August 1992 No. 349

FATTER

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FATTER

Stephen King/Richard Bachman fans will relate to this title. For those who eschew Mr. King, the book, Thinner, related the tribulations of a corpulent lawyer who melted from 246 pounds to less than 100 pounds in a matter of weeks following a Gypsy curse. Dairy farmers are experiencing the opposite phenomenon. Butterfat, once held in esteem by the dairy marketplace, is now a drag on that marketplace. Consequently, U.S. milk production is rapidly getting fatter relative to commercial disappearance. What underlies this curse, and how can it be removed?

Pricing Butterfat

Milk pricing in the U.S. depends heavily on the price of butter. At one time, most dairy farmers were paid for their milk on a "straight fat" basis; that is, they were paid for the number of pounds of butterfat in their milk. In those good old days, butter was the most valuable commodity made from milk, and even fluid milk consumers rated product quality by the height of the cream ring on their bottles.

As nonfat components gained value because of changing consumption patterns, butterfat differential pricing gradually replaced straight fat pricing. Under this milk pricing method, farmers receive a base price for milk containing 3.5 percent butterfat and a premium (deduction) for each "point" (1/10 of a percent) their milk test is above (below) the standard test. The value per point of butterfat test is based on the market price for butter.

Butterfat differential pricing is used today in 40 of the 41 federal milk marketing orders.[2] The orders establish a minimum blend price for 3.5 percent butterfat milk based on administered class prices and utilization of milk by class. A butterfat differential is set by multiplying the Chicago Mercantile Exchange price per pound of Grade A butter by .138 and

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[2]The exception is the Great Basin-Lake Mead order in Utah, where multiple component pricing was introduced in April 1988. In that order, a protein price is derived by subtracting the value of butterfat from the Minnesota-Wisconsin price.

subtracting .0028 times the current month Minnesota-Wisconsin price.[3] Regulated handlers are obligated to pay producers the minimum blend price for their specific location adjusted for butterfat value calculated as the butterfat differential times the number of "points" a producer's fat test is above or below 3.5 percent.

The butterfat differential establishes skim milk value under orders and, thus, the value of nonfat milk solids. Specifically, the order value of skim milk per hundredweight is the order price per hundredweight of milk at 3.5 percent butterfat less 35 times the butterfat differential. Hence, with constant milk prices, the value of skim milk increases as butter prices decline and vice-versa.

As butter surpluses have mounted, the Commodity Credit Corporation (CCC) of the USDA has become a major purchaser of butter under the dairy price support program. Consequently, market prices for butter have been virtually fixed by the CCC purchase price for several years. Thus, the butterfat differential moves in lock-step with the CCC purchase price for butter, which is determined from the announced support level for manufacturing milk under the support program.

In summary, the CCC establishes butter prices, which, in turn, establish butterfat differentials, which, in turn, establish nonfat solids value. Under federal milk orders, dairy farmers are paid for their volume of milk adjusted for their butterfat test. There are no incentives within the federal order system to increase production of solids-not-fat. While many plants do pay protein or solids-not-fat premiums independent of federal order regulations, these premiums bear no obvious relation to market values for nonfat components. And deductions for substandard solids-not-fat composition are uncommon, because these could place order-regulated plants in violation of minimum blend price rules.

Butterfat Supply

The butterfat composition of milk in the U.S. has changed very little over the last 40 years. There was a slight decrease in fat tests, from al-most 4 percent to less than 3.7 percent, from 1950 through the early 1960s. This was attributable to a decreasing percentage of colored breeds in the U.S. dairy herd. Since the mid-1960s, the U.S. average butterfat test has been remarkably constant at between 3.64 and 3.70 percent (Figure 1). And in the last two years (1989 and 1990), there has been a small but nevertheless ominous *increase* in the butterfat content of U.S. milk.

