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Seasonality of Milk Production under the Louisville Fall Premium Plan



Marketing Research Report No. 63



U. S. DEPARTMENT OF AGRICULTURE

Washington, D. C.

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PREFACE

This report is based on a study of the "Louisville Fall Premium Plan" and its effect on seasonality of production in the Louisville supply area. It is one of a series of studies made by the Marketing Research Division of the Agricultural Marketing Service, U. S. Department of Agriculture, to supply a factual basis for appraising various aspects of Federal milk marketing programs.

The discussion of the basic implications of the plan and the analysis of 9 years of experience in the market that introduced this seasonal pricing method, provide much information which may have application in other milk markets that have adopted, or contemplate adopting, this type of seasonal pricing.

Thanks are expressed to Louis S. Iverson, milk market administrator for the Louisville area, and to Richard L. Duncan, secretary-manager of the Falls Cities Cooperative Milk Producers' Association, for furnishing records which made possible the analysis of responses of individual producers. The author also greatly appreciates the criticisms and suggestions of several members of the staff.

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The study on which this report is based was made under the authority of the Agricultural Marketing Act (RMA, Title II).

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SUMMARY

A new seasonal pricing method, known as the Louisville Fall Premium Plan, was introduced in 1943 as part of Federal Milk Marketing Order No. 46 in the Louisville, Ky., marketing area. It called for the accumulation of a reserve fund of money by deduction of designated rates per hundredweight of milk delivered in designated spring months, out of which producers would receive premium payments on deliveries of milk in designated fall months. This procedure created an incentive for dairy farmers to produce relatively more milk in the fall than in the spring, thus reducing seasonal variation in production. Although individual producers are affected in just the same way as though class prices varied seasonally by the amounts of the spring rate of deduction and the fall rate of payment, seasonality in the price to producers is accomplished without changing the price to handlers or to consumers.

The original rate of deduction—15 cents per hundredweight for the milk received by handlers—was too low to affect seasonal production of milk. It was stepped up 5 cents each year, reaching a level of 35 cents in 1948. The order provided for a deduction of 40 cents per hundredweight in 1949 and in subsequent years. But testimony of producers indicated that the 40-cent rate would be too severe and rigid in view of lower producer prices. The amendment of September 1949 provided a formula which relates the rate of deduction to the general level of milk prices.

There was a wider seasonal variation in prices to producers for milk in Louisville under the Louisville plan than in Cincinnati and St. Louis under different pricing plans. Of the three markets, Louisville made the greatest progress toward even seasonal production.

From 1950 through 1952 the fall-spring ratios of daily delivery of milk per producer in the Louisville area ranged from 80 to 82 percent as compared with 73 to 76 percent for the years 1941 through 1943. This higher fall production level was attained under fall pasture conditions varying from extreme drought to excellent.

With few exceptions, the size of the dairy enterprise apparently was not a deciding factor as to whether or not a producer delivered relatively large quantities of milk in the fall.

The reduction in seasonality has contributed to more efficient and stable marketing of milk than existed when the plan was introduced. The incentive to even out production has been created by shifting a greater proportion of the total annual value of milk to the months when production tends to be short; under existing patterns of utilization, the average annual cost per hundredweight of milk to handlers has remained approximately the same.

Analysis of the Louisville market presented here may provide a guide in judging the value to other areas of this or some similar plan.

SEASONALITY OF MILK PRODUCTION UNDER THE
LOUISVILLE FALL PREMIUM PLAN

By Gertrude G. Foelsch, agricultural economist

SCOPE OF THE ANALYSIS

To provide an incentive for fall production of milk and to ease the spring surplus problem, the Falls Cities 1/ Cooperative Milk Producers' Association, at a public hearing in June 1943, proposed that certain changes be made in the pricing and paying provisions of Federal Milk Marketing Order No. 46. These special provisions for the accumulation of a reserve fund in the spring and for payments out of the fund in the fall constitute the "Louisville Fall Premium Plan." This new method of seasonal pricing now (August 1953) has been in effect in Louisville for 9 full years. Any effects of the plan should have been discernible within the last few years, even though considerable time is required before a "producer" 2/ can change his operation from that typical of a "grass" producer to one typical of an "even" or perhaps a "fall" producer. 3/ Some problems associated with changing the seasonality of milk production are treated in reports cited under (1, 6, 7, and 12). 3/

The chief purpose of this report is to show how the fall premium plan operates, and to analyze the seasonal pattern of production in the Louisville area since its inauguration in the spring of 1944. The analysis is based primarily on records that were kept in administering Federal Milk Marketing Order No. 46. It also includes a comparison of relative changes in the spring and fall deliveries of producer milk to the Louisville market with similar changes for the Cincinnati and St. Louis markets. The federally regulated markets of Cincinnati and St. Louis were selected because they are rather close by and do not operate under a fall premium plan. They are located in approximately the same latitude as Louisville and consequently their seasons of high and low production occur in about the same months as do those of Louisville.

Information on these specific questions was sought: (1) To what extent have individual producers in the Louisville supply area responded

1/ "Falls Cities" refers to Louisville, Ky., and New Albany and Jeffersonville, Ind. These cities are located at the falls of the Ohio River; they make up the major part of the Louisville milk marketing area.

2/ Currently (1954) defined as any person who produces, under a dairy farm inspection permit issued by the appropriate local health authorities, milk that is: (a) Delivered from his farm to a pool plant; (b) Diverted by a handler to a pool plant or a nonpool plant. (A pool plant was first defined for the Louisville area under the amendment of September 1951 to Order No. 46.)

3/ Underscored numbers in parentheses refer to Literature Cited, p. 42.

to the plan (size of the dairy enterprise is taken into account); (2) to what extent has the average seasonal variation in deliveries per producer and in the market supply of milk from producers been reduced since the adoption of the plan; (3) how does the record of seasonality in Louisville compare with that in Cincinnati and St. Louis where this type of seasonal pricing is not in effect; and (4) to what extent, if any, does the plan appear to influence producers to deliver milk to the Louisville market in the months when fall payments are made but not in the spring months when the reserve fund is being accumulated.

It is recognized that the incentive provided by the plan or by other pricing devices is only one of several factors which may affect the relationship between the quantity of milk delivered in the months of low production as compared with the quantity delivered in the months of heavy production. Some important contributing factors may be: (1) Changes in the pricing plans under an order; (2) favorable or unfavorable weather and pasture conditions; (3) changes in the milk-feed and other price ratios; and (4) changes in the type of producers entering or leaving a fluid milk market.

This report emphasizes market experiences since the Fall Premium Plan has been part of the pricing mechanism in Louisville. Interest in the effectiveness of this seasonal pricing device is widespread because variations of the plan are in force in a number of Federal order markets (appendix table 21) and in some milk markets that are not under Federal regulation. The implications of the plan are discussed in a report by Roberts (9); and its effect in the Louisville area, based on the records of a sample group of producers, was analyzed by Roberts and Grayson (10). Markets that were operating under fall premium pricing plans in 1952 are described and compared by Pritchard (8). Experiences with a fall premium plan in the Clinton, Iowa, market are covered by Swantz (13).

EVOLUTION OF THE "PLAN"

Previous Attempts to Meet the Seasonal Problem

As in many other milksheds, large surpluses of milk in the spring and early summer months and shortages of milk for fluid requirements in the fall and winter months frequently occur in the Louisville market. For many years leaders of the industry, particularly the Falls Cities Cooperative Milk Producers' Association, had been striving to get producers to reduce the seasonality of production so that it would correspond more closely to the rather level month-to-month sales of fluid milk products. Before the institution of the so-called Louisville Fall Premium Plan in 1944, the problem had been approached in several ways. These included a base-surplus plan, programs to make producers aware of the need for and the advantages of more even production, and seasonal pricing of Class I and of Class II milk—milk used, respectively, for fluid whole and skim milk and fluid cream products.

The base-surplus plan apparently did bring about some reduction in seasonality. It was operated by the Falls Cities Cooperative Milk Producers' Association from February 1932 until the adoption of Federal License No. 60 in June 1934. Although the license included a base-surplus plan, it was used for only a few months in 1934 and during the months of peak production in 1935. Because of the strong opposition of some producers, no provisions for this type of plan were included in Federal Milk Marketing Order No. 46, effective June 1940. For discussions of the base-surplus plan as it functioned in the Louisville supply area in the 1930's see citations (2, pp. 18-20, 11, pp. 69-72, 14, pp. 36-38).

Between 1940 and 1943, fuller employment, higher wages, and an influx of civilians and of military personnel into the Louisville market area greatly expanded the requirements for fluid milk and cream. The secretary-manager of the Falls Cities Cooperative Milk Producers' Association testified, at the hearing in June 1943, that most of the increases in deliveries of milk since 1940 had been in the grass or flush months of the year, but that deliveries in the fall months were not large enough to meet the growing requirements of the market. Taking on additional "grass" producers therefore was not the solution. To counteract the growing fall shortage problem, the producer organization proposed that Order No. 46 be amended to include provisions for a fall premium plan and, for the same reason, handlers proposed a "quota-rating" plan. But the handlers did not push their proposal and they entered no objection to the spring "take-off" and fall "pay-back" plan of the producers.

Original Provisions of the Fall Premium Plan

Because no precedent existed which might aid in establishing the initial rate of deduction for the fall reserve fund, this experiment in seasonal pricing was begun on a modest scale. In April, May, and June of 1944, the market administrator set aside 15 cents per hundredweight from the total obligations of handlers for milk received from producers thereby reducing the uniform price to producers by a like amount. One-fourth of the fund so accumulated was distributed to producers in each of the months of September, October, November, and December, as part of the uniform blended price.

The plan operated to bring about a sharper seasonal variation in returns received by producers without changing the class prices which handlers paid for milk. Producers approved of this feature partly because they believed seasonal changes in costs of milk to handlers had not always been properly reflected in changes in the retail price of milk. Handlers felt that the demand for fluid milk is little influenced by small changes in price, so they preferred stable rather than seasonally changing retail prices. Both groups thought that stable retail prices fostered good producer-distributor-consumer relationships.

The plan was conceived simply as a new method of marketwide seasonal pricing under which individual producers fared the same as they

would under the commonly used seasonal class price method. It was expected that the spring rate of deduction, like a seasonal drop in prices of the same amount, would tend to discourage excessive production in the flush season, and that the fall rate of payment, like a seasonal rise in prices of the same amount, would tend to encourage producers to provide larger supplies during the normal season of low production.

Leaders of the producer association stated that the fall premium plan would have advantages over a base-surplus plan, as follows: The price per hundredweight of milk of the basic butterfat content would be uniform to all producers; producers would receive the fall premium payments just when they needed cash to buy feed for fall and winter production; the operation of the plan would not require keeping up an elaborate set of records for each producer; the rate of deduction could easily be adjusted to changing market conditions. 4/

Modifications

Late in 1944 the order was amended to increase the deduction rate to 20 cents per hundredweight in April, May, and June, and to provide for fall payments to be made by separate checks distributed by the producer association or the market administrator, in September, October, and November. Subsequent amendments included provisions for progressively higher rates, a suspension, and the change, in 1951, from a fixed rate of deduction to one that is a percentage of the average of the basic formula price 5/ for the previous calendar year (table 1). Since 1951, accumulations are effective in the months of April through July and payments are made in the months of September through December.

The earlier amendments reflect efforts gradually to establish rates of deduction that would be high enough to encourage in an effective manner greater production of milk in the fall months and to discourage excessive production in the spring months. The vigorous protests of producers to the 40-cent rate in 1949, when they were experiencing a sharp drop in the blended price as compared with 1948, brought on a hearing which led to the suspension of the 35- and the 40-cent rates. After another hearing, the Secretary recommended a fluctuating rate based on the price level for manufacturing milk. The recommendation was adopted as part of the September 1949 amendment to the order. On May 1, 1951, the percentage of the rate of deduction to the average basic formula price for the previous year was raised from 8 percent to 12 percent (table 1).

Experiences in Louisville indicate that the rate of deduction should have some relationship to the level of milk prices, and that it

4/ Hearing June 9, 1943. Docket No. AO-123-A3, pp. 68-69. Hearing records with respect to Federal milk orders are on file in the Office of the Hearing Clerk, U. S. Department of Agriculture, Washington 25, D. C.

5/ In the Louisville order, the basic formula price for a specific month was the highest of these alternative prices for manufacturing milk: Average price at 7 nearby plants; butter-powder formula; average price 18 midwest condenseries; butter-cheese formula. The prices of Class I and of Class II milk were established at specific differentials over the basic price.

should be high enough to provide a real incentive for fall production but not so high that producers will become dissatisfied with the program. A fuller discussion of the reasons for the several amendments to the plan is part of a report on "The Marketing of Milk in the Louisville Area under Federal Regulation" (2, pp. 190-196).

Table 1.—Successive provisions of Order No. 46 for the Louisville Fall Premium Plan, 1943-51 ^{1/}

Effective date of amendment	Deduction per hundredweight	Months of -	
		Accumulation	Payment
August 1, 1943	15 cents	April-June incl.	Sept.-Dec. incl.
December 1, 1944	20 cents	Unchanged	Sept.-Nov. incl.
May 14, 1946 ^{2/}	25 cents	Unchanged	Unchanged
	30 cents (1947)		
	35 cents (1948)		
	40 cents (1949 and thereafter)		
April 1, 1949	35- and 40-cent rates suspended making 30-cent rate effective.	Unchanged	Unchanged
September 1, 1949	8 percent of the average of the announced monthly basic formula prices for the previous calendar year.	Unchanged	Unchanged
May 1, 1951	12 percent of the average of the announced monthly basic formula prices for the previous calendar year.	April-July incl.	Sept.-Dec. incl.

^{1/} No change since May 1, 1951, at this writing (August 1953).

^{2/} The 25-cent rate applied only in May and June 1946, the old rate of 20 cents being in effect in April 1946. This amendment provided for progressively higher rates in 1947, 1948, and 1949 as indicated.

Compiled from Federal Milk Marketing Order No. 46, as amended.

HOW THE PLAN OPERATES

Creation and Distribution of the Reserve Fund

The provisions for the accumulation of the fall reserve fund are found in the section of Order No. 46 which sets forth how the market administrator computes the uniform price to producers. Under the latest provisions (amendment of May 1951), the fund is accumulated in April, May, June, and July. The amounts set aside during these months are separately accounted for as part of the producer-settlement fund ^{6/} and one-fourth of this fall reserve fund is distributed to producers in each of the months of September, October, November, and December. The rate of payment for any one of these months depends upon the total quantity of milk that handlers receive from producers during the month. The amount of fall payment received by an individual producer, for example for the month of September, depends upon the rate of payment for September and upon the quantity of milk he delivers to a handler during that month.

