AN ANALYSIS OF THE BASE-SURPLUS PLAN USED IN SELECTED VIRGINIA MILK MARKETS

By

Carl Jefferson Arnold

AN ABSTRACT

Submitted to the School for Advanced Graduate Studies of
Michigan State University of Agriculture and
Applied Science in partial fulfillment of
the requirements for the degree of

DOCTOR OF PHILOSOPHY

Department of Agricultural Economics

Year 1958

Approved Gerald G. Quackenbush

ABSTRACT

Overproduction relative to fluid milk requirements is a problem of major consequence in many fluid milk markets. The use of an allotment or quota plan offers a means of reducing the incentive to overproduce.

The purpose of this study was to investigate some of the more important economic and institutional aspects of one specific allotment plan--a base-surplus plan--as it has operated in certain Virginia milk markets under the state milk control law.

A theoretical analysis was developed to indicate the nature of producer supply response under different types of producer payment plans. Data were collected from the Virginia Milk Commission on milk deliveries to plants, fluid milk sales, individual producer base allotments, the transfer of allotments over time and other related items for three Virginia milk markets--Roanoke, Harrisonburg and Newport News. These data were analyzed to test certain hypotheses dealing with the effect of the Virginia base-surplus plan on seasonal variations in milk supply, total milk supply relative to fluid milk sales, prices returned to producers for milk and producer base growth over time. Attention was given also to producers' attitudes and opinions about the plan as expressed in a mail questionnaire.

In 1955, total annual deliveries of milk were 12 percent, 23 percent and 5 percent greater than total assigned base allotments in Roanoke, Harrisonburg and Newport News, respectively; and the base

allotments were closely aligned with fluid milk sales. The relative success of market equalization and production control efforts was reflected in the average price paid to producers for their milk.

Average base growth over time was small, especially where no additional base had been purchased. Limited growth was particularly evident in Roanoke where moderate year-to-year increases in fluid milk sales were coupled with relatively rigid enforcement of the base regulation pertaining to the allotting of additional base. Examination of the 1956 base situation indicated that approximately 50 percent of the producers in the three selected markets had base allotments of 15,000 pounds per month or less.

The producers shipping to each of the selected markets in 1956 gave strong support to the continuance of the base-surplus plan in its present form. Slightly less than 20 percent of those producers answering the questionnaire indicated that they felt definite changes should be made.

The analytical results obtained in this study appear to support the following conclusions: (1) the Virginia base-surplus plan has achieved its objective of maintaining supplies of milk in relative balance with fluid milk needs in the markets selected for study; (2) there appears to be no particular reason why other milk markets with similar market characteristics could not achieve a similar degree of success by using a base plan of the type described in this study; (3) some definite producer growth problems arose from the methods used to achieve the above objective. Achievement of price and market stability appeared to necessitate rather definite "freezing" of size except where allotments were purchased from other producers.

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ACKNOWLEDGEMENTS

The author wishes to express his gratitude and appreciation to all who have helped with the completion of this study and the preparation of the manuscript.

Thanks are expressed to the Virginia Milk Commission and its staff for excellent cooperation and assistance in providing the primary data for this study. Special thanks are extended to Mr. T. M. Ragland and Mr. John W. Owen of the Commission's staff. The assistance of those dairy farmers who returned the mail questionnaire is gratefully acknowledged.

Special thanks are extended by the author to his major professor, Dr. Gerald G. Quackenbush, for the guidance, inspiration and encouragement which he has provided throughout the course of the author's graduate study.

The author is indebted to Dr. Maynard C. Conner of the Virginia Polytechnic Institute for his counsel and assistance during the course of this investigation.

Thanks are extended to Mrs. Judy Smith, Mrs. Rose Zebrowski and Mrs. Betty Morie for their capable assistance with the statistical computations and preparation of the manuscript.

Lastly, the author is grateful to his wife and daughter for their patience and forebearance during the preparation of this thesis.

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AN ANALYSIS OF THE BASE-SURPLUS PLAN USED IN SELECTED VIRGINIA MILK MARKETS

CHAPTER I

INTRODUCTION

Many fluid milk markets are confronted with supplies of milk in excess of their fluid needs. The principal economic effect of this oversupply is a depression of the price received by producers relative to the price established for fluid milk under classified pricing schemes. This problem is of special concern to the administrators of milk price control programs since they are under considerable pressure to assure reasonable returns to producers without unduly manipulating resale prices to consumers.

Overproduction appears to receive its greatest stimulus from the method used to pay producers for their milk. The distribution of proceeds from the sale of milk often takes the form of a blend price paid to all producers for the total amount of product which they contribute. This blend price represents the average value per hundredweight of all the milk shipped to a specific distributor or market. A blend price makes no distinction between the value of milk sold for fluid milk purposes and that sold for manufacturing purposes, even though the basic idea of classified pricing is to make such a distinction. Under a blend price payment plan, there is little or no incentive for an individual producer to restrict his production, especially in the short run, since he will receive the same price for all the milk he delivers at any given time.

Can a classified price plan be implemented by some type of producer payment arrangement which discourages excessive overproduction? Allotment or quota plans appear to offer possibilities for restricting production to fluid milk needs by establishing a share of the market's fluid milk sales for each producer and paying only the manufacturing price for milk delivered in excess of fluid milk needs.

The purpose of this study is to investigate some of the more important economic and institutional aspects of one specific allotment plan--a base-surplus plan--as it has operated in certain Virginia milk markets. An analysis of the experience of these markets with their own particular variation of the base-surplus plan should be of value to other markets with similar problems as well as to the Virginia markets themselves.

Objectives of Study

Within the context of the purpose outlined above, this study has three primary objectives:

(1) to describe the base-surplus plan as used in specified Virginia milk markets with particular emphasis on its production control features.

(2) to quantify and/or describe some of the more important economic and institutional characteristics of this plan.

(3) to determine the implications of these characteristics both for the continued operation of the base-surplus plan in these Virginia markets and for its possible adoption in whole or in modified form in other milk markets.

Several hypotheses are considered during the course of this investigation. On the basis of the data available, some are subject to direct empirical verification while others are not.

It is hypothesized that the base-surplus plan as used in selected Virginia markets has:

(1) tended to retard production adjustments between farms and thus perpetuated many uneconomical and inefficient production units.

(2) maintained the average price paid to producers at a high level relative to the Class I price set by the Virginia Milk Commission.

(3) provided substantial price incentives to producers with even production patterns.

(4) maintained total milk receipts in balance with fluid milk sales and has allocated these receipts among individual distributors according to their fluid milk sales patterns.

(5) resulted in a reasonably even seasonal pattern of delivery to market.

(6) not had a uniform effect on the three markets selected for detailed study with regard to the hypotheses enumerated above. In other words, each market situation must be considered separately since the effects of the base-surplus plan may be expected to differ from market to market.

Scope of Study

The dairy industry in Virginia has long operated within an intricate framework of regulation, both with regard to price and to most of the remaining marketing functions. This investigation is concerned with

only one aspect of these regulations--that dealing with the method used to prorate proceeds from fluid milk sales to distributors among individual producers supplying given markets.[1] This method of proration is commonly referred to as the base-surplus plan.

Three markets are singled out for individual detailed analysis.[2] They are Roanoke, Harrisonburg and Newport News, respectively. The choice of individual markets limits the generalizations which can be drawn for the state as a whole. However, some generalizations are made in which cases the attendant assumptions are made explicit.

The time periods involved in this investigation vary with the type of data, the segment of the industry and the particular relationship being analyzed. The primary producer data pertain to the year 1955 with certain related information for the period 1947-1956. On one particular group of producers, certain data are analyzed for the years 1936, 1939, 1947 and 1955. The main distributor data pertain to the years 1951, 1953 and 1955.[3] Certain aspects of market relationships are analyzed from distributor data for markets other than those selected for detailed study.

In the main, this study attempts to assess some of the more important effects of the base-surplus plan on market deliveries-sales balances, prices paid to producers, seasonality of delivery and producer

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[1] No other seasonal plans or production control plans were considered in this study.

[2] An explanation of the choice of these particular markets may be found on page 21.

[3] An explanation of the choice of time periods may be found on page 23.

growth and adjustment in the market. Consideration is given to the industry's reactions to the plan.

Special emphasis is given to the market equalization and annual production control aspects of the Virginia plan since its uniqueness is derived largely from these features. It is recognized that some aspects of the problem do not lend themselves to empirical quantification. In these cases an attempt is made to discuss their general economic implications.

Review of Literature

During the past three decades a number of research studies involving the description and use of base-surplus plans have been conducted. In addition to the studies conducted, some general writing on the subject is available. These studies appear to have two major limitations with regard to the problem under study in this investigation. In the first instance they deal primarily with descriptive aspects of these plans rather than with attempts to analyze effects of the operation of the plans. Secondly, where analytical procedures were used and reported, their scope was usually limited to the seasonal leveling of production aspects with little attention given to the market equalization or production control aspects of such plans. A brief review of a sample of the studies and general statements dealing with this subject is presented below. Discussions of the production control features of these plans, where mentioned, are given special attention. The reports are reviewed in chronological order of publication rather than by any rank of the relative importance of the individual contributions.

One of the earliest studies which involved the description and evaluation of a base-surplus plan was reported by Horner in 1928.[1] This study concerned itself with an analysis of the early efforts in Detroit to meet seasonal production problems. Early attempts to set bases which would reflect producers' deliveries during the base-making period without regard to market fluid sales conditions resulted in heavy surpluses of milk. As a result, provisions were made for the "Call" plan. Under this plan, distributors notified producers at the beginning of each month the percentage of base production they thought could be sold as fluid milk and subsequently they issued a "call" for that percentage of base production. The percentage was applied equally to each producer's base production. Distributors agreed to pay the fluid milk price for the predetermined percentage and the surplus price for anything over that amount. The principal defect of the "Call" plan was that there was a penalty for overproduction only. Producers would deliver only the quantity "called" and paid for at the fluid price. Consequently, distributors were often short of milk since some operating surplus was necessary. The inability of distributors to determine accurately their needs under the "Call" system also was a source of friction. The plan herein described began in 1923 and was discontinued in 1927. Another plan was begun in 1928 and has continued to the present time. Attention is directed to this plan in a later section of this review.

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[1] J. T. Horner, The Detroit Milk Market, Michigan Agricultural Experiment Station Special Bulletin 170, March, 1928.

Another report was published in 1928 by Lininger.[1] He reported that during the first five years in which the basic-surplus plan was in operation in the Philadelphia milkshed it "evened up" seasonal production. In 1925, the seasonal variation was found to be 31 percent less than in 1921. Many individual producers attempted to adjust production so that they would have little or no surplus. Three common methods of adjusting production to sales were practiced: buying and selling cows at the beginning and ending of the basic period, respectively; increasing grain feeding during the basic period; and increasing the proportion of fall freshening cows in the herd. Such adjustments might be uneconomical on many farms. It was found that "boosting" production during the basic period was frequently an expensive operation, and that an individual incurred a risk in making a quota under such circumstances since he might not be able always to produce enough to make his quota during the quota payment period. In the main, this study was limited to certain milk production problems arising from the use of the basic-surplus plan.

In 1934, Jensen reported the establishment of a base-rating plan under the Federal Milk Marketing Order effective for the Boston milk market in March 1934.[2] Four objectives were cited with regard to the base-rating plan: (1) assurance to a producer of a definite and fair share of the fluid milk sales of the market; (2) protection for him

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[1] F. F. Lininger, The Relation of the Basic-Surplus Marketing Plan to Milk Production in the Philadelphia Milk Shed, Pennsylvania Agricultural Experiment Station Bulletin 231, August, 1928.

