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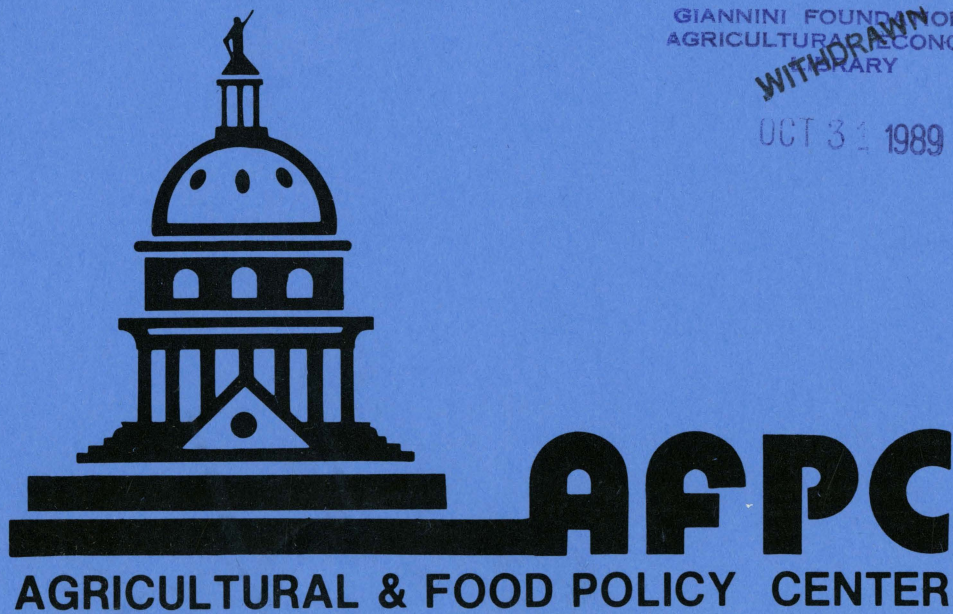
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AFPC POLICY WORKING PAPER
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ACCURACY OF USDA SUPPLY AND USE ESTIMATES
FOR MILK: A RECENT HISTORY

Department of Agricultural Economics
Texas Agricultural Experiment Station
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ACCURACY OF USDA SUPPLY AND USE ESTIMATES FOR MILK: A RECENT HISTORY

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Provisions in the Food Security Act of 1985 require the Secretary of Agriculture to adjust the price support level for milk in calendar years 1988 through 1990 based on the estimated amount of net Commodity Credit Corporation (CCC) purchases of dairy products. If annual purchases for the coming calendar year are estimated to be 2.5 billion pounds or less (milk equivalent), the Secretary must increase the price support level by 50 cents per hundredweight (cwt) on January 1. If net CCC purchases are estimated to exceed 5 billion pounds, however, the price support level must be decreased 50 cents.

Policymakers refer to such an automatic program adjustment provision as a "supply-demand adjuster," or "trigger" mechanism. In dairy, this legislation replaced the Secretary of Agriculture's discretion to set milk price supports based on parity. Similar provisions exist for "triggering" feed grain acreage set-aside levels based on accumulations of CCC stocks.

In December 1987, the Secretary announced that USDA estimates of net CCC dairy product purchases for the 1988 calendar year equaled 7.3 billion pounds milk equivalent. This "triggered" a 50-cent drop in the price support level on January 1, 1988, which was implemented by reduced prices paid by the CCC for butter, cheese, nonfat dry milk, and other dairy products. With the 50-cent-per-cwt price cut, USDA estimated 1988 net CCC purchases at 6 billion pounds, still above the 5 billion pound trigger level set by Congress.

Preperiod estimates of net CCC purchases are usually based on forecasts of milk production, commercial disappearance, and related factors which make up the milk supply-demand balance sheet (Table 1); therefore, unless the Congress decides otherwise, the price support level is based on forecasts of the items in USDA's milk balance sheet. The accuracy of those forecasts becomes critically important to the dairy industry. This paper reviews the accuracy of U.S. milk supply and use estimates made by USDA, with special emphasis on net CCC purchases.