In the first year of operation, a fall reserve fund of about \$70,000 was accumulated. With increases in the rate of deduction and in the quantity of milk delivered in the spring months, and with the addition of July to the accumulation period, the fall reserve fund, by 1952, exceeded \$400,000 (table 2). The size of the fund is fixed and becomes public knowledge within a month after the end of the spring accumulation period. Producers have the assurance that they will share in its distribution according to their relative contributions to the market supply during each of the payment months.

Differences in the cost of producing milk in the spring as compared with the fall months, the effect of a change in seasonality of production on annual average costs, and other factors, probably determine whether or not a producer favors a fall milk production program. A producer's volume of fall deliveries may be affected not only by the longer-time changes resulting from changes in freshening dates, but also by his feeding more or less intensively than usual, by changing his culling and replacement program so that they affect the average level of production per cow, or by substantial changes in the size of his herd. All these factors have some bearing on the seasonal pattern of milk production.

Relation of Fall Rates to Spring Rates

For the market as a whole, it is quite evident that, as the rate of deduction was increased or decreased, a change in the same direction

^{6/} The total value of a handler's milk at the respective class prices may be greater or less than his total payment to producers at the uniform price. The difference is paid into, or drawn from, a "Producer-Settlement" fund supervised by the market administrator.

took place in the rate of payment (table 2). It is not so evident that the ratio of fall receipts to spring receipts also had an important effect on the fall rate of payment. If R 1 represents the ratio of fall to spring receipts, the mathematical relationship between the fall rate of payment and the other factors is:

$$\text{Fall rate} = \frac{\text{Spring rate}}{R 1}$$

From this equation, rates of fall payment were calculated, using spring rates of deduction of 15, 30, and 45 cents, respectively, and ratios of fall to spring receipts (R 1) within the range of 45 to 120 percent (fig. 1). These relationships are evident: (1) With a given spring rate of deduction, say 30 cents, the fall rate of payment varies inversely with changes in the ratio of fall to spring receipts—for example, at the 60 percent point the fall rate is 50 cents and at the 100 percent point the spring and fall rates are equal; but if the ratio of fall to spring receipts were to exceed 100 percent, the fall rate of payment would be less than the spring rate of deduction; (2) the fall rate of payment increases less rapidly as the ratios of fall to spring receipts become larger; (3) at a given ratio of fall to spring receipts, doubling the spring rate of deduction also doubles the fall rate of payment.

Relationships (1) and (2) indicate that the plan offers the greatest incentive for fall production when a market is farthest from even production and that the incentive decreases as the goal of even production is approached. Relationship (3) indicates that, at a given time, the incentive may be strengthened quickly by a sharp increase in the spring rate of deduction.

Relation Between Fall-to-Spring Ratios of Rates and Receipts

The fall-to-spring ratio of rates is the reciprocal of the fall-to-spring ratio of receipts. If R 2 represents the ratio of fall to spring rates, this reciprocal relationship is:

$$R 2 = \frac{1}{R 1}$$

In 1952, for example, the ratio of fall to spring receipts was 83.1 percent; therefore, the ratio of fall to spring rates would be 120.4 percent. This is the relationship for 1952 between the average fall rate of payment of 56.6 cents per hundredweight and the spring rate of deduction of 47 cents.

The Producer's Gain or Loss

The producer's gain or loss, considering only take-off and pay-back, depends on how his ratio of fall to spring deliveries compares with

Table 2.--Receipts of milk from producers in the months affected by the Louisville Fall Premium Plan, monthly and average rates of deduction and rates of payment, and amounts of money accumulated in the spring months and distributed in the fall months, 1944-52

Year and month	Reserve accumulation			Year and month	Fall premium payment		
	Spring receipts	Rate of deduction	Amount $\frac{1}{2}$		Fall receipts	Rate of payment	Amount $\frac{1}{2}$
	1,000 pounds	Cents per cwt.	Dollars		1,000 pounds	Cents per cwt.	Dollars
1944:				1944:			
April	14,165	15.0	21,250	Sept.	14,031	12.5	17,496
May	16,951	15.0	25,427	Oct.	13,301	13.2	17,497
June	15,540	15.0	23,309	Nov.	12,022	14.6	17,496
Total	46,656	15.0	69,986	Dec.	12,468	14.0	17,497
				Total	51,822	13.5	69,986
1945:				1945:			
April	17,086	20.0	34,173	Sept.	14,141	25.4	35,962
May	18,790	20.0	37,579	Oct.	12,620	28.3	35,752
June	17,909	20.0	35,819	Nov.	11,275	31.8	35,854
Total	53,785	20.0	107,571	Total	38,036	28.3	107,568
1946:				1946:			
April	17,722	20.0	35,443	Sept.	15,307	28.0	43,215
May	19,381	25.0	48,453	Oct.	13,945	31.0	43,179
June	18,308	25.0	45,770	Nov.	12,555	34.0	42,735
Total	55,411	23.4	129,666	Total	41,807	31.0	129,129
1947:				1947:			
April	17,446	30.0	52,340	Sept.	16,273	36.0	58,582
May	20,610	30.0	61,830	Oct.	14,574	40.0	58,298
June	19,825	30.0	59,474	Nov.	12,494	45.0	56,230
Total	57,881	30.0	173,644	Total	43,341	40.0	173,110
1948:				1948:			
April	18,453	35.0	64,587	Sept.	16,498	41.0	67,642
May	21,306	35.0	74,572	Oct.	15,700	44.0	69,081
June	18,492	35.0	64,721	Nov.	14,469	47.0	68,004
Total	58,251	35.0	203,880	Total	46,667	44.0	204,727
1949:				1949:			
April	21,676	30.0	65,030	Sept.	18,554	36.0	66,795
May	24,170	30.0	72,509	Oct.	16,900	40.0	67,599
June	21,226	30.0	63,678	Nov.	15,949	42.0	66,987
Total	67,072	30.0	201,217	Total	51,403	39.0	201,381
1950:				1950:			
April	21,887	26.0	56,907	Sept.	20,752	29.0	60,180
May	25,149	26.0	65,387	Oct.	20,187	30.0	60,563
June	23,061	26.0	59,958	Nov.	17,269	35.0	60,442
Total	70,097	26.0	182,252	Total	58,208	31.0	181,185
1951:				1951:			
April	19,919	26.0	51,790	Sept.	19,099	42.0	80,215
May	25,064	39.0	97,750	Oct.	19,099	42.0	80,216
June	23,251	39.0	90,679	Nov.	16,639	49.0	81,529
July	20,992	39.0	81,867	Dec.	17,696	46.0	81,404
Total	89,226	36.1	322,086	Total	72,533	45.0	323,364
1952:				1952:			
April	22,586	47.0	106,154	Sept.	19,576	55.0	107,669
May	25,574	47.0	120,196	Oct.	18,564	57.0	105,812
June	21,859	47.0	102,739	Nov.	17,975	59.0	106,053
July	20,742	47.0	97,490	Dec.	19,343	55.0	106,389
Total	90,761	47.0	426,579	Total	75,458	56.6	425,923

$\frac{1}{2}$ The difference between the reserve fund and premium payment represents the yearly accumulation of balances.

Compiled from Annual Report, 1952. Federal Milk Marketing Order No. 46. Data for 1952 compiled from reported pool figures, subject to audit.

FALL PREMIUM RATE TO MILK PRODUCERS

According to Market Fall/Spring Receipts Ratio and Spring Rate of Deduction, Louisville Marketing Area

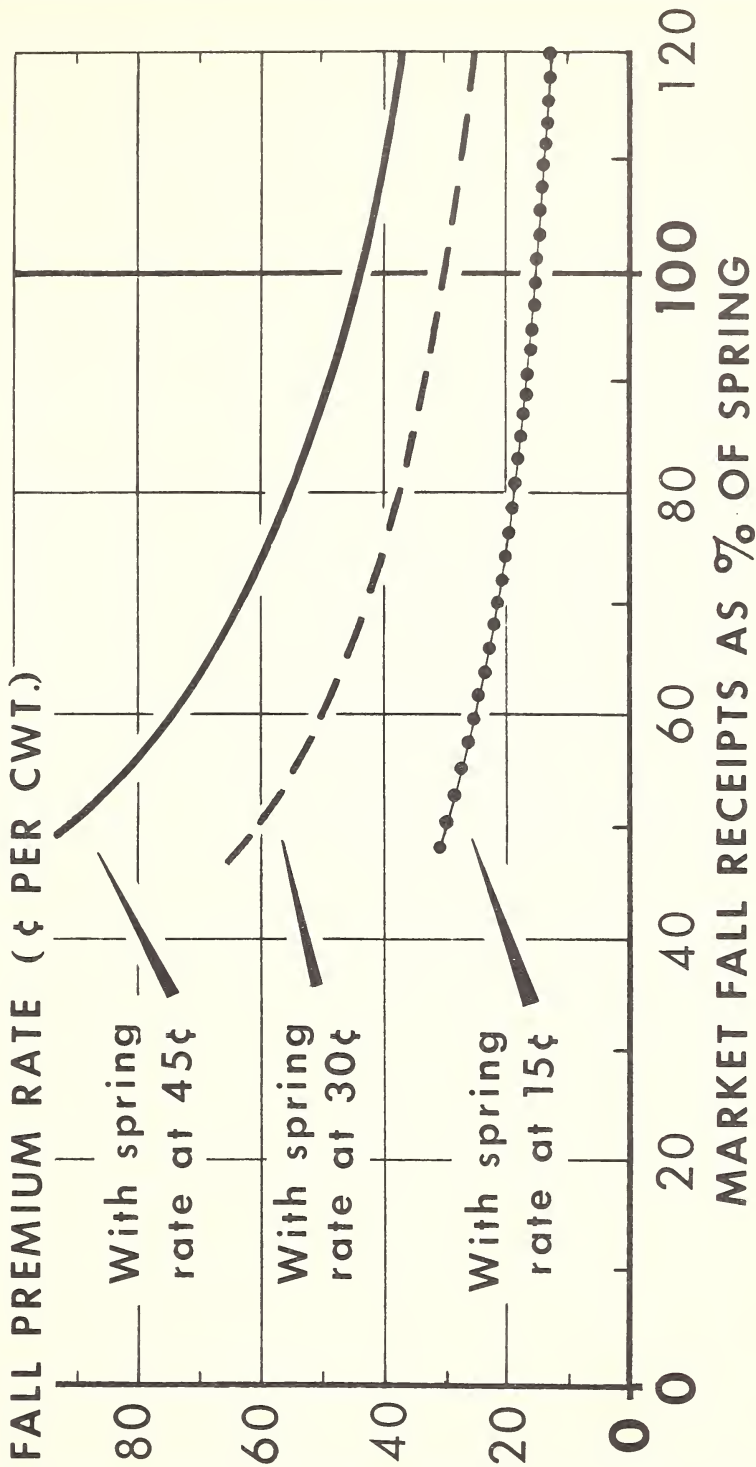


Figure 1.

the ratio of fall to spring receipts for the market as a whole. If D 1 represents a producer's ratio of fall to spring deliveries, the following equation applies:

$$\frac{\text{Producer's fall payment}}{\text{Producer's spring deduction}} = \frac{D 1}{R 1}$$

$$= \frac{1}{R 1} \times D 1$$

The relationship may be shown graphically as a straight line with slope = 1/R 1, as in figure 2. For example, if R 1, or the market ratio, equals 80 percent, and D 1, or the producer's ratio, also equals 80 percent, then the producer's fall payment will equal 100 percent, or the same as his deduction in the spring months. 7/

Because of differences in seasonal patterns of production among producers in the Louisville area, the fall premium plan has widely varying effects upon individual producers, corresponding to the relationships shown in figure 2. Producers who deliver no milk to the market during the months in which fall payments are made receive neither a regular nor a premium check; producers whose fall deliveries are a smaller percentage of their spring deliveries than the average fall-spring ratio for the market, receive less in fall payments than was deducted from their returns in the spring months; producers who contribute at the average market ratio break even; but producers whose fall-spring ratio of deliveries is higher than the ratio for the market draw proportionately more out of the fund than was deducted pro-rata from their returns in the spring months.

In other words, producers who do a better-than-average job of supplying milk to the market in the short months receive relatively the largest rewards. They are affected in just the same way, and to the same extent, as though class prices varied seasonally by the same amounts. Producers who enter the market after the spring accumulation period also share in the fall distribution. They, too, make a contribution to the market supply when it is most needed, and their absence from the market during the flush season means less surplus milk to lower the blended price to producers who remain on the market.

