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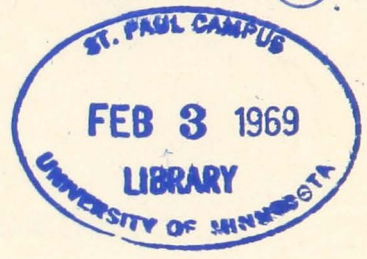
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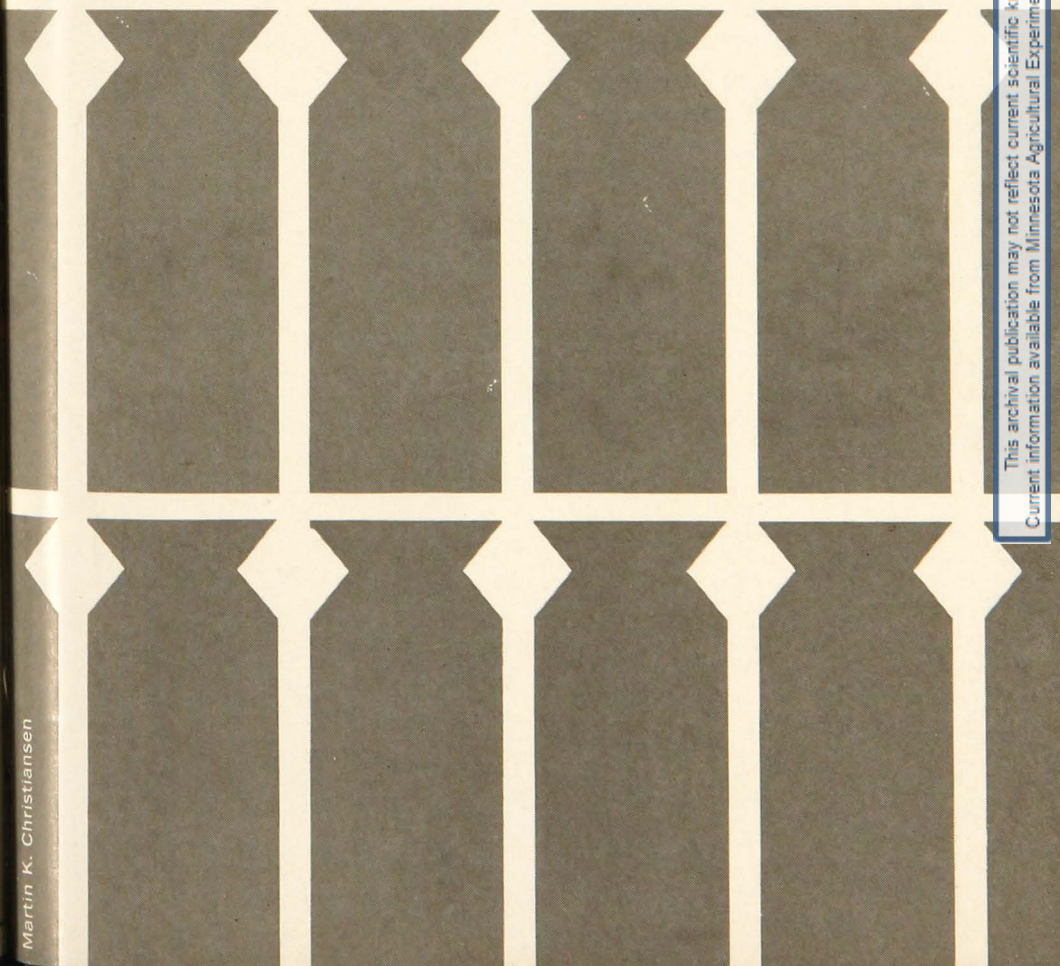
The Impact of MILK HOLDING

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in MIDWESTERN MARKETS



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Martin K. Christiansen

The Impact of Milk Holding on Midwestern Markets

Martin K. Christiansen*

During the latter half of March 1967, the National Farmers Organization (NFO) attempted to increase its influence upon the marketing of dairy products by instructing members and encouraging other dairymen to withhold milk from the market. Unlike previous "holdings actions," primarily involving livestock, milk was disposed of through non-market means. Methods employed included dumping rather than simply postponing the time of selling, as in the case of livestock or grain.

The NFO effort in dairy, therefore, represented a departure from its previous efforts with other commodities because it involved greater financial sacrifice for those who took part.