Table 1. Milk Balance Sheet.

Milk Supply

Beginning Commercial Stocks
+ Milk Production
- On-farm Use
= Milk Marketings
+ Net Milk Imports
= Total Commercial Supply of Milk

Milk Use

Commercial Disappearance
+ Ending Commercial Stocks
= Total Commercial Use of Milk

Equilibrium

Total Commercial Supply of Milk
- Total Commercial Use of Milk
= Net CCC Purchases of Milk

Methodology

The major outlets USDA uses to present forecasts of milk supply and use are: (a) the annual *Agricultural Outlook Conference* held in December; (b) the *Dairy Situation and Outlook* report released five times a year; and (c) *World Agricultural Supply and Demand Estimates (World Estimates)*, published at least once a month. *World Estimates* forecasts milk supply and use on a marketing year basis, which runs from October 1 through September 30 of the following year. Since *World Estimates* provides a consistent series of forecasts and final estimates, it allows comparisons to be made over time, and was the source of data for this analysis.

It should be noted that USDA publishes final estimates of milk supply and use shortly after the end of the marketing and calendar year; however, these final estimates are often revised as more information becomes available. In the case of estimates found in *World Agricultural Supply and Demand Estimates*, these revisions continue to be made for as long as two years after the end of the marketing year for which the estimate applies.

This analysis covers six completed marketing years from 1982 to 1987. In each year, the forecast published in September (before the start of the marketing year on October 1) is used to represent a pre-marketing-year forecast of milk supply and use. This forecast is then compared to the last final revised estimate available, regardless of when it was published, to determine the accuracy of the pre-marketing-year forecast.

Some items in the milk balance sheet are relatively constant over time and represent a small amount of milk compared to total milk supply and demand. These include beginning commercial stocks, farm use, imports, and ending commercial stocks. This analysis focuses on the major components in the estimation process: milk production, milk marketings, commercial use, and net CCC purchases.

Results

Comparisons of pre-marketing-year forecasts and revised final estimates made by USDA appear in Table 2. The accuracy of the forecasts of net CCC purchases is quite variable, with

Table 2. Comparison of Pre-Marketing-Year Forecasts and Revised Final Estimates for U.S. Milk Supply and Use, 1982-87 Marketing Years.

	Milk Production	Milk Marketings	Commercial Use	Net CCC Removals
-----Billion Lb.-----				
1982				
Pre-Marketing-Year Forecast	135.0	132.8	123.3	11.5
Revised Final Estimate	<u>139.0</u>	<u>136.6</u>	<u>122.1</u>	<u>16.6</u>
Difference ¹	-4.0	-3.8	+1.2	-5.1
(Percent Difference)	(-3.0)	(-2.9)	(+1.0)	(-44.3)
1983 ²				
Pre-Marketing-Year Forecast	137.5	135.4	122.0	15.5
Revised Final Estimate	<u>136.7</u>	<u>133.9</u>	<u>126.4</u>	<u>10.4</u>
Difference	+0.8	+1.5	-4.4	+5.1
(Percent Difference)	(+0.6)	(+1.1)	(-3.6)	(+32.9)
1984				
Pre-Marketing-Year Forecast	135.5	132.7	128.0	7.2
Revised Final Estimate	<u>140.2</u>	<u>137.5</u>	<u>128.9</u>	<u>11.5</u>
Difference	-4.7	-4.8	-0.9	-4.3
(Percent Difference)	(-3.5)	(-3.6)	(-0.7)	(-59.7)
1985 ³				
Pre-Marketing-Year Forecast	143.0	140.6	130.2	13.1
Revised Final Estimate	<u>145.1</u>	<u>142.7</u>	<u>133.1</u>	<u>12.3</u>
Difference	-2.1	-2.1	-2.9	+0.8
(Percent Difference)	(-1.5)	(-1.5)	(-2.2)	(+6.1)
1986				
Pre-Marketing-Year Forecast	142.0	139.7	136.5	5.7
Revised Final Estimate	<u>141.5</u>	<u>139.2</u>	<u>136.1</u>	<u>5.4</u>
Difference	+0.7	+0.5	+0.4	+0.3
(Percent Difference)	(+0.5)	(+0.4)	(+0.3)	(+5.3)
1987				
Pre-Marketing-Year Forecast	143.5	141.0	139.0	4.5
Revised Final Estimate	<u>144.9</u>	<u>142.7</u>	<u>136.2</u>	<u>9.7</u>
Difference	-1.4	-1.7	+2.8	-5.2
(Percent Difference)	(-1.0)	(-1.2)	(+2.0)	(-115.6)