[2] Einar Jensen, The Boston Milk License, Market Administrator, 80 Federal Street, Boston, Massachusetts, August, 1934.

against losing a portion of his fluid milk sales through increases in production by other producers; (3) establishment of greater independence of any particular distributor; and (4) advance knowledge of the approximate price he would receive for his milk. Under this particular plan producers were not required to deliver milk in excess of their base allotment. The opinion was expressed that this feature would operate naturally to control total production and hold it in line with fluid sales. Under this plan new base ratings were not established each year. Provisions were made to the effect that the originally established bases would hold until market sales had increased to a point where all producer bases could be increased by a definite percentage. Further, it was stipulated that an individual producer would not have to deliver any excess milk to qualify for such increases. Some modifications also were made for producers with very low initial base ratings. On January of each year each producer would be entitled to a new base equal to 61% of his average daily deliveries of milk during the past year, if such a base would be larger than his present one.

Black, writing in 1935, made the point that the base-rating plan was invented originally as a method of encouraging uneven producers to even out their production and thus reduce the quantity of seasonal surplus coming to market.[1] Later it was recognized primarily as a method of paying more regular producers equitably for their share of the surplus milk. It then accomplishes its objective of evening out production by paying only what the surplus production is worth. It was pointed out

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[1] John D. Black, The Dairy Industry and the AAA, Brookings Institution, Washington, D. C., 1935.

that year-to-year revisions of bases scarcely can avoid increasing the bases and expanding total production at the same time. This problem is the same one which has confronted all administered proposals concerning the division of production and sale of products among individuals. Dr. Black was concerned that there be a path always open for new producers to enter a market and he discusses the limitations incurred when trying to control production and at the same time permit relatively free access to the market.

With regard to the problem of production control, Cassels was one of the first to indicate the monopoly aspects of bases or quotas.[1] Cooperatives could be expected to have particular interests in restraining expansion of production. A large surplus means lower blend prices with the attendant difficulty in holding producers as members. Maximization of returns to all producers within the cooperative would require restriction of output to some given level. All milk produced over this amount likely would cost more to produce than it would return.

In 1937, Gaumnitz and Reed attempted to examine the effects on seasonality of delivery of a closed versus an open base-surplus plan.[2] Data from the Baltimore market were used. Prior to 1924 this market had an open ratings system. After 1924 the ratings were more or less closed. Analysis of the data indicated that there had been a marked reduction in seasonality under the open ratings plan, but that once the

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[1] John M. Cassels, A Study of Fluid Milk Prices, Harvard University, Harvard University Press, 1937.

[2] E. W. Gaumnitz and O. M. Reed, Some Problems Involved in Establishing Fluid Milk Prices, United States Department of Agriculture, Agricultural Adjustment Administration, September, 1937.

ratings were closed the producers tended to slip back into their old seasonal patterns. It was concluded that when the incentive to increase fall production and make a higher rating each year is removed by closing the ratings, there would appear to be little reason to expect significant seasonal responses to price incentives under the quota plan. Evidence was presented that this had occurred to some extent when such a change was made in the Baltimore market.

Welden and Stitts, reporting on the use of the base-surplus plan in selected Ohio markets, indicate some interesting findings from a study of producers' reactions to the use of quota plans.[1] On the average the producers interviewed were split evenly as to approval or disapproval of the plan. A slight majority, 58 percent, registered approval. Cross-classification of these replies by size of herd and years the producers had been cooperative members indicated that the number indicating approval was higher for those with larger herds than the average, and that the same relationship held with regard to length of membership. It was reasoned that such a relationship might have been expected due to the fact that older and larger producers would appreciate more the purpose and value of the plan. Another reason might have been that they probably would suffer less under the system.

In 1938, Stitts and Gaumnitz analyzed returns to producers under various types of milk pools.[2] The Boston market was selected as the

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[1] W. C. Welden and T. G. Stitts, Milk Cooperatives in Four Ohio Markets, Farm Credit Administration Bulletin 16, April, 1937.

[2] T. G. Stitts and E. W. Gaumnitz, Relative Prices to Producers Under Selected Types of Milk Pools, Farm Credit Administration Bulletin 25, June, 1938.

market for study. Individual handler, association and market pools were considered with and without base-rating schemes. Two particular comparisons are of special significance. These concern a market pool with base ratings established on a broad basis and much larger than the volume of fluid milk sales, as contrasted to a market pool with base ratings established according to the producers' low quarter of delivery in 1934 and somewhat more in line with the total volume of fluid sales. Analyses of the two types of pools indicated that those producers previously designated as "even" producers gained more under the latter pool since they had higher base deliveries in terms of total shipments than did other producers. Conversely, the "most uneven" group lost the heaviest under the low quarter ratings. It was found also that in all cases the dealer pools and each of the two base-rating plans materially increased the average price received by "even" producers as compared with their price under a straight market pool. "Even" producers received a higher price than "uneven" producers in all cases.

In 1940, Welden and Herrmann attempted to summarize in nonempirical form experience with base-surplus or quota plans prior to that date.[1] This report is of particular significance for this investigation since it quantifies the extent of the usage of such plans prior to 1940 and describes in some detail a number of the more important variations as used in actual practice. It was indicated that in 1940, of the 162

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[1] W. C. Welden and L. F. Herrmann, Base Allotment or Quota Plans Used by Farmers' Cooperative Milk Associations, Farm Credit Administration Miscellaneous Report 23, May, 1940.

markets on which data were available, 101 of the markets were using some form of a base plan. In 31 more of the markets the plan had been used at one time or another. A cross-classification on the basis of State or Federal control and no control at all revealed that of 27 Federal markets 14 were using bases, 44 out of 62 State markets were doing likewise and that 47 out of 79 noncontrolled markets surveyed also were using some type of base plan.

Discussion was presented concerning the plans used in a number of selected markets. Two of these plans are discussed in this portion of this review because of their particular relevance to this investigation. The plans discussed are those used in Chicago prior to 1940 and in Connecticut markets during the same period.

Bases were used first in the Chicago market in 1929. The plan as used in this market was characterized by semi-closed bases, the right to transfer base by direct purchase and sale, local committee base adjustment procedures and a market adjustment fund operated by the dominant cooperative to pay for that base milk for which no dealer outlets could be found. Penalties were provided for a specified degree of underdelivery. The amount of base so taken away from an individual producer was given to the local base committee to be redistributed among other producers in that local area. Redistribution was done on the basis of a specified payment per pound of daily base by those who wished to purchase. In 1935, a uniform price of one dollar per daily pound was established. Ninety-five cents of this was returned to the producer who had lost the base. In 1936, anyone who so desired was allowed to sell up to 25 percent of his base to the cooperative at 95 cents per pound

for resale at one dollar per pound. New producers were required to accept surplus prices for their first three months' deliveries and after this time were given some established percentage of their deliveries during this period as their base. They also were permitted to purchase a base if they so chose.

In the early years of the Connecticut quota plan, producers were allowed to name their own quotas each year. Quotas were measured in terms of quarts per month and penalties were provided for over and under delivery. A separate penalty pool was operated and distributions were made each month in proportion to the total payment already received for quota milk. Beginning in 1935, quotas were assigned each year with the quota-forming period extending from July through November and the quota-payment period extending from February through June. The extent of any yearly increases in quotas was limited by the size of the aggregate of quotas lost by other producers, the quantity given up by producers going out of business and by the changes in market fluid sales. As will be seen later, the present Virginia base-surplus plan utilizes some approaches which are similar to both the Chicago and Connecticut plans.

In part, as a follow-up to their original study, Herrmann and Welden reported in 1942 the results of a modification of the old Chicago base plan as used in some of the outer-markets in that area.[1] The Janesville, Wisconsin, market was singled out for special attention. The new plan specified that the base-making period would be longer than

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[1] L. F. Herrmann and W. C. Welden, Use of the Level Production Plan in Milk Marketing, Farm Credit Administration Miscellaneous Report 57, August, 1942.

previously had been the case. It was thought that a longer length of period would discourage attempts to build excessively high fall bases since it would be more expensive to do so. In addition, payments on a quota basis were not made for the entire year. It was reasoned that the "truly even" producer still would receive a premium for his efforts. Analysis of the data indicated that even producers received 1.6 cents less than fall producers but 4.8 cents more than spring producers. All told, 41 out of 65 producers had a higher income under the new base plan than they would have had on a year round blend-price basis. A sampling of producers' opinions indicated that they felt the new plan was definitely more satisfactory than the old Chicago plan. In summary, this report reaffirmed the idea presented earlier in this review that the closer a base plan comes to being "closed" the less effect it will have in reducing the seasonality of delivery.

In March, 1949, Hirsch and Hedges reported on a quota plan used in an important southern market.[1] In the Memphis market the plan was operated by the local cooperative which had 100 percent supply contracts with the market's distributors. At any time when local milk was not sufficient to meet dealers' requirements, the cooperative had to import milk to take care of the undersupply. The quota plan used required penalties for underproduction with arrangements whereby the cost of milk imports was borne by those producers who underdelivered their quotas and thus necessitated the imports in the first place. No penalties

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[1] H. G. Hirsch and I. R. Hedges, An Analysis of the Base-Quota Plan in the Memphis Milkshed, Farm Credit Administration Miscellaneous Report 131, March, 1949.

were assessed for underproduction when no imports were needed. Quotas were established equal to each producer's average daily deliveries from September through February. A sample of 94 producers' penalty records showed that 86 of them had incurred some penalties during the period September 1947 to March 1948. The average penalty amounted to 1.59 percent of net receipts and in no case was the penalty more than 11 percent of net receipts. The effect of this plan was to shift the cost of imported milk from the dealers to the producers whose underdelivery was responsible for the imports. At the same time, it provided a potentially greater source of revenue for that group of producers who fulfilled their obligations by leveling production in that extra revenue was available to them--revenue that would have otherwise gone to outside interests.

Quackenbush and Homme reported that the base plan used in the Detroit market had returned a greater price incentive to the even producer than could be obtained with the use of a seasonal differential or take-off and pay-back plan.[1] The plan was used for producer pay-offs throughout the entire year in the market. It was found that reducing the number of months used would reduce the price incentive to even producers. The point also is made that the wider the spread between base and surplus prices, the greater the seasonal price incentive offered by the base plan. An attempt was made to relate producers' supply responses to the seasonal price incentives achieved. It was concluded

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[1] G. G. Quackenbush and H. A. Homme, Seasonal Price Incentives of the Base and Excess Plan in the Detroit Milk Market, Michigan Agricultural Experiment Station Technical Bulletin 228, March, 1952.

that the relationships which could be determined were too few to provide conclusive evidence of the rate and degree of response. There was some evidence that producer response was lagged at least four years.

In 1955, Spencer indicated that a quota plan might offer some possibilities for heavily surplused New York markets in combatting their overproduction problems.[1] He indicated that prices fixed under regulatory measures may be higher than are necessary to call forth adequate milk supplies. In such situations, counterbalancing measures may be necessary either to even out the price stimulus over the entire year or actually to retard total annual production. This point particularly is significant since such a large percentage of fluid milk is produced under some type of price regulation. The free transfer of bases among producers was favored on the grounds that such transfers would facilitate the building of more economically and efficiently sized quotas by those who remain in the market. This may not take into account the inability of many producers to provide the wherewithal to purchase such bases, particularly if the price is unusually high.

For the purposes of this investigation, this review of literature has revealed the following general information: (1) most studies investigating the seasonality relationship indicate that base plans, particularly those of an open nature, tend to reduce seasonal variations in deliveries; (2) even producers are rewarded by higher price incentives than are uneven producers in most cases; and (3) very little

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[1] Leland Spencer, "Quota Plans to Regulate Milk Supplies", Talk presented at Farm and Home Week, Cornell University, March 23, 1955, (mimeographed).

work, if any, has been done to explore any other effects of base plans other than those mentioned above.

The present investigation attempts to delve somewhat deeper into the previously described seasonality relationships and at the same time to explore the effects of base plans on market delivery-sales balances and the transfer, growth and production adjustment aspects of base-surplus or quota plans.