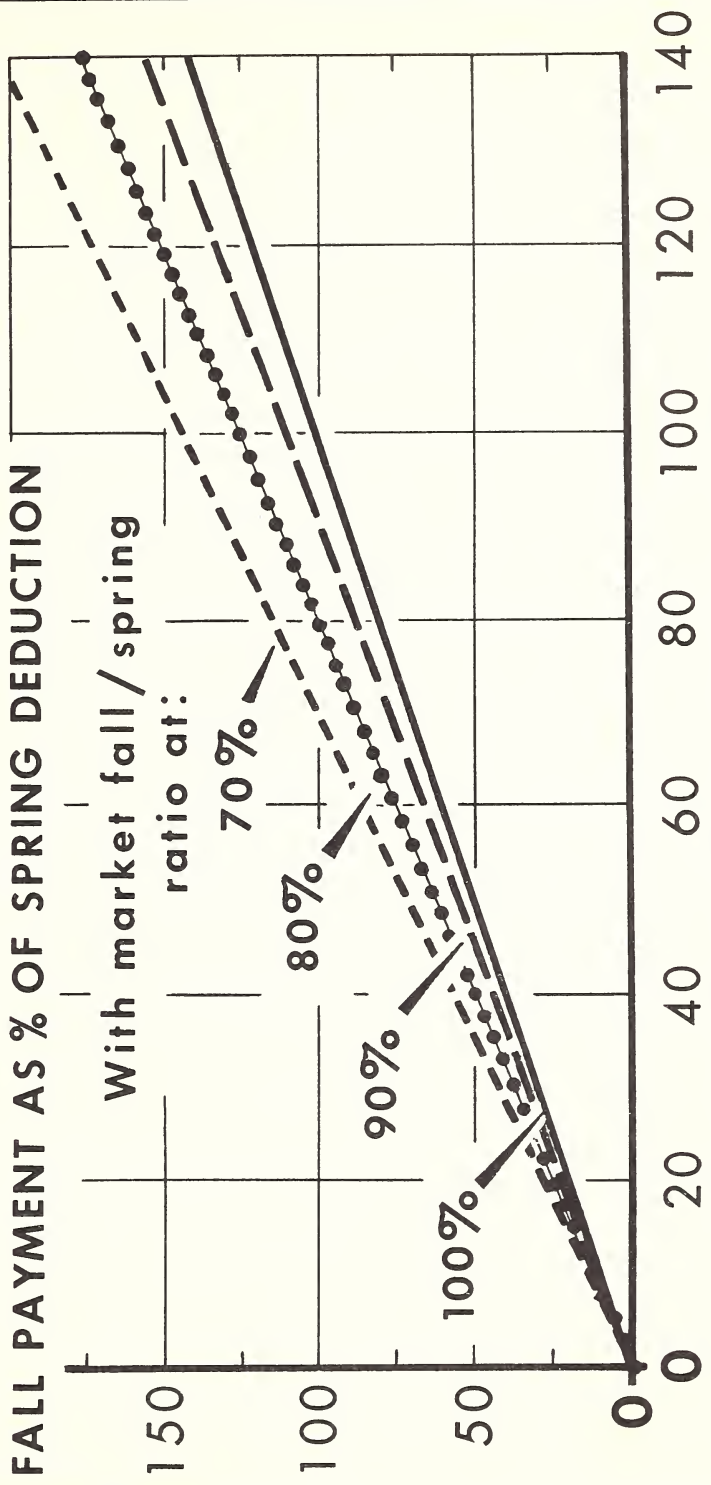
RESPONSES OF INDIVIDUAL PRODUCERS

One method of evaluating the effectiveness of the plan in the Louisville milkshed is to analyze the responses of individual dairy farmers to its incentives. This analysis calls for an answer to two

7/ The sum of money equal to a producer's spring delivery multiplied by the rate of deduction is referred to as his deduction. This does not imply that he has an equity in the fund. The rate of deduction is analogous to a drop in price in this respect as in others. (See §, p. 38.)

RATIO OF FALL PAYMENT TO SPRING DEDUCTION

According to Milk Producer's Fall / Spring Delivery Ratio
and Market Fall / Spring Receipts Ratio



PRODUCER'S FALL DELIVERY AS % OF SPRING

Figure 2.

major questions: (1) What changes took place between 1945 and 1949 and 1950 in the proportions of spring and of fall producers; (2) did a relationship exist between the size of the dairy enterprise and the ratios of November to May deliveries.

Records of deliveries by individual producers were not available for any year prior to 1945. The Falls Cities Cooperative Milk Producers' Association supplied data on deliveries of their members in May and November of 1945. In addition about 170 unorganized producers delivered milk in 1945, but their individual records are no longer available. The market administrator supplied data on deliveries of both organized and unorganized producers in May and November of 1949 and 1950. 8/

The years 1949 and 1950 were selected because spring and fall pasture conditions in both years were good to excellent and this was also true of 1945. The analysis of deliveries by individual producers is confined to the high and low months of production because, to include the other months of the "take-off" and "pay-back" periods would have multiplied the task beyond the facilities of the office, probably without changing the general conclusions.

Aggregate Performance

In each of the years 1945, 1949, and 1950, approximately one-third of the producers delivered between 50.0 and 74.9 percent as much milk to the Louisville market in November as they had in the previous May (table 3). But the proportions on either side of this peak changed significantly between 1945 and the later years, particularly in the groups delivering 25.0-49.9, 75.0-99.9, and 100 percent or more (fig. 3). The consistent shift of producers from the lower percentage categories to the higher indicates that there was a favorable response to the plan. In 1945, for example, 25.5 percent of the producers delivered 75 or more percent as much milk in November as in May. In 1949 and 1950 the comparable percentages were 31.4 and 35.7, respectively.

Wide differences among producers in their relative deliveries of milk in November are shown. Some producers who delivered milk in May made no delivery the following November, whereas, at the other extreme, a number of producers delivered more milk in November than they did the previous May.

Size of Dairy Enterprise as a Factor

The highest number of producers were in the group that delivered between 5,000 and 9,999 pounds of milk in May of each of the given years;

8/ A chi square test indicates that membership in an organization had no significant bearing upon the ratio of November to May deliveries of individual producers. Data for 1945, representing organized producers only, therefore are compared with data for 1949 and 1950, representing both organized and unorganized producers.

PATTERN OF PRODUCER RATIOS

Percentage of Milk Producers with Given Ratios of
November/May Deliveries, 1945, 1949, 1950

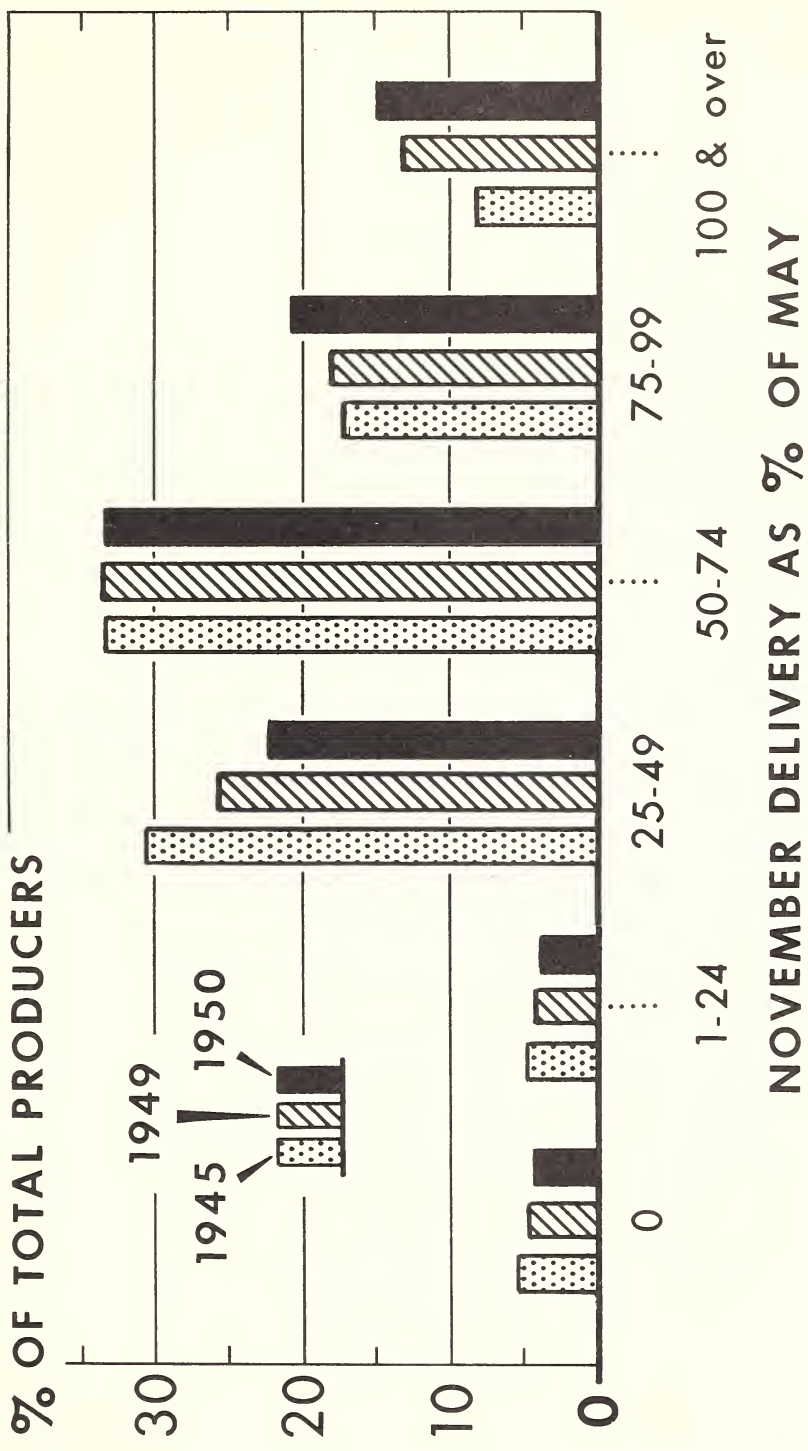


Figure 3.

Table 3.—Number and percentage of producers delivering specified percentages of milk to the Louisville market, in November as compared with May, 1945, 1949, 1950

November delivery :	1945		1949		1950	
as percentage of :	1945		1949		1950	
May delivery :	1945		1949		1950	
	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>
0	79	5.5	96	4.9	95	4.5
Less than 25.0	71	4.9	85	4.3	85	4.0
25.0-49.9	441	30.6	510	25.8	469	22.3
50.0-74.9	483	33.5	662	33.6	703	33.5
75.0-99.9	248	17.3	359	18.2	436	20.7
100 or more	118	8.2	260	13.2	314	15.0
Total	1,440	100.0	1,972	100.0	2,102	100.0

Computed from records of the Falls Cities Cooperative Milk Producers' Association and of the market administrator.

next in numerical importance were those in the group who delivered between 10,000 and 14,999 pounds (table 4). The latter group, however, was relatively smaller in 1949 and 1950 than in 1945. There was a slight upward trend in proportions in the 15,000-19,999 group, and "large producers" (delivering 20,000 pounds or more) were considerably more important in 1949 and 1950 than in 1945. The proportion of "small producers" (delivering less than 5,000 pounds) fluctuated from 9.4 to 11.3 percent. The average delivery of milk in May 1945 was 11,256 pounds; corresponding averages for 1949 and 1950 were, respectively, 12,300 and 11,835 pounds.

The ratios of total November to May receipts by handlers in the Louisville market area in 1945, 1949, and 1950, were, respectively, 60, 66, and 69 percent. Producers whose ratios of November to May deliveries fell within the range of 60.0 to 69.9 percent therefore were taken as belonging to the average group; that is, those who would receive about as much in fall premium payments in November as had been deducted pro rata in May. When producers are classified by size of delivery, no consistent pattern is indicated for the average group either for any one of the years, or between years (table 5). Responses to the incentive of the plan were similar in all size groups because, between 1945 and 1949 and again between 1949 and 1950, some producers in each size group, shifted out of the less than 60 percent, or below average, classification.

Those who were most likely to deliver milk in May but not in November were usually the small producers. But an outstandingly high percentage of the producers who delivered less than 5,000 pounds in May had November to May ratios of 100 percent or more. This probably is largely a reflection of the fact that, with a small herd, the addition of

Table 4.—Number and percentage of producers delivering milk to the Louisville market in May, by size of delivery, 1945, 1949, and 1950

Pounds of milk delivered in May	1945		1949		1950	
	Number	Percent	Number	Percent	Number	Percent
Less than 5,000	157	10.9	186	9.4	238	11.3
5,000-9,999	536	37.2	720	36.5	777	37.0
10,000-14,999	438	30.4	539	27.4	554	26.4
15,000-19,999	188	13.1	274	13.9	295	14.0
20,000 or more	121	8.4	253	12.8	238	11.3
Total	1,440	100.0	1,972	100.0	2,102	100.0

Computed from records of the Falls Cities Cooperative Milk Producers' Association and of the market administrator.

one cow or a difference in the freshening date of one cow will have a pronounced effect upon the fall to spring ratio. The percentage of producers having November to May ratios of 100 percent or more declined steadily as size of herd increased.

Small differences in the percentages of November-to-May deliveries among the size groups may be due to random influences such as weather or feed conditions rather than to a reflection of response to the incentive of the plan. This possibility was not ignored in evaluating the responses of small, average, and large producers who received relatively large premium payments in November of the given years (table 6).

In general, the percentage of producers in each size group in the 70.0-99.9 percent delivery classification did not differ significantly from comparable percentages in the total or "all producers" classification. Size of enterprise apparently was not an important factor as to whether or not a producer achieved a November-May delivery ratio in the range of the 70.0-99.9 percent classification.

But as has already been observed in the patterns shown in table 5, the large differences between the percentage of producers in each size group in the 100-percent-or-more delivery classification and comparable percentages in the "all producers" classification again suggest that it is easier for a smaller producer (probably by addition to or subtraction from his herd) to deliver as much or more milk in the short as in the flush months, than it is for a large producer to achieve a like record.

In each of the selected years, some producers delivered milk in November but not in May. More than one-half of these producers delivered

Table 5.--Producers classified by size of delivery in May and by proportion delivering specified percentages in November as compared with May, Louisville market area, 1945, 1949, and 1950

Year and pounds of milk delivered in May	November delivery as a percentage of May delivery					
	Producers delivering milk in May	0	Less than 60.0	60.0-69.9 (average)	70.0-99.0	100 or more
	Number	Percent	Percent	Percent	Percent	Percent
1945:						
Less than 5,000	157	100.0	13.4	30.6	14.0	19.1
5,000 - 9,999	536	100.0	3.9	46.8	14.0	26.5
10,000 - 14,999	438	100.0	5.3	53.4	13.2	23.5
15,000 - 19,999	188	100.0	4.3	51.1	13.8	25.0
20,000 or more	121	100.0	5.0	50.4	19.0	22.3
Total or average	1,440	100.0	5.5	47.9	14.2	24.2
1949:						
Less than 5,000	186	100.0	11.8	26.9	6.4	21.0
5,000 - 9,999	720	100.0	5.3	44.4	11.0	23.7
10,000 - 14,999	539	100.0	3.0	49.9	15.0	22.3
15,000 - 19,999	274	100.0	2.6	49.6	16.4	23.0
20,000 or more	253	100.0	5.1	46.3	13.0	32.0
Total or average	1,972	100.0	4.9	45.2	12.7	24.0
1950:						
Less than 5,000	238	100.0	12.2	24.0	8.4	21.8
5,000 - 9,999	777	100.0	3.9	40.4	12.2	26.9
10,000 - 14,999	554	100.0	4.1	46.4	10.1	28.9
15,000 - 19,999	295	100.0	4.1	45.8	14.2	26.4
20,000 or more	238	100.0	4.4	42.4	16.4	32.4
Total or average	2,102	100.0	4.5	41.1	12.0	27.4

Market receipts in November 1945 were 60.0 percent of market receipts in May 1945; the corresponding relationships in 1949 and 1950 were, respectively, 66.0 and 68.7 percent.