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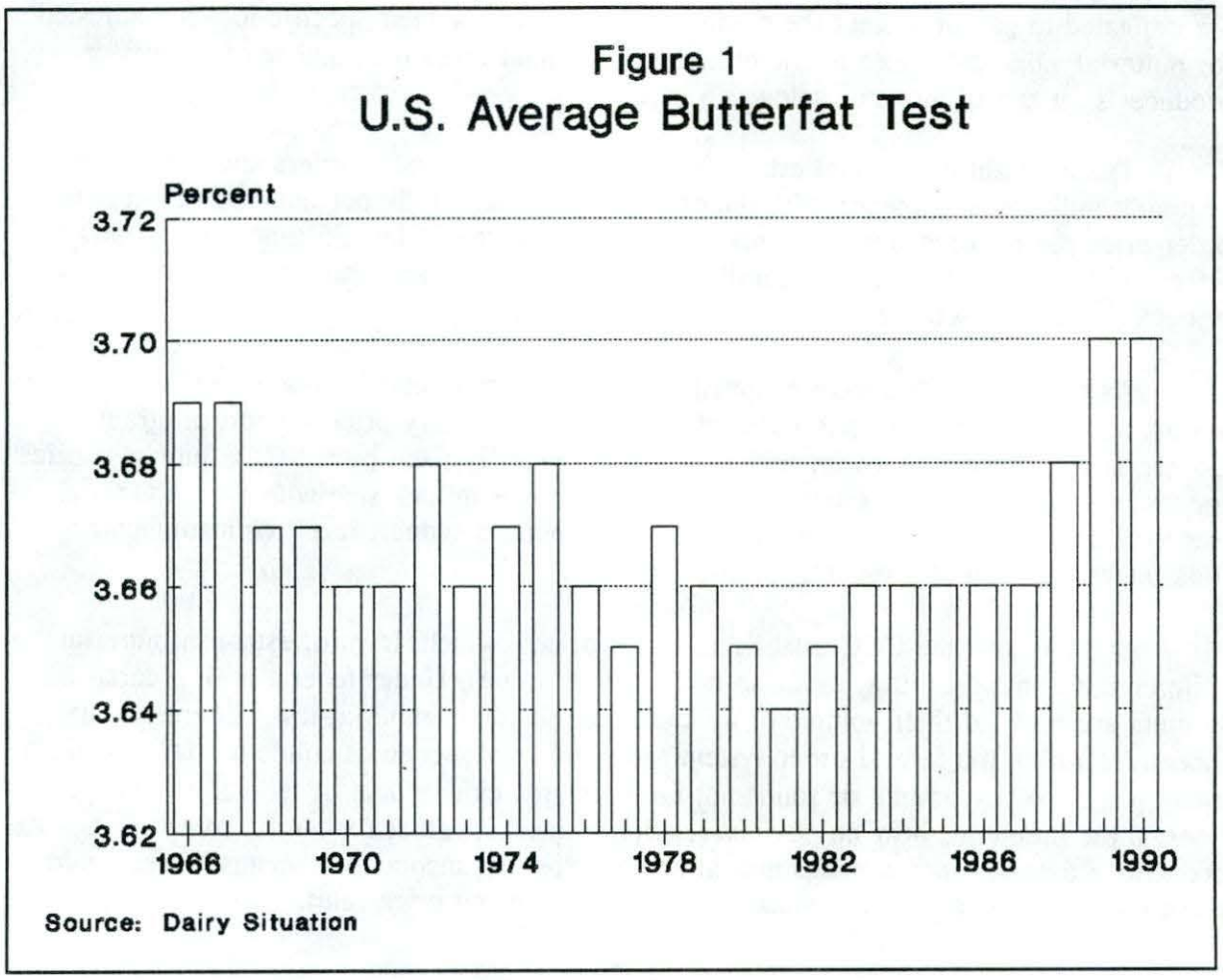
[3]This method of fixing the butterfat differential was established in November 1990 following a national federal milk marketing order hearing. Previously, the butterfat differential was 0.115 times the Chicago Mercantile butter price.