Definitions

Some of the terms used in this investigation have specialized meaning. Those most frequently used are defined below:

Base - refers to an individual producer's established share of a market's fluid milk sales.

Open base - means provision for establishment of an entirely new base each year usually on the basis of average deliveries during some specified period.

Closed base - refers to the freezing of existing bases with little or no opportunities for increasing any given base.

Semi-closed base - means that minor adjustments may be made from year to year but new bases are usually linked to old bases in some manner. Purchase and sale of base among producers usually is permitted.

Base transfer - refers to exchange of base from one production unit to another usually for some monetary consideration. Bona fide proof of sale must be presented to the proper authorities and cows must accompany the base in the ratio of milking herd to base.

Base assignment - refers to the assignment of individual producers to specific distributors by the Virginia Milk Commission.

Deliveries - refers to that quantity of milk which an individual producer delivered to a distributor. Conversely, it may also refer to the total quantity received by distributors from individual producers.

Seasonality - refers to the degree to which deliveries to plants vary from their low point to high point during the year.

Even producer - is one whose degree of seasonal variation in delivery is small relative to other producers.

Uneven producer - is one whose degree of seasonal variation in delivery is large relative to other producers.

Surplus producer - is one who received a large amount of his total delivery as surplus sales.

Utilization - refers to the relationship between total deliveries and fluid milk sales. It is found by expressing fluid sales as a percent of total deliveries.

Base-Surplus blend price - is the average price received by an individual producer as payment per hundred pounds of milk under the base-surplus plan.

Straight blend price - refers to the average price paid by distributors and received by individual producers if computed on a straight utilization basis.

Classified pricing - refers to method whereby distributors pay specified prices for the milk which they receive in accordance with the manner in which they use it. Higher prices are set for milk used in fluid form than for milk used in surplus or manufacturing usages.

Class I price - refers to the price paid by distributors for milk sold for fluid purposes.

Class II price - refers to the price paid by distributors in Virginia markets for milk used for manufacturing purposes.

General Research Procedure

There are two basic methodological approaches which may be employed to analyze the problem. These are: (1) analysis of actual empirical data which are used to describe the problem under investigation; and (2) the synthesizing of data to represent actual operating conditions under specified assumptions. This study relies primarily on the first of these approaches. In a few instances, the second approach is employed.

Sources of Data

The sources of data for this investigation are several in number. The base, deliveries and fluid milk sales information for Virginia Milk Commission markets were obtained from records filed in the Commission's Richmond office. Base transfer data were also obtained from the Commission's records. The above data form the main body of analysis. Certain supplementary information was obtained from this source.[1] In addition, the Commission and its staff were consulted with regard to numerous matters of interpretation of data and the historical aspects of the base plan development in markets under their jurisdiction.

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[1] Such as classified price schedules, milk use classifications and other scattered bits of information relevant to this study.

Mail questionnaires provide the remaining primary data used in this investigation. These questionnaires were sent to producers in each of the Milk Commission markets selected for detailed study.

Questionnaire Data

Mail questionnaires were sent to all producers shipping milk to the Roanoke, Harrisonburg and Newport News markets.[1] Using a pretested questionnaire in which the letter explaining the purpose of the study formed an integral part, the following mailing procedure was used: (1) each producer was mailed a questionnaire on February 14, 1957; (2) five days later each producer was mailed a postcard reminder concerning the original questionnaire; (3) ten days later all those producers who had not returned the original questionnaire were sent another copy of the questionnaire with an accompanying letter further explaining the need for the data. In all cases, a self-addressed stamped envelope was included with each questionnaire.

An attempt was made to obtain brief, concise answers to certain relevant questions which could be answered only by the producers themselves and not from records obtainable from some other source.[2] Producer response to the questionnaire was very good. The following tabulation indicates the response to the original and follow-up

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[1] Producers shipping as of September 1956 as determined from lists maintained in the Commission's Richmond office.

[2] The questions asked dealt primarily with the individual producer's opinions and feeling with regard to the internal structure, rules and regulations and administration of the base-surplus plan. Supplemental information on individual farms was also obtained via the questionnaire. A copy of the complete questionnaire is included in Appendix A.

questionnaires in each market:

Table 1. Response to mail questionnaire

Market	Original questionnaires mailed	Original questionnaires returned	Follow-up questionnaires mailed	Follow-up questionnaires returned	Total questionnaires returned
Roanoke	189	131	58	22	153
Harrisonburg	45	18	27	11	29
Newport News	136	96	40	13	109
Total	370	245	125	46	291

This tabulation indicates that usable questionnaires were obtained from 81 percent, 64 percent and 80 percent of the producers in the Roanoke, Harrisonburg and Newport News markets, respectively, with the over all total response approximating 79 percent.[1]

Choice of Markets

There is always a certain amount of judgment and perhaps arbitrariness involved in the selection of information for analysis in an investigation of the type reported in this study. The selection of particular groups or strata to be considered presented a major problem. Time and expense were the principal limiting factors. In the formulation of this study, it was decided that the picking of "representative"

[1] It will be noted that the number of original questionnaires mailed is larger than the number of producers given on page 29. This occurs since some producers had entered the markets after the original deliveries and sales data were obtained. It was felt that the reactions of this new group should also be included.

markets would permit a more detailed analysis of such markets and would provide a better basis for analyzing the effects of the base plan under heterogeneous conditions.[1]

The ultimate selection of the Roanoke, Harrisonburg and Newport News markets for detailed study was based on a deliberate attempt to choose markets which were: (1) widely scattered geographically; (2) surplus and nonsurplus; (3) generally stable or unstable with regard to producer-distributor relationships; (4) generally stable or unstable with regard to competitive conditions among distributors; (5) large or small in numbers of producers and milk consuming population; and (6) other related factors.[2] The Roanoke market was characterized as: (1) large in number of producers and market consuming population; (2) nonsurplus in terms of recent deliveries-sales information; (3) relatively stable in terms of producer-distributor relationships and competitive distributor relationships; and (4) probably the most "ideal" single market in the State.[3] Harrisonburg was considered to be: (1) relatively small in number of producers and market consuming population; (2) a surplus market in terms of recent deliveries-

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[1] The obvious alternative would have been to sample information taken from all Milk Commission markets using the base-surplus plan. This choice would have limited greatly the detail of analysis although it might have permitted more generalizations of results.

[2] In the predetermination of these market characteristics, the writer drew on his experience as extension dairy marketing specialist in Virginia, consultation with the Milk Commission and its staff and relevant market information which this agency had in its files.

[3] "Ideal" in the sense that location disadvantages would be the only deterrent to large numbers of producers being attracted to the market if in fact such entry were allowed.

sales information; and (3) somewhere between Roanoke and Newport News with regard to producer-distributor relationships and competitive distributor conditions. Newport News was characterized by: (1) a rapidly expanding market population; (2) a nonsurplus situation in terms of recent deliveries-sales information; (3) a medium-size group of producers in terms of numbers; and (4) relatively poor producer-distributor relationships and extremely competitive distributor relationships. The presence of sizeable federal military installations in the Tidewater area, of which Newport News was a part, provides many opportunities for discounts, rebates and related unstabilizing marketing practices. The choice of these particular markets provided a real test of the base-surplus plan's ability to attain its objectives under varying market circumstances.

Choice of Time Periods

The time periods for which data were obtained were previously mentioned on page 4. The selection of these time intervals was conditioned by the availability of accurate and reliable data, the need for historical data to determine specified relationships and the cost of obtaining additional data relative to its expected contribution to the proposed analysis.

Deliveries to plants and fluid milk sales for the selected Virginia Milk Commission markets were available for 1951 through 1955 from the Milk Commission's files.[1] Consideration was given to obtaining

[1] Approximately one year prior to the collection of data for this study, records for a number of earlier years were destroyed.

records on individual producers for all five of the available years or perhaps every other year during the five-year period. The decision was reached to obtain individual producer data for the one year 1955 on the basis of the following considerations:[1] (1) in at least three of the five years for which data were available a certain amount of abnormality may have existed as a result of the wartime conditions that prevailed; (2) many of the impacts of a program in operation for 20 years may be analyzed nearly as well from one-year data as from data for several recent years; (3) detailed information could be obtained for the one year while the cost of getting such information for additional years probably would have been greater than its contribution to the analysis of the problem under consideration; and (4) distributor data were collected for the years 1951, 1953 and 1955 providing data for the market analyses and reflecting to some extent the actions of producers in the aggregate, thereby reducing the need for individual producer data in other years.

The base transfer data were available as far back as 1947. Since the primary objective of this portion of the analysis was to show change over time for which historical data were considered necessary, data for the entire period were obtained.

Analytical Procedure

No special or unique analytical techniques were used in this investigation. IBM sorting and tabulation was used to process much of

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[1] See note one, Appendix D.

the data. The results of various analyses within the study are presented in tabular, graphic or equation form, depending upon the nature of the particular analysis and its adaptability to expression in these forms. Statistical tests of various types were used where deemed desirable and necessary. Specific computational procedures are discussed at the point of their use rather than in this introductory chapter.

CHAPTER II

STUDY SETTING

In order to appraise properly the analysis which follows in later chapters, it is necessary that attention be given to the setting in which the base-surplus plan operates in the selected Virginia markets. This chapter deals with an effort to define the importance of dairying in the State, to briefly examine the over all regulatory framework and to examine in detail the principal component parts of the particular plan under analysis.

Virginia Dairy Background

The most recent figures available indicate that dairying is Virginia's third largest source of agricultural income. It accounted for approximately 16 percent of cash farm receipts in 1956.[1] In that same year, Virginia ranked seventeenth among all states in total production of milk on farms, eighteenth in number of cows on farms and thirty-first in production per cow.[2] According to the 1954 Census of Agriculture, there were 17,821 farms in the State selling milk.[3] The most reliable estimates available indicate that this total figure was composed of

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[1] Dairy Situation, Agricultural Marketing Service, U. S. Department of Agriculture, August, 1957, p. 18.

[2] Ibid., p. 18.

[3] 1954 Census of Agriculture, U. S. Department of Commerce, Bureau of the Census, Vol. 1, part 15, 1956, p. 110.

approximately 3,800 Grade A producers with the remaining farms producing milk for cream or manufacture.[1] Table 2 presents, in summary form, the changes which have occurred in a few of the measurable characteristics of Virginia's dairy industry. This tabulation indicates that over the State as a whole milk production has increased 35 percent in the past 16 years; that the number of cows has first increased and then gradually declined; and that production per cow has steadily increased. It also shows that Grade A milk deliveries have doubled during the past 16 years. These data indicate that Virginia's dairy industry has undergone considerable change during the time the base-surplus plan has been in use.

More specific information on the markets selected for detailed study is shown in Table 3 and Figure 1. Table 3 is largely self-explanatory, but at least two accompanying considerations must be mentioned. These are cooperative functioning and pooling plans, respectively. Each of these markets has at least one producers' cooperative supplying it. In the case of Newport News, producers from three different cooperatives serve the market. The cooperatives serving these markets are relatively small and their ability to perform services for their members is severely limited by their lack of volume and in some instances by the lack of a felt need for more constructive action. In all three markets individual handler pools are used in which producers share only in the fluid sales of the distributor to whom their base is assigned. There is no repooling of net proceeds by the cooperatives serving these markets.

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[1] Estimate made by M. W. Jefferson, Virginia Department of Agriculture, Richmond, Virginia, January, 1955.

