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The Butter-Powder Tilt

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On May 31, 2001, USDA announced a change in the Commodity Credit Corporation (CCC) purchases prices for butter and nonfat dry milk under the dairy price support program. The new price for butter (U.S. Grade A or higher, 25-kg blocks, salted) is $0.8548, an increase of 19.99 cents per pound. The new prices for nonfat dry milk are $0.90 for nonfortified and $0.91 for Vitamin A and D fortified, both types in 25-kg bags. The new nonfat dry milk prices are 10.32 cents per pound lower.

This change in relative prices for butter and nonfat dry milk was controversial, even though it did not alter the support price for milk. The change was supported by the International Dairy Foods Association and most dairy producer groups in the Upper Midwest. The decision to change relative prices was strongly opposed by the National Milk Producers Federation and other dairy producer groups.

What is meant by a butter-powder tilt?

In implementing the dairy price support program, USDA sets purchase prices for butter, nonfat dry milk, and cheddar cheese at levels that allow manufacturers of these products to pay the announced support price for milk to dairy farmers, currently $9.90 for milk at a fat test of 3.7 percent. The purchase prices for products are derived though formulas that use assumed yields of product per hundredweight of milk and specified manufacturing or "make" allowances representing

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manufacturing costs. Yields and make allowances are consistent with those used to calculate component and Class III and Class IV prices under federal milk marketing orders.

In deriving product prices for butter and nonfat dry milk, the two products are assumed to be jointly produced.[2] Thus, the sum of the value of butter and powder that can be produced from 100 pounds of milk less the make allowance for a butter powder plant must equal the support price for milk. This means that the butter and nonfat dry milk prices can be altered as long as the combined value of butter and nonfat dry milk per hundredweight of raw milk stays the same.

A relative change in product prices is popularly known as a butter-powder tilt – if one price goes down, then the other must go up to compensate for the lower value. Think of the tilt as a teeter-totter. The ends go up and down, but the fulcrum remains level.

Butter-powder tilts were common in the early 1990s, after the 1990 farm bill instructed the Secretary of Agriculture to minimize the public cost of the dairy price support program by adjusting purchase prices. At that time, butter was in surplus relative to nonfat dry milk. Four tilts were made between April 1990 and July 1993, when the milk support price was $10.10 per hundredweight. The butter purchase price was decreased from $1.0925 to $.65 and the nonfat dry milk price was increased from $.79 to $1.034. The industry responded by allocating milk fat from butter production to higher uses in other dairy and food products. The industry produces less butter today than 10 years ago. The result has been more volatile but generally much higher butter prices.

Butter-powder tilts were re-authorized by the Agricultural Market Transition Act of 1996. As under the 1990 Act, the Secretary of Agriculture was required to tilt butter-powder prices as often as twice a year as necessary to minimize purchase and storage costs. However, no tilts were made under the 1996 Act until May 31, 2001, and that was the first tilt that increased the butter purchase price and decreased the purchase price for nonfat dry milk.

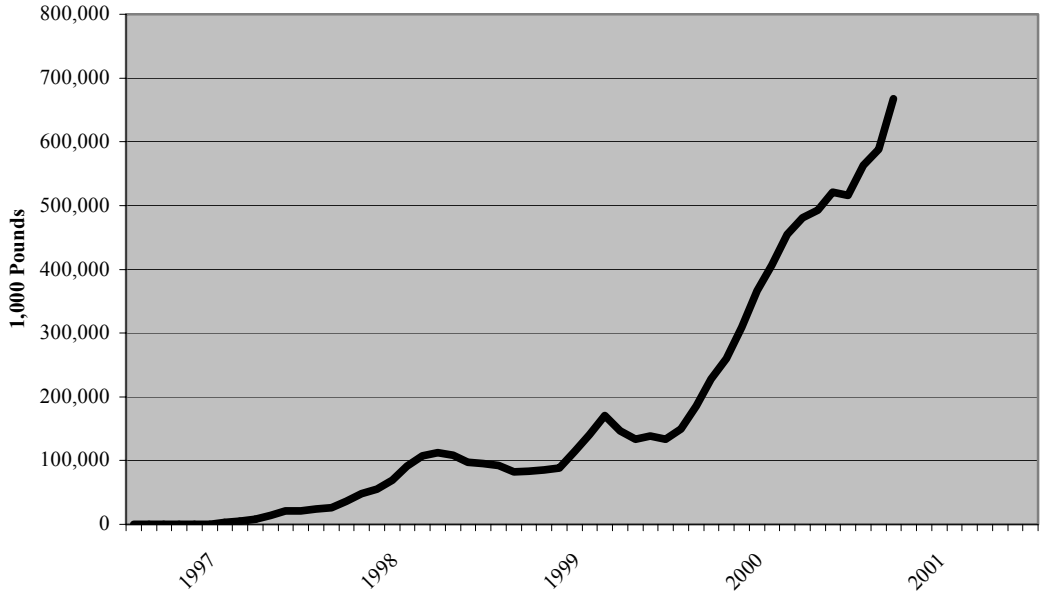
Reasons cited for the May 31 tilt were:

- An accumulation of nonfat dry milk stocks in quantities well above USDA's ability to use the product
- The level of expenditures to USDA
- Significant market distortions

[2] This is not a valid assumption. Most of the butter manufactured in the U.S. is produced independent of nonfat dry milk, coming from excess cream skimmed in fluid milk processing and lower-fat cheese manufacturing. However, the assumption correctly implies that the relative price relationship between butter and nonfat dry milk must conform to relative yields from raw milk.

These are sound reasons. As of March 31, 2001, CCC stocks of nonfat dry milk were 668 million pounds (see Figure 1), about three times year-earlier levels. Since the beginning of FY2002 (October 1, 2000) through the end of May 2001, the CCC purchased about 330 million pounds of nonfat dry milk. This represents more than 40 percent of the volume produced over that period of time. Government purchase costs exceeded $340 million. The CCC has purchased no butter in FY2002, since butter prices have been well above the $.655/pound CCC purchase price. Thus, the market distortions cited by USDA in their decision relate to the price for one of the two joint products (butter) driven by market forces while the price for the other (nonfat dry milk) was unrelated to market conditions.

Figure 1: Month-End Government Stocks of Nonfat Dry Milk



Why was the recent tilt controversial?

Lowering butter prices and raising nonfat dry milk prices was not a controversial issue in the earlier tilts. That's because farm milk prices were only remotely tied to the price of nonfat dry milk and butter prices only affected the butterfat differential.

Prior to May 1995, the key milk price indicator in the U.S. was the Minnesota-Wisconsin Price Series (M-W Price). The M-W Price, dating to 1960, was an estimate made by USDA's National Agricultural Statistics Service (NASS) and its predecessor, the Statistical Reporting Service, of the average price paid for Grade B milk in Minnesota

and Wisconsin. The Grade B milk price was derived predominantly from cheese factories, which used most of the Grade B milk produced in the two states.

The M-W price adjusted to 3.5 percent butterfat was used in federal milk marketing orders as the Class III price, which at that time applied to milk used for making cheese, butter, and nonfat dry milk. The M-W price was also used as the "mover" of Class II and Class I prices. Minimum Class prices and farm-level blend prices were adjusted for varying fat tests using a butterfat differential. The butterfat differential was an adjustment in price per hundredweight for each one-tenth of one percent (point) deviation in butterfat test above or below 3.5 percent. The formula for the butterfat differential was (.138 X Chicago Grade A butter price) minus (.0028 X current M-W at test). The formula represented the difference between the value of a tenth of a pound of butterfat and a tenth of a pound of skim milk in a hundredweight of milk. The butterfat differential typically was in the 6 to 12 cents per point range.

A declining volume of Grade B milk production prompted USDA to replace the M-W price with the Basic Formula Price (BFP) in 1995. The BFP still relied on a monthly survey of Grade B plants in Minnesota and Wisconsin to establish a base price. The base price was then adjusted for weighted average changes in cheese and nonfat dry milk prices. The weights were the relative proportion of Minnesota and Wisconsin Grade B milk used for cheese and nonfat dry milk. Hence, the BFP more explicitly incorporated nonfat dry milk prices than the M-W Price, but the nonfat dry milk weight was less than 5 percent. So cheese prices continued to dominate the federal order price mover. There was no change in the calculation of the butterfat differential with adoption of the BFP except that the current M-W at test was replaced with the current BFP at test.

