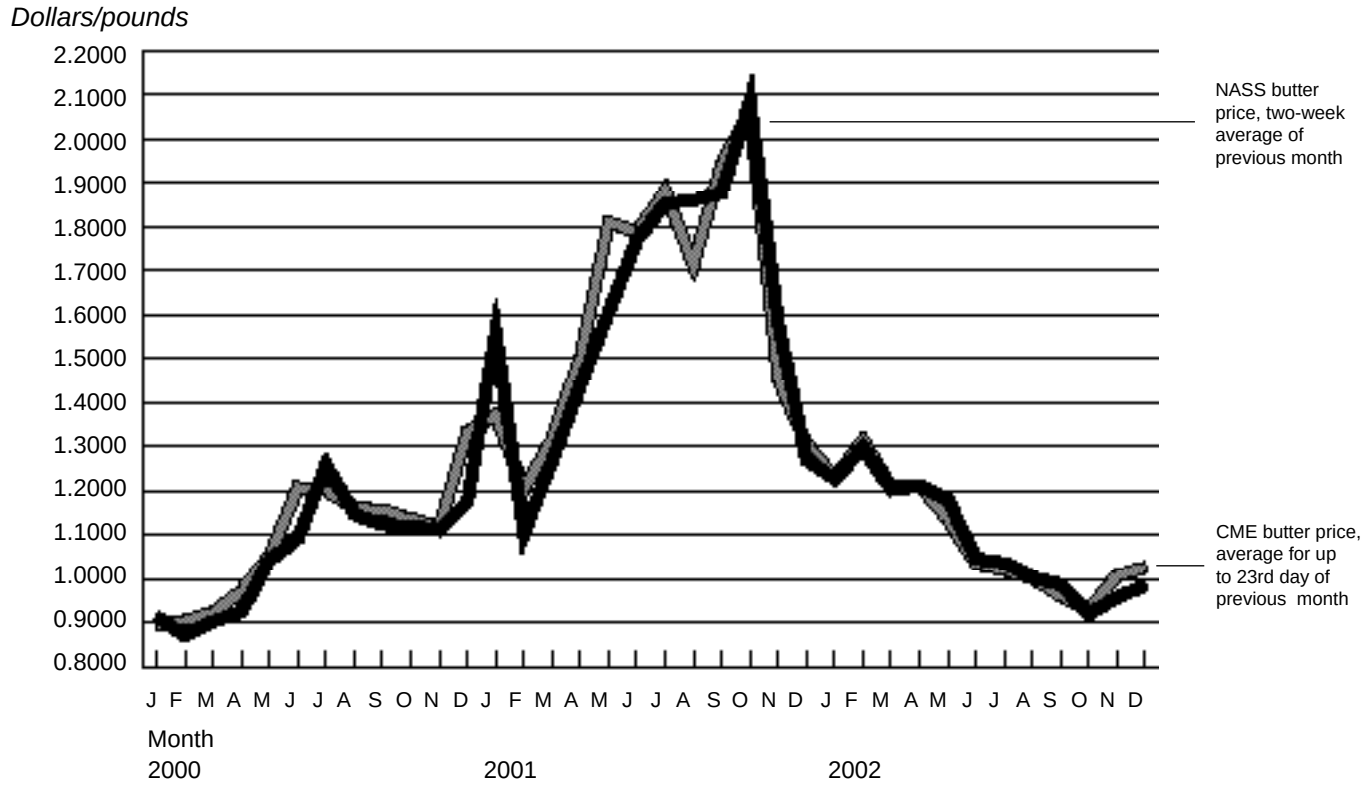


Appendix 1 table 3— **NASS and CME butter prices for calculating advanced butterfat prices**

Year	Month	Butter price (dollars/pound)			Butter (thousand pounds)	
		NASS price, two-week average of previous month	CME price, average for up to 23rd day of previous month	CME price over (under) NASS	NASS survey[1]	CME[2]
2000	January	0.9220	0.9027	(0.0193)	6.037	996
	February	0.8768	0.9127	0.0359	10,074	1,162
	March	0.9105	0.9329	0.0224	10.928	2,532
	April	0.9331	0.9848	0.0517	10,736	1,702
	May	1.0618	1,0704	0.0086	9,449	2,117
	June	1,1140	1.2369	0.1229	8,166	3,237
	July	1.2911	1.2308	(0.0603)	5,414	4,482
	August	1,1729	1.1884	0.0155	4,767	3,943
	September	1,1465	1,1829	0.0364	5,415	5,727
	October	1.1444	1.1618	0.0174	5,706	3,528
	November	1.1337	1.1410	0.0073	5,838	3,071
	December	1.2032	1.3719	0.1687	6.950	996
2001	January	1.6110	1.4113	(0.1997)	7,360	872
	February	1.1279	1.2344	0.1065	11,440	374
	March	1.3026	1.3539	0.0513	7,327	374
	April	1.4862	1.5560	0.0698	10,218	1,411
	May	1.6637	1.8819	0.2182	6,328	1,162
	June	1.8397	1.8577	0.0180	7,426	1,702
	July	1.9275	1.9570	0.0295	5,715	2,324
	August	1.9364	1.7794	(0.1570)	5,154	4,565
	September	1.9544	2.0249	0.0705	6,814	2,739
	October	2.1781	2.1516	(0.0265)	7,632	1,162
	November	1,6366	1.4990	(0.1376)	7,254	3,030
	December	1.3051	1.3422	0.0371	10,962	2,490
2002	January	1.2580	1.2600	0.0020	6,905	1,577
	February	1.335	1.3502	0.0167	9,178	1,660
	March	1.2316	1.2364	0.0048	10,885	1,204
	April	1.2411	1.2429	0.0018	8,232	996
	May	1.2088	1.1605	(0.0483)	9,109	1,702
	June	1.0643	1.0525	(0.0118)	7,942	3,569
	July	1.0533	1.0364	(0.0169)	6,169	2,656
	August	1.0188	1.0174	(0.0014)	6,302	872
	September	1.0010	0.9730	(0.0280)	7,880	1,992
	October	0.9297	0.9402	0.0105	6,470	4,773
	November	0.9697	1.0232	0.0535	8,372	8,342
	December	0.9991	1.0430	0.0439	8,397	8,840
	Simple average	1.2830	1.2973	0.0143	7,749	2,608
	Range—low	0.8768	0.9027	(0.1997)		
	Range—high	2.1781	2.1516	0.2182		
	Standard deviation	0.3434	0.3375			
	% of average	26.8%	26.0%			
	F-statistic		0.0317			
	p-value		0.8593			

[1] Product pounds reported up to the price calculation date; may not be the same as the NASS final numbers.
[2] Converted from the number of lots of butter traded, assuming 41,500 pounds per lot.

Appendix I figure 3— **NASS & CME butter prices for calculating advanced butterfat prices**

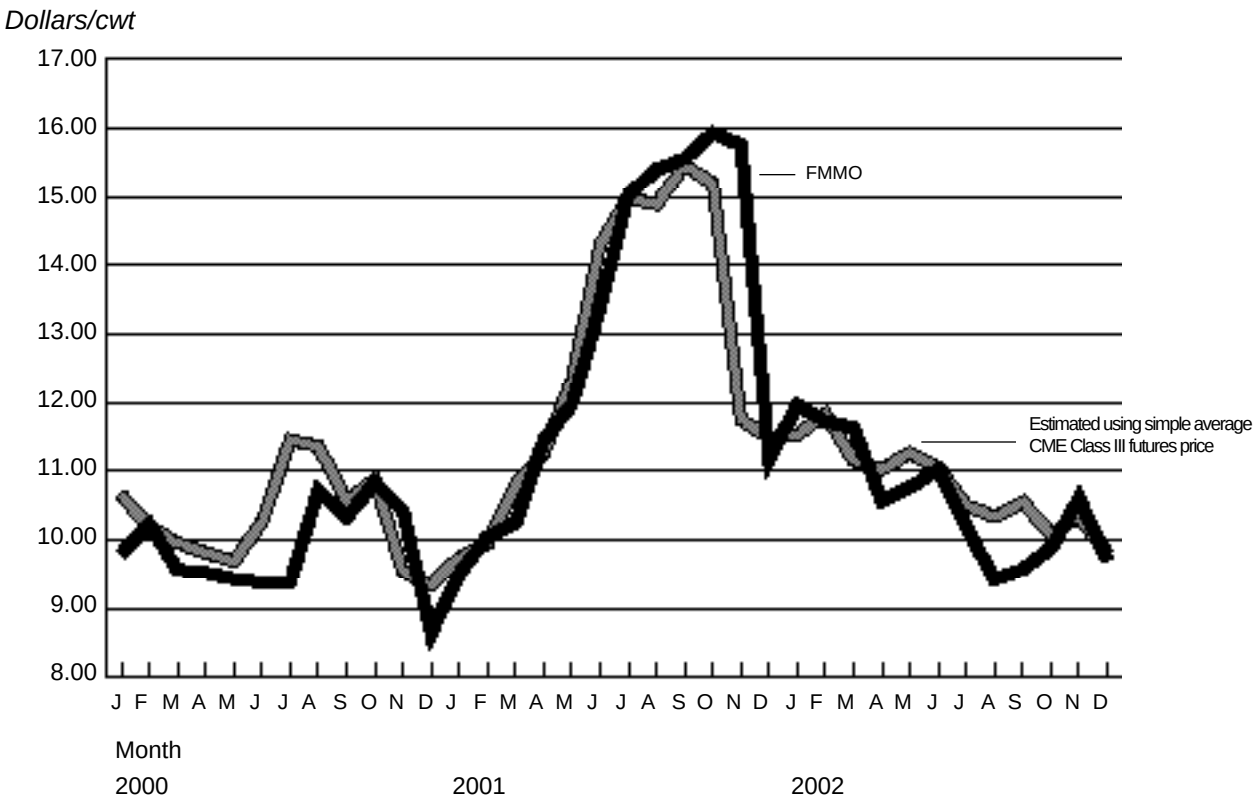


Appendix I table 4—**FMMO advanced Class III price and estimate using simple average Class III futures price (Alternative 1)**

Year	Month	Advanced Class III price (dollars/cwt) FMMO	Advanced Class III price (dollars/cwt) Estimated using simple average CME Class III futures price	Estimated over (under) FMMO	Milk volume (million pounds) of futures contracts traded[1]	Contract month (traded in previous month)
2000	January	9.79	10.65	0.86	76.2	January
	February	10.23	10.19	(0.04)	44.8	February
	March	9.56	9.96	0.40	54.2	March
	April	9.52	9.81	0.29	40.4	April
	May	9.43	9.69	0.26	35.2	May
	June	9.38	10.26	0.88	71.6	June
	July	9.38	11.45	2.07	138.8	July
	August	10.72	11.36	0.64	161.4	August
	September	10.33	10.57	0.24	108.2	September
	October	10.83	10.87	0.04	107.4	October
	November	10.43	9.54	(0.89)	64.4	November
	December	8.64	9.34	0.70	149.6	December
2001	January	9.51	9.74	0.23	43.0	January
	February	10.05	9.94	(0.11)	101.0	February
	March	10.24	10.80	0.56	155.4	March
	April	11.45	11.26	(0.19)	125.0	April
	May	11.97	12.33	0.36	151.0	May
	June	13.40	14.30	0.90	207.2	June
	July	15.03	14.98	(0.05)	266.4	July
	August	15.40	14.89	(0.51)	90.2	August
	September	15.56	15.46	(0.10)	161.0	September
	October	15.93	15.20	(0.73)	118.2	October
	November	15.76	11.74	(4.02)	259.0	November
	December	11.18	11.49	0.31	89.8	December
2002	January	11.96	11.53	(0.43)	99.6	January
	February	11.72	11.82	0.10	139.8	February
	March	11.62	11.15	(0.47)	182.0	March
	April	10.57	11.03	0.46	192.0	April
	May	10.76	11.26	0.50	147.0	May
	June	11.03	11.05	0.02	161.8	June
	July	10.18	10.50	0.32	188.0	July
	August	9.42	10.34	0.92	211.8	August
	September	9.57	10.55	0.98	236.0	September
	October	9.88	10.08	0.20	133.6	October
	November	10.60	10.34	(0.26)	205.0	November
	December	9.71	9.80	0.09	102.80	December
	Simple average	11.13	11.26	0.13	133.9	
	Range—low	8.64	9.34	(4.02)		
	Range—high	15.93	15.46	2.07		
	Standard deviation	2.03	1.67			
	% of average	18.2%	14.8%			
	F-statistic		0.0824			
	p-value		0.7750			

[1] Each contract is 200,000 pounds of milk.