Table 2. Cow numbers, milk production, milk receipts at plants and blend prices for Virginia, 1940-56

Year	Average number of cows		Average production per cow		Total milk production	Receipts of whole milk at plants			Average blend price, milk for fluid consumption[b]
	On farms[a]	On D.H.I.A. test	All cows	Cows on D.H.I.A. test		Grade A milk	Manufacturing milk	Total	
	(thous.)	(thous.)	(lbs.)	(lbs.)	(mil. lbs.)	(mil. lbs.)	(mil. lbs.)	(mil. lbs.)	(dollars per cwt.)
1940	402	21.0	3,760	7,700	1,512	---	---	---	2.92
1941	414	25.4	3,840	7,654	1,590	---	---	---	3.06
1942	428	24.7	3,790	7,726	1,622	---	---	---	3.74
1943	436	23.9	3,730	7,319	1,626	409.1	140.6	549.7	4.19
1944	440	24.2	3,800	7,372	1,672	414.0	185.8	599.8	4.32
1945	430	24.2	4,000	7,691	1,720	397.3	237.6	634.9	4.28
1946	420	27.6	4,130	7,612	1,735	418.2	253.3	671.5	4.97
1947	423	33.4	4,220	7,700	1,785	460.1	299.6	759.7	5.72
1948	426	34.4	4,400	7,813	1,874	505.3	349.2	854.5	6.13
1949	433	39.3	4,480	7,972	1,940	590.7	370.9	961.6	5.76
1950	440	45.6	4,490	8,174	1,976	680.9	342.8	1,023.7	5.52
1951	427	45.3	4,490	8,246	1,917	715.0	314.2	1,029.2	5.98
1952	420	45.4	4,500	8,252	1,890	746.7	314.4	1,061.1	6.31
1953	426	46.7	4,740	8,350	2,019	836.6	362.4	1,199.0	6.04
1954	418	49.3	4,790	8,385	2,002	885.0	360.0	1,245.0	5.67
1955	398	50.0	5,000	8,867	1,990	911.7	356.7	1,268.4	5.62
1956[c]	390	50.5	5,220	9,030	2,036	996.9	356.6	1,353.5	5.52

Source: Compiled from Virginia Dairy Statistics, Department of Agricultural Economics, Virginia Polytechnic Institute, 1956, and other supplemental reports on file in the Department.

[a] Average number of cows during the year excluding heifers not yet fresh.

[b] Simple average annual blend price f.o.b. plant paid by distributor, nonadjusted for butterfat test or other premiums.

[c] Preliminary.

Table 3. Selected characteristics of markets chosen for detailed study, 1955

Market	Market population[a]	Number of producers[b]	Maximum distance of producers from market	Number of distributors	Average size of distributors' pounds of annual fluid milk sales	Number of producer-distributors	Total fluid milk sales
			(miles)		(pounds)		(pounds)
Roanoke	144,000	178	50	4	8,947,143	0	35,788,573
Harrisonburg[c]	49,200	42	35	2	---	1	---
Newport News	175,000	122	200	8	3,516,637	1	28,133,111

[a] Metropolitan areas as of January 1. Estimates from Sales Management, May, 1955 issue.

[b] Producers in each market during the entire year and for whom complete base, deliveries and fluid sales data were obtained.

[c] Average distributor size and total fluid milk sales are not shown for Harrisonburg since there were only two distributors in the market.

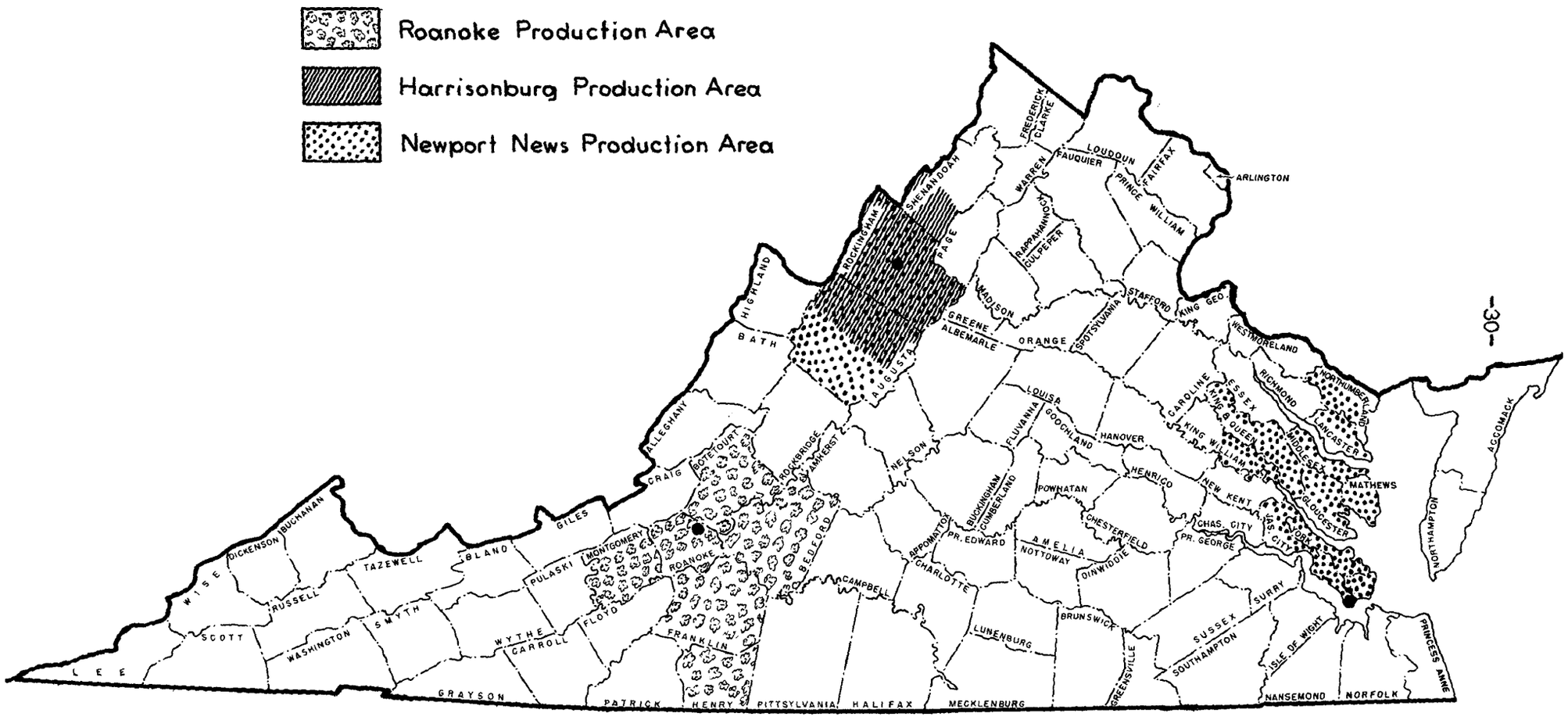

Figure 1. Geographical location of markets and milk production areas, selected Virginia milk markets, 1955

Milk Market Regulation in Virginia

During the depression years dairy farmers, in company with many others, were faced with extreme economic pressures. The price of milk tumbled to a very low level and marketing conditions in general in the dairy industry were disorderly and often termed chaotic. In this setting the Milk and Cream Act of 1934 was passed in the Virginia General Assembly on March 20. It created the Virginia Milk Commission and gave it broad regulatory powers over the Virginia dairy industry. The avowed purpose of this regulation was to correct the disorderly conditions which then prevailed; to protect the well-being of the people of Virginia; and to promote the public welfare, public health and public peace.

The regulatory body authorized by the above legislation is composed of three members: one producer representative, one distributor and one consumer representative who must have no financial connection with either segment of the industry. Each commissioner is appointed by the Governor and serves at his pleasure. The chairmanship of the Commission is rotated among the members annually. Present compensation for service on the Commission is at the rate of ten dollars per day of actual conduct of Commission business plus necessary expenses incurred in performance of official duties. To assist the commissioners there was at the time of this study a fully paid staff of twelve people, all headquartered at the Commission's offices in Richmond. This staff was composed of five field auditors, two inspectors, three secretaries, one head auditor and assistant commission secretary and the Commission Secretary.

In addition to creating the Virginia Milk Commission, the Milk and Cream Act also provided for the establishment of local milk boards in each market area. These local boards serve as the Commission's representative in the local market and exercise only such powers as the Commission has seen fit to delegate to them. All rulings of these local boards may be appealed to the Commission. These local boards are composed of five members: two producers, two distributors and one consumer representative who is automatically designated as chairman of the local board.

The Milk and Cream Act provides for the financing of the Commission and local milk boards operations by assessments on both producers and distributors. The local boards are permitted to assess producers up to two cents per hundredweight on all milk delivered and to assess distributors also up to two cents per hundredweight on all milk handled. The Commission is empowered to collect from the local boards that portion of the resulting funds necessary for its own operation. Regulations promulgated by the Commission have set the local board's maximum usage at two cents of the four cents per hundredweight maximum assessment.

The scope of the Commission's regulatory power is best expressed by the opening paragraph of the preamble to the Milk and Cream Act. It reads as follows:

> "An Act to provide for the <u>supervision</u>, <u>regulation</u> and <u>control of the production</u>, <u>processing</u>, <u>transportation</u>, <u>storage</u>, <u>distribution</u>, and <u>sale of milk and cream</u>; to create a Milk Commission and local milk boards and to define and provide for the functions, duties and powers thereof; to provide for the appointment, suspension, removal, compensation,

> costs, and expenses of such commission and boards and the members, officers, agents and employees thereof; to provide for licensing processors, bottlers, wholesalers, distributors and retailers of milk and cream, or either; to provide for the raising of funds for the administration of this act and to provide for the disposition of revenue collected hereunder and to impose penalties for violations of the provisions of this act."[1]

The Commission has interpreted the powers so enacted to include the authority to fix prices at both the producer and resale level as well as the regulation of trade practices. The latter includes such diverse items as certain forms of advertising and merchandising and other related marketing functions.

The Commission has been in the courts a number of times since its creation. The constitutionality of the Act has never been successfully challenged, but on several occasions the Commission has been directed to amend or change some of its own regulations and orders.

In summary, the regulatory powers of the Commission are rather broad and inclusive. These powers enable the Commission generally to determine who may engage in either the production or marketing of milk for fluid consumption as well as the prices of milk at various stages of the marketing process. About the only limitation to its authority is that imposed by judicial interpretation requiring that orders adopted by the Commission must be relevant to the accomplishment of the purposes of the Milk and Cream Act.

While some seventeen states regulate the marketing of milk, only one state--North Carolina--out of six states bordering Virginia has state milk control regulation.

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[1] Virginia Milk Commission Law, published by Virginia Milk Commission, Richmond, Virginia, November, 1956, p. 3. Underscoring by the author.

In addition to the state regulation discussed above, two Federal Milk Marketing Orders covering the Bristol and Bluefield markets, respectively, were operating in Virginia in 1956. With the Washington, D. C. metropolitan area in the process of developing an order, it seems likely that a third area in the State will be under federal regulation soon.

The Virginia Base-Surplus Plan

The base-surplus plan has been subject to many adaptations to local conditions in its employment across the country. For this reason, it seems desirable that the essential features of the base-surplus plan as used by the regulatory agency in Virginia be briefly summarized. Since there is some variation within the markets selected for study, the main characteristics are grouped according to whether they are similar or dissimilar for the markets under study.[1] These divisions will hold generally for other regulated markets in the State.

Similarities Between Markets

Those features of the base-surplus plan which are similar for the three markets include the following:

(1) The Commission and local milk boards exercise the authority to assign individual producers and their accompanying base allotments to specific distributors. Once assigned, producers cannot change distributors without the prior consent of the regulatory body.

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[1] The main elements of the plan as presented were condensed from numerous orders and regulations issued by the Virginia Milk Commission. See Appendix B for the base regulation in Roanoke in its entirety.

(2) No producer can have more than one base allotment for a given production unit. An individual's base cannot be split between distributors.

(3) Milk cannot be purchased and delivered for the purpose of increasing the bases of individuals and/or groups.

(4) Provisions are made for base adjustments by the regulatory body in hardship cases.