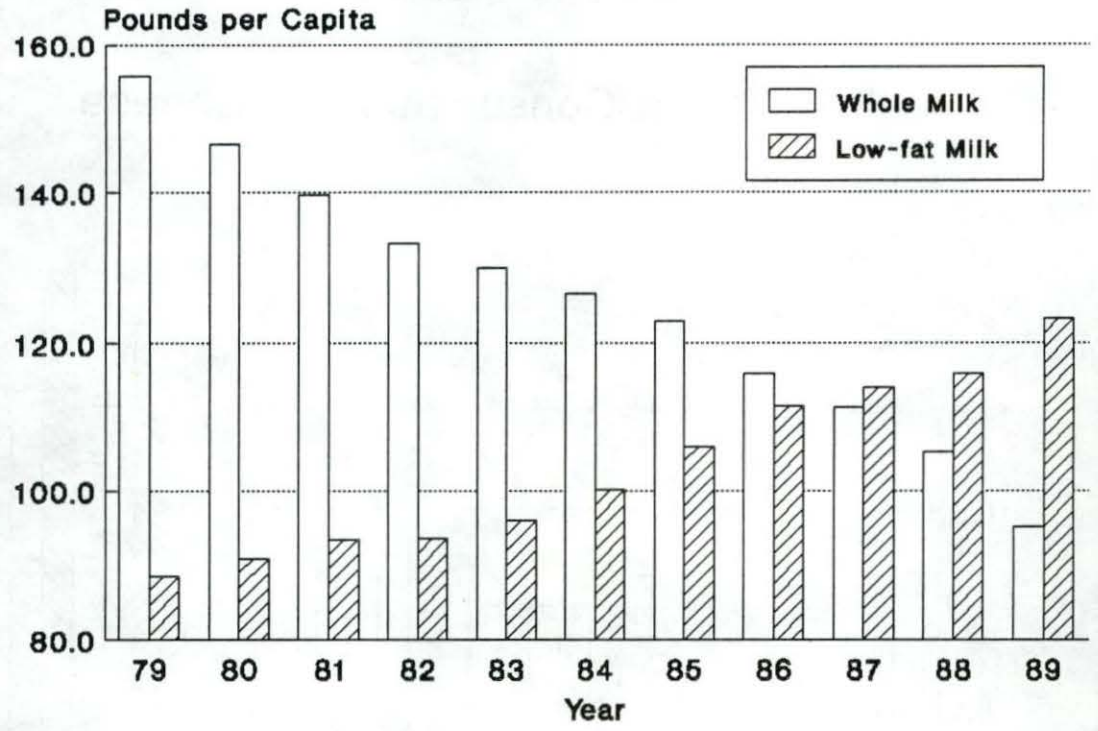
Butterfat Demand

In contrast to butterfat production, butterfat use has been declining. This decline has come from three sources. First, per-capita consumption of butter exhibited a steady drop since it peaked at nearly 20 pounds in the 1920s. Most of the decline in butter use was due to market erosion from less-expensive vegetable oil substitutes. By the early 1970s, per-capita butter use was less than 5 pounds, a 75 percent decline from peak consumption levels. Consumption appears to have stabilized at that level. But new concerns about the health effects of cholesterol and saturated fats may drop butter use even further unless these concerns are countermanded by advertising or lower butter prices.

The second source of reduced butterfat use is in fluid products. Two percent low-fat milk began to substitute for whole milk in the 1960s. Later, one percent milk gained modest popularity. In the late 1980s, a surge in skim milk use began, after many years of stagnant sales. By 1987, per capita use of low-fat milks in the aggregate (two percent, one percent,

and skim) exceeded use of whole milk (Figure 2). The substitution of low-fat for whole fluid milk appears to be accelerating.