¹ A minus sign means the preyear forecast was less than the final estimate, while a plus sign means the preyear estimate was higher.

² Pre-marketing-year forecast made before Congress passed the 1983 Dairy and Tobacco Stabilization Act, which authorized the Milk Diversion Program.

³ Pre-marketing-year forecast made before Congress passed the Food Security Act of 1985, which implemented the Dairy Termination Program.

Source: *World Agricultural Supply and Demand Estimates*

errors ranging from 5.3 percent in 1986 to over 115 percent the following year. In actual pounds, preyear forecasts ranged from 5.1 billion pounds too high in 1983 to 5.2 billion pounds too low in 1987. For the period 1982-87, there was no consistent tendency to either overestimate or underestimate net CCC purchases.

As for the other individual milk supply and use items analyzed, final estimates were never more than 4 percent different from preyear forecasts. When compared with net CCC purchase estimate differences, relatively small inaccuracies in forecasting milk production and commercial use can lead to much larger errors in net CCC purchase estimates. This is due mainly to the magnitude of the volumes of milk equivalent involved-- a 130-to-140 billion-pound-range for milk production, marketings, and commercial use versus a 5-to-15 billion-pound-range for CCC purchases. CCC removals is basically a residual value, i.e., what is left over after subtracting commercial use from milk marketing (with some small differences due to imports, exports, and changes in levels of stocks). A good record in forecasting production, marketings, and commercial use, combined with a poor record in forecasting CCC removals, serves to point out the difficulty of forecasting a residual value. Like CCC purchase estimates, preyear forecasts of other milk supply and use items showed no consistent underestimation or overestimation.

There is little evidence that the USDA dairy forecasts are either consistently optimistic or pessimistic. From the standpoint of the dairy industry, an optimistic forecast would be one that underestimates milk production, milk marketings, and CCC removals while overestimating commercial use. One could argue that, based on revised final estimates, pre-marketing-year forecasts in 1982 and 1987 were optimistic; however, 1983 data show just the opposite - a pessimistic pre-marketing-year forecast, while other years (1984-86) reveal no consistent trend toward optimism or pessimism in USDA forecasts.

Significant changes in dairy policy occurred in 1983 and 1985, after the preyear forecast. In 1983, revised forecasts were published in the month after the legislation was signed. The new forecasts of milk production and milk marketings reflected the belief that the Milk Diversion Program would significantly impact dairy producers; however, the revised forecast was less accurate than the preyear, prelegislation forecast (Table 3). While the revised forecast of 1983

Table 3. Comparison of First Postlegislation Forecast and Revised Final Estimates for Milk Supply and Use, 1983 and 1985 Marketing Years.

	Milk Production	Milk Marketings	Commercial Use	Net CCC Removals
-----Billion Lb.-----				
1983				
December 1983 Forecast ¹	131.0	128.6	123.3	7.8
Revised Final Estimate	<u>136.7</u>	<u>133.9</u>	<u>126.4</u>	<u>10.4</u>
Difference	-5.7	-5.3	-3.1	-2.6
(Percent Difference)	(-4.4)	(-4.1)	(-2.5)	(-33.3)
1985				
April 1986 Forecast ²	145.5	143.1	134.5	11.0
Revised Final Estimate	<u>145.1</u>	<u>142.7</u>	<u>133.1</u>	<u>12.3</u>
Difference	+0.4	+0.4	+1.4	-1.3
(Percent Difference)	(+0.3)	(+0.3)	(+1.0)	(-11.8)

¹Dairy and Tobacco Adjustment Act signed into law November 29, 1983.