The highly significant nature of the NFO effort in dairy prompted the University's Department of Agricultural Economics to undertake a study of two major aspects of the holding action. First, to determine if the milk holding activity had any discernible impact on Midwestern markets and, secondly, to gain some insight into differential impacts the holding activity had on Minnesota processing plants. Whenever it was feasible to do so, an estimate of the amount of milk withheld from the market was calculated.

Answers to these questions were sought through analysis of published data and comparison of milk receipts at five selected Minnesota plants.

No effort was made to gauge the "success" or "failure" of the holding activity. Success, after all, must be measured against the accomplishment of objectives. While the NFO has had clearly specified price objectives, much of its activity has been directed toward signing processing plants to a "master" contract. Once a certain portion of plants have been signed, the NFO believes it will be able to reach its price objectives. However,

* Associate Professor, Department of Agricultural Economics, University of Minnesota.

the absence of precise objectives for the holding activity makes its impossible to judge its success in a meaningful way.

The milk holding action took place in 25 states, beginning March 15, 1967 and extending into the last few days of the month.¹ By March 28, 1967, it was generally reported that very few dairymen continued to withhold milk from the market.²

For purposes of this study this two-week period is defined as the holding activity period. Data shown in figure 1 support this definition.

United States production of both butter and cheese for the weeks ending March 23 and March 30 was considerably below levels of earlier weeks. Production decline during these two weeks was a result of the NFO holding activity. This fact is supported by a comparison with averages of normal weekly production during 1961-65.

Research Procedure

The method used to measure the impact of the holding activity on markets was to compare production figures of milk and milk products for March 1967 with those of February and/or April, in light of relationships that existed between these months in prior years. Data for the years 1958-66 were used to define past or "normal" relationships. The degree to which the results for March 1967 departed from this norm represents the impact of the holding activity.

The analysis was carried out with the aid of monthly data, even though the milk holding period was about 2 weeks in duration. The main reliance was placed on these data because they apply to more phases of the dairy industry than weekly data.

One of the first items studied was whether milk production during March 1967 (not milk held off the market) conformed to the normal pattern. Determination of this illuminates the analytical method used in much of the study.

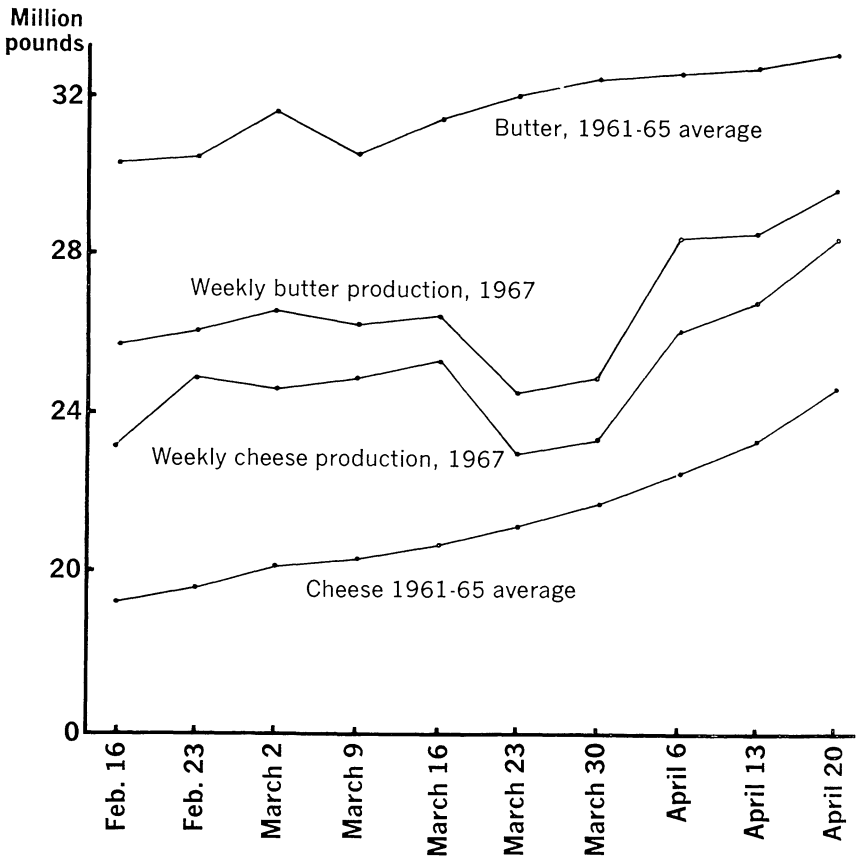
Table 1 shows milk production for the United States and Minnesota for the years 1958 through 1967. The years 1960 and 1964 were excluded because of the extra day in February. Production in March for each of these years is compared with the February level.