In 1993 USDA issued a controversial final decision to adopt a special Class and price (Class III-A) for milk used to produce nonfat dry milk in plants regulated by federal marketing orders. This action came after more than two years of contentious administrative and legal proceedings. Class III-A pricing was advocated and supported by regulated milk handlers who operate butter/powder plants, which had been less profitable than cheese plants. These handlers argued that they were providing a valuable market-wide service to all producers by balancing fluid milk requirements and producer milk supplies, processing "surplus" milk into butter and nonfat dry milk as required by bottling schedules. But, given the prices of butter and nonfat dry milk relative to cheese, the handlers maintained that they could not afford to pay as much for milk as cheese plants.

Opponents of Class III-A pricing argued that it would inhibit the allocation of milk to its highest use, instead encouraging the expansion of nonfat dry milk processing capacity when market signals indicate that more milk should move to cheese plants. In fact, that is exactly what happened. The combination of less risky operating margins to plants with Class III-A pricing and an upward adjustment in the support price for nonfat dry milk with the butter/powder tilts in the early 1990s did encourage nonfat dry milk production in excess of market needs.

While III-A pricing increased the role of nonfat dry milk in setting milk prices to farmers, at least in markets with significant nonfat dry milk production, it did not affect other Class prices, which continued to be tied to the cheese-dominated Class III price.

However, the dominance of cheese as the driver of federal order prices was fundamentally altered on January 1, 2000, when USDA adopted new pricing rules as part of a package of reforms mandated by the 1996 Farm Bill. The new orders included a new milk class, Class IV, which is the minimum price for milk used to manufacture butter and nonfat dry milk. In effect, this institutionalized the previous Class III-A price.

More important, the new orders use a "higher of" formula for setting Class I prices. Class I prices for a given month are announced on the Friday prior to the 23rd of the previous month. They are derived from *advanced* skim milk values for Class III and Class IV, calculated on the Friday of the month preceding the 23rd. The advanced Class III skim milk value is based on cheese and whey prices from the two full calendar weeks preceding the 23rd.[3] The advanced Class IV skim milk value is based on nonfat dry milk prices for the same two weeks.

Whichever skim milk value is higher becomes the base skim milk price for Class I. The market-specific Class I skim milk price is the base skim milk price plus the applicable Class I differential. The Class I whole milk price is the market-specific Class I skim milk price times .965 (the proportion of whole milk consisting of skim milk) plus 3.5 times the advanced Class I butterfat price (the advanced Class III/IV butterfat price plus the Class I differential divided by 100).[4]

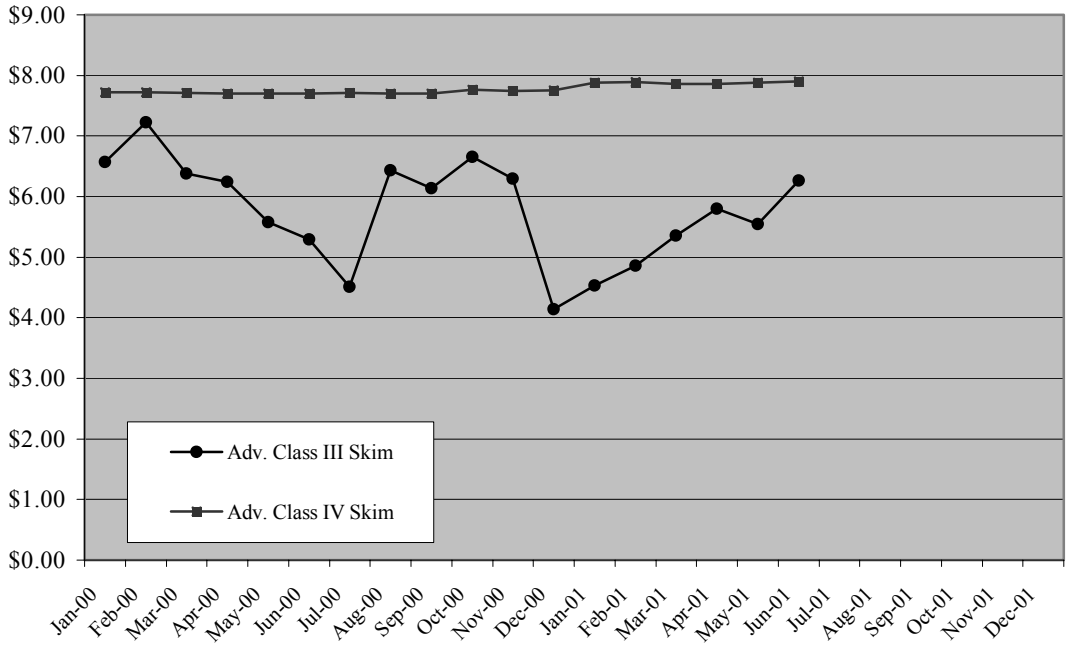
The Class II skim milk price is also advance priced, and is equal to the advance Class IV skim milk price plus $.70 per hundredweight.