Appendix I figure 4— **FMMO advanced Class III price and estimate using simple average Class III futures price (Alternative 1)**

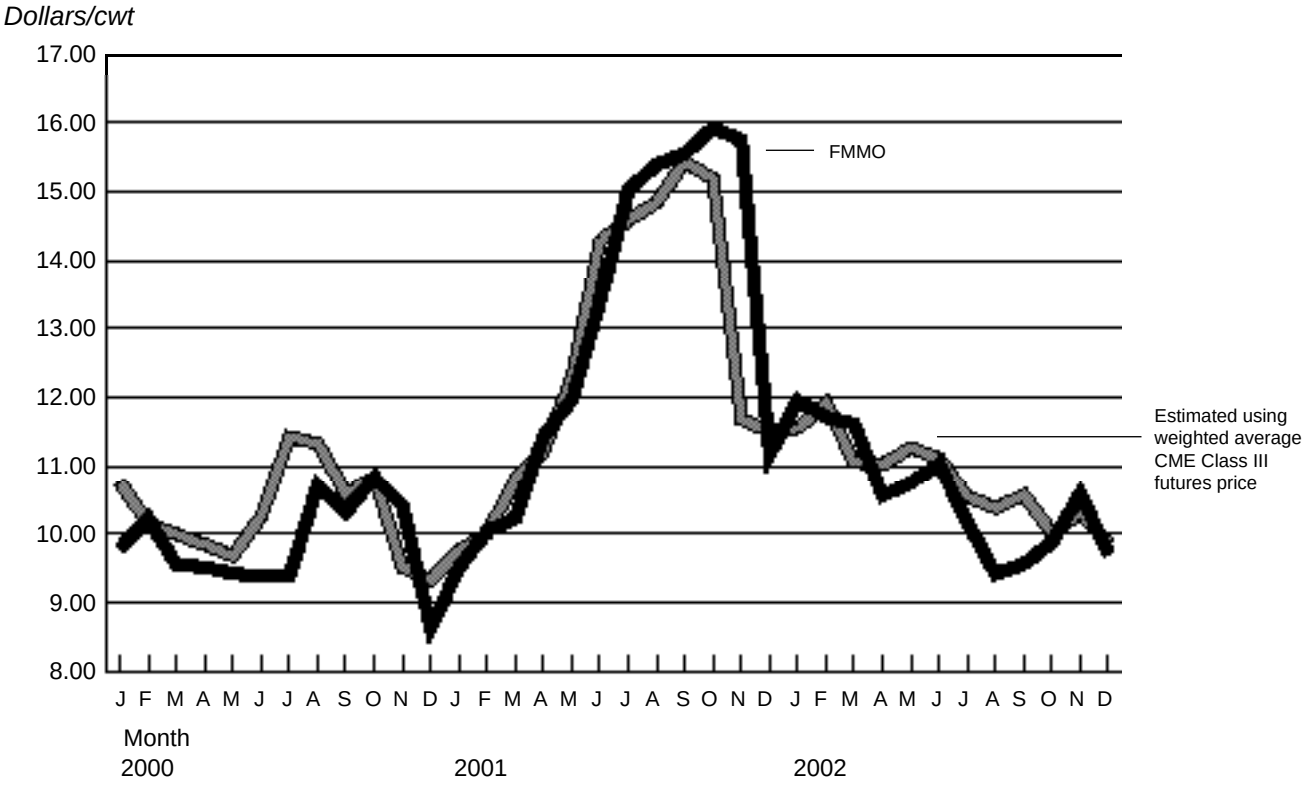


Appendix I table 5—**FMMO advanced Class III price and estimate using weighted average Class III futures price (Alternative 1)**

Year	Month	Advanced Class III price (dollars/cwt) FMMO	Estimated using weighted average CME Class III futures price[1]	Estimated over (under) FMMO	Milk volume (million pounds) of futures contracts traded[2]	Contract month (traded in previous month)
2000	January	9.79	10.76	0.97	76.2	January
	February	10.23	10.16	(0.07)	44.8	February
	March	9.56	10.00	0.44	54.2	March
	April	9.52	9.85	0.33	40.4	April
	May	9.43	9.69	0.26	35.2	May
	June	9.38	10.26	0.88	71.6	June
	July	9.38	11.43	2.05	138.8	July
	August	10.72	11.34	0.62	161.4	August
	September	10.33	10.60	0.27	108.2	September
	October	10.83	10.84	0.01	107.4	October
	November	10.43	9.52	(0.91)	64.4	November
	December	8.64	9.34	0.70	149.6	December
2001	January	9.51	9.76	0.25	43.0	January
	February	10.05	10.01	(0.04)	101.0	February
	March	10.24	10.81	0.57	155.4	March
	April	11.45	11.23	(0.22)	125.0	April
	May	11.97	12.29	0.32	151.0	May
	June	13.40	14.29	0.89	207.2	June
	July	15.03	14.59	(0.44)	266.4	July
	August	15.40	14.85	(0.55)	90.2	August
	September	15.56	15.44	(0.12)	161.0	September
	October	15.93	15.19	(0.74)	118.2	October
	November	15.76	11.69	(4.07)	259.0	November
	December	11.18	11.51	0.33	89.8	December
2002	January	11.96	11.56	(0.40)	99.6	January
	February	11.72	11.91	0.19	139.8	February
	March	11.62	11.06	(0.56)	182.0	March
	April	10.57	11.03	0.46	192.2	April
	May	10.76	11.27	0.51	147.0	May
	June	11.03	11.12	0.09	161.8	June
	July	10.18	10.55	0.37	188.0	July
	August	9.42	10.39	0.97	211.8	August
	September	9.57	10.57	1.00	236.0	September
	October	9.88	10.02	0.14	133.6	October
	November	10.60	10.32	(0.28)	205.0	November
	December	9.71	9.86	0.15	102.8	December
	Simple average	11.13	11.25	0.12	133.9	
	Range—low	8.64	9.34	(4.07)		
	Range—high	15.93	15.44	2.05		
	Standard deviation	2.03	1.64			
	% of average	18.2%	14.6%			
	F-statistic		0.0779			
	p-value		0.7809			

[1] Weighted by volume traded.
[2] Each contract is 200,000 pounds of milk

Appendix I figure 5— **FMMO advanced Class III price and estimate using weighted average Class III futures price (Alternative 1).**

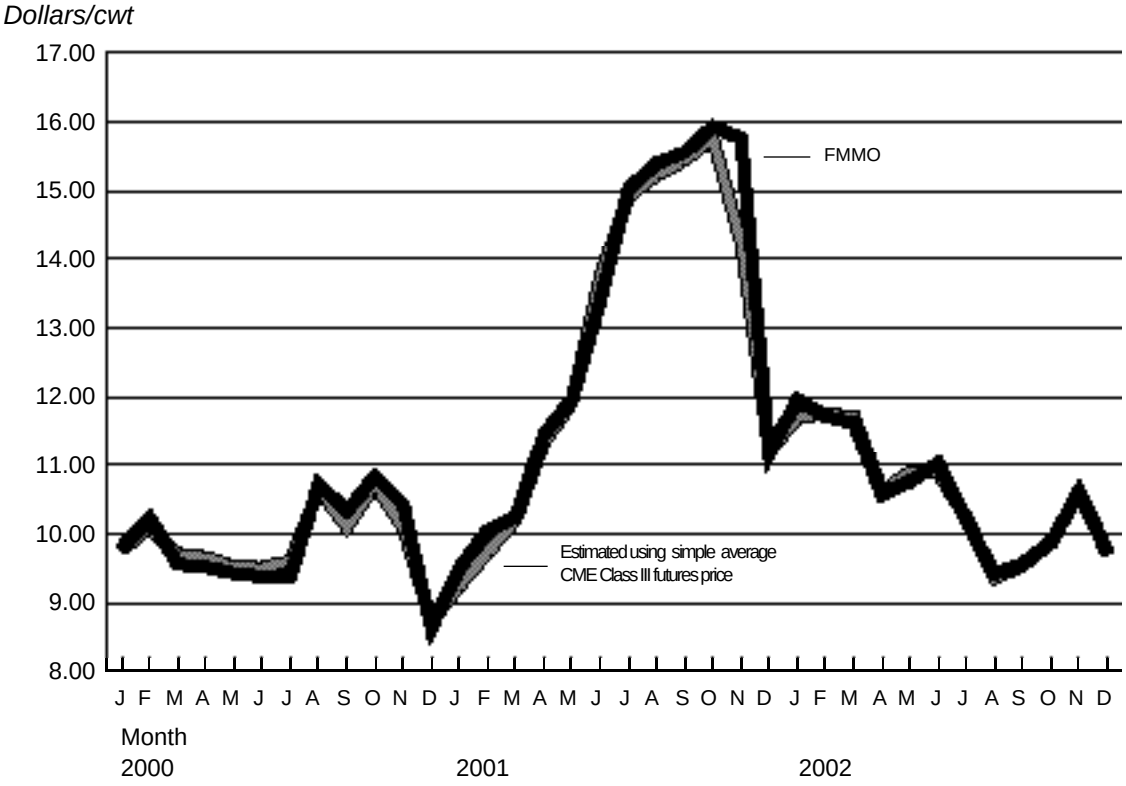


Appendix I table 6—**FMMO advanced Class III price and estimate using simple average Class III futures price (Alternative 2)**

Year	Month	Advanced Class III price (dollars/cwt)			Milk volume (million pounds) of futures contracts traded[1]	Contract month
		FMMO	Estimated using simple average CME Class III futures price	Estimated over (under) FMMO		
2000	January	9.79	9.77	(0.02)	66.2	December
	February	10.23	10.09	(0.14)	35.8	January
	March	9.56	9.71	0.15	129.6	February
	April	9.52	9.66	0.14	27.6	March
	May	9.43	9.52	0.09	27.6	April
	June	9.38	9.51	0.13	23.4	May
	July	9.38	9.61	0.23	66.6	June
	August	10.72	10.64	(0.08)	60.8	July
	September	10.33	10.11	(0.22)	54.4	August
	October	10.83	10.71	(0.12)	54.2	September
	November	10.43	10.10	(0.33)	135.4	October
	December	8.64	8.74	0.10	46.0	November
2001	January	9.51	9.25	(0.26)	40.2	December
	February	10.05	9.73	(0.32)	63.6	January
	March	10.24	10.21	(0.03)	60.8	February
	April	11.45	11.34	(0.11)	78.8	March
	May	11.97	11.93	(0.04)	110.8	April
	June	13.40	13.75	0.35	121.6	May
	July	15.03	14.92	(0.11)	173.6	June
	August	15.40	15.23	(0.17)	70.0	July
	September	15.56	15.45	(0.11)	64.8	August
	October	15.93	15.76	(0.17)	36.4	September
	November	15.76	14.25	(1.51)	270.2	October
	December	11.18	11.22	0.04	36.6	November
2002	January	11.96	11.70	(0.26)	41.8	December
	February	11.72	11.76	0.04	76.8	January
	March	11.62	11.71	0.09	116.0	February
	April	10.57	10.61	0.04	58.2	March
	May	10.76	10.90	0.14	125.6	April
	June	11.03	10.88	(0.15)	131.8	May
	July	10.18	10.24	0.06	46.0	June
	August	9.42	9.36	(0.06)	47.2	July
	September	9.57	9.55	(0.02)	263.8	August
	October	9.88	9.87	(0.01)	44.8	September
	November	10.60	10.62	0.02	59.8	October
	December	9.71	9.75	0.04	115.8	November
	Simple average	11.13	11.06	(0.07)	82.9	
	Range—low	8.64	8.74	(1.51)		
	Range—high	15.93	15.76	0.35		
	Standard deviation	2.03	1.92			
	% of average	18.2%	17.4%			
	F-statistic		0.0237			
	p-value		0.8782			

[1] Each contract is 200,000 pounds of milk.

Appendix I figure 6— **FMMO advanced Class III price and estimate using simple average Class III futures price (Alternative 2)**

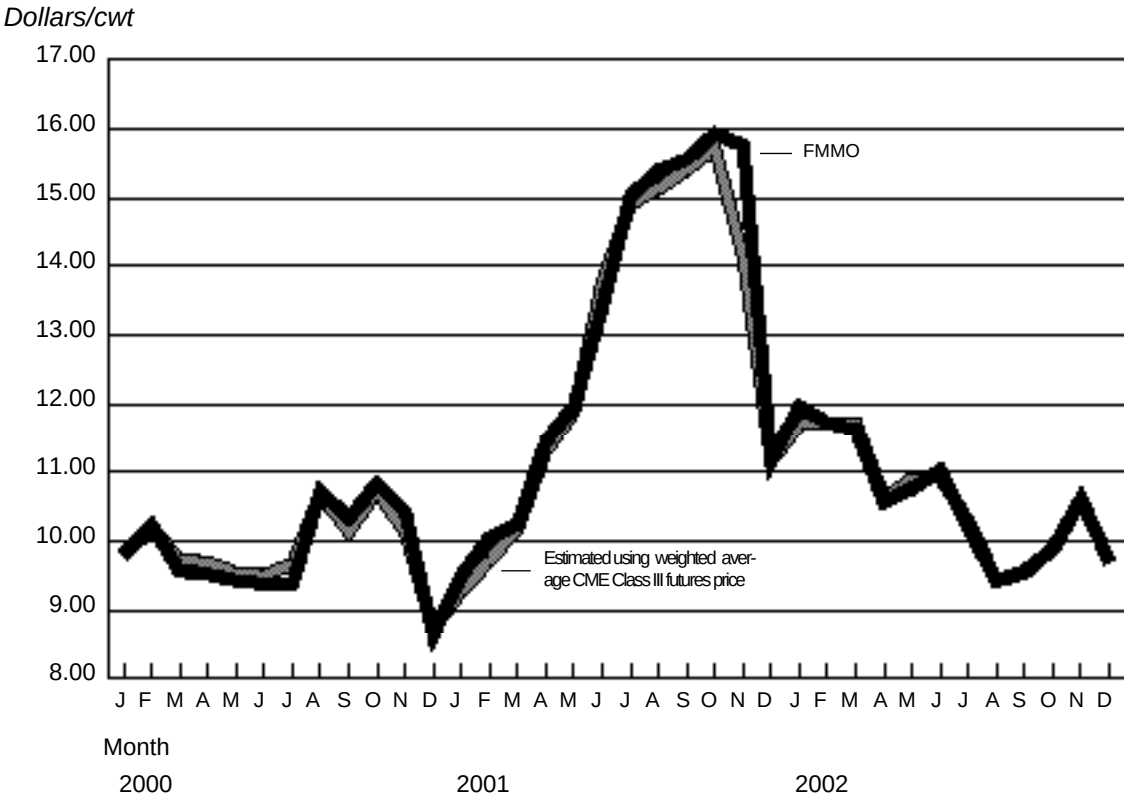


Appendix I table 7—**FMMO advanced Class III price and estimate using weighted average Class III futures price (Alternative 2)**

Year	Month	Advanced Class III price (dollars/cwt) FMMO	Estimated using weighted average CME Class III futures price[1]	Estimated over (under) FMMO	Milk volume (million pounds) of futures contracts traded[2]	Contract month
2000	January	9.79	9.81	0.02	66.2	December
	February	10.23	10.17	(0.06)	35.8	January
	March	9.56	9.74	0.18	129.6	February
	April	9.52	9.69	0.17	27.6	March
	May	9.43	9.54	0.11	27.6	April
	June	9.38	9.51	0.13	23.4	May
	July	9.38	9.67	0.29	66.6	June
	August	10.72	10.68	(0.04)	60.8	July
	September	10.33	10.14	(0.19)	54.4	August
	October	10.83	10.72	(0.11)	54.2	September
	November	10.43	10.14	(0.29)	135.4	October
	December	8.64	8.73	0.09	46.0	November
2001	January	9.51	9.28	(0.23)	40.2	December
	February	10.05	9.72	(0.33)	63.6	January
	March	10.24	10.20	(0.04)	60.8	February
	April	11.45	11.32	(0.13)	78.8	March
	May	11.97	11.89	(0.08)	110.8	April
	June	13.40	13.76	0.36	121.6	May
	July	15.03	14.91	(0.12)	173.6	June
	August	15.40	15.14	(0.26)	70.0	July
	September	15.56	15.41	(0.15)	64.8	August
	October	15.93	15.73	(0.20)	36.4	September
	November	15.76	14.14	(1.62)	270.2	October
	December	11.18	11.17	(0.01)	36.6	November
2002	January	11.96	11.70	(0.26)	41.8	December
	February	11.72	11.73	0.01	76.8	January
	March	11.62	11.72	0.10	116.0	February
	April	10.57	10.61	0.04	58.2	March
	May	10.76	10.91	0.15	125.6	April
	June	11.03	10.92	(0.11)	131.8	May
	July	10.18	10.28	0.10	46.0	June
	August	9.42	9.42	-	47.2	July
	September	9.57	9.54	(0.03)	263.8	August
	October	9.88	9.89	0.01	44.8	September
	November	10.60	10.61	0.01	59.8	October
	December	9.71	9.70	(0.01)	115.8	November
	Simple average	11.13	11.06	(0.07)	82.9	
	Range—low	8.64	8.73	(1.62)		
	Range—high	15.93	15.73	0.36		
	Standard deviation	2.03	1.90			
	% of average	18.2%	17.2%			
	F-statistic		0.0225			
	p-value		0.8812			

[1] Weighted by volume traded.
[2] Each contract is 200,000 pounds of milk.