The average amount by which U.S. production during the month of March exceeded February production was 15.1 percent for the 7 year period from 1958 to 1966. In 1967, U.S. milk production in March was 14.3 percent above the February level, .8 less than the 7-year average. For Minnesota, March milk production during the 7 year period exceeded February production by an average of 13.3 percent, compared to 12.7 percent in 1967.

¹ The Minneapolis Morning Tribune, March 16, 1967.

² *Op. cit.*, March 28, 1967.

Figure 1. Estimated United States weekly butter and cheese production; selected weeks, 1967 (preliminary) and 1961-65 average



Data for figure 1. Estimated U.S. weekly butter and cheese production; selected weeks, 1967 (preliminary) and 1961-65 average

	Butter		Cheese	
	1967	1961-65	1967	1961-65
Thousand Pounds				
February 16	25,600	30,600	23,750	19,150
February 23	26,250	30,750	24,250	19,500
March 2	26,750	31,050	24,150	19,750
March 9	26,300	30,850	24,500	20,150
March 16	26,500	31,000	24,950	20,800
March 23	24,100	32,000	22,950	21,350
March 30	24,850	32,400	23,750	22,150
April 6	28,100	32,500	26,450	23,000
April 13	28,150	32,650	27,550	23,800
April 20	29,050	33,050	28,300	24,750

The increase in milk production from February to March was somewhat smaller than usual in 1967 for both the U.S. and Minnesota. The question arises as to whether this decline was any greater than the normal year-to-year variation. Data in table 1 suggest that it was not. In 2 out of 7 years, 1962 and 1965, the gain in milk production from February to March was smaller than in 1967.

This type of problem was confronted throughout the study: determining whether conditions during the holding activity significantly departed from what otherwise might have been expected. To account for this, a common statistical device (standard deviation) was used to measure variability.³ Applying this measure to data in table 1 resulted in a two-thirds probability that the 1967 ratio of March to February milk production for the U.S. would fall between 14.2 and 16 percent. For Minnesota the range was 12 to 14.6 percent. Results for 1967 were well within these ranges. We may conclude that the production level of milk products in the U.S. and Minnesota for March 1967 bore a normal relationship to that of February.

The indicator used to determine the impact of the holding activity on the U.S. and Midwestern states was butter and cheese production rather than a combination of all milk uses. This approach was possible because of the excess supply situation that normally exists in fluid milk markets. Generally speaking, the amount of fluid milk withheld from market did not lessen the quantity actually sold in fluid form. Rather, it affected excess supplies.

Another useful indicator of the effect of the holding action was the amount of butter and cheese production. Production of other dairy products are not analyzed because some milk uses take priority claim on avail-

Table 1. Milk production in the United States and Minnesota, February and March, 1958-59; 1961-63; 1965-67*

Years	1958	1959	1961	1962	1963	1965	1966	1967
Million pounds								
United States								
February	9,201	9,208	9,431	9,685	9,498	9,795	9,133	9,203
March	10,613	10,623	10,998	11,044	10,906	11,177	10,537	10,517
March as percent of February ..	115.3	115.4	116.6	114.0	114.8	114.1	115.3	114.3
Minnesota								
February	853	917	960	975	927	1,021	880	899
March	967	1,040	1,095	1,095	1,060	1,132	1,008	1,013
March as percent of February ..	113.4	113.4	114.1	112.3	114.3	110.9	114.5	112.7

Source: Statistical Reporting Service, United States Department of Agriculture.

* Data for the years 1960 and 1964 are not shown because of the extra day in February.

³ The estimated standard deviation of the "universe" was calculated from the data for the "sample" years. This measure was then used as a basis for judging, in a probability sense, whether conditions during the holding period departed from those that might have been expected, as indicated by the experience of earlier years.

able milk supplies. Fluid bottle milk, ice cream, and cottage cheese yield a greater net return than other dairy products. Therefore, shortage of milk or withholdings generally will not be reflected in the amount of milk allocated to these uses. Even in fluid milk markets that require higher quality milk, large excess supplies or alternative fluid supplies are available for butter or cheese production.

Here, also, shortages will be felt first for the manufacturing uses. Consequently, the impact of milk withholding will be principally on the amount of milk used in butter and cheese.