Figure 2
Per Capita Consumption of Fluid Milk



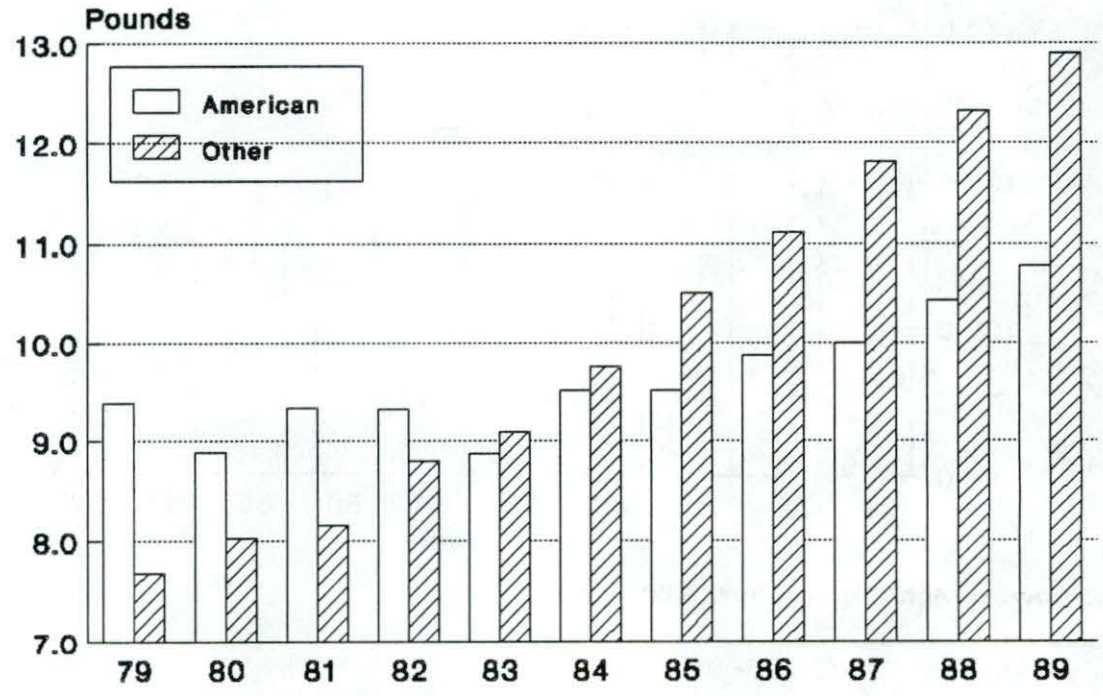
Source: Agr. Outlook, Nov. 1990

Even for whole milk, the butterfat content of the retail product (minimum 3.25 percent butterfat, but usually higher) is less than the butterfat content of the raw product (about 3.7 percent butterfat). This means that sales of *all* fluid milk generate excess butterfat in the form of cream. With low-fat milks, the volume of excess butterfat associated with fluid milk processing is much larger.[4]

[4]Dairy spokespersons in regions of the country with high fluid milk utilization often argue that their dairy farmers are not responsible for surpluses, since no CCC purchases emanate from their regions. In fact, a hundredweight of milk sold as fluid milk creates about 2 pounds of butter, most of which is purchased by the

The trend in cheese consumption is the third source of reduced butterfat use. All varieties of cheese have shown strong growth in the last two decades. But the largest growth recently has come in Italian varieties (Figure 3), which have considerably lower butterfat content that traditional American varieties. Italian cheese production results in large quantities of whey cream, and, subsequently, whey cream butter. While whey cream butter cannot legally be sold to the CCC, it does substitute for sweet cream butter in many food processing uses.