Appendix I figure 7— **FMMO advanced Class III price and estimate using weighted average Class III futures price (Alternative 2)**

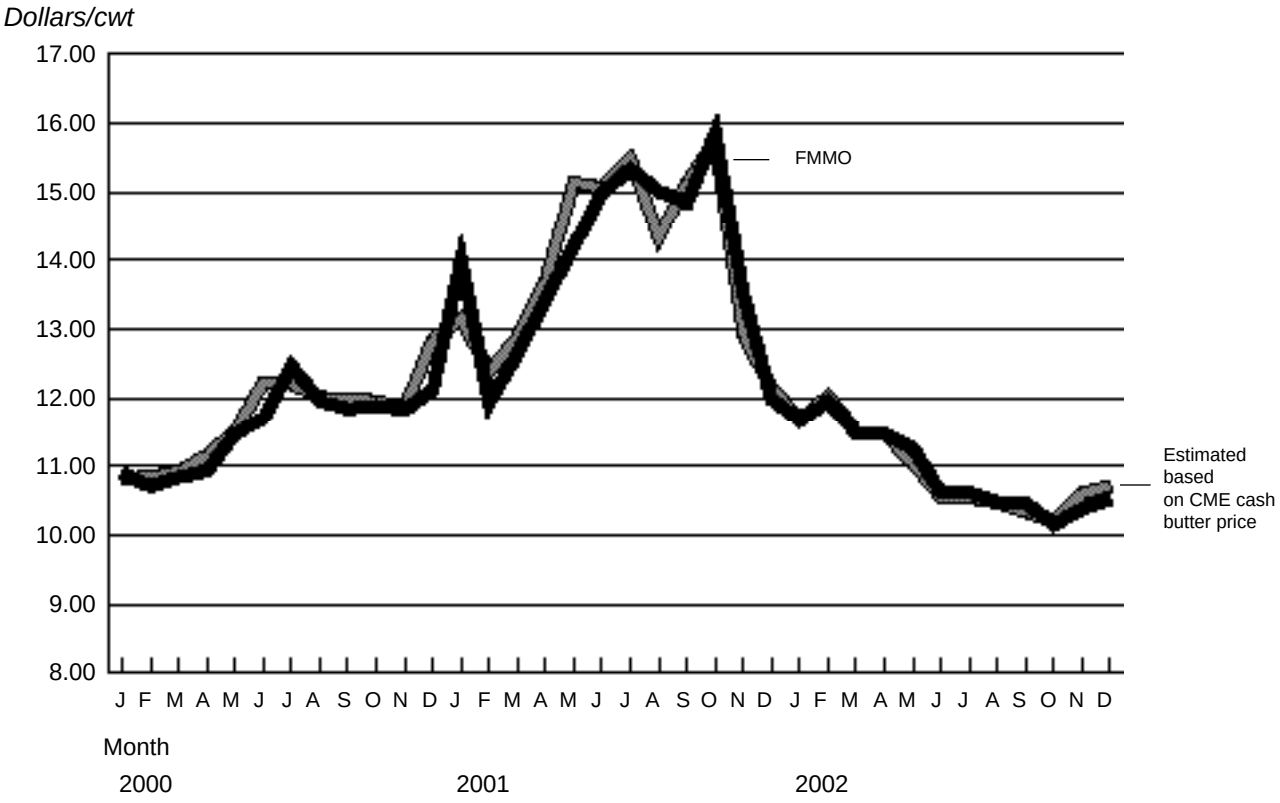


Appendix I table 8—**FMMO advanced Class IV price and estimate using CME cash butter price and NASS nonfat dry milk price**

Year	Month	Advanced Class IV price (dollars/cwt)			Butter (thousand pounds)	
		FMMO	Estimated based on CME cash butter price	Estimated over (under) FMMO	NASS survey[1]	CME[2]
2000	January	10.90	10.82	(0.08)	6,037	996
	February	10.71	10.85	0.14	10,074	1,162
	March	10.84	10.93	0.09	10,928	2,532
	April	10.93	11.15	0.22	10,736	1,702
	May	11.48	11.51	0.03	9,449	2,117
	June	11.70	12.23	0.53	8,166	3,237
	July	12.46	12.21	(0.25)	5,414	4,482
	August	11.95	12.01	0.06	4,767	3,943
	September	11.84	11.99	0.15	5,415	5,727
	October	11.89	11.96	0.07	5,706	3,528
	November	11.82	11.85	0.03	5,838	3,071
	December	12.13	12.85	0.72	6,950	996
2001	January	13.99	13.14	(0.85)	7,360	872
	February	11.94	12.40	0.46	11,440	374
	March	12.65	12.87	0.22	7,327	374
	April	13.44	13.73	0.29	10,218	1,411
	May	14.21	15.14	0.93	6,328	1,162
	June	14.99	15.06	0.07	7,426	1,702
	July	15.34	15.47	0.13	5,715	2,324
	August	15.01	14.34	(0.67)	5,154	4,565
	September	14.84	15.14	0.30	6,814	2,739
	October	15.85	15.73	(0.12)	7,632	1,162
	November	13.50	12.91	(0.59)	7,254	3,030
	December	11.98	12.14	0.16	10,962	2,490
2002	January	11.67	11.68	0.01	6,905	1,577
	February	11.95	12.02	0.07	9,178	1,660
	March	11.48	11.50	0.02	10,885	1,204
	April	11.47	11.48	0.01	8,232	996
	May	11.26	11.05	(0.21)	9,109	1,702
	June	10.61	10.56	(0.05)	7,942	3,569
	July	10.62	10.54	(0.08)	6,169	2,656
	August	10.48	10.47	(0.01)	6,302	872
	September	10.46	10.34	(0.12)	7,880	1,992
	October	10.15	10.19	0.04	6,470	4,773
	November	10.39	10.61	0.22	8,372	8,342
	December	10.52	10.71	0.19	8,397	8,840
	Simple average	12.15	12.21	0.06	7,749	2,608
	Range—low	10.15	10.19	(0.85)		
	Range—high	15.85	15.73	0.93		
	Standard deviation	1.59	1.59			
	% of average	13.1%	13.0%			
	F-statistic		0.0249			
	p-value		0.8751			

[1] Product pounds reported up to the price calculation date; may not be the same as the NASS final numbers.
[2] Converted from the number of lots of butter traded, assuming 41,500 pounds per lot.

Appendix I figure 8— **FMMO advanced Class IV price and estimate using CME cash butter price and NASS nonfat dry milk price.**

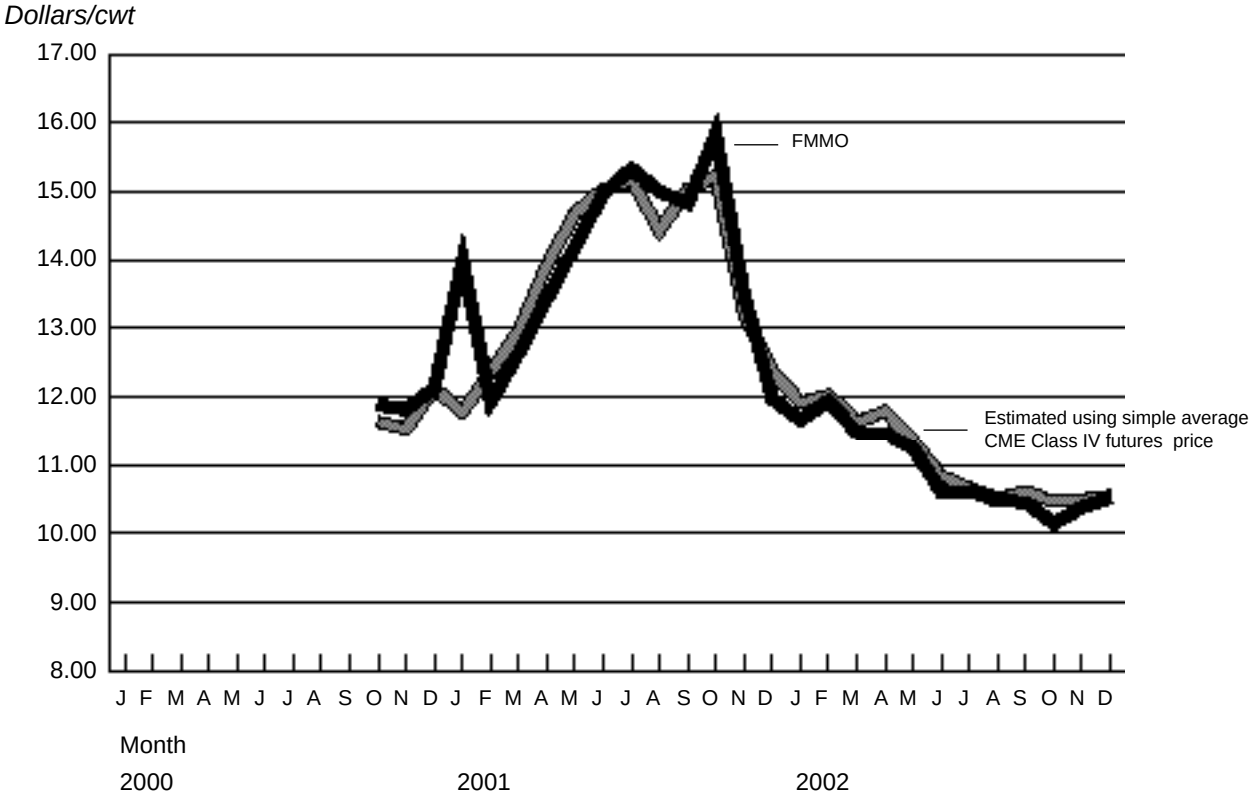


Appendix I table 9—**FMMO advanced Class IV price and estimate using simple average Class IV futures price (Alternative 1)**

Year	Month	Advanced Class IV price (dollars/cwt) FMMO	Advanced Class IV price (dollars/cwt) Estimated using simple average CME Class IV futures price	Estimated over (under) FMMO	Milk volume (million pounds) of futures contracts traded[1]	Contract month (traded in previous month)
2000	January					
	February					
	March					
	April					
	May					
	June					
	July					
	August					
	September					
	October	11.89	11.64	(0.25)	8.0	October
	November	11.82	11.54	(0.28)	1.0	November
	December	12.13	12.13	-	50.0	December
2001	January	13.99	11.79	(2.20)	22.6	January
	February	11.94	12.36	0.42	8.4	February
	March	12.65	12.97	0.32	13.8	March
	April	13.44	13.94	0.50	8.4	April
	May	14.21	14.70	0.49	15.0	May
	June	14.99	15.04	0.05	6.4	June
	July	15.34	15.17	(0.17)	3.4	July
	August	15.01	14.45	(0.56)	1.2	August
	September	14.84	15.04	0.20	4.8	September
	October	15.85	15.23	(0.62)	0.6	October
	November	13.50	13.20	(0.30)	8.2	November
	December	11.98	12.38	0.40	3.2	December
2002	January	11.67	11.93	0.26	4.4	January
	February	11.95	12.03	0.08	10.2	February
	March	11.48	11.64	0.16	12.8	March
	April	11.47	11.79	0.32	3.2	April
	May	11.26	11.35	0.09	3.2	May
	June	10.61	10.84	0.23	28.4	June
	July	10.62	10.66	0.04	9.4	July
	August	10.48	10.51	0.03	-	August
	September	10.46	10.61	0.15	2.2	September
	October	10.15	10.47	0.32	0.2	October
	November	10.39	10.50	0.11	-	November
	December	10.52	10.55	0.03	-	December
	Simple average	12.39	12.39	0.00	8.5	
	Range—low	10.15	10.47	(2.20)		
	Range—high	15.85	15.23	0.50		
	Standard deviation	1.75	1.64			
	% of average	14.1%	13.2%			
	F-statistic		0.0002			
	p-value		0.9885			

[1] Each contract is 200,000 pounds of milk.

Appendix I figure 9— **FMMO advanced Class IV price and estimate using simple average Class IV futures price (Alternative 1)**



Appendix I table 10—**FMMO advanced Class IV price and estimate using weighted average Class IV futures price (Alternative 1)**

Year	Month	Advanced Class IV price (dollars/cwt) FMMO	Estimated using weighted average CME Class IV futures price[1]	Estimated over (under) FMMO	Milk volume (million pounds) of futures contracts traded[2]	Contract month (traded in previous month)
2000	January					
	February					
	March					
	April					
	May					
	June					
	July					
	August					
	September					
	October	11.89	11.61	(0.28)	8.0	October
	November	11.82	11.55	(0.27)	1.0	November
	December	12.13	12.24	0.11	50.0	December
2001	January	13.99	11.74	(2.25)	22.6	January
	February	11.94	12.22	0.28	8.4	February
	March	12.65	12.93	0.28	13.8	March
	April	13.44	14.05	0.61	8.4	April
	May	14.21	14.63	0.42	15.0	May
	June	14.99	14.97	(0.02)	6.4	June
	July	15.34	15.01	(0.33)	3.4	July
	August	15.01	14.62	(0.39)	1.2	August
	September	14.84	15.03	0.19	4.8	September
	October	15.85	15.32	(0.53)	0.6	October
	November	13.50	13.19	(0.31)	8.2	November
	December	11.98	12.34	0.36	3.2	December
2002	January	11.67	11.93	0.26	4.4	January
	February	11.95	12.05	0.10	10.2	February
	March	11.48	11.67	0.19	12.8	March
	April	11.47	11.86	0.39	3.2	April
	May	11.26	11.46	0.20	3.2	May
	June	10.61	10.80	0.19	28.4	June
	July	10.62	10.68	0.06	9.4	July
	August[3]	10.48	10.51	0.03	-	August
	September	10.46	10.68	0.22	2.2	September
	October	10.15	10.42	0.27	0.2	Octobe
	November[3]	10.39	10.50	0.11	-	November
	December[3]	10.52	10.55	0.03	-	December
	Simple average	12.39	12.39	0.00	8.5	
	Range—low	10.15	10.42	(2.25)		
	Range—high	15.85	15.32	0.61		
	Standard deviation	1.75	1.63			
	% of average	14.1%	13.2%			
	F-statistic		0.0000			
	p-value		0.9949			

[1] Weighted by volume traded.
[2] Each contract is 200,000 pounds of milk.
[3] No weighted average price, because no contract was traded; use simple average instead.