Impact on U.S. and Midwestern States

Following the procedure of the milk production example, ratios were calculated between March and February for the amount of milk devoted to the production of butter and cheese (see table 2). For the U.S. and all states shown except Illinois, the amount of milk used in butter and cheese during March 1967, compared to February, fell below the 7-year average.

This suggests that the milk holding activity had an impact in these areas, but this must be evaluated in the light of year-to-year variability. The two-thirds probability range provides a means of doing this. For the U.S. the 1967 ratio was below the lower level of the two-thirds probability range. Similarly for Missouri, Wisconsin, Indiana, and Iowa, 1967 production levels fell below the probability range. This is strong evidence that the milk holding activity had a significant market impact in these areas.

Table 2. March to February ratio of milk used in butter and cheese and estimated quantity of milk held off market for U.S. and eight Midwestern states*

	Seven year average	March to February ratio		Estimate of milk held off market	
		1967	Two-thirds probability range	Likely	Range
		Percent		Million pounds	
United States . . .	114.4	110.2	113.5 to 115.4	138	107 to 170
Missouri	116.4	105.0	112.9 to 119.9	11	8 to 15
Wisconsin	116.5	107.2	112.0 to 120.9	82	43 to 121
Indiana	99.3	93.5	94.2 to 104.3	3	† to 6
Iowa	111.7	109.3	109.6 to 113.9	7	1 to 15
Minnesota	113.4	112.2	111.9 to 114.8	8	† to 20
Michigan	113.2	109.5	106.5 to 119.9	Not estimated	
Ohio	105.8	99.6	94.5 to 117.1	Not estimated	
Illinois	107.3	108.4	98.9 to 117.7	Not estimated	

* States are ranked in order of the amount of impact caused by holding activity, greater to lesser.

† Less than 1 million pounds.

For Minnesota the 1967 ratio was just above the lower level of the two-thirds probability range, indicating that the holding activity had less impact in Minnesota than in Missouri, Wisconsin, Indiana, and Iowa. In Michigan and Ohio the effect was comparatively light, with no discernible impact in Illinois.

Table 2 shows the estimated quantities of milk held off the markets for the entire United States and for Missouri, Wisconsin, Indiana, Iowa, and Minnesota. For the United States the estimate was 138 million pounds. But because of the year-to-year variability in the amount of milk used in the production of butter and cheese, which was used as the basis of the estimate, there is a two-thirds probability that the amount fell between 107 and 170 million pounds.

An estimate for the U.S. was also made using the weekly figures of butter and cheese production shown in figure 1. The amount calculated from these data was 179 million pounds. Compared to U.S. production of 10,517 million pounds in March 1967, this was 1.7 percent of March production. Compared to average daily production in March, the amount of milk held off the market was equal to about one-half the U.S. production for 1 day.