(5) Bases are not transferrable between markets.

(6) New producers desiring to enter the market by earning a base allotment must demonstrate first the need for additional milk in the particular market they wish to enter.

(7) Distributors must accept all milk delivered to them by their assigned base-holding producers so long as it is of marketable quality.

Differences Between Markets

The base-surplus plan as used in the three markets studied varies slightly with regard to three essential parts: (1) base transfer conditions, (2) base-making period requirements and (3) the regulation of producers' deliveries to plants. Each of these is presented market by market to illustrate the differences.

Base transfers

Roanoke - A renter or tenant may retain his base or any percentage of a base which he may have in the event he moves from one farm to another within the market's production area. The owner of a base and herd may sell or transfer subject to the approval of the Commission

any part or all of his herd and base. All such transfers must be accompanied by a bona fide bill of sale and the sale of base must be accompanied by the purchase of the cows responsible for the production represented by the amount of base transferred. For transfer purposes the base is considered to go with the herd rather than the farm. The Roanoke regulation further specifies that if a producer, who failed by a certain amount to maintain his base at a previous base-making period, should sell his entire base, or a part of his base; he may sell and transfer only his current base and may not transfer to the buyer any of his privilege of regaining base lost at the previous base-making period.

Harrisonburg - In this market no ruling is provided with regard to transferring the privilege of regaining lost base. In all other respects the base transfer provision in the Harrisonburg regulation is identical to Roanoke.

Newport News - Identical to Harrisonburg.

Base-making period requirements

Roanoke - The base is in effect on a calendar year basis and is determined with reference to average monthly deliveries during the months of September, October and November of the preceding calendar year. Adjustments to be made in the existing base each year thereafter are as follows:

(1) If the average monthly delivery of milk during any base-making period is less than the base then in effect, then the producer shall be given a temporary base equal to his average monthly deliveries

of milk for the last base-making period, but he shall be allowed to recover his former base if his average monthly deliveries of milk for either of the next two regular base-making periods are sufficient to cover the original base. If, however, he shall fail three successive attempts to maintain his former base, he shall be assigned a new base equal to his average monthly deliveries of milk for the last regular base-making period without any recourse.

(2) If the average monthly delivery of milk by a producer is in excess of 110 percent of his base, that part in excess of 110 percent shall be eligible for additional base if any is to be allotted. However, if he shall sell a part of his base, then he shall not be eligible for any increase in base under the 110 percent rule until he has purchased as much as he sold.

(3) The aggregate bases of all producers shall not exceed the average monthly sales of fluid milk and cream by distributors for the previous twelve months by more than 5 percent.

Harrisonburg - The 110 percent and 5 percent provisions described above also apply to the Harrisonburg market. However, no provision is made for regaining lost base nor is there any requirement on repurchasing base previously sold to qualify.

Newport News - This market's provisions are the same as those for Harrisonburg with regard to base-making period requirements.

Producers' deliveries to plants

Roanoke - Producers are required to deliver to their assigned distributors all milk they produce up to but not over 110 percent of their

assigned base. They are allowed to subtract out milk used for home consumption.

Harrisonburg - Producers are required to deliver all the milk they produce except that used for home consumption.

Newport News - Producers are required to deliver all the milk they produce except that used for home consumption. If, however, it is mutually agreeable to all parties concerned, producers are not required to deliver regularly to their distributors milk produced by them in excess of their established allotments.

The 110 Percent Rule Illustrated

The following example serves to illustrate the 110 percent and 5 percent rules which coupled with restriction of entry form the central core of the production control feature of the plan. Assume there are four producers, A, B, C and D, shipping to a given market. The following tabulation might represent the results of a set of base calculations:

	Current base	Average deliveries	Amount deliveries are in excess of 110 percent of current base	Base loss	Additional base allotted	New base
			(pounds)			
A	10,000	12,000	1,000	0	930	10,930
B	15,000	15,000	0	0	0	15,000
C	20,000	19,000	0	1,000	0	19,000
D	5,000	6,000	500	0	465	5,465

It is assumed that the previous twelve months market sales averaged 48,000 pounds per month. One hundred five percent of this figure equals

50,400 pounds. Current base adjusted for base loss equals 49,000 pounds (50,000 pounds minus 1,000 pounds). Therefore, total additional base available to be allotted equals 1,400 pounds (50,400 pounds minus 49,000 pounds).[1] The total amount of milk delivered in excess of 110 percent of current base is 1,500 pounds. Dividing 1,400 pounds by 1,500 pounds gives a percentage of 93. Applying this percentage to the 1,000 pounds delivered in excess of 110 percent of his current base by A and to the 500 pounds delivered in excess of 110 percent of his current base by D, it is found that A and D would receive 930 pounds and 465 pounds of additional base, respectively. This example illustrates two other important aspects of the base-surplus plan used in these markets. First, producer B's base remains the same since his average deliveries are exactly the same as his current base. So long as a producer at least delivers his current base during any base-making period no other producers can take any of his share of the fluid sales from him through increased production. By contrast, under an open base system such a producer may lose some portion of his previous share of the market's fluid milk sales. Secondly, note that producer C's new base is his average delivery since he failed to deliver at least his current base. In computing additional base to be allotted his failure to deliver his current base is taken into account and the amount of his loss is made available to other producers in the market. If he had been a Roanoke producer, he would have been given an opportunity to regain the loss which he incurred during the

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[1] The tabulated total is 1,395 pounds due to rounding.

succeeding base-making periods. In the Harrisonburg and Newport News markets this would not have been true.

Major Changes Since Adoption of Plan

Preceding paragraphs have discussed the more important mechanical features of the base-surplus plan as currently used in the markets selected for detailed study. It also seems desirable to review briefly some of the major changes which have occurred since the adoption of the plan in each of the markets. Such a review indicates the nature of the changes deemed necessary in forging the plan into its present form.

The base plan was used first in the Roanoke market in June, 1934. A number of important changes have occurred since that time. Prior to 1938 producers were allowed to have split bases, that is, a portion of their base with one distributor and the rest with another distributor. They also were allowed to shift from distributor to distributor without first getting the approval of the local milk board and the Commission. It was found that such movements made it difficult for the Commission to use the base as a means of market equalization and such privileges were discontinued.

In the early years of the Roanoke market penalties were provided for underdelivery of a certain percentage of base for three consecutive months during any part of the year. Apparently the local board was empowered with the authority to determine what readjustments were to be made in such cases. The local milk board also was empowered at one time with the authority to determine the manner in which bases were to be prorated among producers and was given discretionary authority as to

the entry of new producers. The Commission found that such an extension of its own authority was not in the best interests of all concerned and it soon set up definite procedures for computing bases and undertook to review all applications for entry on the market. It has continued this practice until the present time.

Several other changes are worthy of mention. Prior to 1938, no concrete evidence was required as proof of sale in cases involving base transfers. Since that time a bona fide bill of sale has been required as evidence of sale. In earlier years producer-distributors were allowed to hold bases with other distributors. This was discontinued in 1941. Finally, the special provisions dealing with base-making period requirements as discussed on page 36 were put into the regulation since 1950. These dealt with the failure to maintain current base and the denial of the right to sell to a purchaser the privilege to make any base lost before the transfer transaction.

The base-surplus plan was begun in the Harrisonburg market in 1934. The changes in the base plan in this market closely parallel those discussed for Roanoke with the exception that no changes have been made recently with regard to the base-making period requirements as mentioned above.

The Newport News market also began its base plan in 1934. Changes since that time closely parallel those described for Roanoke with three major exceptions. First, the Newport News market, like Harrisonburg, has had no recent changes with regard to base-making period requirements. Secondly, producers at one time were allowed to sell milk to other distributors after having first delivered their base allotment

to their assigned distributor. Some producers serving the area desire to have this privilege restored. Thirdly, distributors at one time were permitted to reject all milk delivered over and above assigned base allotments.

CHAPTER III

SOME THEORETICAL CONSIDERATIONS

In Chapter II, the nature of the regulatory framework within which the base-surplus plan operates in selected Virginia markets was indicated and the principal features of the plan described in some detail. The purpose of the current chapter is to consider the objectives of the base-surplus plan as used in Virginia and to discuss the implications of its production control features.

Base Objectives

Bases or quotas in fluid milk marketing may be employed in any one or all of three distinct capacities: (1) to adjust seasonal variations in milk deliveries; (2) to equalize market utilization so that all distributors have enough milk to meet their needs, while at the same time, milk supplies are directed to the highest value outlets; and (3) to control total annual production coming to market. In the Virginia markets selected for study, the base-surplus plan attempts to perform all three functions with the latter two functions receiving the greatest emphasis. As such, the Virginia plan may be described as a semi-closed base plan. The functioning of the base-surplus plan in the manner described might be expected to facilitate the attainment of certain predetermined objectives. One also might expect to find some disadvantages to the operation of a plan with a threefold function

inasmuch as designing it to accomplish one goal may restrict its effectiveness for other purposes.

The Virginia base-surplus plan attempts to accomplish the following objectives: (1) to return high average prices to those producers holding bases; (2) to assure distributors of adequate supplies of milk by assigning definite production potential to each; (3) to prevent the market from becoming unduly overbalanced on supply relative to the demand for fluid milk; and (4) to afford "old" producers some means of insulation against the competitive inroads of individuals not presently in the market as well as against those presently in the market who may be in a position to take competitive advantage of other "old" producers. The objectives enumerated above would be considered advantageous from the viewpoint of those producers and distributors presently in the various markets. If one were "on the outside looking in," he might view the situation somewhat differently.

Sharing of Surplus

The underlying principle of a base or quota plan for milk is that each producer should be made to bear the full consequences of his own surplus production; that is, he should have to accept the surplus price for all the milk he produces, over his "recognized share" of the market's fluid milk sales.[1] A rigidly enforced base plan would be expected

[1] Open base plans such as the type used in most Federal Order markets are concerned primarily with seasonal surplus response, while semi-closed base plans such as the type used in the selected Virginia markets attempt to influence both seasonal and annual production with primary emphasis being given to the annual aspect.

to pay individual producers only the manufacturing or surplus price for milk in excess of their individual bases rather than a straight blend price on all milk they deliver. Where the straight blend price is paid, an individual producer, under atomistic supply conditions, is paid more than the manufacturing price for that portion of his milk going into surplus uses.[1] It therefore may be argued that there is no inducement for an individual to restrict total production, but instead there is an inducement to expand production.[2] Such a condition may also offer inducements for new producers to enter the market, particularly manufacturing milk producers. Under the straight blend price system of payment the price received by an individual producer is a function of the total market surplus in a market pool or the total distributor's surplus on an individual dealer pool rather than a function of his own contribution to that surplus. Cooperative leaders and others in a number of the "surplus" eastern and midwestern markets feel that this problem presents an important threat to market development and stability.[3] The diagram presented in Figure 2 may be used to

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[1] Assume the following market situation: Class I price is $6.00/cwt., Class II price is $3.00/cwt., market blend price is $5.50/cwt. A given producer ships 10,000 pounds of milk, 8,000 pounds of which are used in fluid uses and 2,000 pounds in surplus uses. If he were paid the straight market blend price, he would receive $550 ($5.50 x 100 cwt.) for his milk. He would receive $5.50/cwt. for the 2,000 pounds of surplus milk. This milk was worth only $3.00/cwt. See note two, Appendix D.

[2] This, of course, has its limiting factor in that continued increments of surplus gradually lower the blend price and some producers will find continued expansion unprofitable.