With this change, nonfat dry milk potentially gained a key role in setting the price of milk for fluid purposes. And to the surprise of most industry observers, the advanced Class IV skim milk value has exceeded the advanced Class III skim milk value in every month that the new orders have been in effect (see Figure 2).

[3] For more information on how class and component prices are calculated, see Tom Cox and Bob Cropp, *Federal Order Reform: The Final Rule,* Marketing and Policy Briefing Paper No. 68, April 1999, and Ed Jesse and Bob Cropp, *Order Reform and Reforming Order Reform*, Marketing and Policy Briefing Paper No. 71, December 2000.

[4] USDA altered the new orders on January 1, 2001, by adding a separate Class III butterfat price, changing the calculation of the protein price, and making the "higher of" the higher of the Class III or Class IV prices expressed at 3.5 percent butterfat instead of skim values. This change was suspended by a court injunction before it went into effect. Since Class III and IV butterfat values are the same, the higher of skim values continues to be the mover pending resolution of the injunction.

Figure 2: Advanced Class III and IV Skim Milk Prices, 2000-01



With advanced Class IV milk prices consistently driving the Class I price, the importance of the price of nonfat dry milk and the Dairy Price Support Program purchase price was amplified. The CCC price was setting the market price for nonfat dry milk. And in doing so, the CCC was also setting the price for fluid milk. Any reduction in the CCC price would therefore correspondingly reduce not only the Class IV price, but also the Class I and Class II prices. This would result in lower farm level prices, with the amount of price reduction proportional to utilization of milk in the affected classes.

So not surprisingly, there was considerable opposition to the tilt. National Milk Producers Federation (NMPF) predicted dire consequences for dairy farm families with monetary losses approaching $1 billion. NMPF argued that the growing surplus of nonfat dry milk was not due to a relatively high support price for nonfat dry milk. Rather, growing stocks were the result of domestic use of nonfat dry milk being displaced by imports of milk protein concentrates. Major lobbying efforts were directed at Congress and USDA to maintain the status quo despite Congress' earlier mandate requiring the tilt (the Agricultural Market Transition Act of 1996).

The International Dairy Foods Association (IDFA) lobbied equally hard for the tilt. Their position was that the high CCC price for nonfat dry milk was precluding export opportunities and encouraging imports of milk protein concentrates as well as discouraging the domestic use of nonfat dry milk. IDFA also argued that fluid milk

prices were inappropriately decoupled from cheese, the principal manufactured dairy product.

Dairy interests in the Upper Midwest also supported the tilt, but for different reasons than IDFA. About 80 percent of the milk pooled under the Upper Midwest order is used for making cheese. Therefore, dairy farm incomes in that region were heavily influenced by the low cheese prices during 2000. The "higher of" pricing rule partially insulated higher Class I use markets, since their price was tied to the fixed CCC purchase price for nonfat dry milk. Compared to the previous M-W Price/BFP method of setting Class I prices in reference to cheese, effective Class I differentials were much higher. In 2000, the advanced Class IV price averaged nearly $2.00 per hundredweight higher than the advanced Class III price. So adjustments to a milk surplus were being disproportionately borne by producers in high Class III use markets.

What will the tilt mean for dairy farmers?

The May 31 tilt in butter-powder prices is, on net, positive for the dairy industry. In our judgment, the "higher of" provision of order reform led to an unintended consequence – a complete separation of fluid milk prices from cheese prices. The component pricing formulas used in the new orders work OK under "normal" circumstances. But with very low cheese prices relative to the CCC purchase price for nonfat dry milk, the formulas result in price distortions. There is an incentive to move milk to a product (nonfat dry milk) that is already in heavy surplus. Worse, the CCC price for the product in surplus becomes the sole driver of fluid milk prices. The dairy price support program was certainly not intended to operate in that fashion. Neither was it USDA's intent that the "higher of" formula would consistently result in Class IV skim values moving Class I prices.