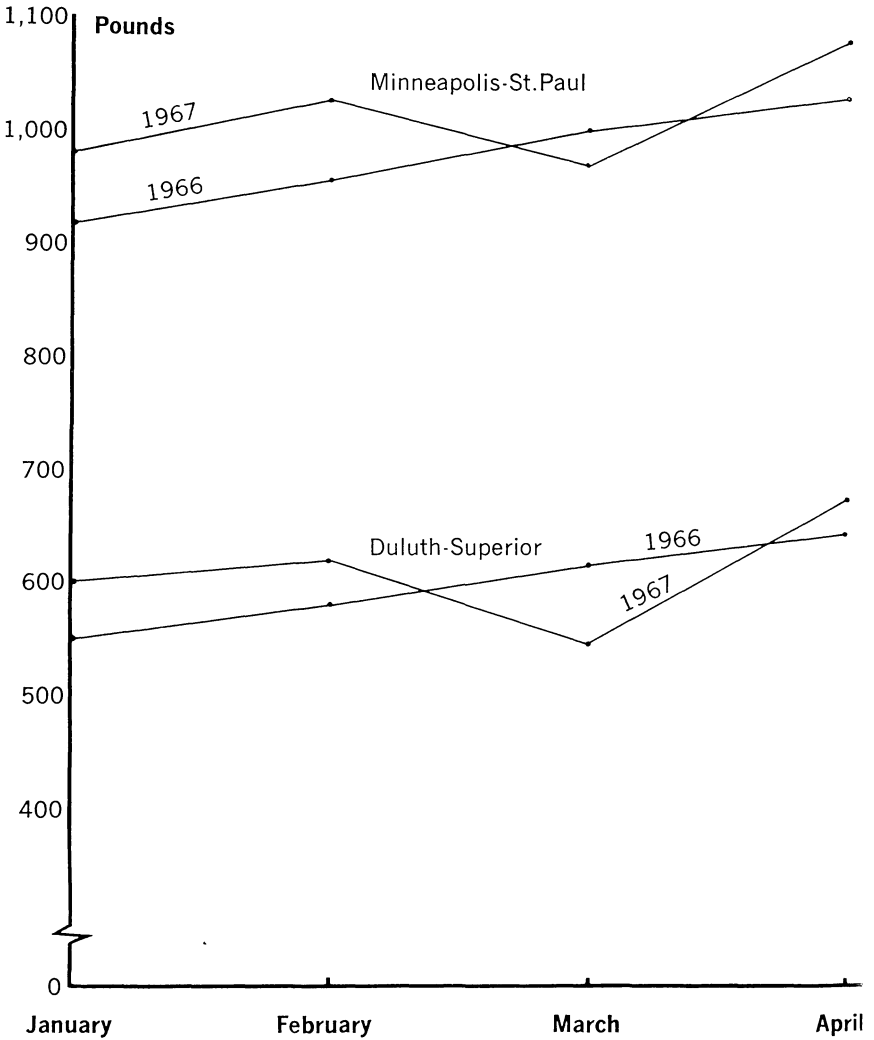
The amount of milk held off the market in Minnesota was estimated to be 8 million pounds. The two-thirds probability range suggests this might have been as high as 20 million pounds, however. Among the five states for which the quantity was estimated, Wisconsin led with 82 million pounds. The probability range of this estimate was 43 to 121 million pounds. However, state estimates do not represent the amount of milk held off the market by producers in those states. Rather, because the data employed apply to production of products, they represent the impact upon processors, many of whom receive milk from producers in nearby states.

Impact on Midwestern Fluid Markets

The impact of the holding activity on federally regulated fluid markets in the Midwest was evaluated by analyzing average daily producer deliveries, as reported by Market Administrators. The average delivery per producer for the months of January through April for 1966 and 1967 is shown in figure 2 for the Minneapolis-St. Paul and Duluth-Superior markets. The decline in average delivery per producer during March 1967 is apparent for both markets.

Data similar to those from the Duluth-Superior and Minneapolis-St. Paul markets were analyzed for all federally regulated markets in the eight-state and closely surrounding areas. On the basis of this analysis, estimates were made of the impact of the holding activity on individual markets and of the quantity of milk held off each market during March 1967. Results for 19 federally regulated markets where the holding activity had a discernible impact are shown in table 3. The range of the

Figure 2. Average daily delivery per producer, Minneapolis-St. Paul and Duluth-Superior markets, January-April, 1966 and 1967



Data for figure 2. Average daily delivery per producer, Minneapolis-St. Paul and Duluth-Superior markets, January-April 1966 and 1967

	Minneapolis-St. Paul		Duluth-Superior	
	1966	1967	1966	1967
January	915*	995	545	599
February	954	1,027	564	606
March	1,001	988	603	449
April	1,038	1,087	646	660

* All figures listed represent pounds.

estimates shown in table 3 was not calculated because of the high degree of year-to-year stability exhibited by the data. Estimates should be regarded as indicative of the magnitude involved rather than a precise quantity.

Results of the analysis suggest that among federally regulated fluid markets in the Midwest the holding activity had its greatest impact upon the Duluth-Superior market when measured in terms of the percent of producer deliveries held off the market. The Minneapolis-St. Paul market ranked about midway for the 19 markets shown. Ohio, Indiana, and Michigan markets were scattered throughout the 19. Two Wisconsin markets ranked at the bottom of the scale; however, many Wisconsin producers serve the Minneapolis-St. Paul market as well as Duluth-Superior. Additionally, the huge Chicago market, served mainly by Wisconsin producers, was not analyzed because data were unavailable.

The total estimate of individual markets listed in table 3 was 133.5 million pounds, compared to the 170 million pound national estimate. The total estimated for the 19 markets appears to be in reasonable relation to the U.S. total because the major thrust of the holding activity was in the Midwestern states. It also suggests that producers serving fluid markets participated most actively during the holding activity.