Computed from records of the Falls Cities Cooperative Milk Producers' Association and of the market administrator.

Table 6.--Number and percentage of producers in each size group whose ratios of November to May deliveries were greater than average, and number and percentage of all producers in each size group, 1945, 1949, and 1950

Year and pounds of milk delivered in May	: November delivery as a percentage of :					
	: <u>May delivery</u> :			: All producers :		
	: 70.0-99.9-percent:		: 100-percent or-		: more classification:	
	: Number of	: Percent:	: Number of	: Percent:	: Number of	: Percent
	: <u>producers</u>		: <u>producers</u>		: <u>producers</u>	
1945:	:	:	:	:	:	:
Less than 5,000:	30	8.6	36	30.5	157	10.9
5,000-9,999	142	40.7	47	39.8	536	37.2
10,000-14,999	103	29.5	20	17.0	438	30.4
15,000-19,999	47	13.5	11	9.3	188	13.1
20,000 or more	27	7.7	4	3.4	121	8.4
Total	349	100.0	118	100.0	1,440	100.0
1949:	:	:	:	:	:	:
Less than 5,000:	39	8.2	63	24.2	186	9.4
5,000-9,999	171	36.1	112	43.1	720	36.5
10,000-14,999	120	25.3	53	20.4	539	27.4
15,000-19,999	63	13.3	23	8.8	274	13.9
20,000 or more	81	17.1	9	3.5	253	12.8
Total	474	100.0	260	100.0	1,972	100.0
1950:	:	:	:	:	:	:
Less than 5,000:	52	9.0	80	25.4	238	11.3
5,000-9,999	209	36.3	129	41.0	777	37.0
10,000-14,999	160	27.8	58	18.4	554	26.4
15,000-19,999	78	13.5	28	8.9	295	14.0
20,000 or more	77	13.4	20	6.3	238	11.3
Total	576	100.0	315	100.0	2,102	100.0

Computed from records of the Falls Cities Cooperative Milk Producers' Association and of the market administrator.

less than 5,000 pounds; in fact, there was a decided concentration of producers in the 2 smaller size groups (table 7). No producer, who delivered in November but not in May, delivered as much as 20,000 pounds in all.

Table 7.—Number and percentage of producers delivering milk in November but not in May, by size of delivery, Louisville market area, 1945, 1949, and 1950 ^{1/}

Pounds of milk delivered in November	1945		1949		1950	
	Number	Percent	Number	Percent	Number	Percent
Less than 5,000	58	53.7	80	51.9	80	53.3
5,000-9,999	36	33.3	62	40.3	61	40.7
10,000-14,999	12	11.1	9	5.8	5	3.3
15,000-19,999	2	1.9	3	2.0	4	2.7
20,000 or more	0	0	0	0	0	0
Total	108	100.0	154	100.0	150	100.0

^{1/} Includes producers whose milk was degraded in May.

Computed from records of the Falls Cities Cooperative Milk Producers' Association and of the market administrator.

SEASONALITY OF PRODUCTION IN THE LOUISVILLE, CINCINNATI, AND ST. LOUIS SUPPLY AREAS

In the preceding section, effects of the Louisville fall premium plan were analyzed in terms of individual and total developments over a period of time among producers serving the Louisville marketing area. Another standard of analysis is a comparison of total spring and fall deliveries in Louisville with corresponding deliveries in other markets.

Wide Seasonal Price Spreads in Louisville

The Cincinnati and St. Louis Federal milk marketing orders do not include a "take-off" and "pay-back" provision for reducing surpluses in the spring and increasing supplies in the fall, but the pricing schemes used in these cities, nevertheless, include incentives to more uniform production. These are: (1) Seasonality in basic price; (2) seasonality in differentials; (3) seasonality in utilization. These obviously could be either more or less effective in bringing about more uniform production than the pricing scheme, plus the fall premium plan, applied in the Louisville market.

A review of the pricing methods that have been effective in each of the three markets shows that there are substantial differences in the seasonal pricing schemes set up in these markets. Because prices of manufactured dairy products have a seasonal pattern, Class I price series, which are derived from formulas including or based upon prices of manufactured dairy products, also vary seasonally. The Class I prices paid by handlers in Louisville and in St. Louis, for example, have varied seasonally since 1940 because they were related to the price of butter and (later) to prices of other dairy products. But, until December 1946, the Cincinnati market operated under a series of fixed minimum Class I prices which did not provide any seasonal differences.

Differentials over a basic price may or may not be used as a means of injecting seasonality into the pricing system. Differentials have been included in the pricing provisions for Class I milk in St. Louis since December 1941, in Louisville since June 1942, and in Cincinnati since December 1946. The differentials for the St. Louis market consistently have supplied stronger incentives for greater fall and winter production (and thus for greater seasonal uniformity) than those for either Louisville or Cincinnati (table 8). In fact, with the exception of the period September 1948 through April 1949, various flat rather than seasonal Class I differentials were in effect in Louisville after the adoption of the fall premium plan.

For the most part, the pricing methods in the three markets for milk used in Class II, or cream products, differed from those for milk used for Class I products only in that the differentials over the basic prices were smaller. Handlers generally pay less for milk diverted to Class III products in the months of heavy production than in the months of low production. These various seasonal price patterns together with seasonal changes in the relative quantity of milk from producers that was utilized in the respective classes, create the seasonal patterns of the blended price to producers. In Louisville, however, the seasonal returns to producers are also sharply modified by the provisions of the fall premium plan.

From 1945 through 1951 producers delivering milk to handlers in Louisville under the plan were paid a lower average price per hundred-weight of milk containing 3.8 percent butterfat during April-June and a higher price during the period September-November than were producers delivering milk of the same butterfat content to handlers in Cincinnati and St. Louis. The fall-spring price relationships for Louisville consequently were substantially higher than for either Cincinnati or St. Louis (table 9). During the war and early postwar years, the fall-spring price ratios fluctuated widely, but for every given year the Louisville price structure provided a stronger price incentive for reducing the seasonality of production than did the price structure for either Cincinnati or St. Louis. It might reasonably be expected, therefore, that the seasonal pattern of production for the Louisville market would show a stronger trend toward more even production than either the Cincinnati or St. Louis markets.

Table 8.—Various Class I price differentials over basic formula prices in effect since January 1, 1944, under the Louisville, Cincinnati, and St. Louis Federal milk marketing orders

Effective date 1/	Applicable months	Class I price differentials		
		Louisville	Cincinnati	St. Louis
		Dollars per cwt.	Dollars per cwt.	Dollars per cwt.
Jan. 1, 1944	Apr.-June	2/	3/	0.80
	July-Nov.	2/	3/	1.10
	Dec.-Mar.	2/	3/	0.90
Dec. 1, 1946	All months		1.15	
July 27, 1947	Apr.-July		1.05	
	Aug.-Mar.		1.35	
Sept. 1, 1947	Apr.-July			0.90
	July-Nov.			1.35
	Dec.-Mar.			1.10
May 1, 1948	April		1.05	
	May-July 1948		1.35	
	Aug.-Mar.		1.35	
Sept. 1, 1948	Apr.-Aug.	1.05		
	Sept.-Mar.	1.25		
Nov. 18, 1948	Nov. 18-Dec. 1948			1.81
	Jan.-Mar. 1949			1.33
Dec. 1, 1948	Apr.-July		1.05	
	Aug.-Mar.		1.35	
Apr. 1, 1949	Apr.-June			0.90
	July-Dec.			1.35
	Jan.-Mar.			1.10
May 1, 1951	All Months	1.25		
Sept. 1, 1951	Apr.-July		4/ 1.05	
	Aug.-Mar.		4/ 1.35	
Oct. 1, 1951	Oct. 1951-Feb. 1952	5/ 1.69	6/ 1.79	
Sept. 1, 1952	Sept. 1952	7/ 1.69		2.21
	Oct. 1952	7/ 1.69		2.21
	Nov. 1952	7/ 1.69		2.21
	Dec. 1952	7/ 1.69		2.04
	Jan. 1953	7/ 1.69		6/ 1.79
	Feb. 1953	7/ 1.69		6/ 1.79

1/ Applies only to markets that show a change in the differential. No entry indicates that differentials remained unchanged.
 2/ Flat differential of \$1.05 per hundredweight in effect.
 3/ Fixed Class I price of \$3.55 per hundredweight in effect.
 4/ Plus or minus "a supply-demand adjustment."
 5/ Because of drought conditions an emergency increase of \$0.44 per hundredweight in effect during indicated months. Regular differentials in effect after February 1952.
 6/ "Not less than \$1.79."
 7/ Because of drought conditions an emergency increase of \$0.44 per hundredweight added to regular differential of \$1.25 per hundredweight.

Table 9.—Average gross spring and fall prices paid to producers per hundredweight of milk containing 3.8 percent butterfat, and percentages that fall prices were of spring prices, Louisville, Cincinnati, St. Louis market areas, average 1940-43, and annual 1944-52

Year	Average prices paid to producers for 3.8 percent milk ^{1/}						September-November average price as percentage of April-June average price ^{2/}			
	Louisville		Cincinnati ^{3/}		St. Louis		Dollars	Percent	Dollars	Percent
	Sept.-	Apr.-	Sept.-	Apr.-	Sept.-	Apr.-	Sept.-	Sept.-	Sept.-	Sept.-
	June	June	Nov.	June	Nov.	June	Nov.	Nov.	Nov.	Nov.
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Percent	Percent
1940-43 average	2.41	2.44	2.90	2.52	3.04	124.5	118.9	120.6		
1944	3.64	3.58	4.23	3.83	4.54	120.1	118.2	118.5		
1945	3.58	3.63	4.11	3.76	4.34	125.1	113.2	115.4		
1946	3.80	3.91	4.74	4.17	5.64	151.3	121.2	135.3		
1947	3.59	3.93	5.09	3.99	5.26	149.6	129.5	131.8		
1948	4.68	5.04	4.94	5.12	5.18	115.6	98.0	101.2		
1949	3.43	3.58	4.37	3.76	4.78	139.9	122.1	127.1		
1950	3.49	3.57	4.41	3.79	4.57	133.0	123.5	120.6		
1951	4.20	4.52	5.45	4.50	5.17	137.1	120.6	114.9		
1952	4.25	4.64	5.59	4.65	6.29	146.8	120.5	135.3		

^{1/} Include the dairy production payments which were in effect from October 1943 through June 1946. In addition, prices for Louisville reflect deductions and payments under the fall-premium plan.

^{2/} In 1951 (when 4-month "take-off" and "pay-back" periods became effective in Louisville), September-December average prices were percentages of April-July average prices as follows: Louisville 140.2; Cincinnati 125.3; St. Louis 115.7 percent. Similar relationships for 1952 were: Louisville 161.3; Cincinnati 119.3; St. Louis 128.5 percent.

^{3/} Since September 1949 separate prices are reported for Grade "A" and Grade "B" milk. The Grade "A" price is used beginning with that date.

Computed from reports of the market administrators.

Daily Delivery per Producer

Trends in Fall-Spring Milk Delivery Ratios in the Selected Markets

In the Louisville supply area (and very likely also in the Cincinnati and St. Louis areas), the monthly average of daily deliveries of milk per producer represents a composite of milk production on a diversity of farms, some having relatively small herds, others having large ones; some with ample grasslands, others on which extensive feeding is practiced; some on which dairying is the major enterprise, and still others on which it is only a supplemental source of farm income. The average quantities of milk delivered daily per producer in each of the selected markets show both a recurring seasonal pattern and an irregular annual increase (appendix tables 17, 18, and 19). According to these deliveries, it would appear that the average size of the dairy enterprise in the Louisville area is somewhat larger than that in the St. Louis area, and considerably larger than that in the Cincinnati area.

For purposes of this analysis, attention is concentrated upon the adjusted ratios between average quantities of milk delivered daily per producer in the fall payment months and quantities delivered in the spring accumulation months (table 10 and fig. 4). In 4 out of the 5 years from 1940 through 1944, the fall-spring milk-delivery ratios for St. Louis were highest, those for Louisville held the middle position, and, for each year, those for Cincinnati were lowest (fig. 4). All the ratios were relatively low in 1945, St. Louis and Louisville showed about equal recovery in 1946, and from 1947 through 1952 Louisville held the highest position. The ratios for St. Louis showed an irregular downward trend between 1940 and 1947, but have shown yearly increases since 1947. The ratios for Cincinnati are without any sustained trend. Despite drought conditions in the fall of 1952, Louisville maintained a fall-spring delivery ratio of more than 80 percent but, for the first time since 1946, the ratio for St. Louis was practically as high as that for Louisville.

For the pre-plan years of 1940-43, the September-November deliveries per producer in Louisville, Cincinnati, and St. Louis averaged, respectively, 74.5, 73.4, and 77.9 percent of the April-June deliveries (table 10). In the Louisville milkshed the average fall-spring ratio for 1947-50 increased to 76.1 percent. In contrast, comparable average ratios for Cincinnati and St. Louis of 71.9 and 73.2 percent, respectively, were lower than in the earlier period. Each year beginning with 1948, the fall-spring delivery ratios for Louisville have been higher than its pre-plan average fall-spring ratios. Cincinnati exceeded its earlier average record only in 1950 and St. Louis only in 1952.