[3] A. L. McWilliams, Manager of the Pure Milk Producers Association, serving the Chicago market, addressed himself to this point in a quote taken from Pure Milk News by Dairy Record, Vol. LVIII, No. 15, September 18, 1957, p. 5.

illustrate the nature of price discrimination in pricing milk and dairy products and the expected producer supply response when a straight blend price is used as the method of payment under the price discrimination scheme.[1]

Price Discrimination

Classified pricing or pricing according to use simply means that higher prices are paid for milk going into fluid use than for milk used in surplus outlets. The relative inelasticity of demand for fluid milk at the consumer level and the relative elasticity of demand for a local market for manufactured dairy products provides an excellent opportunity for price discrimination. The classified price plan is designed to take advantage of this opportunity.[2]

In Figure 2, OY is the price axis and OX the quantity axis. Curve DD represents the net demand at the farm level for milk for fluid consumption in relation to the OY and OX axes. The line dd represents the demand for manufactured dairy products and relates to the AY' and AX axes. The dashed line dd' is the marginal revenue curve derived from dd. Assume the total quantity of milk in the market is fixed at OB. The equilibrium price in the absence of price discrimination will be BP_o. Now assume the introduction of a price discrimination scheme

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[1] A similar form of diagramatic analysis was first made by Cassels. The present discussion attempts to extend Cassels' analogy somewhat further, particularly with respect to producer response under the blend price and base systems of payment. See John M. Cassels, A Study of Fluid Milk Prices, Harvard University Press, 1937, pp. 51-55.

[2] As in any price discrimination scheme, increased returns are achieved by charging the higher price in the inelastic portion of the market and the lower price in the elastic segment of the market.

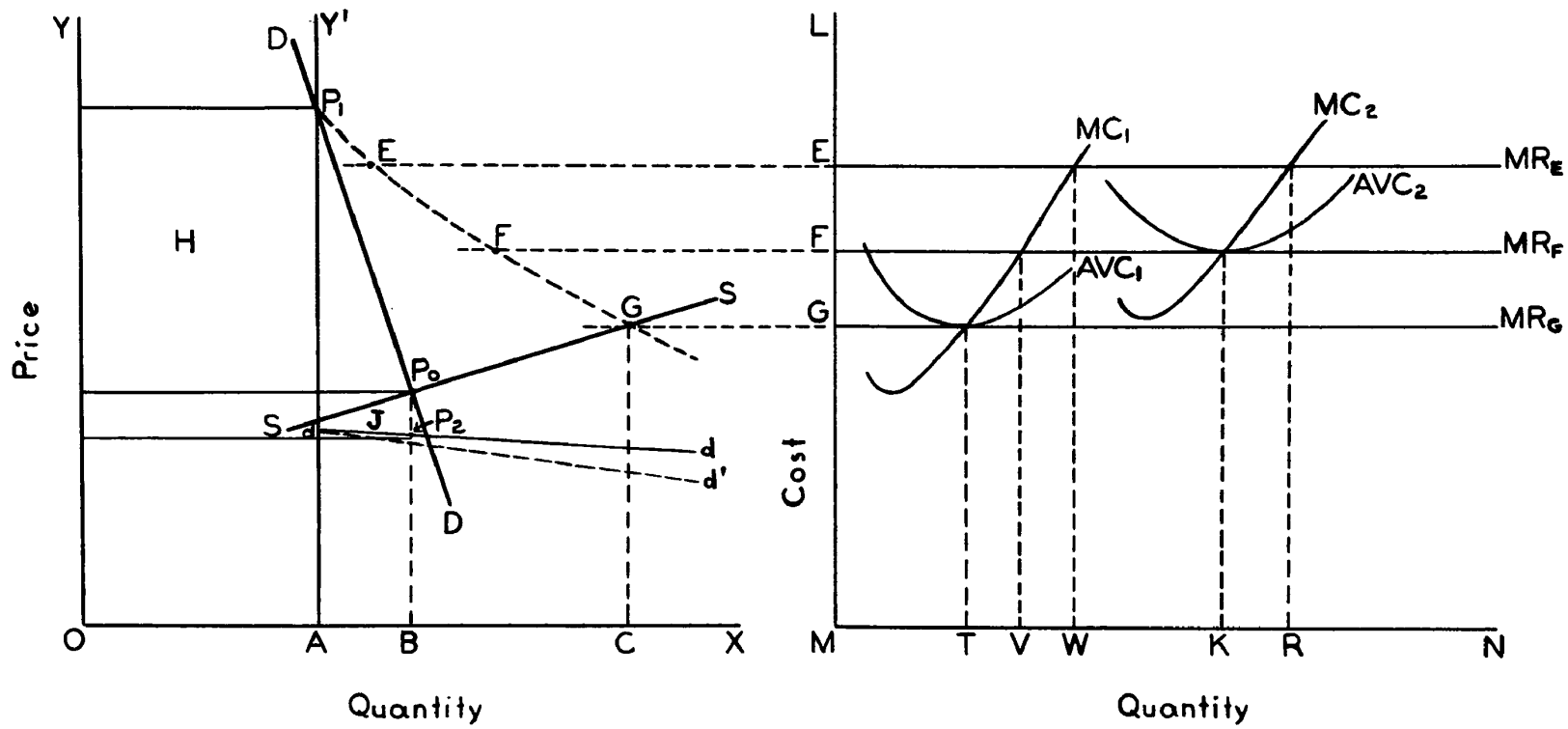

Figure 2. Price discrimination and producer supply response to blend price payment of proceeds from discrimination

(classified pricing). The price of milk for fluid use is raised to AP_1.[1] The quantity which can be sold at this price will be OA. The remainder of the original fixed supply, the quantity AB, will be sold at the manufacturing price BP_2. Since the area under rectangle H is greater than the area under rectangle J, such a move will result in greater returns than can be obtained without classification at the original price BP_0.

Payment on the Blend Price System

The use of the price discrimination scheme raises the question as to how producers should be paid for their milk in light of their contribution to the quantities which can be sold in each class.[2] One approach to the problem is to pay all producers a blend price derived from the average value of all milk in the market. In Figure 2 the curve SS represents the aggregate supply curve of all producers in the market.[3] The dashed curve P_1G represents the market blend prices which can be obtained from the sale of various amounts of milk with OA quantity

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[1] This price is not set at a level which will equate the marginal revenues in both markets. It is set at a level which will bring greater returns (but not maximum returns) than could be realized in the absence of discrimination.

[2] The assumption of fixed supply, OB, is relaxed at this point.

[3] The lateral summation of their marginal cost curves above average variable cost.

being sold as fluid milk.[1] In this situation, it is clear that the blend price received when the quantity OB is marketed is more than sufficient to call forth this supply. In fact, the supply will have to be increased to OC before an equilibrium point is attained at price OG. Remembering that only OA is sold in fluid form and that the remaining quantity AC is sold in surplus outlets, it is evident that the price paid for AC is substantially above the value of such milk as expressed by the marginal revenue curve dd'.

The explanation for an increase in production (all of which will go into surplus usage) rather than a contraction, which would have actually been necessary for maximum discriminatory gains, may be found by considering individual producer responses. The line P_1G is the average revenue curve for the market under the blend price payment system. However, at any given quantity of production, a horizontal line drawn through the corresponding point on P_1G is the marginal revenue curve for each individual producer. Under atomistic supply conditions and blend price payment, the production of an individual producer does not affect his price; consequently, his own marginal revenue curve is horizontal. He will receive the same price for all the milk

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[1] The derivation of this curve is illustrated below.
Assume OA = 1000 cwt., Class I price = \$6/cwt., Class II price = \$3/cwt.
When the following quantities are delivered these prices will be obtained:

Deliveries (cwt.)	Computation	Price/cwt. (AR)
1000	1000x6/1000	\$6.00
1100	1000x6+100x3/1100	5.73
1200	1000x6+200x3/1200	5.50
1300	1000x6+300x3/1300	5.31
1400	1000x6+400x3/1400	5.14
1500	1000x6+500x3/1500	5.00

P_1G would level off just above the manufacturing price (curve dd) at infinity and would approach the Y axis as quantity approached zero.

he contributes to the market's total quantity at any given time. Furthermore, the marginal revenue curve of each producer will be horizontal since each receives the same price at any given time. The marginal cost curves of individual producers will differ according to their own particular cost structure. An example of an individual producer's reaction may be seen by drawing horizontal lines through the points E, F and G on P_1G and extending these lines (marginal revenue curves facing each producer for varying amounts of total market production) to the right hand side of Figure 2 where the average and marginal cost curves of two producers are shown. The cost curves of the two producers relate to the LM and MN axes, respectively. Producer one, for example, will produce the quantities MT, MV and MW at points G, F and E, respectively.

The supply curve SS represents the aggregate response of the above individual producers and all other producers in the market. Since the marginal revenue curves passing through points E, F and G are the same for all producers, total production will ultimately settle at OC where a horizontal line passing through point G will intersect the SS curve.[1] Before this equilibrium is reached, the total supply probably will have been even larger than OC since at points E, F and all other points between P_1 and G the marginal revenue curves of all producers will have been above the SS curve. The combined increases of all producers (but

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[1] The wider the differential between the Class I and Class II prices the farther production would have to increase before an equilibrium point is reached.

not the increase of any one individual) will eventually reduce the price to point G and an equilibrium will be reached.[1]

The crucial point in the overproduction analogy under the blend price payment system is the fact that an individual producer cannot effect the price he receives at any given time by the amount of milk he produces (or adds to the surplus in the market). Acting rationally, each individual will adjust his production to the point where his marginal revenue and marginal cost curves intersect. The collective actions of each producer result in a similar adjustment for the market. To counteract this adjustment some way must be found to make each producer's price dependent upon his own production response and, consequently, to make his marginal revenue curve change its shape when he makes significant increases in production. The use of a base plan offers a means of doing this.

Possibilities Offered by a Base Plan

Under a base plan an individual producer's price received is affected only by his own production response. He is faced with a discontinuous marginal revenue curve. If he restricts his production to his assigned base, he will receive the same price (Class I) for each hundredweight delivered up to the total amount of his base. If he delivers any quantity in excess of his base, his marginal revenue curve will drop perpendicularly to the surplus price point and become horizontal again at that point. He will receive the same surplus price

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[1] This situation would be similar to that illustrated by the converging phase of the cobweb theorem.

regardless of the amount of excess quantity he delivers. Under a blend price payment system as discussed in the preceding illustration, his marginal revenue curve will be a horizontal line located at some point between the Class I and surplus price. The difference between the marginal revenue situations facing him under the base payment plan and the blend price payment plan and his probable production response to each situation is illustrated in Figure 3. Section A shows the situation under a base plan. The quantity OQ represents his assigned base. The line AB is his marginal revenue curve for OQ quantity of milk. The line CD is his marginal revenue curve for any quantity he delivers over his base. CD is horizontal at the surplus price. Thus, his complete marginal revenue curve ABCD is a discontinuous curve. With the given marginal cost curve shown in section A, he will produce only the quantity OQ (his assigned base) since his marginal cost curve intersects the marginal revenue curve ABCD at point E. Any additional production beyond this point is valued at less than its cost.

In section B of Figure 3 the same producer's response is shown under a blend price plan. His marginal revenue curve will be a horizontal line (for reasons given in the prior blend price discussion) at some price higher than the surplus price but lower than the Class I price. The price chosen for illustrative purposes is $5.00 per hundredweight and the appropriate marginal revenue curve is MN. The same marginal cost curve as before is assumed to show his cost structure. He will produce the quantity O'Q', for at this level he will equate marginal revenue and marginal cost. When the quantity OQ in section A is compared to O'Q' in section B, the latter is clearly the larger quantity.