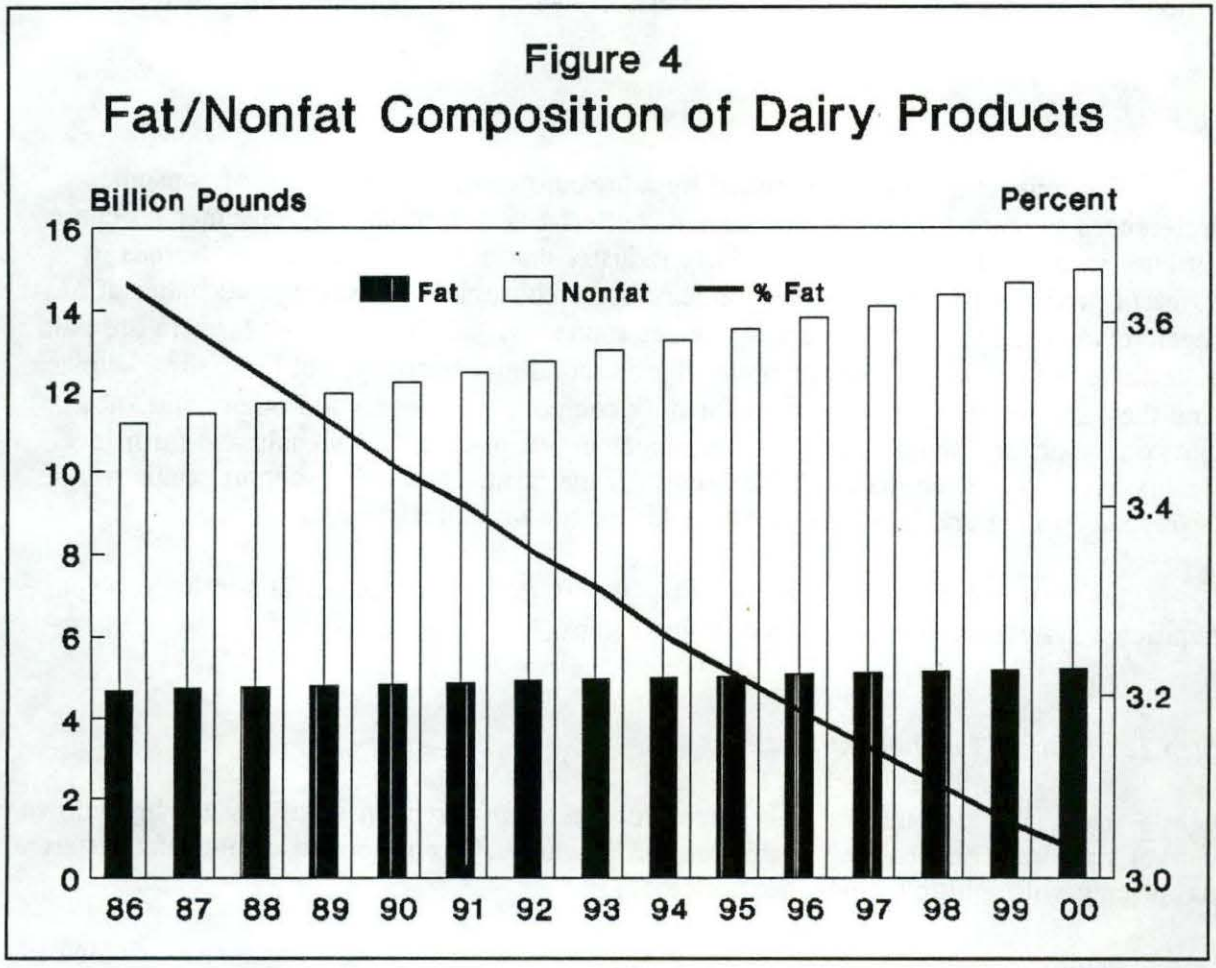
Figure 3
Per Capita Consumption of Cheese



Commercial Use (No Giveaways)
Source: Dairy Sit. Aug 1990

CCC. The illusion of inculpability is created by the absence of butter processing facilities in these regions. The cream moves to regions that have excess butter processing capacity, and are counted against those regions in the "who sells to the CCC" game.