The Louisville Fall Premium Payment Plan was designed not only to encourage fall milk production but also to check and discourage excessive spring milk production. If these objectives were met consistently, the upward trend for the spring months would level off as compared with the

Table 10.—Average daily spring and daily fall delivery of milk per producer, and fall delivery as percentage of spring delivery, Louisville, Cincinnati, and St. Louis marketing areas, average 1940-43, and annual 1940-52

Year	Average daily delivery per producer					
	Louisville		Cincinnati		St. Louis	
	Apr.-June	Sept.-Nov.	Apr.-June	Sept.-Nov.	Apr.-June	Sept.-Nov.
	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
1940-43 av.	310	231	158	116	263	205
1940	289	217	144	105	246	199
1941	314	239	153	116	269	214
1942	325	242	166	121	275	197
1943	312	227	169	121	263	209
1944	312	257	174	144	281	234
1945	356	252	205	145	321	232
1946	368	274	211	142	339	255
1947	375	272	208	146	348	238
1948	364	280	209	147	336	250
1949	375	277	221	156	353	261
1950	362	294	220	168	353	269
1951	<u>1/</u> 357	<u>2/</u> 296	<u>1/</u> 223	<u>2/</u> 158	<u>1/</u> 360	<u>2/</u> 271
1952	<u>1/</u> 362	<u>2/</u> 296	<u>1/</u> 234	<u>2/</u> 176	<u>1/</u> 353	<u>2/</u> 294

Year	Sept.-Nov. deliveries as a percentage of April-June deliveries					
	Louisville		Cincinnati		St. Louis	
	Un-adjusted	Adjusted <u>3/</u>	Un-adjusted	Adjusted <u>3/</u>	Un-adjusted	Adjusted <u>3/</u>
	Percent	Percent	Percent	Percent	Percent	Percent
1940-43 av.	74.5	-	73.4	-	77.9	-
1940	75.1	72.0	72.9	70.7	80.9	77.3
1941	76.1	74.8	75.8	72.7	79.6	78.7
1942	74.5	76.0	72.9	72.2	71.6	73.2
1943	72.8	72.8	71.6	70.6	79.5	76.8
1944	82.4	76.9	82.8	76.0	83.3	77.7
1945	70.8	69.6	70.7	69.7	72.3	70.3
1946	74.5	73.8	67.3	67.8	75.2	74.2
1947	72.5	73.6	70.2	70.0	68.4	69.6
1948	76.9	75.8	70.3	68.4	74.4	72.6
1949	73.9	75.2	70.6	70.7	73.9	73.9
1950	81.2	81.0	76.4	75.5	76.2	75.7
1951 <u>4/</u>	82.9	82.2	70.9	69.3	75.3	76.1
1952 <u>4/</u>	81.8	80.4	75.2	71.8	83.3	80.1

1/ April through July as per amendment to Order No. 46.

2/ September through December as per amendment to Order No. 46.

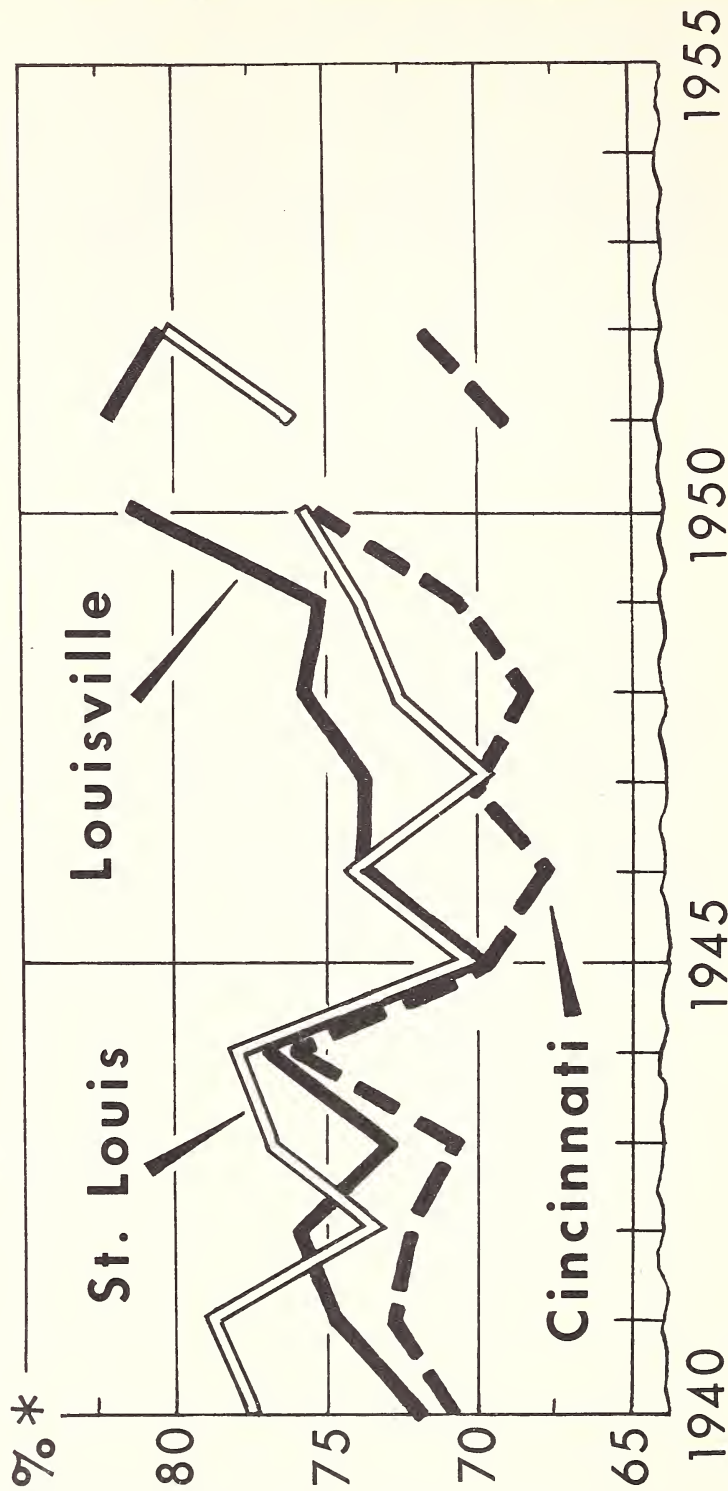
3/ Adjustment was made for upward trend in size of daily deliveries per producer by expressing the average of deliveries for September-November as a percentage of the average of deliveries for the previous and following April-June periods.

4/ September-December deliveries as percentage of April-July deliveries (periods effective under Order No. 46 since May 1951).

Computed from reports of the respective market administrators. Monthly data are shown in appendix tables 17, 18, and 19.

DAILY FALL DELIVERY OF MILK AS PERCENTAGE OF SPRING

Louisville, Cincinnati, and St. Louis Marketing Areas



* ADJUSTED FALL - SPRING RATIOS: "FALL" FOR 1940-50 IS SEPT.-NOV., AND FOR 1951-52 IS SEPT.-DEC.;
 "SPRING" FOR 1940-50 IS APR.-JUNE, AND FOR 1951-52 IS APR.-JULY

Figure 4.

upward trend for the fall months. Between 1945 and 1949, in Louisville, the spring and fall trends kept close together but in Cincinnati and St. Louis the trend for the spring months rose to higher levels than that for the fall months (fig. 5). Apparently during those years the plan served to check, in the Louisville milkshed, a rather general tendency towards greater seasonality in production. From 1950 through 1952 the spring trend in Louisville remained about level but the fall trend rose to higher levels, indicating that both objectives of the plan were being attained to some degree. During the same period the tendency to greater seasonality in Cincinnati and St. Louis was checked.

Pasture Conditions and Milk-Feed Price Ratios as Seasonal Factors

Since 1945 good to excellent pasture conditions have prevailed each year in each area during the April-July period, thus providing a natural stimulus to heavy spring production (table 11). But only in 1945, 1949, and 1950 could the same be said with respect to fall pasture conditions. Of the 9 years under review, Louisville experienced 5 years of favorable fall pasture conditions, Cincinnati 4 years, and St. Louis 6 years. The greater progress made in the Louisville area in reducing seasonality of production therefore cannot be ascribed to uniquely favorable pasture conditions in the months of August through November. In the fall of 1951, because of drought conditions, pastures in the Louisville and Cincinnati milksheds were much poorer than indicated by the given Statewide averages. In the fall of 1952, all three milksheds experienced severe and prolonged drought conditions. The data show that relatively high levels of milk deliveries in the fall months were associated both with good and with poor pasture conditions.

Although the grazing period in the Louisville supply area usually extends into November, many of the producers also feed roughage and concentrates in the fall months. The intensity of feeding in the area generally is inversely related to pasture conditions, but is directly related to the ratio between the price the producer receives for milk and the price for feed.

A local milk-feed price ratio is available only for the St. Louis area. For this reason, the regional ratios which include, respectively, Kentucky, Ohio, and Missouri, were used to compare relationships between milk prices and feed costs in the selected areas (table 11). Because of the broad extent of these regions, the milk-feed price ratios should be considered only as approximations. Furthermore, the price of milk sold wholesale (one of the components of the milk-feed price ratio) is a weighted average of the prices paid for milk sold off farms at wholesale both for fluid and for manufacturing purposes. For a given area, this composite price is lower than the "uniform" or blended prices paid to producers who supply the fluid milk markets within that area. It follows that the purchasing power of milk in terms of feed is higher in the Louisville, Cincinnati, and St. Louis supply areas than is indicated by the respective milk-feed price ratios shown in table 11. In 1950, and 1951,

TRENDS IN SPRING AND FALL DELIVERY OF MILK*

Louisville, Cincinnati, and St. Louis Marketing Areas

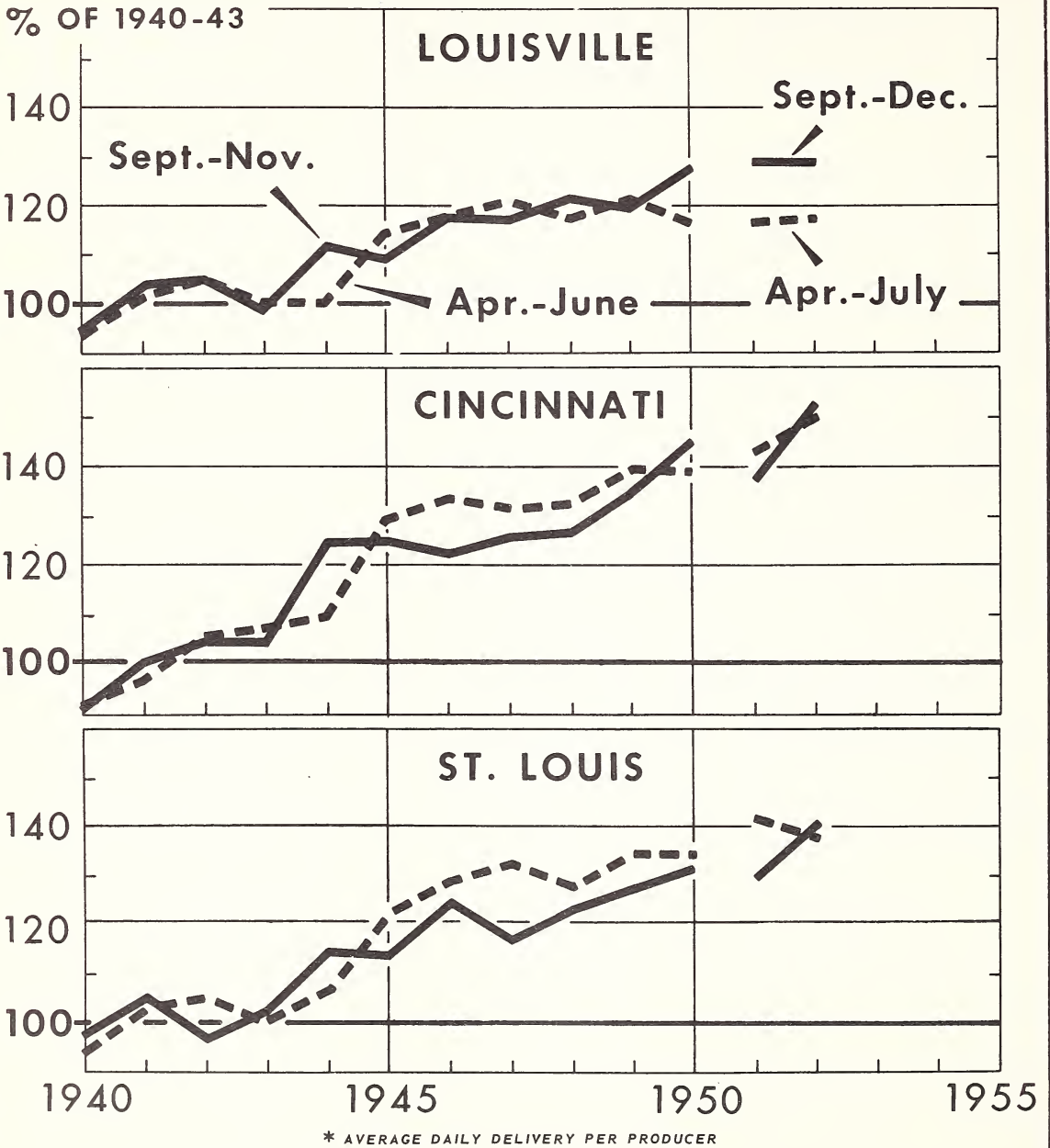


Figure 5.

Table 11.--Average pasture conditions and milk-feed price ratios, and fall-spring ratios of daily delivery of milk per producer, Louisville, Cincinnati, St. Louis, 1944-52

Year and market	Pasture conditions 1/		Milk-feed price ratios 2/	Adjusted fall-spring ratios of daily delivery per producer 3/
	April-July	Aug.-Nov.	(Aug.-Nov.)	
	Percent	Percent	Pounds	Percent
1944:				
Louisville	77.5	61.8	1.46	76.9
Cincinnati	86.8	56.2	1.42	76.0
St. Louis	86.8	71.5	1.64	77.7
1945:				
Louisville	93.8	82.0	1.48	69.6
Cincinnati	91.5	82.8	1.41	69.7
St. Louis	93.1	87.0	1.66	70.3
1946:				
Louisville	93.2	88.5	1.38	73.8
Cincinnati	91.8	73.2	1.47	67.8
St. Louis	93.8	82.3	1.59	74.2
1947:				
Louisville	83.8	88.2	1.24	73.6
Cincinnati	86.5	88.5	1.06	70.0
St. Louis	85.3	72.9	1.12	69.6
1948:				
Louisville	83.8	68.2	1.56	75.8
Cincinnati	90.8	79.5	1.40	68.4
St. Louis	86.0	84.0	1.56	72.6
1949:				
Louisville	88.2	85.8	1.58	75.2
Cincinnati	89.2	83.0	1.32	70.7
St. Louis	87.9	90.7	1.51	73.9
1950:				
Louisville	87.0	95.5	1.40	81.0
Cincinnati	85.3	89.0	1.21	75.5
St. Louis	82.4	90.0	1.36	75.7
1951:				
Louisville	80.5	73.5	1.48	82.2
Cincinnati	89.3	70.5	1.28	69.3
St. Louis	86.0	95.1	1.38	76.1
1952:				
Louisville	83.0	51.5	1.44	80.4
Cincinnati	88.0	66.2	1.34	71.8
St. Louis	83.5	64.4	1.46	80.1

1/ Data on pasture conditions in Kentucky, in Ohio, and an average of conditions in Missouri and Illinois were used, respectively, for the selected markets. Percentages have these meanings with respect to "normal": 80 percent or more, good to excellent; 65-80, poor to fair; 50-65, very poor; 35-50, severe drought.