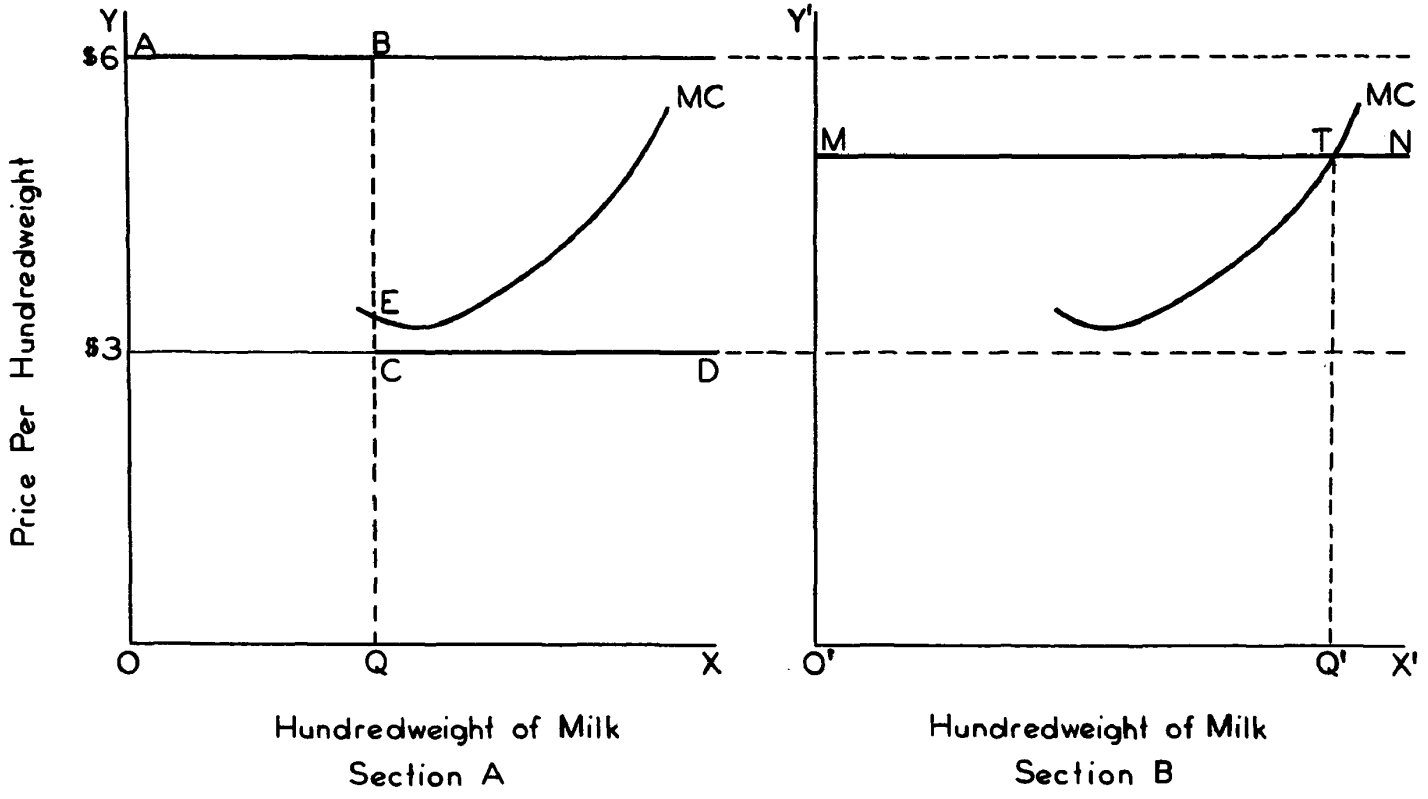

Figure 3. Typical producer supply response under a base payment plan and a blend price payment plan

He will produce less under the base system than under the blend price system.[1] The reactions of other producers in the market will take a similar form with the actual amount of production difference between the two systems of payment being determined by the marginal cost structures of the individual producers.[2]

Payment on a base system rather than a blend price system makes each individual producer "responsible" for his own production actions. In Figure 3 a specified cost structure is assumed. His production response under a base payment system depends upon the actual shape of his marginal cost curve. If the base assigned to him were of sufficient size to enable him to equate marginal cost and marginal revenue, he will deliver only the amount of his base. If, however, his allotted share of the market's fluid sales is not of such magnitude, he may be expected to deliver some quantity in excess of his base. The producer in Figure 3, section A, will deliver only his assigned base. However, if his marginal cost curve had been lower so that some portion of it cut the curve CD, he would have produced some quantity in excess of OQ, the exact amount being dependent upon the point of intersection. It is important to recognize that a base plan may be less than

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[1] See page 55 for certain qualifications of this statement with respect to time periods and type of base plan.

[2] The marginal cost curve used in Figure 3 might have taken any number of other shapes. It might have been higher or lower, further to the right or left or flatter or steeper. The particular curve shown in Figure 3 indicates that no portion of the curve is below the surplus price. This situation is believed to be typical of the situation facing most Virginia producers. Regardless of the shape of the marginal cost curve the proportionate amount of milk produced under the base system would be less than that produced under the blend system if the cost curve is the same in both cases.

completely effective in controlling production when assigned bases are materially smaller than the most efficient operating levels of a large number of the producers concerned. However, a base plan will retard the excess of production over fluid needs to a greater degree than will a blend price payment plan when either is superimposed on the same production conditions.

At this point, it is necessary to make a differentiation between open and closed base plans in terms of their expected adherence to the analysis shown in Figure 3. The time period to which the analysis in section A of Figure 3 is applicable will depend upon the type of base payment plan used.[1] If a closed or semi-closed plan is used, section A is applicable to both short run and long run periods. Under an open base plan, however, the analysis of production response in section A will apply only to the short run (between successive base-making periods). Under an open base plan, an individual producer will likely attempt to increase the size of his base by increasing production during the base-making period.[2]

The long run effect of an open base plan (where base is established only in relation to deliveries during a specified period) may be to increase the excess of milk over fluid needs in much the same manner as

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[1] The question of time period and type of base plan has been purposely delayed until this point to avoid confusion in the major part of the discussion--that related to the difference in marginal revenue situations under the base and blend price plans.

[2] He may do this even at the expense of disregarding the marginal cost-marginal revenue relationship during the base-making period. After his new base is established, the analysis of section A will be applicable until the beginning of the next base-making period.

that anticipated under a blend price plan. In such a situation, each individual acts as though his individual action toward increasing base will not be duplicated by all other producers in the market.[1] Unless all other producers do in fact duplicate his action, he will be able to increase his proportionate share of the market's fluid milk sales. If large numbers of producers take similar actions, the total supply of milk in the market will increase relative to the fluid milk needs of the market. Under a closed or semi-closed base plan, one producer cannot take fluid sales from another in the above described manner; consequently, the incentive to increase production is greatly modified.

The preceding analysis has important implications for the design and administration of base plans. The degree of effectiveness in controlling production (if this is a desired objective) may be determined by: (1) the setting of bases which accurately reflect market fluid milk sales (plus necessary operating reserves) and the periodic adjustment of such bases as sales change up or down and (2) the establishment, as nearly as possible, of bases which permit efficient levels of production by the producers concerned.[2] These requirements are relative in nature and do not lend themselves to precise attainment. Nevertheless, the success of a base plan designed to control production will vary in direct proportion to the degree of attainment achieved.

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[1] This situation is analogous to an individual producer's estimate of the effect of his production on the price he will receive at any given time under a blend price plan.

[2] This would rule out an open base plan as an effective means of controlling production.

Some Welfare Implications

Unless one accepts the thesis that economics and economic analysis should be devoid of welfare considerations, each program and/or policy should be appraised in terms of its probable impact on the welfare of those whom it affects. Thus, it seems both necessary and appropriate to give consideration to the welfare implications of the semi-closed base plan as it operates in Virginia milk markets. In the discussion which follows, no attempt is made to specify what the welfare goal or goals of Virginia's economy should be. Only the probable effects of the semi-closed base plan on general welfare are considered. The ultimate decision on policies to be followed must be made through the democratic (legislative) process.

The use of a semi-closed base plan has definite implications for: (1) the efficiency with which resources are used in the production of milk and other goods and services and (2) the redistribution of income between some milk producers and other segments of Virginia's economy. Allied to these two general areas of reference are considerations of uncertainty, technological advance and other related factors.

Resource Use Efficiency

With a given income distribution and a given set of resources to be allocated among competing uses, optimum allocation of these resources will be achieved when the marginal rate of substitution between factor and product, between factors and between products is the same for all firms, resource owners and consumers.[1] Such a condition is automatically

[1] This implies the equating of the marginal physical productivities of factors to their price ratios and the marginal utilities of consumers to product price ratios.

encouraged by the price mechanism under perfect competition. However, the question of resource allocation must be viewed in terms of those conditions which actually exist--some form of imperfect competition. In appraising the possible effect of a semi-closed base plan on resource allocation or resource use efficiency, the relevant consideration is not a comparison between that which would be achieved under perfect competition as against that under a semi-closed base plan; but rather it should be a comparison between resource allocation under one form of imperfect competition (without such a production control plan) and another form of imperfect competition (that which includes a production control plan).

There appear to be two primary ways in which a semi-closed base plan can affect the efficiency of resource use. In the first instance, there is the question of how the possible stability (price and income) to be offered by the plan will influence individual firms to increase the efficiency of their operations. Secondly, there is the consideration of how the restrictions (allotments) placed on those best able and most willing to produce may effect productive efficiency.

Consideration is given first to the effect of price and income stability. Uncertainty as to future returns is a prime cause of misallocation of resources. It may result in individual resources being used at less than their maximum marginal productivities, and/or cause too much or too little of some products to be produced. Operating under uncertainty, farmers are faced with both an internal and external capital rationing problem. This problem appears to be especially acute in the case of dairy farming, where size of investment is large and

where fixed costs are often a higher proportion of total costs than is true in the production of many other agricultural commodities. Any increase in the relative certainty of price and income derived from the use of a semi-closed base plan could be expected to mitigate the capital rationing problem facing some dairymen. On the other hand, a control program that is effective in providing stability by the use of production restrictions (base allotments) may tend to "freeze" the size of individual production units and thus limit the benefits to be obtained from the reduction in capital rationing.[1] The actual impact of the control effort may be such that only the larger firms receive the benefits of the reduction in capital rationing.[2] Small firms still are likely to find themselves faced with a severe limitation on borrowable funds (at least for growth purposes).

To pursue the point further, there is no *a priori* basis for saying that all producers (even the larger ones) will necessarily take full advantage of the possible reduction in uncertainty.[3] On the contrary, the reduction of uncertainty and subsequent insulation from competitive

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[1] A major administrative problem arises as the control agency attempts to reduce uncertainty and at the same time permit resource adjustments.

[2] Paradoxically, these firms may need additional allotments more than they need additional cash.

[3] Considerable contact with producers in D.H.I.A., supposedly the "cream of the crop," indicates that even these producers fall short of utilizing currently known and proven practices. Research on some other controlled commodities has indicated a strong influence toward productive efficiency exerted by reduction of uncertainty. Most of these commodities were controlled on an acreage allotment basis, providing a powerful incentive to grow as much product as possible from that acreage. If bases were allotted in terms of cows rather than pounds of milk, a similar stimulus might be present.

forces may just as easily perpetuate inefficiency as eliminate it. The preceding comments are in no sense an indictment of the beneficial effects of reducing uncertainty. They do, however, raise a question as to whether or not the particular method discussed (the semi-closed base plan) is the best method available for securing productive efficiency.

Consider now the effect on resource use emanating from the restrictions (allotments) placed on those best able and most willing to produce milk. The restriction of output requires the use of some yardstick (allotment) to limit the quantity which each producer is allowed to contribute to the total quantity of fluid milk to be marketed. Unless these allotments are apportioned among individual production units in accordance with the potential productivity of the resources controlled by each unit, optimum resource allocation cannot occur. From a practical administrative standpoint, such an allocation of allotments seems unlikely. Consequently, a misallocation of resources will be the rule rather than the exception. This is not to say that misallocation would not occur in the absence of output restrictions. It is to say that the use of fixed allotments tends to preclude adjustments that will likely take place in the absence of output restrictions.