The tilt will not prevent the possibility of this pricing distortion continuing. But it will decrease the probability of Class IV skim milk values being consistently above Class III skim milk values. Thus, it is more likely that fluid milk prices will be driven by cheese prices. Tightening the relationship between cheese prices and Class I prices improves market signals to dairy producers. Across all federal orders in 2000, Class IV utilization was about 7 percent, while Class III utilization was more than 45 percent. It makes no economic sense to consistently price fluid milk in reference to Class IV.

The tilt will make U.S. nonfat dry milk more competitive in world markets. As of late May, world market prices for nonfat dry milk were in the $2,000-2,200 per metric ton (mt) range. The new CCC nonfat dry milk price of $0.90 per pound translates to less than $2,000 per mt. Of course, world market prices could adjust quickly to the new CCC price, but the incidence of FMD in European and South American countries could put U.S. nonfat dry milk at a premium.

The tilt should also create economic incentives to use more nonfat dry milk domestically. In particularly, it will make milk protein in nonfat dry milk more price competitive with

imported milk protein concentrates. In recent years, about 60 percent of nonfat dry milk was used as intermediate product in other dairy products. But domestic use of nonfat dry milk has declined, dropping 15 percent in 1999.

The effect on farm milk prices, at least in the short run, will be minimal. Recent strength in cheese markets has raised Class III milk prices despite higher butter prices (a ten-cent increase in the butter price reduces the Class III price by 4 cents). Current futures prices suggest that the advanced Class III skim milk value will be higher than the advanced Class IV skim milk value for much of the remainder of 2001:

CME Milk Futures, Settlement Prices, June 1, 2001

Contract Month	*Class III*	*Class IV*	*III-IV*
JUN 01	14.90	14.81	+0.09
JLY 01	15.47	14.80	+0.67
AUG 01	15.46	14.95	+0.51
SEP 01	15.45	14.90	+0.55
OCT 01	14.40	14.65	-0.25
NOV 01	13.81	13.90	-0.09
DEC 01	12.92	13.82	-0.90
JAN 02	12.05	13.12	-1.07
Average	14.31	14.37	-0.06

These prices are for milk testing 3.5 percent butterfat. Since the butterfat price is the same for both Class III and Class IV, futures prices indicate that the Class III skim value will be higher than Class IV for June through September. The relative futures prices suggest Class IV will be the Class I mover from September 2001 through January 2002. But these Class IV futures prices do not reflect the lower CCC purchase prices for nonfat dry milk, and will likely decrease.

In the longer term, how dairy farmers' pocketbooks are affected by the tilt depends on many factors. The most important of these are the level of cheese prices relative to butter and nonfat dry milk prices and the utilization of milk by class. If cheese prices remain strong, then Class III will likely move Class I on a regular basis. In that case, any effect on farm prices would be limited to lower Class IV and Class II prices. How much lower depends on how far market prices for nonfat dry milk fall toward the lower CCC purchase price bound. Farm price effects would depend on market utilization of milk in these two classes. For 2000, Class II utilization across all federal order markets was 10

percent and Class IV utilization was 8 percent.[5] In the Upper Midwest market, the respective percentages were 4 percent and 1 percent.

If cheese prices weaken and Class IV moves Class I, then there will be an additional negative impact on farm prices from the tilt. The magnitude of the impact would depend on how far nonfat dry milk prices fall and how much milk is used in Class I.

Because of uncertainties with respect to where nonfat dry milk prices will settle and whether Class III or Class IV moves Class I, it is not possible to derive a very accurate projection of the likely farm level effect of the tilt. However, in estimating price effects, we do not believe that it is realistic to assume that market prices for nonfat dry milk will be fixed at the new CCC price of $.90 per pound. Neither do we feel it is reasonable to assume that Class IV will consistently move Class I. That phenomenon has been the result of not making the tilt earlier.

While there is a possibility that the tilt could result in marginally lower milk prices in markets with high Class I, Class II, and Class IV use, there are clear offsetting gains from the tilt. Treasury costs will be lower. Nonfat dry milk exports will likely be higher and milk protein concentrate imports will likely be lower. Most important, economic costs, which are significant but cannot easily be measured, will be reduced. These costs include flawed market signals to dairy farmers and to producers and users of nonfat dry milk. USDA made the correct decision in making the butter-powder tilt.

[5] California, which is not included in these percentages, has a significantly higher utilization percentage for their equivalent of Class IV. The Calfornia Class 4-a utilization in 2000 was 31 percent.