2/ Pounds of concentrate ration equal in value to 1 pound of whole milk sold by farmers to plants and dealers. Milk-feed price ratios for the S. Central States, E. N. Central States, and W. N. Central States were used, respectively, for the selected markets. Ratios for Louisville do not reflect the added purchasing power arising from fall premium payments.

3/ For 1951 and 1952, September-December deliveries as a percentage of April-July deliveries.

Average pasture conditions and milk-feed ratios were computed from published reports of the former Bureau of Agricultural Economics.

for example, the special St. Louis "Feed and Milk Ratio" was at a higher level than the milk-feed price ratio for the West North Central States and differences between the 2 series varied by months and from year to year (fig. 6).

On the average, during the period 1935-44, 1 pound of whole milk sold by farmers in the South Central States (including Louisville) was equal in value to 1.45 pounds of concentrated rations. Corresponding averages of 1.34 pounds and 1.60 pounds applied, respectively, in the East North Central States (including Cincinnati) and in the West North Central States (including St. Louis). The respective averages for 1948-51, however, were 1.50, 1.30, and 1.45 pounds; that is, even without taking account of fall payments, a relatively high purchasing power for milk in terms of feed obtained in the region which includes the greater part of the Louisville supply area. During each of these years the fall-spring milk delivery ratio for the Louisville area was substantially higher than comparable ratios for the other cities (table 11). Apparently fairly high milk feed price relationships and extra fall payments under the plan encouraged some producers in the Louisville area to emphasize fall production of milk. Possibly a shift to more even production would be stimulated if the pricing mechanisms included a provision which gave producers advance assurance that compensating payments would be forthcoming whenever the milk-feed price ratios for the fall and winter months were much below average. The fall premium payments and the probability of a temporary increase in the Class I price under Federal milk marketing orders when conditions warrant such action, partially perform that function.

Average Daily Supplies of Milk from Producers

Two Factors Affecting Supply

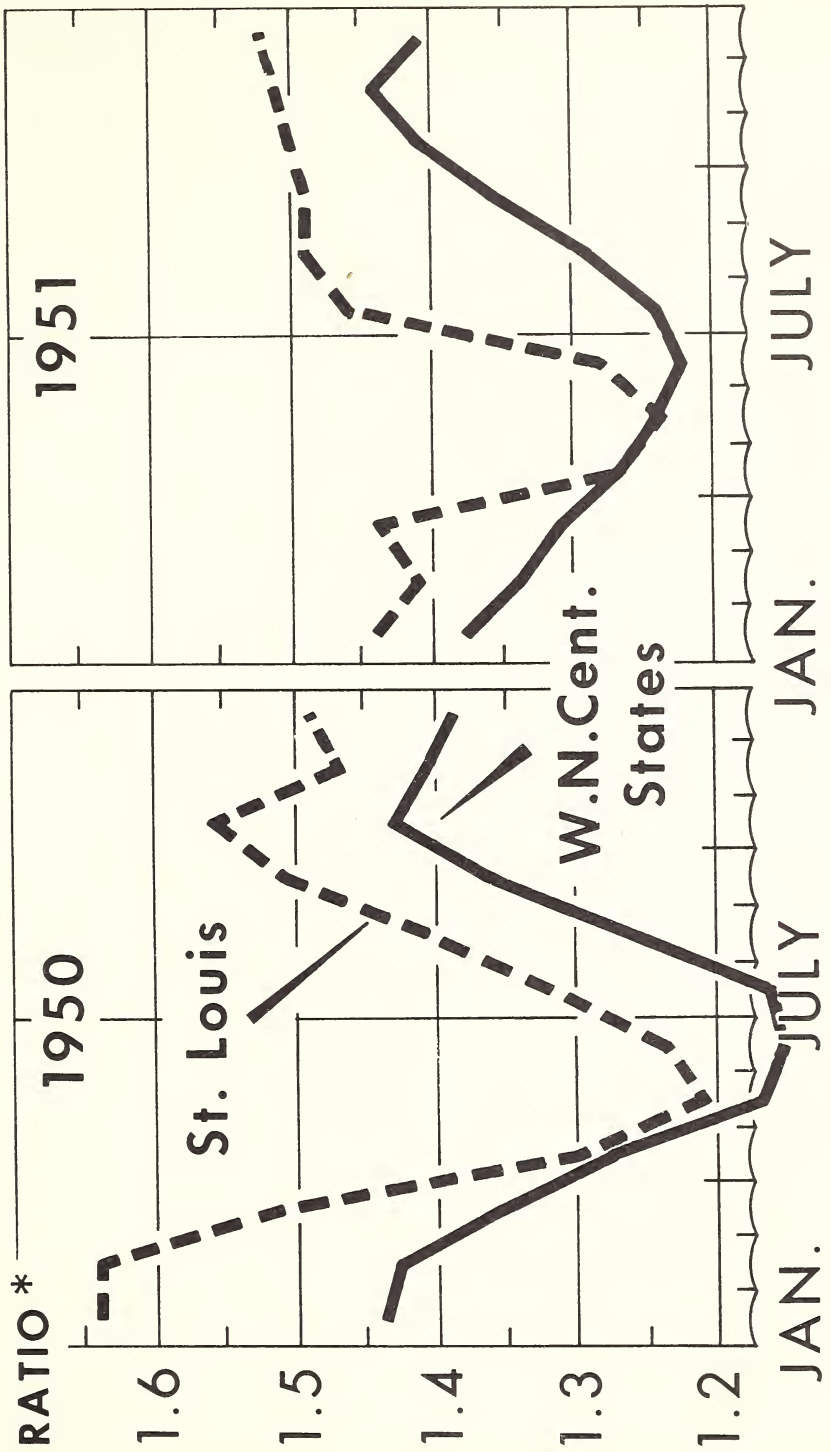
A handler has two ways of modifying his average daily supply of milk from producers: (1) By influencing established producers to increase or decrease the quantity of milk they deliver daily to his plant; (2) by taking on new producers or, in case of an oversupply, by discontinuing to receive milk from some producers. With an increase in the population of the Louisville metropolitan area from 451,000 in 1940 to 575,000 in 1950 and with a pronounced increase in the demand for milk during that decade, the requirements of the market for milk rose sharply. As the demand for fluid milk and cream increased, established producers gradually expanded their dairy operations and more and more new producers entered the market. These factors brought about increases in daily market supplies at all seasons of the year. Average daily receipts from producers increased from 366,000 pounds in 1940 to 667,000 pounds in 1952 (appendix table 17).

Seasonal Indexes of Receipts from Producers

So far the analysis has been focused primarily on production performance in the spring and fall months which was affected by the

MONTHLY MILK-FEED RATIOS

St. Louis Marketing Area and W. N. Cent. States, 1950 and 1951



* LBS. OF FEED EQUAL IN VALUE TO 1 LB. OF MILK

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Figure 6.

Louisville plan. Had the fall-spring milk delivery ratios been approximately 100 percent for each of the years under review, it would signify that production had been seasonally uniform, that there had been no alternate periods of market surpluses and shortages (at least during these two seasons when such extremes usually occur); and that fall shortages (assuming a stable demand) were not a problem. But seasonal indexes of daily market supplies for the periods 1940-43, 1944-47, and 1948-51 (trend removed) for each of the selected markets suggest the difficulty that handlers encounter throughout the year in attempting to balance a variable supply against a relatively stable demand, and to utilize effectively the personnel and facilities of their plants (fig. 7). Although the year-by-year fluctuations for a given month, in the supply of milk—usually associated with vagaries of weather—created real problems, these generally were less important than disturbances in normal operations of handlers created by the wide seasonal changes that occurred within a year. To narrow this seasonal range in receipts, of course, is the primary objective of the Louisville Plan.

During 1944-47, the years when the plan was getting under way, the seasonal index of receipts for Louisville differed but slightly from the pattern in 1940-43. In 1948-51, however, there was noticeable progress toward more even production for the Louisville area. This is indicated by the fact that, both in the summer and in the fall, the monthly indexes have moved closer to 100 percent (fig. 7). Indeed, April and May are the only months that show little change in the level of production under the plan, probably because milk yields of cows freshening in the fall and winter months remain relatively high through the following spring. (See 12, p. 27.)

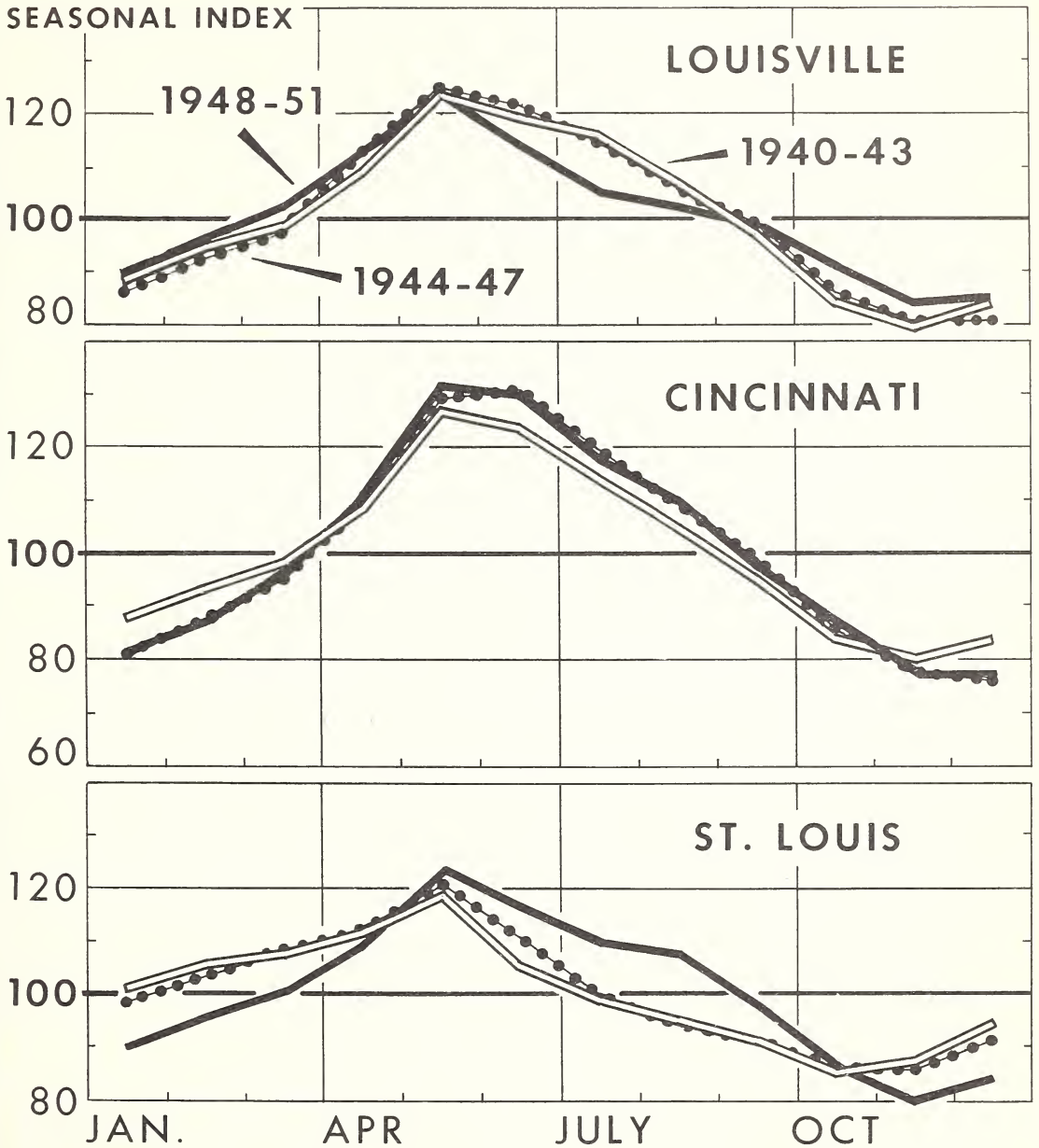
The trend toward less seasonality in the Louisville market in 1948-51 is in contrast to some widening of the seasonal swing in both the Cincinnati and St. Louis areas (fig. 7 and table 12). The change in the seasonal marketing pattern for St. Louis may be associated with the taking on of a large number of producers in a new area (2, 4, pp. 33-38). The fact that the average seasonal range narrowed only in the Louisville area suggests that, without the incentive to greater fall production provided by the plan, the surplus and shortage problems in the Louisville area probably would have been worse.

Significance of Reducing Seasonal Distortions

What is the significance of the record made by Louisville producers, under the plan, in terms of economical milk marketing? During 1951 an average of 2,066 producers delivered 236,275,486 pounds of milk to 28 handlers in the Louisville marketing area. If there had been no variation in supply from month to month, the 28 handlers would have received a total of about 19,700,000 pounds of milk per month, or an average of about 700,000 pounds per handler. If the 19,700,000 pounds had been only enough to meet the demand for fluid milk and fluid cream products (including an adequate reserve) then, indeed, an ideal fluid milk market situation would

SEASONALITY OF MILK RECEIPTS*

Louisville, Cincinnati, and St. Louis Marketing Areas,
1940-43†, 1944-47, and 1948-51



* AVERAGE DAILY RECEIPTS PER MONTH

† BEFORE INTRODUCTION OF LOUISVILLE FALL PREMIUM PLAN

Figure 7.

have existed. A minimum of high-cost producer milk would have been diverted to manufactured products, handlers' facilities would have tended to be used to capacity at all seasons, and consumers could have enjoyed prices that reflect more efficient marketing conditions and possibly also more efficient production conditions than those that prevailed. 9/

Table 12.—Change from 1940-43 to 1948-51 in seasonal range and in difference between low and high point of monthly indexes of daily delivery of milk per producer in Louisville, Cincinnati, and St. Louis markets

City	Seasonal range		Difference between low point and high point		Change in difference from 1940-43 to 1948-51
	1940-43	1948-51	1940-43	1948-51	
	Percent	Percent	Percent	Percent	Percent
Louisville	79.9-123.5	83.4-123.3	43.6	39.9	- 3.7
Cincinnati	80.0-126.7	76.7-131.8	46.7	55.1	+ 8.4
St. Louis	85.0-118.6	79.9-123.3	33.6	43.4	+ 9.8

Computed from reports of the respective market administrators.