The stability of the butterfat content of raw milk combined with the trends in butterfat use imply a serious problem of excess butterfat. The extent of the problem is illustrated in Figure 4, which shows projected butterfat and nonfat solids consumption based on linear trends in dairy product consumption observed between 1976 and 1986. The projections are probably optimistic because they do not account for growing use of low-fat forms of American-type cheeses. Even if consumption of these new low-fat cheeses does not displace consumption of conventional counterparts, the excess butterfat problem will be exacerbated.



The composition of both fluid products and cheese are likely to yield large increases in excess butterfat by the year 2000. Butterfat use in fluid milk is projected to decline by about 175 million pounds by 2000, in spite of a projected gain in total fluid milk sales. The net result is a projected increase in *excess* butterfat to almost 1 billion pounds. This amount of fat would produce about a third more butter than is projected to be sold commercially in 2000.

Total butterfat use in cheese is projected to increase by nearly 400 million pounds between 1986 and 2000. But the biggest gain in cheese sales will likely come from lower-fat varieties. As a result, *excess* butterfat from cheese production is projected to increase to about 750 million pounds, which converts to butter production about equal to expected commercial use in the year 2000.

In order to balance butterfat produced with butterfat expected to be consumed in 2000, the fat test of U.S. milk will need to be about 3.0 percent. If we continue to produce milk containing 3.7 percent fat, then residual butterfat converted to butter will total nearly a billion pounds. I doubt anyone believes the CCC will be happy to pick up that residual.

Thinning Out

The milkfat imbalance is caused by a breakdown in the translation of consumer preferences to dairy farmers. The *value* of butterfat is determined by consumer purchase patterns. Consumers are telling the dairy industry that butterfat has different values in different products. More important, at least some consumers are saying that butterfat has a negative value. The *price* of butterfat is determined by the CCC. Dairy farmers are paid for butterfat according to a value for butter that is set administratively; not by the marketplace. And they are not being directly paid for milk components (protein and other solids-not-fat) that consumers are demanding. This estrangement of marketplace signals and farm-level signals has also created distorted incentives off the farm. The dairy support sector has developed feeding and breeding practices for maximum butterfat production.

So what can we do? Thinning out -- that is, solving the butterfat surplus problem -- requires a systematic process involving three steps.

Step 1: Multiple Component Pricing

Rectifying the butterfat imbalance problem must start with rectifying the breakdown in market signals. The first step in this process is wholesale replacement of butterfat differential pricing with multiple component pricing.

Multiple component pricing (MCP) individually prices milk components of value to processors and, ultimately, consumers. Any number of components can be separately priced, but most MCP plans focus on butterfat and either protein or solids-not-fat. With MCP, component prices can be altered to conform with consumer signals.

The problem with this approach is that components have different values in different dairy products. Consequently, a single MCP plan may discriminate against certain processors who might be obligated to pay for elevated levels of some component whose value they cannot recover.

This problem has delayed adoption of MCP in federal milk marketing orders. Although most of the milk sold to regulated handlers under federal orders is now used for manufacturing, the orders are designed to price milk for fluid purposes. Federal and state standards specify minimum levels of butterfat and solids-not-fat in fluid products. Fluid processors can control butterfat content by skimming or adding cream. They cannot control solids-not-fat in a similar fashion, nor can they alter their selling prices according to the solids-not-fat content. While cheese plants can garner added revenue from the higher cheese yields associated with milk that is high in protein, fluid processors cannot capture this added value.

This problem is not insurmountable. An easy solution is to exempt fluid handlers from MCP. That approach is used in the Great Basin-Lake Mead order, which began using MCP in April 1988. Another, albeit more difficult, solution is to raise the federal minimum solids-not-fat standards to a level higher than the solids-not-fat in raw milk. This would require all handlers to fortify their fluid milk with skim milk solids. Raw product costs would thereby be equalized, but at a higher level than currently experienced.