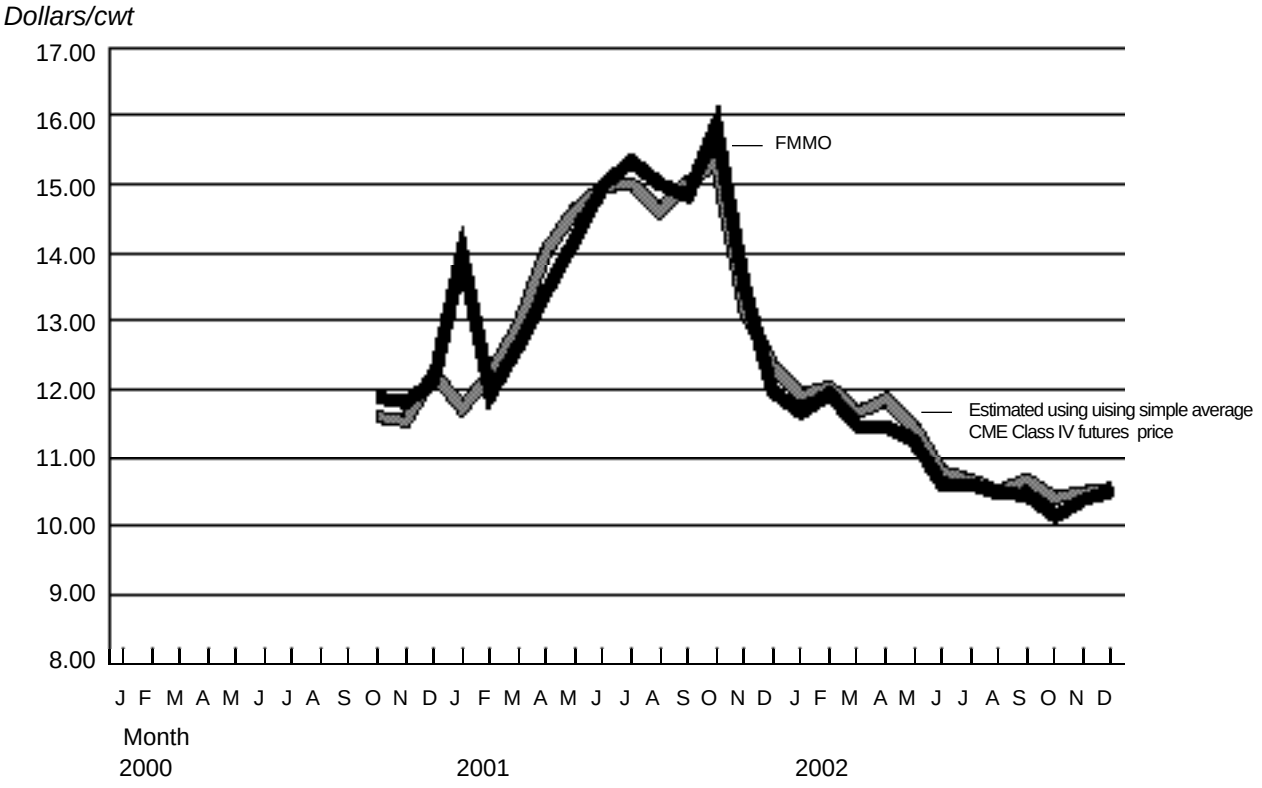
Appendix I figure 10— **FMMO advanced Class IV price and estimate using weighted average Class IV futures price (Alternative 1)**

Appendix I table 11—**FMMO advanced Class IV price and estimate using simple average Class IV futures price (Alternative 2)**

Year	Month	Advanced Class IV base price (dollars/cwt) FMMO	Estimated using simple average CME Class IV futures price	Estimated over (under) FMMO	Milk volume (million pounds) of futures contracts traded[1]	Contract month
2000	January					
	February					
	March					
	April					
	May					
	June					
	July					
	August					
	September					
	October					
	November	11.82	11.62	(0.20)	0.8	October
	December	12.13	12.43	0.30	31.6	November
2001	January	13.99	13.42	(0.57)	43.8	December
	February	11.94	12.08	0.14	9.2	January
	March	12.65	12.67	0.02	18.2	February
	April	13.44	13.40	(0.04)	6.2	March
	May	14.21	14.35	0.14	11.6	April
	June	14.99	14.87	(0.12)	5.8	May
	July	15.34	15.12	(0.22)	2.6	June
	August	15.01	14.92	(0.09)	22.0	July
	September	14.84	14.89	0.05	6.4	August
	October	15.85	15.78	(0.07)	0.2	September
	November	13.50	13.39	(0.11)	0.4	October
	December	11.98	12.05	0.07	4.4	November
2002	January	11.67	11.94	0.27	-	December
	February	11.95	12.08	0.13	0.4	January
	March	11.48	11.76	0.28	1.2	February
	April	11.47	11.59	0.12	9.2	March
	May	11.26	11.38	0.12	7.0	April
	June	10.61	10.74	0.13	20.4	May
	July	10.62	10.61	(0.01)	8.8	June
	August	10.48	10.50	0.02	4.0	July
	September	10.46	10.56	0.10	5.0	August
	October	10.15	10.44	0.29	-	September
	November	10.39	10.30	(0.09)	-	October
	December	10.52	10.50	(0.02)	-	November
	Simple average	12.41	12.44	0.03	8.4	
	Range—low	10.15	10.30	(0.57)		
	Range—high	15.85	15.78	0.30		
	Standard deviation	1.78	1.70			
	% of average	14.3%	13.7%			
	F-statistic		0.0026			
	p-value		0.9595			

[1] Each contract is 200,000 pounds of milk.

Appendix I figure 11— **FMMO advanced Class IV price and estimate using simple average Class IV futures price (Alternative 2)**

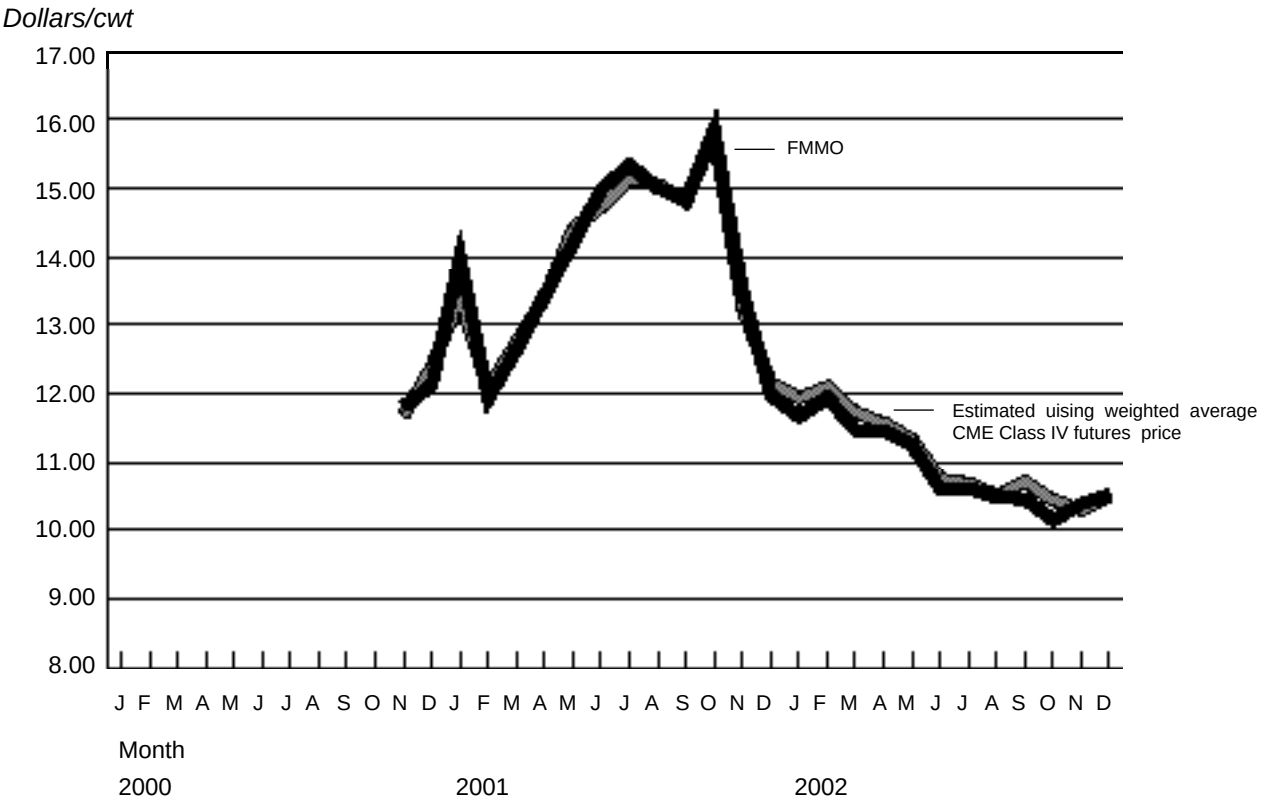


Appendix I table 12—**FMMO advanced Class IV price and estimate using weighted average Class IV futures price (Alternative 2)**

Year	Month	Advance Class IV price (dollars/cwt) FMMO	Estimated using weighted average CME Class IV futures price[1]	Estimated over (under) FMMO	Milk volume (million pounds) of futures contracts traded[2]	Contract month
2000	January					
	February					
	March					
	April					
	May					
	June					
	July					
	August					
	September					
	October					
	November	11.82	11.69	(0.13)	0.8	October
	December	12.13	12.39	0.26	31.6	November
2001	January	13.99	13.40	(0.59)	43.8	December
	February	11.94	12.07	0.13	9.2	January
	March	12.65	12.75	0.10	18.2	February
	April	13.44	13.40	(0.04)	6.2	March
	May	14.21	14.42	0.21	11.6	April
	June	14.99	14.74	(0.25)	5.8	May
	July	15.34	15.14	(0.20)	2.6	June
	August	15.01	15.06	0.05	22.0	July
	September	14.84	14.81	(0.03)	6.4	August
	October	15.85	15.80	(0.05)	0.2	September
	November	13.50	13.25	(0.25)	0.4	October
	December	11.98	12.15	0.17	4.4	November
2002	January[3]	11.67	11.94	0.27	-	December
	February	11.95	12.10	0.15	0.4	January
	March	11.48	11.73	0.25	1.2	February
	April	11.47	11.58	0.11	9.2	March
	May	11.26	11.34	0.08	7.0	April
	June	10.61	10.75	0.14	20.4	May
	July	10.62	10.69	0.07	8.8	June
	August	10.48	10.51	0.03	4.0	July
	September	10.46	10.71	0.25	5.0	August
	October[3]	10.15	10.44	0.29	-	September
	November[3]	10.39	10.30	(0.09)	-	October
	December[3]	10.52	10.50	(0.02)	-	November
	Simple average	12.41	12.45	0.04	8.4	
	Range—low	10.15	10.30	(0.59)		
	Range—high	15.85	15.80	0.29		
	Standard deviation	1.78	1.69			
	% of average	14.3%	13.6%			
	F-statistic		0.0053			
	p-value		0.9423			

[1] Weighted by volume traded.
[2] Each contract is 200,000 pounds of milk.
[3] No weighted average price, because no contract was traded; use simple average instead.

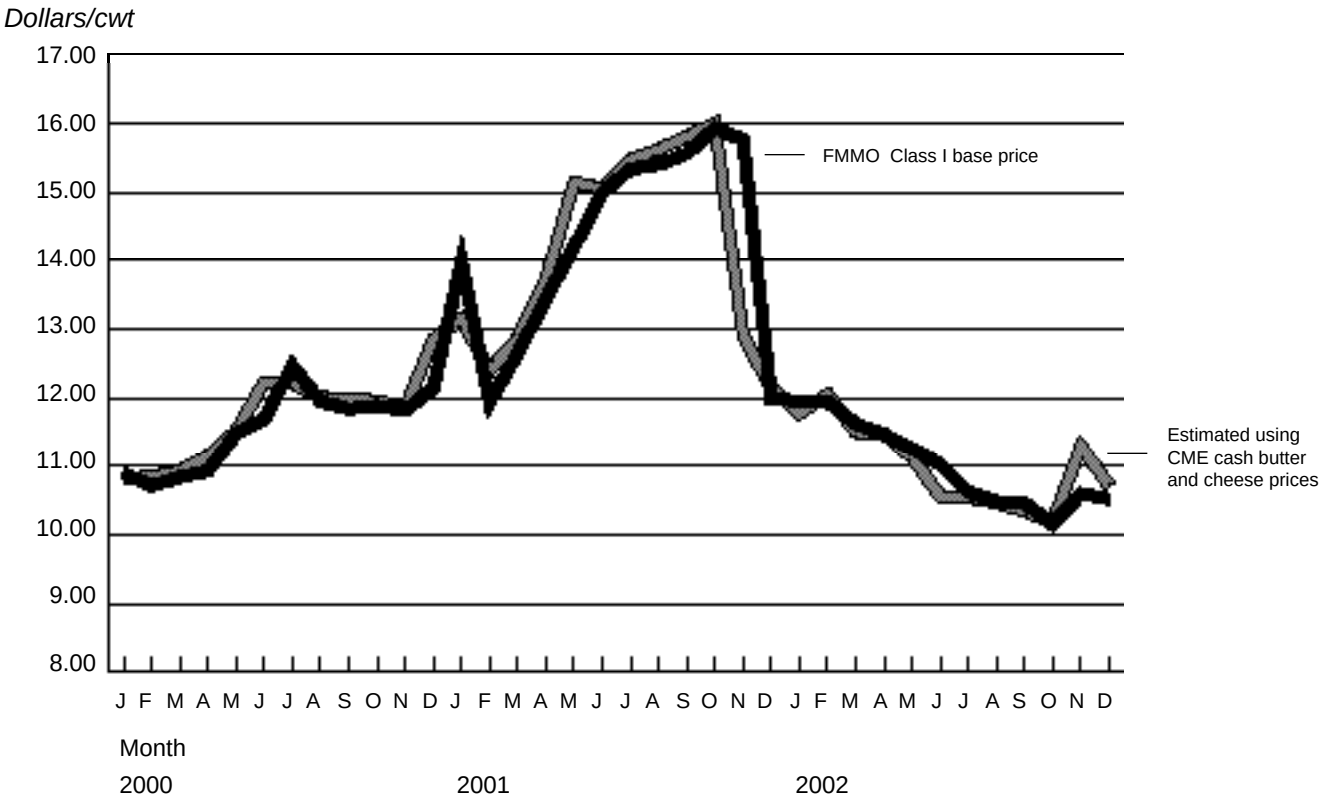
Appendix I figure 12— **FMMO advanced Class IV price and estimate using weighted average Class IV futures price (Alternative 2)**