These hypothetical conditions are represented by the "no seasonality" data given in table 13. In reality, however, the average monthly processing capacity required by the market for the April-June period of 1951 was 4,466,000 pounds greater than in the September-November period. The average receipts in the spring months of 1951 were 3,045,000 pounds greater and average receipts in the fall months were 1,421,000 pounds less than the "no seasonality" average of 19,700,000. This would have meant (under the assumption of an average monthly requirement of 19,700,000 pounds of milk for fluid uses) that in the spring months a "home" had to be found for about 354,000 gallons of milk and that in the fall months an average requirement of about 165,000 gallons had to be filled. Any handler seeking an outlet for supplies, or a source of additional supplies, may approach a number of handlers, so that a small surplus or shortage may create the illusion of a much larger surplus or shortage and arouse a feeling of instability throughout the market.

9/ Reports with respect to some areas indicate that under good management, including good feeding practices, fall, winter, and even dairying can be more efficient than spring and summer dairying, mainly because annual production per cow usually is higher (1, 7, 12). But a report pertaining to the Boston milkshed indicates that even dairying would somewhat reduce the annual quantity of milk produced on a farm (6). Even though it might be possible to demonstrate that costs should be lower with even or fall production patterns, there is reason to suppose that producers, on the average, are following the seasonal patterns that they consider most profitable, that is, lowest cost.

Table 13.—Seasonal difference in receipts from producers and in average processing capacity required by handlers under specified circumstances, Louisville marketing area, 1951

Circumstance	Average monthly receipts from producers		Average capacity required per handler		Seasonal difference in capacity required by	
	Apr.—June	Sept.—Nov.	Apr.—June	Sept.—Nov.	Market	Handler
	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds	1,000 pounds
1951 receipts	22,745	18,279	812	653	4,466	159
Assuming:						
No seasonality	19,700	19,700	700	700	0	0
1943 seasonality ^{1/}	23,482	17,119	839	611	6,363	228

^{1/} In 1943 average receipts per month in the April-June and in the September-November period were 119.2 and 86.9 percent, respectively, of the average for the year, as compared with 115.5 and 92.8 percent, respectively, in 1951.

Based on market data as reported by the market administrator.

Greater instability would have prevailed, however, if the seasonal amplitude had been as large in 1951 as it was in 1943. Under those conditions (again assuming average monthly requirements of 19,700,000 pounds), the additional surplus in the spring would have been about equal to the combined quantity of milk received monthly by 3 or 4 of the small handlers in the Louisville area. Unless additional emergency supplies had been obtained from other markets, the increase in the fall shortage would have required that about 100 farmers incur the costs to become producers for the fluid market and that these costs would be part of the cost of market supplies throughout the year. Loss of some efficiency in the use of transportation facilities also might be involved. These comparisons indicate how the fall premium plan contributes to marketing efficiency and stability.

Records of the Dairy Herd Improvement Association indicate that adopting a different freshening program not only changes the quantities of milk delivered by a producer from month to month but also changes the total quantity which he delivers during the year (15). Furthermore, changes in the annual blended price accompanying a change in the seasonal pattern of production for the market probably would have an effect on the total number of producers who delivered milk to the market. Both factors probably would affect total annual production.

Hypothetical average annual returns to producers under three assumptions as to seasonality and utilization are shown in table 14. With one exception, it was assumed that annual receipts remained at the 1951 level of 236,275,000 pounds. It appeared most realistic to adjust monthly receipts and values under different patterns of seasonality by changing the quantity of milk utilized in Class III products. Class III utilization of milk in Louisville in 1951 ranged from 4.9 percent in November to 38.6 percent in June; the average for the year was 21.4 percent. In distributing this surplus according to the respective assumptions (table 14) the monthly values of receipts were either raised or lowered because of changes in the quantity and in the butterfat content of milk in the respective classes.

Table 14.—Estimated values per hundredweight of milk and estimated average annual returns per producer under specified circumstances, Louisville marketing area, 1951

Circumstance	Annual	Value of milk 1/		Average annual
	receipts	Total	Per hundredweight	returns per producer 2/
	1,000 pounds	1,000 dollars	Dollars	Dollars
1951 data	236,275	11,898	5.04	5,766
Assuming:				
I	236,275	11,860	5.02	5,743
II	236,275	11,946	5.06	5,789
III	218,289	11,264	5.16	3/ 5,903

I The 1943 seasonal pattern had applied in 1951.
 II Even production of about 19,700,000 pounds of milk a month in 1951.
 III Class I and Class II utilization as reported in 1951; Class III utilization 15 percent of total receipts each month.

1/ Estimated values based on 1951 monthly and total receipts, average monthly butterfat tests, and class prices for 3.8 percent milk adjusted by the respective monthly butterfat differentials that applied to Class I, Class II, and Class III utilization of milk.

2/ An average of 2,066 producers delivered an average of 1,144 hundredweight of milk in 1951.

3/ Assuming that average deliveries per producer remained at 1,144 hundredweight but that producer numbers decreased from 2,066 to 1,908.

In Case I the average return to producers in 1951 would have been almost as large under the 1943 seasonal pattern as it was under the reduced seasonal pattern that actually prevailed in 1951. The benefit to the

average producer was largely the intangible, but important, benefit of greater market stability under the reduced seasonal pattern. Those producers who helped to narrow the seasonal range in receipts in 1951 by delivering relatively large quantities of milk during the fall payment months received the higher fall prices on a sizable part of their production and earned comparatively large fall premium checks.

Case II assumes the same total production evenly distributed through the year. But with the market carrying an annual average surplus substantially in excess of fluid requirements, the effect would be an average annual return only slightly higher than the return producers received in 1951.

With a more even seasonal pattern the market could function with a smaller average reserve over fluid requirements. In Case III the quantity of surplus milk each month was assumed to be 15 percent and total receipts were reduced accordingly. Under these conditions the annual average price to producers would be increased to \$5.16 per hundredweight without any change in class prices. Assuming the same annual deliveries per producer, the market could be supplied by 1,908 producers instead of 2,066.

A decline in the number of producers is not necessarily inconsistent with an increase in the average annual price from \$5.04 to \$5.16 per hundredweight of milk. The higher price would be brought about by a change in seasonality at presumably greater costs of production (see 2/, p. 32). Under the Fall Premium Plan some producers receive an average annual price that is lower and some a price that is higher than the market average, the price received depending on whether their production patterns have more or less seasonality than the average for the market. Spring producers would tend to leave the market because their annual average price would be less attractive, relative to prices in outlets not having a plan. Some producers would be attracted to the market by the opportunity of qualifying for a higher-than-average price. But because of the added costs of a fall production pattern, the quantity of milk attracted to the market would be less than the quantity leaving the market. A further factor affecting the level of total supplies would be whether or not handlers consider the processing of surplus milk too profitable to forego.

THE PLAN AND CHANGES IN NUMBER OF PRODUCERS

One method of adjusting total market receipts would be to take on producers in the fall, and let them go in the spring. The effect of the Louisville plan on the seasonal price relationships between the Louisville market and other milk plants accessible to dairymen around Louisville may influence some producers to use other outlets for their milk during the "take-off" period and may attract some to the Louisville market for the "pay-back" period.

Four Variables Affect Total Number of Producers

The total number of producers serving the Louisville market from month to month (appendix table 20) is modified by the number of new, discontinuing, excluded, and reinstated producers. Producers are excluded from the fluid market when inspection shows that their milk does not meet the health requirements for milk used for Grade A pasteurized milk; they are reinstated when, upon inspection, their production again meets the requirements of the milk ordinance.

During 1941-52 new producers entered the market in all months of the year, but the largest percentage entered in the first half of the year (table 15). Kentucky has a relatively high proportion of tenancy, ranging, in 1950, from 10 to 43 percent in the principal counties of the Louisville milkshed. The relatively heavy concentration of new producers in the January-June period may be explained by two factors: (1) Most farm-tenant leases expire on March 1, and (2) "grass" producers enter the market in the spring months. The high number of producers who discontinued delivering milk to the market in the January-March period and again in the September-December period, probably reflect spring moving and other farm-management factors, and fall declines in production.

Degradings generally were highest in the hot summer months when special care is necessary to keep the bacterial count below the maximum permitted, and the quality up to required standards. This is the season, however, when field and harvesting work is heaviest and some producers are likely to spend less time and labor on their dairy operations. In particular, the health authorities find that inadequate cleaning of milking machines is a frequent cause of higher bacteria count. Owing to early or late seasons, some shift in the peak period may occur. After a producer has been excluded from the fluid market, he must correct the cause for that action and then must apply for and "pass" a series of inspections in order to be reinstated. This sequence introduces a time-lag. In most of the years under review, the peak of exclusions fell in the July-August period but the peak of reinstatements fell in the August-September period. Although the direct relationship between these categories is recognized, it was thought that the incentive of fall premium payments might induce some speeding up of reinstatements, particularly during August and September, but this does not seem to have been the case.

Aside from these general characteristics, a few "unusual" conditions affected producer numbers during some of the years since the plan became effective. The most obvious was the approval, in the late fall of 1948 and through 1949, of a number of producers delivering milk to a receiving station at Carrollton, Ky., and their transfer to Covington-Newport, Ky., markets in January 1951. Furthermore, as pointed out in the annual reports for 1952 of officials of the Falls Cities Cooperative Milk Producers' Association (5), the relatively wide spread between the blended price paid to producers and the prices paid by nearby manufacturing plants (associated with an emergency increase in the price of Class I milk from September 1952 through February 1953, because of severe drought) attracted additional producers to the Louisville market. An added factor was the sharp break in the price of beef cattle.

Table 15.—Number of new, discontinuing, excluded, and reinstated producers, Louisville marketing area, by months, average 1941-43, annual 1947-52

Year and class	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number
1941-43 av.:													
New	8	11	18	23	19	18	10	11	14	9	12	11	164
Discontinuing	11	15	16	7	7	4	9	11	10	8	10	10	118
Excluded	17	17	22	18	19	35	57	55	44	23	8	16	331
Reinstated	13	13	20	18	18	21	34	64	51	30	17	12	311
1947:													
New	15	20	28	23	19	30	26	16	10	31	22	18	258
Discontinuing	14	17	28	13	12	4	21	15	17	22	31	20	214
Excluded	30	39	47	34	18	65	67	96	16	64	55	36	567
Reinstated	23	23	40	31	36	20	34	64	51	50	49	32	513
1948:													
New	16	18	42	43	21	42	32	25	28	28	18	12	325
Discontinuing	33	18	35	13	7	4	11	15	27	17	17	20	217
Excluded	18	22	20	13	36	75	32	26	31	36	35	38	382
Reinstated	22	16	23	9	21	44	50	28	34	27	32	21	327
1949:													
New	34	33	49	56	46	39	23	19	36	24	29	24	412
Discontinuing	10	29	15	14	5	0	17	15	12	24	30	15	186
Excluded	28	22	21	39	24	53	62	74	59	42	31	45	500
Reinstated	34	31	25	28	28	34	64	57	50	62	33	29	475
1950:													
New	27	35	35	36	39	26	24	28	27	20	14	11	322
Discontinuing	25	18	19	17	10	12	5	18	24	15	23	18	204
Excluded	37	27	37	38	30	58	63	83	42	30	19	8	472
Reinstated	41	28	22	47	27	35	49	88	59	37	25	6	464
1951:													
New	13	14	24	27	25	16	7	18	16	11	29	7	207
Discontinuing	42	79	31	22	8	16	17	23	24	23	18	23	326
Excluded	60	33	61	104	73	90	85	85	53	41	43	42	770
Reinstated	33	41	63	75	77	82	68	89	58	38	34	39	697
1952:													
New	16	17	48	31	26	11	13	30	26	18	22	17	275
Discontinuing	24	18	23	26	11	7	14	17	17	17	14	19	207
Excluded	92	60	65	44	41	58	37	52	68	65	32	76	690
Reinstated	81	56	64	50	35	47	42	50	68	65	33	49	640

Compiled from reports of the Louisville health authorities, as shown in the annual reports of the market administrator.

Producer Numbers Reveal a Seasonal Pattern

After removal of the long-time upward trend in total number of producers (appendix table 20), seasonal patterns for the period 1940-43, 1944-47, and 1948-51 are as shown in figure 8. Because, for the short run, producer numbers usually are fairly stable, a wide seasonal swing is not to be expected. But, even though the patterns do not deviate more than 2 percent from 100 percent in either direction, a seasonal difference in the number of producers is indicated by the fact that the low point occurs early in the year and the peak during the months of heavy production. This was the general pattern in 1941-43 and also for the years since the plan has been in effect. But, except for the sharp dip in February which is associated with the withdrawal of the Carrollton plant, the seasonal pattern for 1948-51 shows a lower peak during the flush season and a more sustained level during the fall months than do the patterns for the earlier periods. This change may in part reflect the timing of some producers (with respect to the "take-off" and "pay-back" periods) in entering or leaving the market.