It is encouraging to note that the 1990 Food, Agriculture, Conservation and Trade (FACT) Act contains a provision to promote the adoption of multiple component pricing. The Secretary of Agriculture is to conduct a study to determine if federal orders are responsible for excess butterfat. If he finds that they are, then he mist provide recommendations to Congress for changes that would alleviate the problem and conduct a national hearing to consider implementing MCP in federal orders.

Step 2: Reduce Butterfat Prices

Multiple component pricing will not, by itself, solve the butterfat imbalance problem. It only provides the vehicle for appropriately transmitting market signals. The second step in the solution is to alter the price ratio between fat and solids-not-fat.

As long as butter remains in surplus and the CCC stands ready to purchase unlimited quantities of butter at fixed prices, the CCC butter purchase price will continue to be the key element in determining butterfat value. There are two options to changing the fat/nonfat price ratio. One is to eliminate CCC authority to purchase both butter and nonfat dry milk. That would be an extreme and possibly very disruptive move. To its credit, the option would very quickly establish the market value of butterfat and nonfat solids. But it could reduce milk prices substantially.

The second option is to reduce the ratio of the CCC butter price to the CCC nonfat dry milk price. This has already been done several times. On April 1, 1989, the support level was increased by 50 cents per hundredweight. The butter price was held constant at $1.32 per pound, and the nonfat dry milk price was raised by 6 cents per pound to account for the full amount of the milk price change. On July 1, 1989, the support price was

lowered by 50 cents per hundredweight. The full decrease in milk value was placed on butter, lowering the CCC butter price to $1.21 per pound. On January 1, 1990, another 50 cents per hundredweight drop in the support level put the CCC butter price at $1.09 per pound. Finally, another "tilt" was implemented in April 1990, when the butter price was lowered to its current level of 98.25 cents per pound and the nonfat dry milk price was raised to 85 cents per pound.

Reducing the fat/nonfat price ratio has both supply- and demand-side impacts. On the supply side, it diminishes dairy farmers' incentive to produce butterfat and increases their incentive to produce nonfat solids. On the demand side, it expands sales of butterfat, both as butter and in other forms.

Further "tilts" in the butter/nonfat dry milk price ratio are authorized under the 1990 FACT Act. The Secretary of Agriculture is instructed to alter the ratio (up to twice a year) in a manner that minimizes CCC purchase costs. These tilts may not occur because both butter and nonfat dry milk are currently being purchased by the CCC. Thus, any tilt would merely redistribute the volume of purchases between butter and nonfat dry milk. However, I would encourage USDA to continue tilting the butter/nonfat dry milk price ratio as long as the ratio of butter to nonfat dry milk purchases exceeds the ratio of butter to nonfat dry milk content in raw milk (currently about 1:1.8).

Step 3: Reduce Butterfat Production

The final corrective step involves changing the ratio of fat and nonfat solids in milk to conform to market demands. This is the most difficult step to achieve.

The fundamental problem is a strong physiological link between butterfat and nonfat solids in cows' milk. My dairy science colleagues tell me that it is easy to suppress butterfat through feeding. Unfortunately, SNF is similarly suppressed, reducing the overall value of milk. However, recent experiments with feeding protected fats are encouraging.

Breeding for a higher fat/nonfat solids ratio is a second possibility. To date, sire selection has not focused on this trait, which means that changing the ratio through conventional breeding practices would be a very long-term undertaking. Fortunately, genetic engineering offers the potential for accelerating the process of changing the fat/nonfat composition of milk through breeding. Recent laboratory breakthroughs suggest that genetic engineering represents the most promising approach to substantially modifying the makeup of milk.

The key to changing milk composition at the farm level is in providing appropriate economic incentives to dairy farmers. The potential for reducing butterfat production cannot be realized until implementation of steps 1 and 2, which provide those incentives.