Appendix II table 1—**FMMO Class I base price and estimated "higher of" price using CME cash butter and cheese prices**

Year	Month	FMMO Class I base price	Estimated using CME cash butter and cheese prices ("higher of")	Estimated price over (under) FMMO
2000	January	10.90	10.82	(0.08)
	February	10.71	10.85	0.14
	March	10.84	10.93	0.09
	April	10.93	11.15	0.22
	May	11.48	11.51	0.03
	June	11.70	12.23	0.53
	July	12.46	12.21	(0.25)
	August	11.95	12.01	0.06
	September	11.84	11.99	0.15
	October	11.89	11.96	0.07
	November	11.82	11.85	0.03
	December	12.13	12.85	0.72
2001	January	13.99	13.14	(0.85)
	February	11.94	12.40	0.46
	March	12.65	12.87	0.22
	April	13.44	13.73	0.29
	May	14.21	15.14	0.93
	June	14.99	15.06	0.07
	July	15.34	15.47	0.13
	August	15.40	15.65	0.25
	September	15.56	15.93	0.37
	October	15.93	16.00	0.07
	November	15.76	12.91	(2.85)
	December	11.98	12.14	0.16
2002	January	11.96	11.81	(0.15)
	February	11.95	12.05	0.10
	March	11.62	11.50	(0.12)
	April	11.47	11.48	0.01
	May	11.26	11.19	(0.07)
	June	11.03	10.56	(0.47)
	July	10.62	10.54	(0.08)
	August	10.48	10.47	(0.01)
	September	10.46	10.34	(0.12)
	October	10.15	10.19	0.04
	November	10.60	11.33	0.73
	December	10.52	10.71	0.19
	Simple average	12.28	12.30	0.02
	Range--low	10.15	10.19	(2.85)
	Range--high	15.93	16.00	0.93
	Standard deviation	1.73	1.69	
	% of average	14.1%	13.7%	
	F-statistic		0.0048	
	p-value		0.9447	

Appendix II figure 1— **FMMO advanced Class I base price and estimated "higher of" price using CME cash butter and cheese prices**

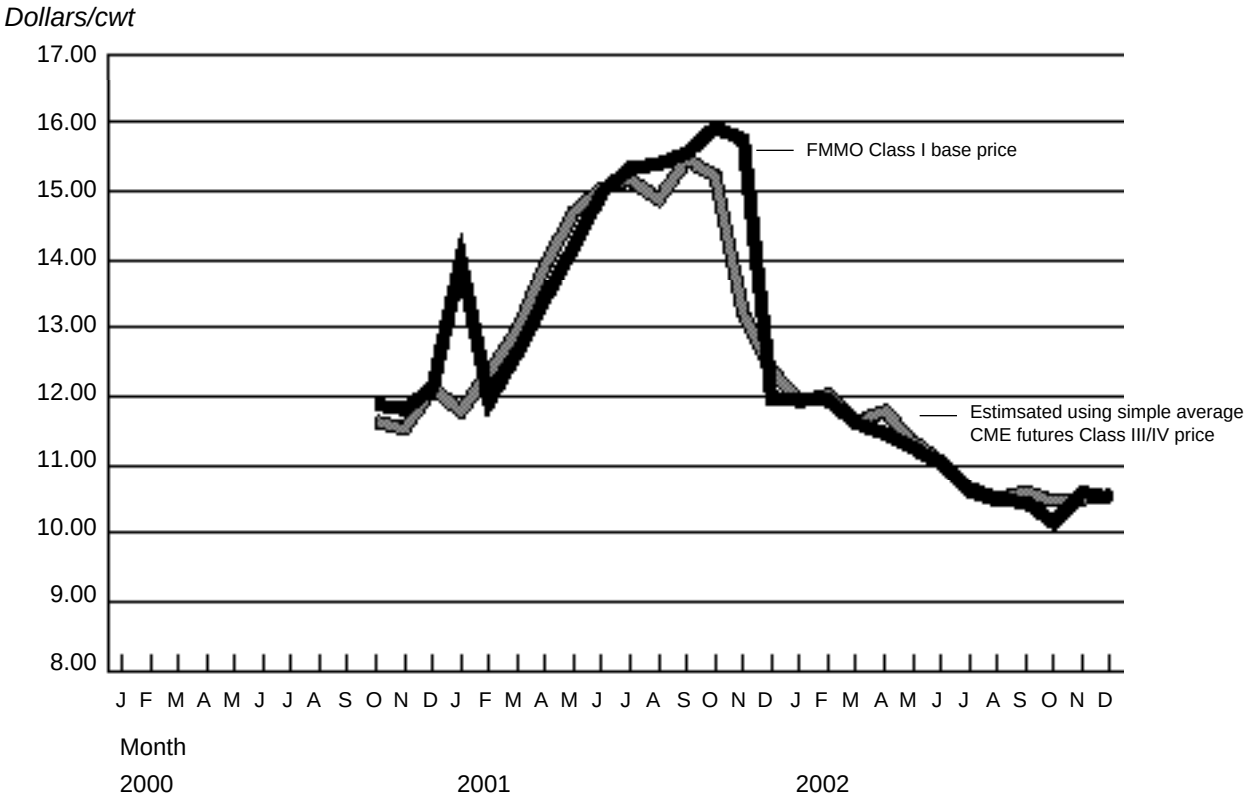


Appendix II table 2—**FMMO Class I base price and estimated "higher of" price using Class III or Class IV futures price (Alternative 1)**

Year	Month	FMMO Class I base price	Estimated using simple average CME futures Class III/IV price ("higher of")	Estimated price over (under) FMMO	Estimated using weighted average CME futures Class III/IV price ("higher of")	Estimated price over (under) FMMO
2000	January					
	February					
	March					
	April					
	May					
	June					
	July					
	August					
	September					
	October	11.89	11.64	(0.25)	11.61	(0.28)
	November	11.82	11.54	(0.28)	11.55	(0.27)
	December	12.13	12.13	-	12.24	0.11
2001	January	13.99	11.79	(2.20)	11.74	(2.25)
	February	11.94	12.36	0.42	12.22	0.28
	March	12.65	12.97	0.32	12.93	0.28
	April	13.44	13.94	0.50	14.05	0.61
	May	14.21	14.70	0.49	14.63	0.42
	June	14.99	15.04	0.05	14.97	(0.02)
	July	15.34	15.17	(0.17)	15.01	(0.33)
	August	15.40	14.89	(0.51)	14.85	(0.55)
	September	15.56	15.46	(0.10)	15.44	(0.12)
	October	15.93	15.23	(0.70)	15.32	(0.61)
	November	15.76	13.20	(2.56)	13.19	(2.57)
	December	11.98	12.38	0.40	12.34	0.36
2002	January	11.96	11.93	(0.03)	11.93	(0.03)
	February	11.95	12.03	0.08	12.05	0.10
	March	11.62	11.64	0.02	11.67	0.05
	April	11.47	11.79	0.32	11.86	0.39
	May	11.26	11.35	0.09	11.46	0.20
	June	11.03	11.05	0.02	11.12	0.09
	July	10.62	10.66	0.04	10.68	0.06
	August[1]	10.48	10.51	0.03	10.51	0.03
	September	10.46	10.61	0.15	10.68	0.22
	October	10.15	10.47	0.32	10.42	0.27
	November[1]	10.60	10.50	(0.10)	10.50	(0.10)
	December[1]	10.52	10.55	0.03	10.55	0.03
	Simple average	12.56	12.43	(0.13)	12.43	(0.13)
	Range--low	10.15	10.47	(2.56)	10.42	(2.57)
	Range--high	15.93	15.46	0.50	15.44	0.61
	Standard deviation	1.89	1.68		1.66	
	% of average	15.0%	13.5%		13.4%	
	F-statistic		0.0759		0.0771	
	p-value		0.7840		0.7824	

[1] No weighted average advanced Class IV price, because no contract was traded; use simple average instead.

Appendix II figure 2— **FMMO Class I base price and estimated "higher of" price using Class III or Class IV futures price (Alternative 1)**

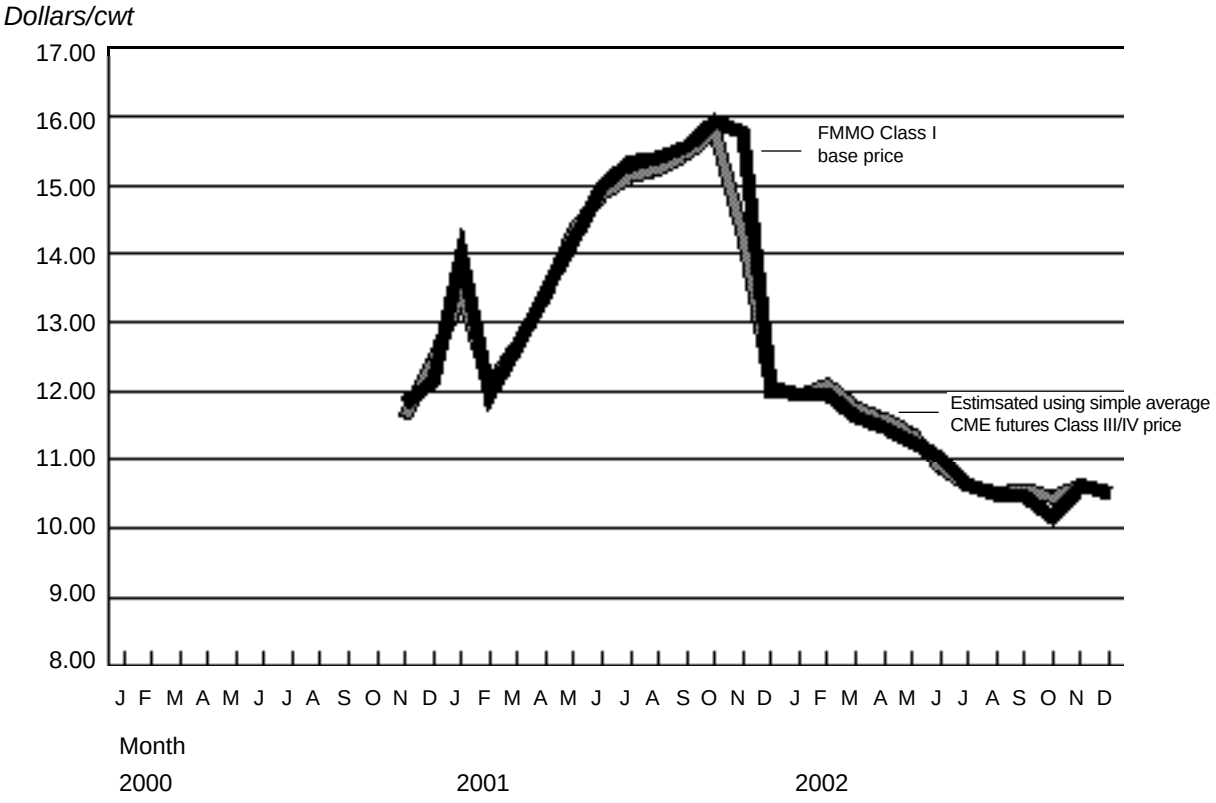


Appendix II table 3—**FMMO Class I base price and estimated "higher of" price using Class III or Class IV futures price (Alternative 2)**

Year	Month	FMMO Class I base price	Estimated using simple average CME futures Class III/IV price ("higher of")	Estimated price over (under) FMMO	Estimated using weighted average CME futures Class III/IV price ("higher of")	Estimated price over (under) FMMO
2000	January					
	February					
	March					
	April					
	May					
	June					
	July					
	August					
	September					
	October					
	November	11.82	11.62	(0.20)	11.69	(0.13)
	December	12.13	12.43	0.30	12.39	0.26
2001	January	13.99	13.42	(0.57)	13.40	(0.59)
	February	11.94	12.08	0.14	12.07	0.13
	March	12.65	12.67	0.02	12.75	0.10
	April	13.44	13.40	(0.04)	13.40	(0.04)
	May	14.21	14.35	0.14	14.42	0.21
	June	14.99	14.87	(0.12)	14.74	(0.25)
	July	15.34	15.12	(0.22)	15.14	(0.20)
	August	15.40	15.23	(0.17)	15.14	(0.26)
	September	15.56	15.45	(0.11)	15.41	(0.15)
	October	15.93	15.78	(0.15)	15.80	(0.13)
	November	15.76	14.25	(1.51)	14.14	(1.62)
	December	11.98	12.05	0.07	12.15	0.17
2002	January[1]	11.96	11.94	(0.02)	11.94	(0.02)
	February	11.95	12.08	0.13	12.10	0.15
	March	11.62	11.76	0.14	11.73	0.11
	April	11.47	11.59	0.12	11.58	0.11
	May	11.26	11.38	0.12	11.34	0.08
	June	11.03	10.88	(0.15)	10.92	(0.11)
	July	10.62	10.61	(0.01)	10.69	0.07
	August	10.48	10.50	0.02	10.51	0.03
	September	10.46	10.56	0.10	10.71	0.25
	October[1]	10.15	10.44	0.29	10.44	0.29
	November	10.60	10.62	0.02	10.61	0.01
	December[1]	10.52	10.50	(0.02)	10.50	(0.02)
	Simple average	12.59	12.52	(0.07)	12.53	(0.06)
	Range--low	10.15	10.44	(1.51)	10.44	(1.62)
	Range--high	15.93	15.78	0.30	15.80	0.29
	Standard deviation	1.92	1.76		1.74	
	% of average	15.3%	14.1%		13.9%	
	F-statistic		0.0160		0.0138	
	p-value		0.9000		0.9071	

[1] No weighted average advanced Class IV price, because no contract was traded; use simple average instead.