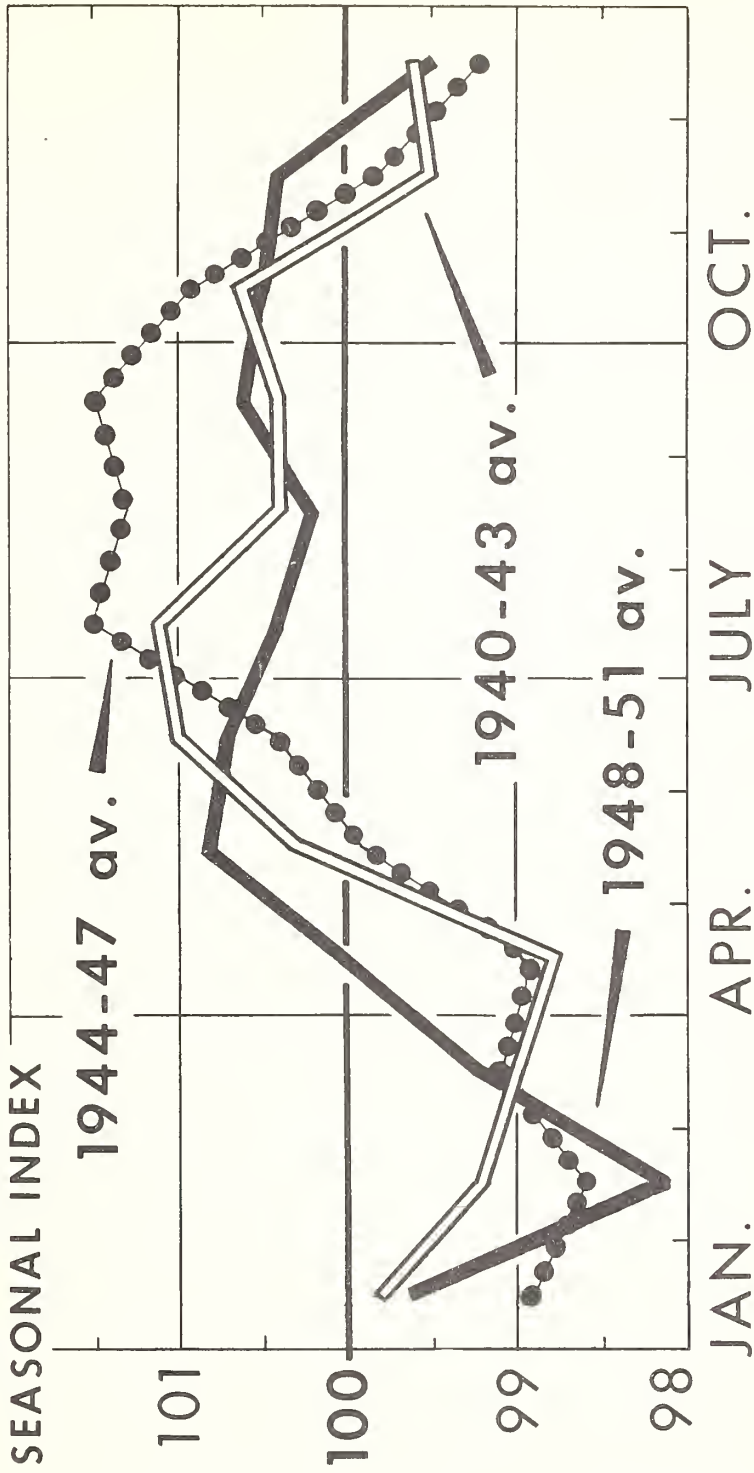
New and Discontinuing Producers

The health authorities know that, in recent years, a small number of producers, located in the part of the Louisville milkshed which overlaps the Cincinnati milkshed, have left the Louisville market in early spring and delivered their milk to the Cincinnati market during the flush season, returning to Louisville for the short period. The Louisville and Cincinnati health authorities accept each other's producer ratings, making it comparatively simple for producers, strategically located, to switch from one market to the other. Such in-and-out action of a few producers is not necessarily detrimental to the interest of regular producers serving the Louisville market because the blended price to continuous producers on this market is higher than it would be if the "in-and-outers" were on the market during the flush season. [For comments on this point with respect to the Clinton, Iowa, market see (13, p. 157).]

Data for 1950 and 1952 indicate that the decisions of some producers with respect to the market they would use probably were associated with the Louisville fall premium plan (table 16). (The data for 1949 and for 1951 are not representative because of the actions with respect to the plant at Carrollton, Ky.) During the "take-off" periods in 1950 and 1952, a smaller than average percentage of new producers came on the market, but larger than average percentages left the market. Relationships with respect to the "pay-back" periods are less consistent, probably because other factors outweighed the incentive of the plan. In the fall of 1950, for example, producers were extremely dissatisfied--the blended price was no higher than that of the previous year, but farm wages and the price of feed had advanced considerably after the invasion of South Korea. Furthermore, the prices of beef and dairy cattle at the Bourbon Stockyards in Louisville were high enough to bring about close culling and

SEASONALITY OF NUMBER OF PRODUCERS DELIVERING MILK

Louisville Marketing Area, 1940-43*, 1944-47, and 1948-51



* BEFORE INTRODUCTION OF LOUISVILLE FALL PREMIUM PLAN

U. S. DEPARTMENT OF AGRICULTURE

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Figure 8.

Table 16.—Percentages of new and of discontinuing producers, by periods associated with the fall premium payment plan, averages 1941-43, annual 1949-52

Class and period	1941-43 average	1949	1950
	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>
New producers:			
January-March	22.6	28.2	30.1
April-June	36.6	34.2	31.4
July-August	12.8	10.2	16.2
September-November	21.3	21.6	18.9
December	6.7	5.8	3.4
Total	100.0	100.0	100.0
Discontinuing producers:			
January-March	35.6	29.0	30.4
April-June	15.3	10.2	19.1
July-August	16.9	17.2	11.3
September-November	23.7	35.5	30.4
December	8.5	8.1	8.8
Total	100.0	100.0	100.0
Class and period	1941-43 average	1951	1952
	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>
New producers:			
January-March	22.6	24.7	29.4
April-July	42.7	36.2	29.5
August	6.7	8.7	10.9
September-December	28.0	30.4	30.2
Total	100.0	100.0	100.0
Discontinuing producers:			
January-March	35.6	46.6	31.4
April-July	22.9	19.3	28.0
August	9.3	7.1	8.2
September-December	32.2	27.0	32.4
Total	100.0	100.0	100.0

Computed from reports of the Louisville health authorities, as shown in the annual reports of the market administrator.

even the liquidation of some dairy herds. Under those circumstances, fewer than average new producers came on the market in September through November of 1950, but a greater than average number of producers left the market. In the fall of 1952—when (due to drought) the Class I price was augmented by an emergency increase of 44 cents per hundredweight, the fall premium payments averaged 57 cents per hundredweight, and the price of beef cattle had leveled off—a greater than average number of producers entered the market and shared in the fall premium payments. The fact that some in-and-outers were among the group caused little comment. Probably the regular producers realized that, by relieving the market of some surplus milk during the flush season and by supplying milk during the short season, the in-and-outers had helped to bring about more even production.

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Table 18.—Average daily delivery of milk per producer and average daily market receipts, Cincinnati marketing area, by months, 1940-52

Year and class	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.
Daily delivery													
1940	108	116	121	128	150	153	140	119	113	104	99	106	121
1941	111	117	124	141	164	155	146	134	125	113	110	116	130
1942	122	133	139	156	176	165	158	151	133	117	112	116	140
1943	126	134	142	152	176	178	164	153	136	116	110	114	142
1944	123	134	142	156	184	181	160	154	158	142	132	134	150
1945	142	152	161	189	211	215	202	184	163	144	128	123	168
1946	132	143	158	173	220	221	203	188	164	137	126	127	168
1947	136	146	159	178	216	229	210	178	169	144	124	122	168
1948	130	142	157	185	225	217	192	190	163	145	134	138	168
1949	148	162	178	204	236	223	208	199	176	153	140	142	181
1950	152	165	177	194	232	235	222	206	186	172	145	136	185
1951	148	157	171	186	242	248	216	188	171	167	147	149	182
1952	161	175	189	217	259	242	218	206	196	173	163	172	198
Daily receipts													
1940	484	532	559	593	703	722	665	563	536	491	463	493	567
1941	523	552	589	673	787	750	695	639	593	533	517	528	615
1942	556	593	618	680	833	803	742	650	597	549	574	540	672
1943	586	626	667	712	839	846	777	726	644	543	510	528	667
1944	562	611	654	718	862	853	747	725	749	673	618	622	700
1945	655	705	753	885	993	1,016	958	874	756	668	593	563	785
1946	603	656	739	913	1,052	1,061	978	901	787	654	605	602	797
1947	655	731	810	917	1,126	1,161	1,055	911	861	734	632	613	851
1948	656	712	803	959	1,179	1,145	1,017	1,015	906	798	740	755	891
1949	802	876	976	1,144	1,331	1,273	1,194	1,138	1,006	867	788	788	1,016
1950	837	914	994	1,092	1,320	1,334	1,248	1,148	1,026	943	792	727	1,032
1951	780	822	903	985	1,277	1,297	1,129	983	890	862	751	753	953
1952	809	882	965	1,110	1,331	1,235	1,113	1,066	1,002	888	823	870	1,009

Compiled from published reports of the Cincinnati market administrator.

APPENDIX

Table 17.—Average daily delivery of milk per producer and average daily market receipts, Louisville marketing area, by months, 1940-52

Year and class	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.
Daily delivery													
1940	219	237	246	264	303	299	263	241	237	212	202	219	245
1941	235	252	262	295	333	314	308	294	268	225	225	235	271
1942	243	262	280	315	340	319	307	301	273	233	220	226	277
1943	241	258	268	285	330	321	309	273	249	220	211	221	266
1944	234	250	263	290	332	314	275	263	275	254	241	243	270
1945	254	274	292	347	363	358	343	314	282	246	228	231	294
1946	255	279	298	362	377	364	352	329	309	264	248	251	307
1947	274	294	309	345	394	385	355	322	310	268	238	245	312
1948	260	283	306	357	390	345	324	331	301	276	264	276	309
1949	294	319	335	375	397	354	325	315	305	267	259	265	317
1950	281	308	322	345	382	359	339	332	319	300	264	257	317
1951	274	295	308	322	391	378	336	314	315	306	275	288	317
1952	308	322	335	369	400	353	324	316	314	285	283	302	326
Daily receipts													
1940	325	350	365	389	445	447	397	360	357	320	304	331	366
1941	357	380	397	452	513	487	481	460	419	355	351	372	419
1942	385	411	436	494	536	507	495	482	436	371	349	359	439
1943	384	413	430	462	534	525	500	444	406	361	343	359	430
1944	380	408	429	475	550	521	470	451	470	431	408	405	450
1945	420	446	477	569	607	598	570	524	472	407	376	381	487
1946	414	450	482	594	628	613	598	563	506	446	415	421	511
1947	461	495	521	582	667	663	617	559	540	468	414	419	534
1948	440	476	523	615	684	616	582	597	550	506	482	501	548
1949	541	587	633	722	780	707	650	631	619	545	532	544	624
1950	584	640	676	730	811	769	728	719	692	651	576	556	678
1951	591	609	635	664	809	775	677	628	637	616	555	571	647
1952	598	635	667	753	825	729	669	656	652	599	599	624	667

Compiled from published reports of the Louisville market administrator.

Table 19.—Average daily delivery of milk per producer and average daily market receipts, St. Louis marketing area, by months, 1940-52

Year and class	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.
Daily delivery													
1940	206	218	223	234	265	240	208	201	205	194	199	216	218
1941	235	249	257	269	287	250	236	225	224	209	209	226	240
1942	241	252	259	275	294	256	238	236	206	189	195	214	238
1943	231	246	255	264	274	251	235	226	214	204	210	228	237
1944	248	265	269	278	302	263	238	229	233	231	239	254	254
1945	273	287	297	318	336	309	282	262	238	227	230	240	275
1946	259	277	295	344	350	323	280	271	272	250	242	259	285
1947	280	300	315	326	368	349	314	261	249	237	227	243	289
1948	261	278	290	325	362	322	297	299	272	243	236	255	287
1949	274	297	312	340	374	345	325	320	279	255	249	253	300
1950	272	293	307	330	372	358	340	317	294	260	253	258	306
1951	278	295	308	323	386	386	346	338	306	273	248	258	311
1952	276	295	310	340	390	351	332	343	313	277	282	303	318
Daily receipts													
1940	874	925	945	988	1,093	989	851	820	833	780	792	858	896
1941	933	985	1,009	1,056	1,126	982	924	884	879	826	810	870	940
1942	921	963	986	1,040	1,111	969	917	903	787	719	742	812	905
1943	875	928	960	987	1,016	927	878	842	793	754	777	844	881
1944	919	966	992	1,020	1,114	980	890	850	862	854	878	933	938
1945	1,022	1,051	1,083	1,153	1,206	1,103	1,003	930	837	797	806	835	983
1946	900	951	1,010	1,174	1,198	1,107	965	928	920	841	813	873	973
1947	940	1,013	1,056	1,086	1,226	1,167	1,049	870	820	773	741	799	961
1948	859	916	955	1,064	1,192	1,063	985	989	898	800	775	844	945
1949	910	985	1,042	1,149	1,286	1,211	1,152	1,147	1,056	990	982	1,024	1,079
1950	1,118	1,225	1,303	1,419	1,634	1,592	1,528	1,432	1,329	1,162	1,003	1,023	1,315
1951	1,098	1,161	1,210	1,266	1,506	1,443	1,355	1,327	1,190	1,052	941	1,015	1,214
1952	1,082	1,154	1,219	1,340	1,550	1,396	1,339	1,389	1,261	1,114	1,137	1,232	1,268

Compiled from published reports of the St. Louis market administrator.

Table 21.—Provisions of fall incentive plans in effect in Federal Milk Order Markets, October 1953

Marketing area	Deductions per hundredweight of milk in months of accumulation	Months of—		Method of payment
		Accumulation	Payment	
Columbus, Ohio	1/ 35 cents	Apr.-July	Oct.-Dec.	2/ Fund divided by 3; pro rata payments made to producers each payment month
Greater Kansas City	40 cents	Apr.-July	Oct.-Dec.	Ditto
Sioux City, Iowa	20 cents	May-June	Sept.-Nov.	Ditto
Topeka, Kans.	40 cents	Apr.-June	Oct.-Dec.	Ditto
Louisville, Ky.	3/ 12 percent of av. of basic formula prices for previous year	Apr.-July	Sept.-Dec.	2/ Fund divided by 4; pro rata payments made to producers each payment month
Duluth-Superior	8 percent of pool value for each month of accumulation	May-July	Oct.-Dec.	One-third of fund included in uniform price computation each payment month
Omaha-Lincoln-Council Bluffs	Ditto	Apr.-June	Sept.-Nov.	Ditto
Sioux Falls-Mitchell	Ditto	May-July	Sept.-Nov.	Ditto
Dayton-Springfield	Apr.-20 cents May -35 cents June-35 cents July-30 cents	Apr.-July	Oct.-Dec.	Ditto

1/ Applies to Class I and Class II milk but not to Class III milk.

2/ The rate of fall payment for each designated month depends upon the total receipts of graded milk that month; the amount received by an individual producer depends upon the rate of payment and the quantity of milk which he delivered during the month.

3/ Amounted to 50 cents per hundredweight in April through July of 1953.