Table 3. Estimated percent of normal deliveries and total milk held off markets during March 1967, nineteen federally regulated fluid milk markets

Market	Estimated milk held off market	
	Percent of normal producer deliveries	Million pounds
Duluth-Superior	29	4.1
Cincinnati, Ohio	20	13.9
Nashville, Tennessee	16	6.4
Fort Wayne, Indiana	14	3.0
Louisville-Lexington, Kentucky	12	14.1
Youngstown-Warren, Ohio	10	2.3
Southern Michigan	8	23.1
St. Louis, Missouri	8	6.3
Minneapolis-St. Paul	7	13.1
Northwestern Ohio	6	3.2
Dayton-Springfield, Ohio	6	2.5
Indianapolis, Indiana	6	5.0
Northwestern Indiana	6	2.1
Northeastern Ohio	6	9.3
Milwaukee, Wisconsin	6	20.0
Columbus, Ohio	5	2.7
Michigan Upper Peninsula	4	0.4
Northeastern Wisconsin	3	1.3
Madison, Wisconsin	3	0.7
TOTAL		133.5

Impact on Minnesota Processing Plants

Five Minnesota plants provided data that were analyzed to determine the impact of the holding activity on the pattern of milk receipts. These plants differed in the following respects: (1) the size and nature of their processing operations, (2) the relative importance of grade A and manufacturing grade milk in total receipts, (3) the relative importance of milk received directly from producers compared to milk received from other plants, and (4) the type of market outlets utilized.

The basis for selecting plants was whether or not they had a contract with the NFO prior to the holding period. Three of the selected plants had such a contract, while two did not.

In analyzing the impact of the holding activity on the pattern of milk receipts, information for 1967 was compared with the same period in 1966 (see table 4). Analysis of data for a number of the plants was difficult because some producers apparently shifted between plants. This changed the pattern of receipts not only during the holding period but also in the months immediately following. Results shown in table 4 should be considered indicative of the impact of the holding activity on the pattern of milk receipts.

Milk receipts at three of the five plants (plants A, C, and D) declined during the holding period. Plant B was not affected by the holding activity. Receipts at plant E increased during the holding period. Impact was greatest on grade A receipts for plants C and D, while for plant A the impact was greatest for manufacturing milk receipts.

Three of the five plants increased their receipts after the holding period, though milk receipts for two of them were down during the holding period. Each of the three plants that showed a gain after the holding period had an NFO contract prior to the holding activity. Receipts of one of the two plants that did not have a contract with the NFO declined during the holding period. This persisted after the holding period. No apparent impact, either during or after the holding period, was experienced at the other non-contract plant.

Table 4. Impact of holding activity on receipts of milk from producers at five Minnesota plants

Plants*	During holding period		After holding period
	Grade A	Manufacturing grade	All grades gain or loss
A	-2†	- 14	Gain
B		No change	No change
C	- 16	- 7	Gain
D	- 14	- 2	Loss
E		+ 5	Gain

* Plants are shown according to size. Plants A, C, and E had a contractual agreement with NFO prior to the holding activity, plants B and D did not.

† All figures expressed are percentages.

Summary and Conclusions

The holding activity conducted by the NFO during March 1967 had a significant effect on most Midwestern markets when viewed in terms of the extent to which the amount of milk devoted to butter and cheese production departed from past patterns. The impact was particularly apparent in the states of Missouri, Wisconsin, Indiana, and Iowa. It was less apparent in Minnesota, Michigan, and Ohio, while no apparent impact was felt in Illinois.

The quantity of milk held off all U.S. markets was estimated at 170 million pounds. This was equal to about 1.7 percent of U.S. production in March 1967. The quantity of milk held off Midwestern fluid markets regulated by Federal Milk Marketing Orders was about 133 million pounds. This suggests that producers of grade A milk were comparatively strong supporters of the holding activity.

An analysis of market information indicated significant producer participation in the holding activity for 19 federally regulated Midwestern fluid milk markets. Among these, the impact of the holding activity was most pronounced in the Duluth-Superior market. An estimated 29 percent of producer deliveries was held off the Duluth-Superior market during March. In the Minneapolis-St. Paul market, an estimated 7 percent of producer deliveries was held off the market. This placed the Minneapolis-St. Paul market about midway among the 9 Midwestern markets for which the holding activity had a discernible impact.

An analysis of milk receipts from producers for five Minnesota plants suggested greater participation among producers of grade A milk than manufacturing milk producers. Among three plants with NFO contracts, two showed a decline in receipts during the holding activity, while one showed a gain. All three showed an increase during the period following the holding activity. Of two plants without an NFO contract, one showed no change in milk receipts either during or after the holding activity. The other plant showed a decline in receipts during the holding activity, but this decline persisted after the holding period ended.