Appendix II figure 3— **FMMO Class I base price and estimated "higher of" price using Class III or Class IV futures price (Alternative 2)**



Appendix III table 1—**Class III price and estimate using CME cash cheese and butter prices and NASS dry whey price**

Year	Month	Class III price (dollars/pound)			Cheese (thousand pounds)	
		FMMO	Estimated based on CME cash prices	Estimated price over (under) FMMO	NASS survey[1]	CME[2]
2000	January	10.05	9.68	(0.37)	69,472	1,050
	February	9.54	9.62	0.08	57,250	2,016
	March	9.54	9.58	0.04	62,402	1,554
	April	9.41	9.43	0.02	82,515	1,302
	May	9.37	9.34	(0.03)	66,086	1,764
	June	9.46	10.53	1.07	68,953	3,528
	July	10.66	10.38	(0.28)	73,395	5,502
	August	10.13	10.43	0.30	57,598	15,204
	September	10.76	11.68	0.92	38,282	13,566
	October	10.02	8.77	(1.25)	64,799	4,116
	November	8.57	8.86	0.29	45,446	2,352
	December	9.37	9.81	0.44	68,563	2,730
2001	January	9.99	9.67	(0.32)	54,630	1,722
	February	10.27	10.96	0.69	66,638	588
	March	11.42	11.93	0.51	60,497	672
	April	12.06	13.38	1.32	81,140	2,478
	May	13.83	14.87	1.04	61,322	1,428
	June	15.02	15.37	0.35	67,577	2,562
	July	15.46	15.63	0.17	78,441	1,470
	August	15.55	16.07	0.52	58,529	2,142
	September	15.90	15.78	(0.12)	78,051	2,436
	October	14.60	11.95	(2.65)	66,398	5,166
	November	11.31	11.74	0.43	66,754	7,308
	December	11.80	11.74	(0.06)	78,793	4,452
2002	January	11.87	11.96	0.09	77,283	1,386
	February	11.63	10.77	(0.86)	79,725	1,890
	March	10.65	10.87	0.22	98,145	714
	April	10.85	11.10	0.25	78,396	1,050
	May	10.82	10.35	(0.47)	79,949	882
	June	10.09	9.40	(0.69)	103,895	2,100
	July	9.33	9.46	0.13	75,742	6,300
	August	9.54	10.00	0.46	73,716	3,696
	September	9.92	10.57	0.65	93,866	10,122
	October	10.72	11.08	0.36	70,423	7,098
	November	9.84	9.59	(0.25)	76,775	1,554
	December	9.74	9.75	0.01	98,037	924
	Simple average	11.09	11.17	0.08	71,652	3,467
	Range—low	8.57	8.77	(2.65)		
	Range—high	15.90	16.07	1.32		
	Standard deviation	2.00	2.05			
	% of average	18.0%	18.4%			
	F-statistic		0.0307			
	p-value		0.8615			

[1] Product pounds reported up to the price calculation date; may not be the same as the NASS final numbers.
[2] Converted from the number of lots of cheese traded, assuming 42,000 pounds per lot.

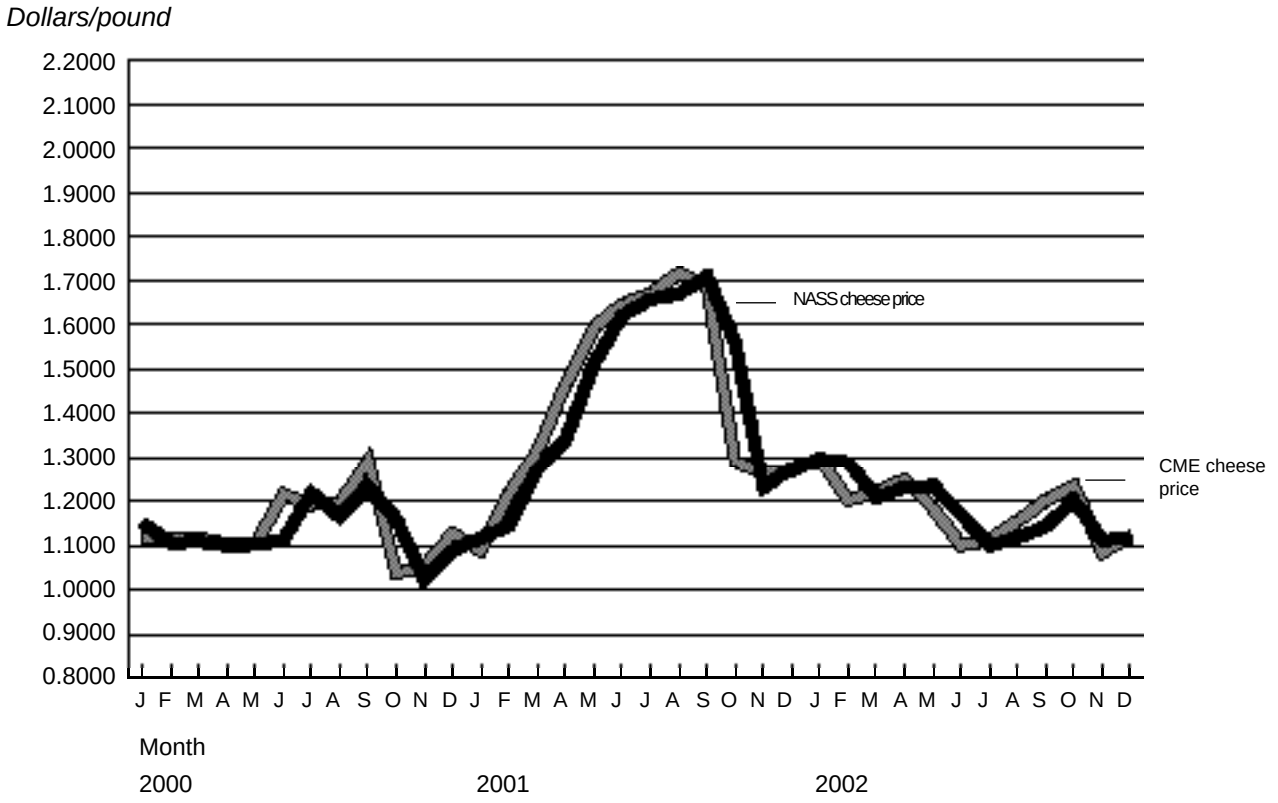
Appendix III figure 1— **Class III price and estimate using CME cash prices and NASS dry whey price**

Appendix III table 2—**NASS and CME cheese prices for calculating FMMO Class III prices**

Year	Month	Cheese price (dollars/pound) NASS	CME	CME pricer over (under) NASS	Cheese (thousand pounds) NASS survey[1]	CME[2]
2000	January	1.1517	1.1170	(0.0347)	69,472	1,050
	February	1.1067	1.1160	0.0093	57,250	2,016
	March	1.1093	1.1169	0.0076	62,402	1,554
	April	1.1011	1.1051	0.0040	82,515	1,302
	May	1.1022	1.1030	0.0008	66,086	1,764
	June	1.1137	1.2157	0.1020	68,953	3,528
	July	1.2189	1.1927	(0.0262)	73,395	5,502
	August	1.1660	1.1966	0.0306	57,598	15,204
	September	1.2315	1.2912	0.0597	38,282	13,566
	October	1.1602	1.0390	(0.1212)	64,799	4,116
	November	1.0245	1.0530	0.0285	45,446	2,352
	December	1.0898	1.1276	0.0378	68,563	2,730
2001	January	1.1180	1.0905	(0.0275)	54,630	1,722
	February	1.1467	1.2186	0.0719	66,638	588
	March	1.2737	1.3275	0.0538	60,497	672
	April	1.3423	1.4772	0.1349	81,140	2,478
	May	1.5129	1.6144	0.1015	61,322	1,428
	June	1.6211	1.6568	0.0357	67,577	2,562
	July	1.6573	1.6705	0.0132	78,441	1,470
	August	1.6693	1.7230	0.0537	58,529	2,142
	September	1.7085	1.6911	(0.0174)	78,051	2,436
	October	1.5591	1.2970	(0.2621)	66,398	5,166
	November	1.2322	1.2759	0.0437	66,754	7,308
	December	1.2762	1.2713	(0.0049)	78,793	4,452
2002	January	1.2922	1.3001	0.0079	77,283	1,386
	February	1.2895	1.2045	(0.0850)	79,725	1,890
	March	1.2087	1.2303	0.0216	98,145	714
	April	1.2323	1.2596	0.0273	78,396	1,050
	May	1.2359	1.1899	(0.0460)	79,949	882
	June	1.1708	1.1037	(0.0671)	103,895	2,100
	July	1.1004	1.1151	0.0147	75,742	6,300
	August	1.1189	1.1635	0.0446	73,716	3,696
	September	1.1438	1.2076	0.0638	93,866	10,122
	October	1.2020	1.2381	0.0361	70,423	7,098
	November	1.1111	1.0893	(0.0218)	76,775	1,554
	December	1.1203	1.1225	0.0022	98,037	924
	Simple average	1.2477	1.2559	0.0082	71,652	3,467
	Range—low	1.0245	1.0390	(0.2621)		
	Range—high	1.7085	1.7230	0.1349		
	Standard deviation	0.1851	0.1914			
	% of average	14.8%	15.2%			
	F-statistic		0.0336			
	p-value		0.8550			

[1] Product pounds reported up to the price calculation date; may not be the same as the NASS final numbers.
[2] Converted from the number of lots of cheese traded, assuming 42,000 pounds per lot.

Appendix III figure 2— **NASS and CME cheese prices for calculating FMMO Class III prices**

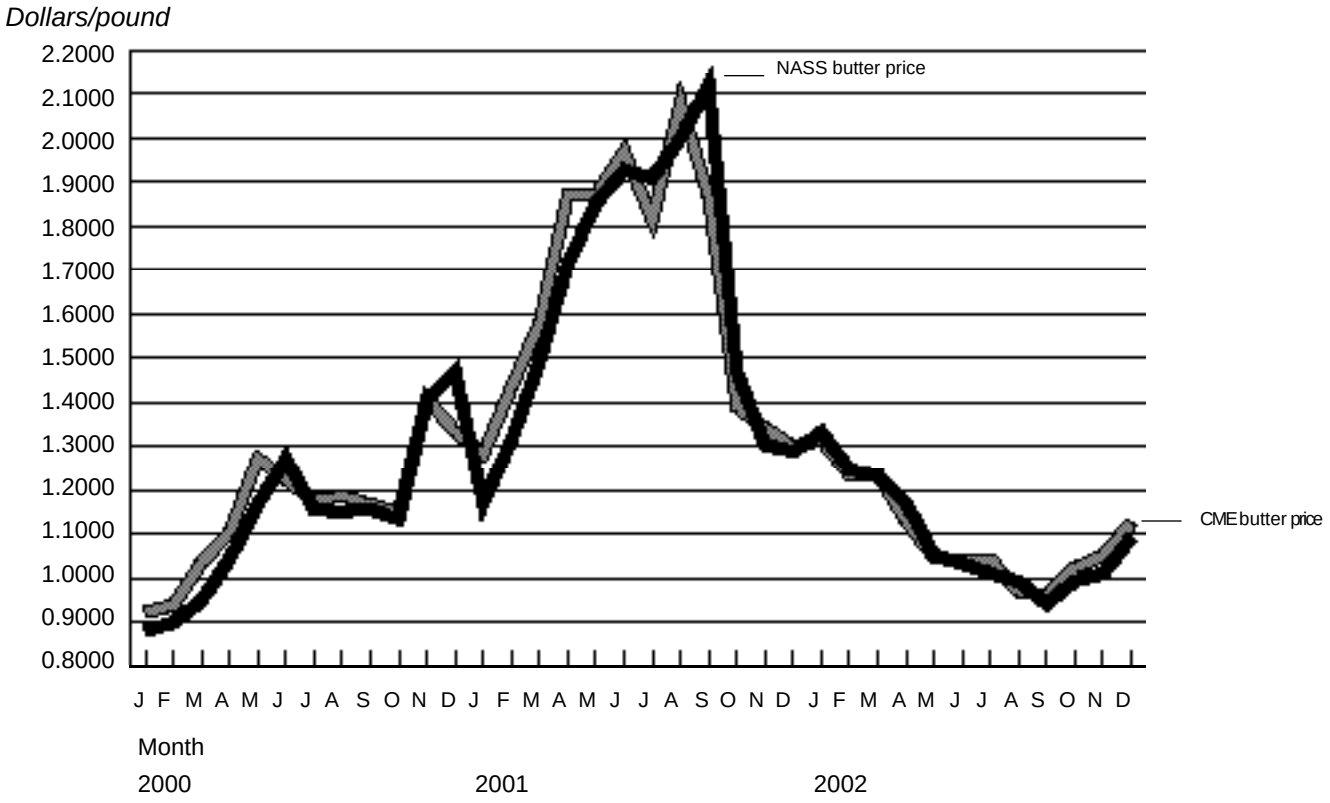


Appendix III table 3—**NASS and CME butter prices for calculating butterfat prices**

		Butter price (dollars/pound)			Butter (thousand pounds)	
Year	Month	NASS	CME	CME pricer over (under) NASS	NASS survey[1]	CME[2]
2000	January	0.8820	0.9232	0.0412	25,104	3,611
	February	0.9002	0.9390	0.0388	20,674	3,113
	March	0.9497	1.0364	0.0867	20,195	3,113
	April	1.0449	1.1047	0.0598	23,405	3,362
	May	1.1680	1.2728	0.1048	15,598	5,395
	June	1.2725	1.2245	(0.0480)	10,423	5,271
	July	1.1547	1.1788	0.0241	13,593	7,553
	August	1.1520	1.1865	0.0345	11,231	8,051
	September	1.1560	1.1678	0.0118	11,604	4,939
	October	1.1344	1.1499	0.0155	17,692	3,860
	November	1.4051	1.4088	0.0037	13,009	1,079
	December	1.4698	1.3338	(0.1360)	18,370	1,204
2001	January	1.1725	1.2841	0.1116	21,280	1,245
	February	1.3143	1.4341	0.1198	17,601	789
	March	1.4942	1.5804	0.0862	20,188	1,868
	April	1.7126	1.8701	0.1575	18,056	1,743
	May	1.8527	1.8730	0.0203	14,828	2,573
	June	1.9263	1.9686	0.0423	13,154	3,154
	July	1.9094	1.8147	(0.0947)	14,080	5,727
	August	1.9990	2.0808	0.0818	15,145	4,275
	September	2.1198	1.8672	(0.2526)	20,413	3,569
	October	1.4701	1.3898	(0.0803)	15,979	6,225
	November	1.3040	1.3425	0.0385	20,453	2,822
	December	1.2894	1.3002	0.0108	20,107	2,988
2002	January	1.3324	1.3160	(0.0164)	19,216	2,158
	February	1.2480	1.2364	(0.0116)	19,706	1,203
	March	1.2333	1.2363	0.0030	20,881	2,324
	April	1.1720	1.1317	(0.0403)	20,296	3,071
	May	1.0525	1.0480	(0.0045)	18,164	6,308
	June	1.0343	1.0391	0.004	17,450	3,694
	July	1.0112	1.0426	0.0314	14,058	2,781
	August	0.9925	0.9715	(0.0210)	15,811	4,233
	September	0.9431	0.9598	0.0167	25,889	8,259
	October	0.9945	1.0249	0.0304	16,770	12,492
	November	1.0107	1.0507	0.0400	15,950	10,085
	December	1.0926	1.1260	0.0334	17,283	1,785
	Simple average	1.2881	1.3032	0.0151	17,602	4,053
	Range—low	0.8820	0.9232	(0.2526)		
	Range—high	2.1198	2.0808	0.1575		
	Standard deviation	0.3309	0.3162			
	% of average	25.7%	24.3%			
	F-statistic		0.0393			
	p-value		0.8435			

[1] Product pounds reported up to the price calculation date; may not be the same as the NASS final numbers.
[2] Converted from the number of lots of butter traded, assuming 41,500 pounds per lot.