²Food Security Act of 1985 signed into law December 23, 1985.

Source: *World Agricultural Supply and Demand Estimates*

net CCC removals was closer to the final estimate in actual pounds, the percent difference was greater. Perhaps learning from this experience, USDA waited four months after the Food Security Act of 1985 was signed into law to publish revised forecasts. By April 1986, not only had the provisions of the program been announced in detail, but actual sign-up had occurred (unlike 1983). The revised forecasts, coming halfway through the marketing year, were more accurate than preyear, prelegislation forecasts for milk production, milk marketings, and commercial use; however, the revised forecast for 1985 net CCC removals was less accurate, both in actual pounds and percent difference, than the preyear, prelegislation forecast. These years indicate the difficulty analysts have in predicting producer, consumer, and processor response to changes in policy.

The current marketing year is a case in point. The 1988 drought brought predictions of heavier-than-usual cow culling due to reduced forage availability and higher feed costs. Anticipating reduced milk production, Congress suspended the dairy supply-demand adjuster for 1989 and included a 50-cent rise in the price support level during April-June 1989, in drought relief legislation passed in early August 1988. The pre-marketing-year forecasts of milk supply and use appearing in the September *World Agricultural Supply and Demand Estimates* were based on the 50-cent rise in the price support level during April-June 1989. By March 1989, USDA analysts were already predicting that anticipated producer and consumer response to this policy necessitated changes in milk supply and use forecasts for the 1988-89 marketing year (Table 4). This is an example of the difficulty in predicting the impact of a natural phenomenon like the drought on milk production as well as milk producers' response to legislated price changes. Further research on dairy industry structure, milk production patterns, milk supply response, and costs of production could improve forecasters' abilities should such issues arise in the future.

Summary

Forecasting milk supply and use has been done for many years by many organizations. Provisions of the Food Security Act of 1985 relating price support levels to USDA forecasts of net CCC purchases of dairy products have focused attention on the reliability of such forecasts by the

USDA. A comparison of pre-marketing-year forecasts with final estimates made by USDA in recent years reveals relatively small differences for milk production, marketings, and commercial use; however, forecasts of net CCC purchases have proved to be less accurate. In addition, it appears to be especially difficult to gauge dairy industry reactions to policy changes in the short term.

While trigger mechanisms have intuitive appeal to policymakers, the use of supply-demand adjusters which rely on forecasts of a residual is highly dependent on accurate forecasts. The published history of USDA supply and use figures for milk forecasts and estimates reveals that accurate implementation of such provisions is very difficult. This does not mean that trigger mechanisms are useless but, rather, that there is a need for increased attention to research designed to improve USDA's ability to make such estimates.

Supply-demand adjusters do provide the flexibility to respond in a timely manner to changing economic conditions. Despite the shortcomings of such trigger mechanisms, they may still be an improvement over relying on political forces and frequent lagged legislated response to changing economic conditions.

Table 4. Comparison of Premarketing Year and Most Recent Estimates for U.S. Milk Supply and Use, 1988-89 Marketing Year.

	Milk Production	Milk Marketings	Commercial Use	Net CCC Removals
-----Billion Lb.-----				
1988				
September 1988 Forecast	142.3	140.1	137.2	5.4
March 1989 Forecast	<u>147.5</u>	<u>145.3</u>	<u>139.0</u>	<u>8.2</u>
Difference	-5.2	-5.2	-1.8	-2.8
(Percent Difference)	(-3.7)	(-3.7)	(-1.3)	(-51.9)

Source: *World Agricultural Supply and Demand Estimates*

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