Appendix III figure 3— **NASS and CME butter prices for calculating butterfat prices**

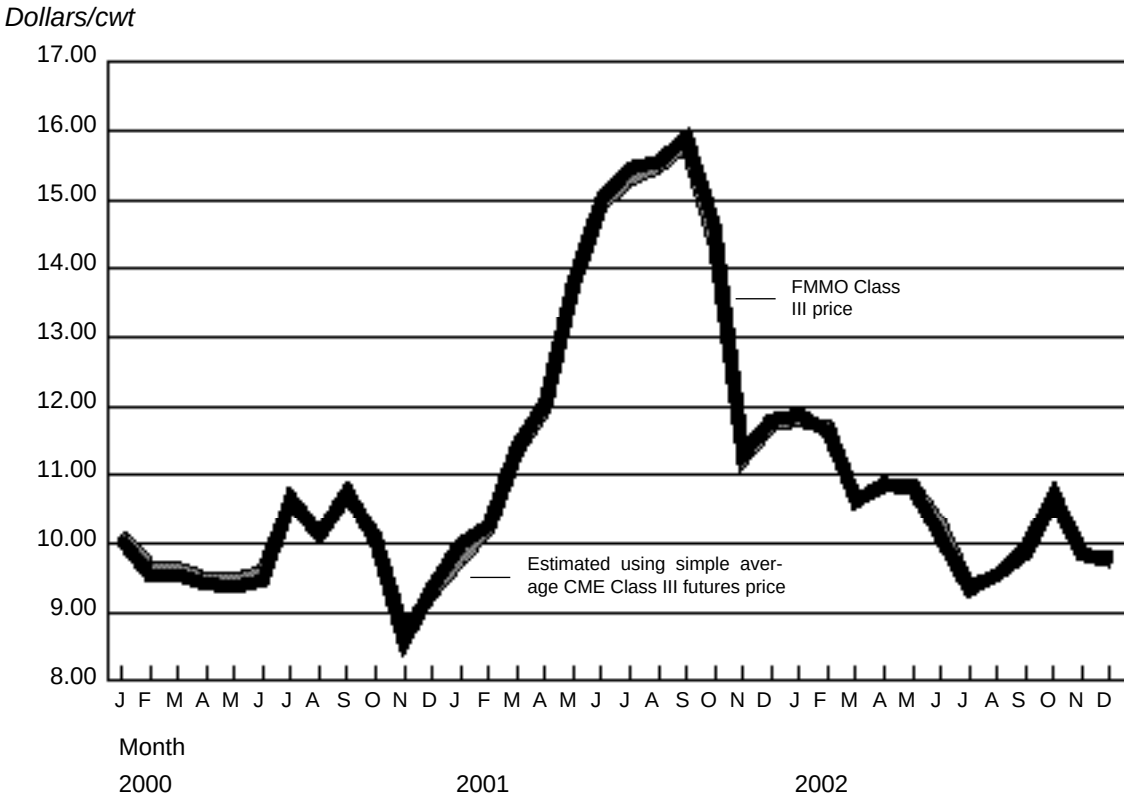


Appendix III table 4—**Class III price and estimate using simple average Class III futures price**

Year	Month	Class III price (dollars/cwt) FMMO	Class III price (dollars/cwt) Estimated using simple average CME Class III futures price	Estimated price over (under) FMMO	Milk volume (million pounds) of contracts traded[1]
2000	January	10.05	10.09	0.04	37.8
	February	9.54	9.67	0.13	130.0
	March	9.54	9.64	0.10	30.2
	April	9.41	9.49	0.08	31.8
	May	9.37	9.48	0.11	25.4
	June	9.46	9.59	0.13	78.2
	July	10.66	10.63	(0.03)	69.0
	August	10.13	10.12	(0.01)	56.4
	September	10.76	10.73	(0.03)	67.0
	October	10.02	10.08	0.06	139.4
	November	8.57	8.70	0.13	46.8
	December	9.37	9.29	(0.08)	46.4
2001	January	9.99	9.77	(0.22)	86.8
	February	10.27	10.22	(0.05)	62.0
	March	11.42	11.35	(0.07)	82.2
	April	12.06	11.97	(0.09)	116.2
	May	13.83	13.76	(0.07)	124.2
	June	15.02	14.94	(0.08)	176.4
	July	15.46	15.29	(0.17)	95.4
	August	15.55	15.48	(0.07)	65.6
	September	15.90	15.81	(0.09)	59.2
	October	14.60	14.34	(0.26)	287.8
	November	11.31	11.25	(0.06)	38.2
	December	11.80	11.73	(0.07)	63.0
2002	January	11.87	11.79	(0.08)	81.2
	February	11.63	11.70	0.07	117.8
	March	10.65	10.63	(0.02)	66.2
	April	10.85	10.88	0.03	162.2
	May	10.82	10.85	0.03	168.6
	June	10.09	10.27	0.18	50.2
	July	9.33	9.36	0.03	74.6
	August	9.54	9.55	0.01	268.2
	September	9.92	9.86	(0.06)	49.2
	October	10.72	10.64	(0.08)	75.8
	November	9.84	9.83	(0.01)	115.8
	December	9.74	9.81	0.07	180.8
	Simple average	11.09	11.07	(0.02)	95.2
	Range—low	8.57	8.70	(0.26)	
	Range—high	15.90	15.81	0.18	
	Standard deviation	2.00	1.94		
	% of average	18.0%	17.5%		
	F-statistic		0.0009		
	p-value		0.9762		

[1] Each contract is 200,000 pounds of milk.

Appendix III figure 4— **Class III price and estimate using simple average Class III futures price**

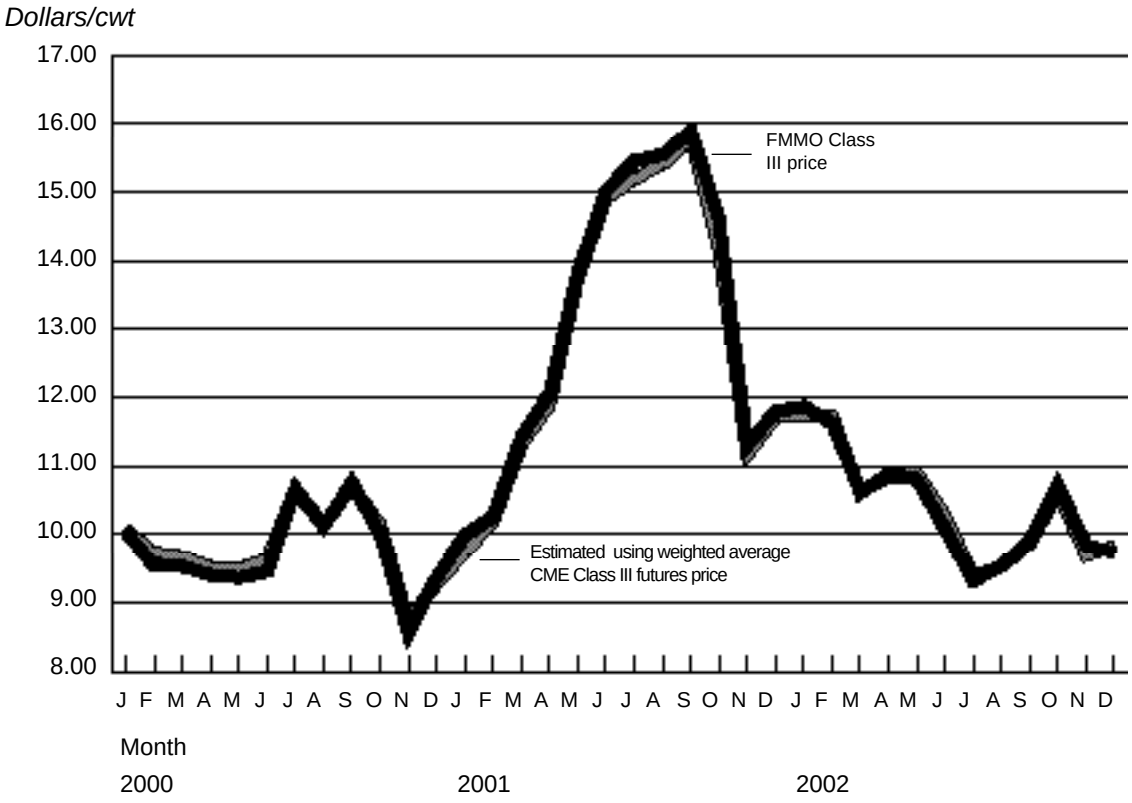


Appendix III table 5—**Class III price and estimate using weighted average Class III futures price**

Year	Month	Class III price (dollars/cwt) FMMO	Estimated using weighted average CME Class III futures price[1]	Estimated price over (under) FMMO	Milk volume (million pounds) of contracts traded[2]
2000	January	10.05	10.07	0.02	37.8
	February	9.54	9.74	0.20	130.0
	March	9.54	9.68	0.14	30.2
	April	9.41	9.53	0.12	31.8
	May	9.37	9.50	0.13	25.4
	June	9.46	9.64	0.18	78.2
	July	10.66	10.67	0.01	69.0
	August	10.13	10.14	0.01	56.4
	September	10.76	10.72	(0.04)	67.0
	October	10.02	10.14	0.12	139.4
	November	8.57	8.73	0.16	46.8
	December	9.37	9.29	(0.08)	46.4
2001	January	9.99	9.75	(0.24)	86.8
	February	10.27	10.20	(0.07)	62.0
	March	11.42	11.32	(0.10)	82.2
	April	12.06	11.90	(0.16)	116.2
	May	13.83	13.76	(0.07)	124.2
	June	15.02	14.92	(0.10)	176.4
	July	15.46	15.20	(0.26)	95.4
	August	15.55	15.41	(0.14)	65.6
	September	15.90	15.79	(0.11)	59.2
	October	14.60	14.16	(0.44)	287.8
	November	11.31	11.18	(0.13)	38.2
	December	11.80	11.73	(0.07)	63.0
2002	January	11.87	11.74	(0.13)	81.2
	February	11.63	11.72	0.09	117.8
	March	10.65	10.62	(0.03)	66.2
	April	10.85	10.89	0.04	162.2
	May	10.82	10.90	0.08	168.6
	June	10.09	10.27	0.18	50.2
	July	9.33	9.39	0.06	74.6
	August	9.54	9.54	-	268.2
	September	9.92	9.88	(0.04)	49.2
	October	10.72	10.62	(0.10)	75.8
	November	9.84	9.70	(0.14)	115.8
	December	9.74	9.84	0.10	180.8
	Simple average	11.09	11.06	(0.03)	95.2
	Range—low	8.57	8.73	(0.44)	
	Range—high	15.90	15.79	0.20	
	Standard deviation	2.00	1.91		
	% of average	18.0%	17.3%		
	F-statistic		0.0024		
	p-value		0.9612		

[1] Weighted by volume traded.
[2] Each contract is 200,000 pounds of milk.

Appendix III figure 5— **Class III price and estimate using weighted average Class III futures price**

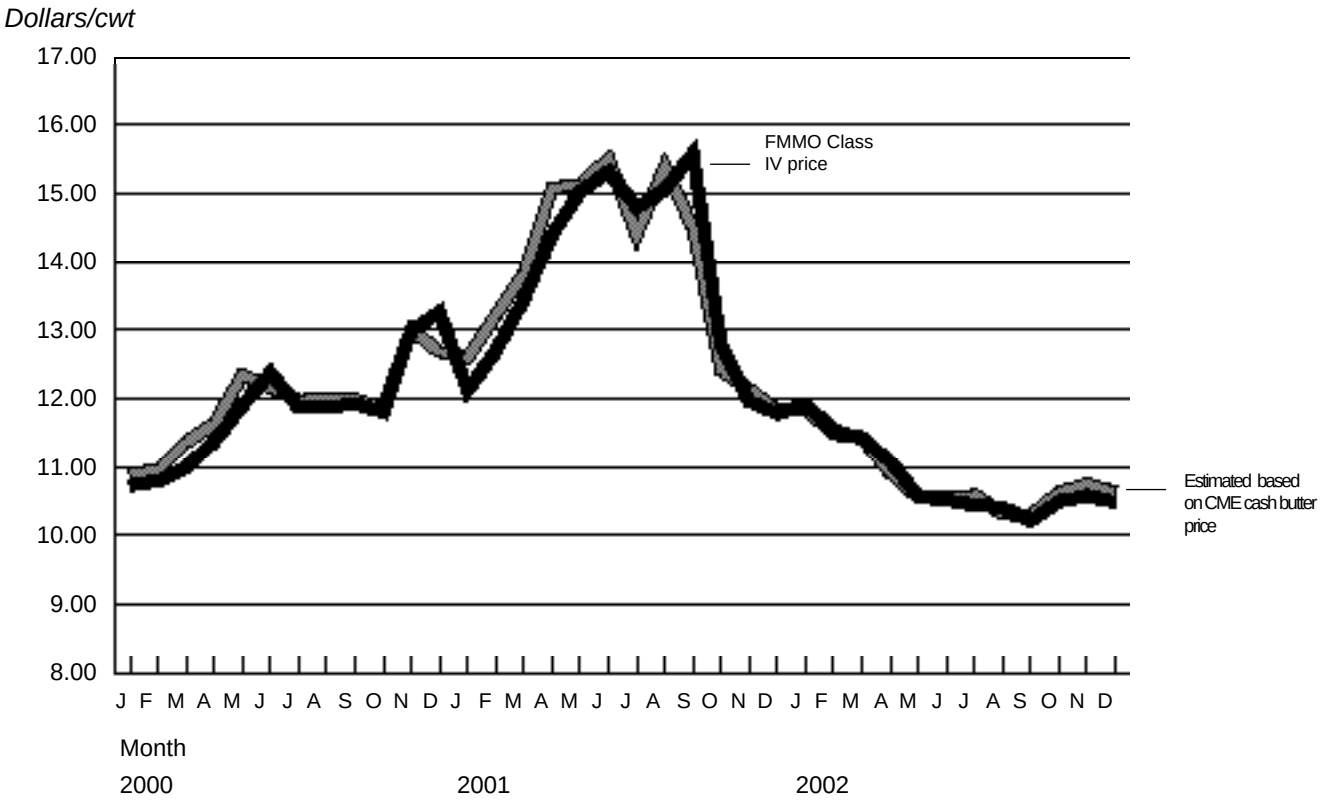


Appendix III table 6—**Class IV price and estimate using CME cash butter price and NASS nonfatdry milk price**

Year	Month	Class IV price (dollars/cwt)			Butter (thousand pounds)	
		FMMO	Estimated based on CME cash butter price	Estimated prive over (under) FMMO	NASS survery[1]	CME[2]
2000	January	10.73	10.90	0.17	25,104	3,611
	February	10.80	10.96	0.16	20,674	3,113
	March	11.00	11.37	0.37	20,195	3,113
	April	11.38	11.64	0.26	23,405	3,362
	May	11.91	12.35	0.44	15,598	5,395
	June	12.38	12.17	(0.21)	10,423	5,271
	July	11.87	11.98	0.11	13,593	7,553
	August	11.87	12.02	0.15	11,231	8,051
	September	11.94	11.99	0.05	11,604	4,939
	October	11.81	11.88	0.07	17,692	3,860
	November	13.00	13.01	0.01	13,009	1,079
	December	13.27	12.69	(0.58)	18,370	1,204
2001	January	12.13	12.60	0.47	21,280	1,245
	February	12.70	13.22	0.52	17,601	789
	March	13.46	13.83	0.37	20,188	1,868
	April	14.41	15.09	0.68	18,056	1,743
	May	15.04	15.13	0.09	14,828	2,573
	June	15.33	15.51	0.18	13,154	3,154
	July	14.81	14.41	(0.40)	14,080	5,727
	August	15.06	15.40	0.34	15,145	4,275
	September	15.59	14.51	(1.08)	20,413	3,569
	October	12.77	12.42	(0.35)	15,979	6,225
	November	11.97	12.14	0.17	20,453	2,822
	December	11.79	11.83	0.04	20,107	2,988
2002	January	11.93	11.87	(0.06)	19,216	2,158
	February	11.54	11.49	(0.05)	19,706	1,203
	March	11.42	11.44	0.02	20,881	2,324
	April	11.09	10.92	(0.17)	20,296	3,071
	May	10.57	10.56	(0.01)	18,164	6,308
	June	10.52	10.55	0.03	17,450	3,694
	July	10.45	10.59	0.14	14,058	2,781
	August	10.41	10.32	(0.09)	15,811	4,233
	September	10.22	10.29	0.07	25,889	8,259
	October	10.50	10.63	0.13	16,770	12,492
	November	10.58	10.75	0.17	15,950	10,085
	December	10.49	10.64	0.15	17,283	1,785
	Simple average	12.13	12.20	0.07	17,602	4,053
	Range—low	10.22	10.29	(1.08)		
	Range—high	15.59	15.51	0.68		
	Standard deviation	1.57	1.54			
	% of average	12.9%	12.6%			
	F-statistic		0.0320			
	p-value		0.8586			

[1] Product pounds reported up to the price calculation date; may not be the same as the NASS final numbers.
[2] Converted from the number of lots of butter traded, assuming 41,500 pounds per lot.

Appendix III figure 6— **Class IV price and estimate using CME cash butter price and NASS nonfat dry milk price**

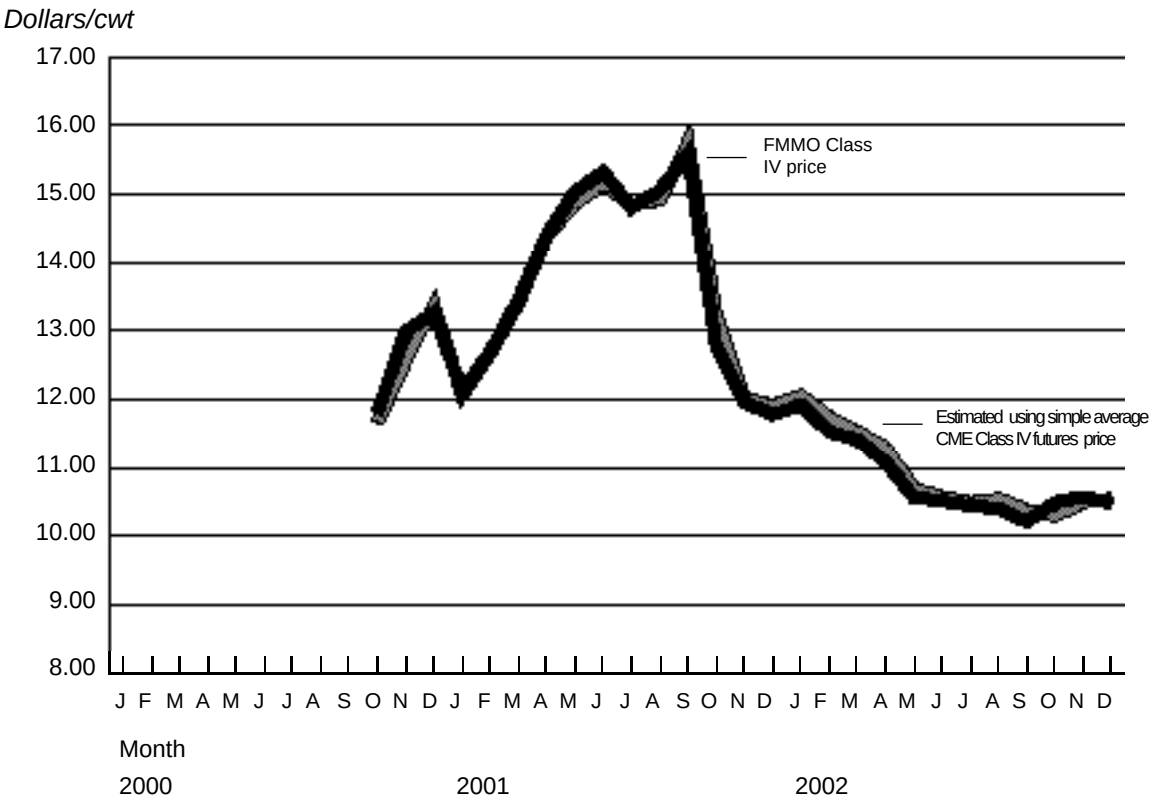


Appendix III table 7—**Class IV price and estimate using simple average Class IV futures price**

Year	Month	Class IV price (dollars/cwt) FMMO	Estimated using simple average CME Class IV futures price	Estimated price over (under) FMMO	Milk volume (million pounds) of contracts traded[1]
2000	January				
	February				
	March				
	April				
	May				
	June				
	July				
	August				
	September				
	October	11.81	11.67	(0.14)	1.0
	November	13.00	12.56	(0.44)	38.4
	December	13.27	13.38	0.11	45.0
2001	January	12.13	12.08	(0.05)	9.2
	February	12.70	12.68	(0.02)	19.2
	March	13.46	13.42	(0.04)	6.2
	April	14.41	14.39	(0.02)	15.0
	May	15.04	14.88	(0.16)	5.8
	June	15.33	15.15	(0.18)	5.2
	July	14.81	14.86	0.05	22.0
	August	15.06	14.92	(0.14)	6.4
	September	15.59	15.76	0.17	0.2
	October	12.77	13.25	0.48	0.4
	November	11.97	12.03	0.06	4.6
	December	11.79	11.93	0.14	-
2002	January	11.93	12.06	0.13	0.4
	February	11.54	11.75	0.21	1.6
	March	11.42	11.54	0.12	9.2
	April	11.09	11.30	0.21	8.0
	May	10.57	10.70	0.13	20.4
	June	10.52	10.58	0.06	11.0
	July	10.45	10.50	0.05	4.0
	August	10.41	10.55	0.14	5.0
	September	10.22	10.39	0.17	-
	October	10.50	10.30	(0.20)	-
	November	10.58	10.50	(0.08)	-
	December	10.49	10.55	0.06	-
	Simple average	12.33	12.36	0.03	8.8
	Range—low	10.22	10.30	(0.44)	
	Range—high	15.59	15.76	0.48	
	Standard deviation	1.75	1.71		
	% of average	14.2%	13.8%		
	F-statistic		0.0042		
	p-value		0.9489		

[1] Each contract is 200,000 pounds of milk.

Appendix III figure 7— **Class IV price and estimate using simple average Class IV futures price**

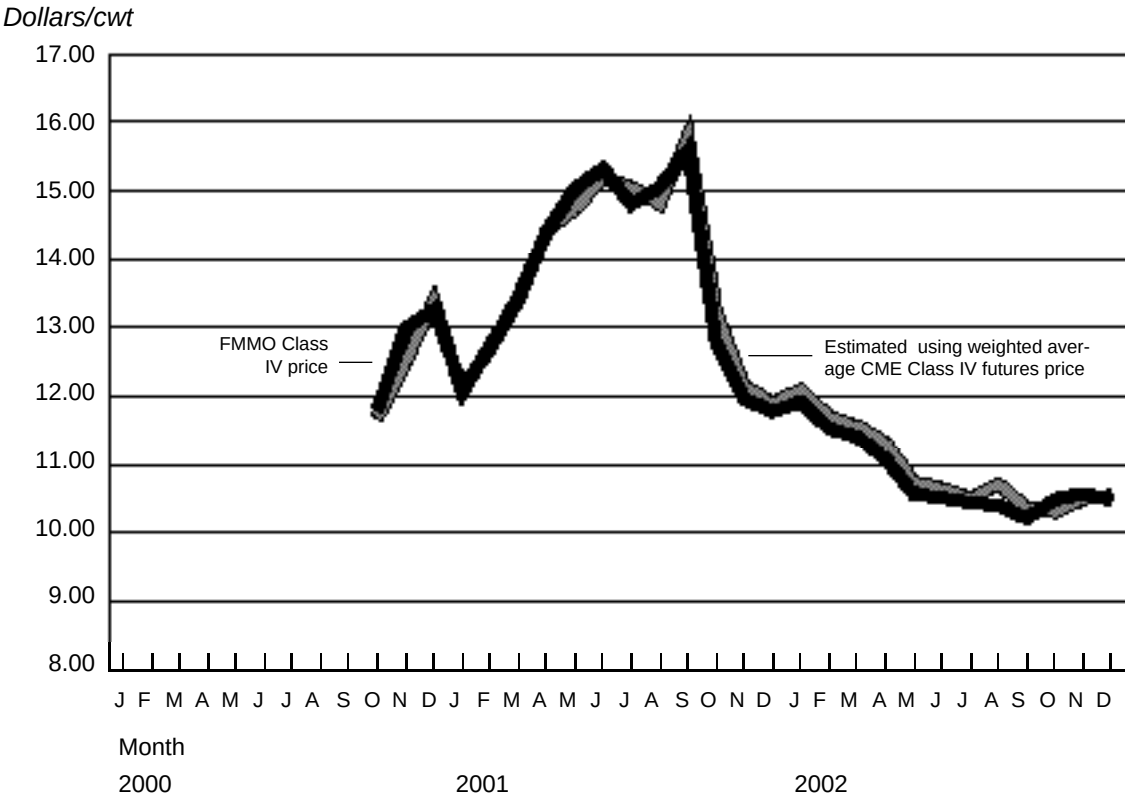


Appendix III table 8—**Class IV price and estimate using weighted average Class IV futures price**

Year	Month	Class IV price (dollars/cwt) FMMO	Class IV price (dollars/cwt) Estimated using weighted average CME Class IV futures price[1]	Estimated price over (under) FMMO	Milk volume (million pounds) of contracts traded[2]
2000	January				
	February				
	March				
	April				
	May				
	June				
	July				
	August				
	September				
	October	11.81	11.70	(0.11)	1.0
	November	13.00	12.50	(0.50)	38.4
	December	13.27	13.39	0.12	45.0
2001	January	12.13	12.07	(0.06)	9.2
	February	12.70	12.75	0.05	19.2
	March	13.46	13.40	(0.06)	6.2
	April	14.41	14.43	0.02	15.0
	May	15.04	14.74	(0.30)	5.8
	June	15.33	15.20	(0.13)	5.2
	July	14.81	15.06	0.25	22.0
	August	15.06	14.81	(0.25)	6.4
	September	15.59	15.80	0.21	0.2
	October	12.77	13.25	0.48	0.4
	November	11.97	12.14	0.17	4.6
	December[3]	11.79	11.93	0.14	-
2002	January	11.93	12.10	0.17	0.4
	February	11.54	11.71	0.17	1.6
	March	11.42	11.58	0.16	9.2
	April	11.09	11.33	0.24	8.0
	May	10.57	10.75	0.18	20.4
	June	10.52	10.66	0.14	11.0
	July	10.45	10.51	0.06	4.0
	August	10.41	10.71	0.30	5.0
	September[3]	10.22	10.38	0.16	-
	October[3]	10.50	10.31	(0.19)	-
	November[3]	10.58	10.50	(0.08)	-
	December[3]	10.49	10.55	0.06	-
	Simple average	12.33	12.38	0.05	8.8
	Range—low	10.22	10.31	(0.50)	
	Range—high	15.59	15.80	0.48	
	Standard deviation	1.75	1.71		
	% of average	14.2%	13.8%		
	F-statistic		0.0122		
	p-value		0.9126		

[1] Weighted by volume traded.
[2] Each contract is 200,000 pounds of milk.
[3] No weighted average price, because no contract was traded; use simple average instead.

Appendix III figure 8— **Class IV price and estimate using weighted average Class IV futures price**



U.S. Department of Agriculture

Rural Business–Cooperative Service

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Rural Business–Cooperative Service (RBS) provides research, management, and educational assistance to cooperatives to strengthen the economic position of farmers and other rural residents. It works directly with cooperative leaders and Federal and State agencies to improve organization, leadership, and operation of cooperatives and to give guidance to further development.

The cooperative segment of RBS (1) helps farmers and other rural residents develop cooperatives to obtain supplies and services at lower cost and to get better prices for products they sell; (2) advises rural residents on developing existing resources through cooperative action to enhance rural living; (3) helps cooperatives improve services and operating efficiency; (4) informs members, directors, employees, and the public on how cooperatives work and benefit their members and their communities; and (5) encourages international cooperative programs. RBS also publishes research and educational materials and issues *Rural Cooperatives* magazine.