When a misallocation of resources is present, a reorganization can be affected either to produce more milk from the same amount of labor and capital or the same amount of milk from fewer units of those resources. Such a reorganization will change the output of some firms. With the use of a semi-closed base plan, however, output is apportioned rather arbitrarily among individual production units and is relatively

fixed. Figure 4 illustrates the problem involved. OD and O'C are production functions for firms A and B, respectively. The total output obtainable from the resources controlled by these two firms will not be at a maximum until the marginal rate of transformation of input into product is the same for both firms. Assume these two firms control enough resources to permit attainment of point H (where the marginal rate of transformation of input into product is the same for both firms). At point K (the point defining current output for both firms), the marginal productivity of capital and labor is much greater for firm A than for firm B. Additional milk can be obtained from the given set of resources available to the two firms by transferring some inputs (equal to the quantity S'R') from firm B to firm A.

If an allotment plan is operating so that OT and O'T' are the allotments (outputs) assigned to A and B, respectively, the transfer of inputs necessary to attain point H likely will not materialize since the output which each firm can sell at the fluid price is fixed (OT for A and O'T' for B).[1]

On balance, the effect of a semi-closed base plan on resource use efficiency and hence on maximum welfare appears to be as follows: the reduction in uncertainty which may be offered by such a plan will stimulate some productive efficiencies that would probably not be otherwise obtained (especially in the short run). However, the use of output restrictions to provide that stability will make it difficult

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[1] The point H can be reached if firm B sells the L'T' portion of its allotment to firm A. The likelihood of such a transfer of allotment being made between these two firms, and between all other firms in the market encountering similar problems, is not very great.

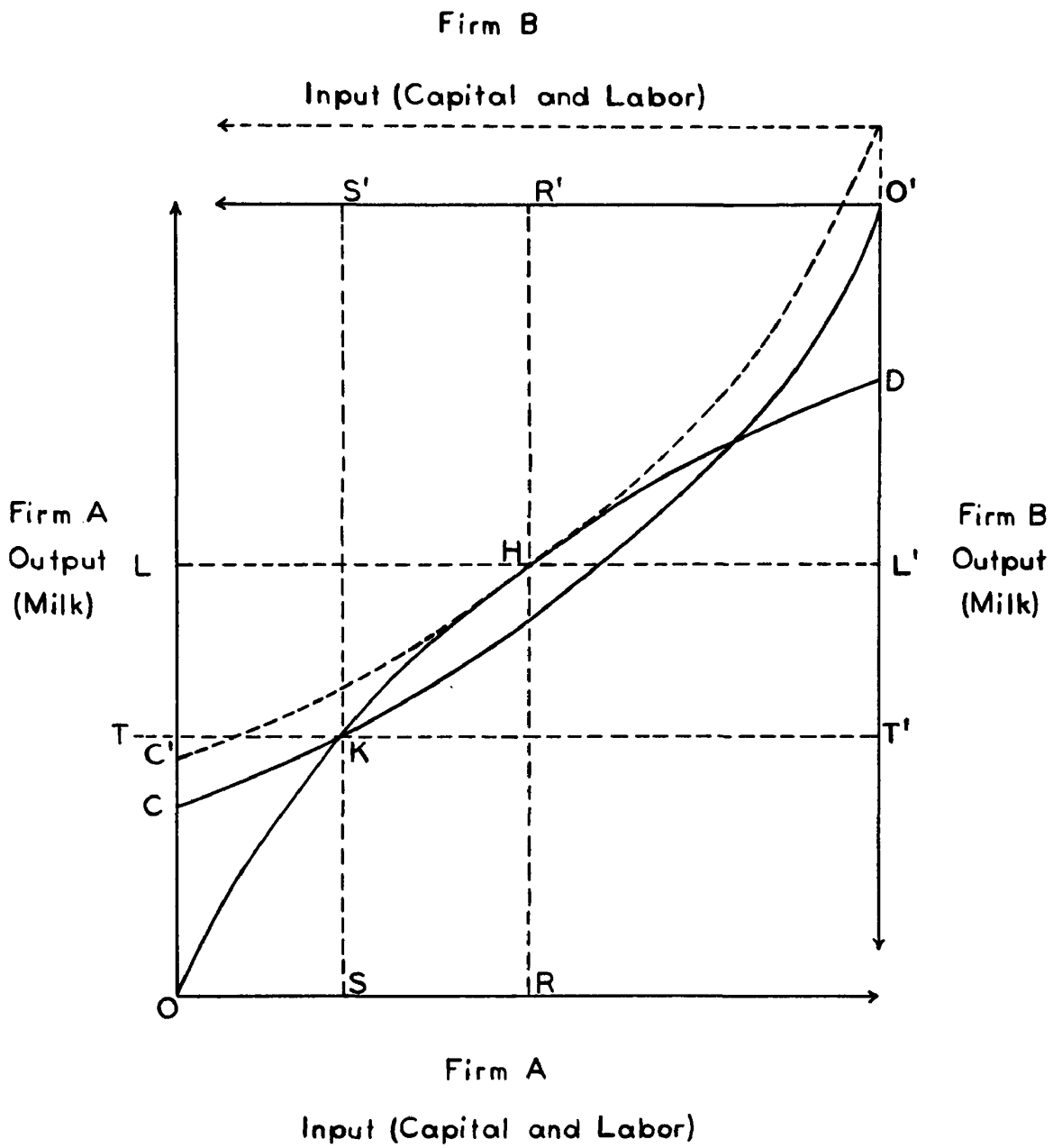

Figure 4. Allocation of resources under output restrictions

to attain optimum resource allocation regardless of the possible incentives provided by the reduction in uncertainty.

Income Redistribution

In view of the relatively inelastic demand for fluid milk, the use of discriminatory pricing implemented by restriction of output results in a redistribution of income from other segments of the economy to those milk producers who hold base allotments.[1] The distribution of the income so transferred is not equal among all milk producers but instead is prorated among them in accordance with the allotments which they hold. Since welfare economics does not permit interpersonal comparisons of utility, it is not possible to say whether the increase in welfare of producers is enough to more than offset the loss in welfare of consumers.[2] In either event, the use of the above method to redistribute income has the undesirable effect on the efficiency of resource use previously discussed. If the value system of society indicates that the income of milk producers should be increased relative to other segments of the economy (the continued existence of the milk control program would seem to indicate this is so), there are other means of accomplishing such an objective without interfering with resource use. Direct taxation of non-milk producers and subsequent

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[1] Discriminatory pricing results in the initial transfer of income from consumers; restriction of output provides the means for passing it on to producers. There is also a redistribution of income between those producers who hold allotments and those producers who are completely excluded from the market.

[2] If such utility comparisons could be made and it were found that the increase in welfare of producers was large enough to compensate consumers for their loss and still leave something additional for producers, total welfare would be increased.

subsidization of milk producers through direct payments is an example of a possible alternative.[1]

An important aspect of the income transfer question is the distribution of benefits derived from technological innovations. To the extent that such innovations are output-increasing (rather than cost-decreasing) in the face of an inelastic demand, benefits normally will be passed on to consumers and/or middlemen.[2] Restriction of output, however, permits producers of the raw product to retain the bulk of such benefits. This may raise a question as to the justification for using public tax monies for research and education in the dairy field if all (including milk producers) who supply such funds are not benefitted.[3]

In summary, no claim is made that efficiency and general welfare are synonymous concepts. More properly, efficiency is but <u>one</u> aspect of general welfare. In this discussion it is reasoned that the use of a semi-closed base plan to restrict output (and the attendant parceling of the quantity to be marketed among individual producers) impedes the efficiency with which resources can be used for the production of

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[1] There may, of course, be strong objections to direct payments on other grounds. However, from the resource utilization viewpoint, they appear to be superior to the present method of income transfer.

[2] In the aggregate, all innovations are output-increasing in the sense that even cost-reducing innovations release resources for use in other production.

[3] This is not to say that agriculture is not a proper area for public support of research. On the contrary, primary industries such as agriculture would seem to be the logical place for such support since resources released by innovations can be used to produce more "luxury" goods rather than subsistence goods. Furthermore, most agricultural firms are too small to conduct their own research activities.

milk and other goods. Society must make the choice as to whether or not income should continue to be transferred from consumers to milk producers, and if so, whether or not the probable effect of the semi-closed base plan on efficiency is more or less desirable than the possible side effects of other methods available for transferring income.

CHAPTER IV

SUPPLY-DEMAND SITUATION

Two of the hypotheses presented in Chapter I dealt with the supply-demand aspects of the Virginia base-surplus plan. In the first instance, it was stated that this plan has resulted in a reasonably even seasonal pattern of delivery of milk to market. Secondly, this plan has maintained total milk receipts in balance with fluid milk sales and has allocated these receipts among individual distributors according to their fluid milk sales patterns. This chapter presents the analysis of data relevant to these two hypotheses. Consideration is given to the seasonality of supply, the equalization of milk receipts and sales and the annual production control aspects of the base-surplus plan used in selected Virginia milk markets.

Seasonality of Supply

The first test of any producer payment plan is its ability to counteract the natural tendency of most dairymen to deliver large quantities of milk during the spring and early summer months and relatively small quantities during the remaining months of the year. How successful has the Virginia base-surplus plan been in leveling or evening out seasonal variations in the supply of milk coming to market?

Market Situation

Data on market deliveries and fluid milk sales were analyzed for

several Virginia milk markets with regard to seasonal variations. Table 4 summarizes the seasonal characteristics of these markets.[1] The range between markets in seasonality of delivery in 1951 was 114 percent to 148 percent; 114 percent to 133 percent in 1953; and 113 percent to 127 percent in 1955. The Roanoke market had the smallest variation in the low-to-high-month ratio in all three years. The observed low-month-to-high-month variations in average daily milk deliveries were comparatively small in all these markets.[2]

There is some limit beyond which seasonal variations in supply cannot be reduced. Some of the markets studied appeared to be approaching this limit. The real objective in evening out seasonal delivery variations is to shift production emphasis from spring to fall in such a manner that adequate supplies are available in the fall and to match seasonal delivery variations with corresponding seasonal variations in fluid milk sales. The plotting of seasonal variations in fluid milk sales in the three selected markets for 1955 indicated that sales were relatively even from January through May; declined during June, July and August; and increased to a high point during September, October and November. Delivery patterns in all three markets exhibited similar seasonal characteristics. Figure 5 shows the relationship

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[1] Seasonality of delivery was computed by expressing average daily deliveries in the high month as a percentage of average daily deliveries in the low month. Seasonality of fluid milk sales was computed in a similar manner using sales data.

[2] Testing by analysis of variance indicated that the observed differences between markets within a given year were not statistically significant. The calculated F value was 1.63 as compared to the tabular values of 3.18 and 2.26 at the 1 percent and 5 percent levels, respectively, with 11 and 22 degrees of freedom.

Table 4. Seasonality of milk deliveries and fluid milk sales, several Virginia milk markets, selected years

Market	1951		1953		1955	
	Deliveries high mo. / low mo.	Fluid sales high mo. / low mo.	Deliveries high mo. / low mo.	Fluid sales high mo. / low mo.	Deliveries high mo. / low mo.	Fluid sales high mo. / low mo.
	percent					
Roanoke	114	109	114	109	113	113
Harrisonburg	131	119	127	124	125	122
Newport News	122	120	119	110	123	117
Danville	128	128	133	123	127	128
Fredericksburg	132	113	121	113	118	108
Lynchburg	122	123	118	121	119	126
Martinsville	148	128	114	114	127	130
Petersburg[a]	144	115	120	126	121	119
Pulaski[b]	132	115	119	111	120	122
Staunton	133	127	121	135	124	130
Waynesboro	127	113	126	114	127	114
Winchester	141	115	121	112	117	119

[a] Petersburg-Hopewell

[b] Pulaski-Montgomery-Giles

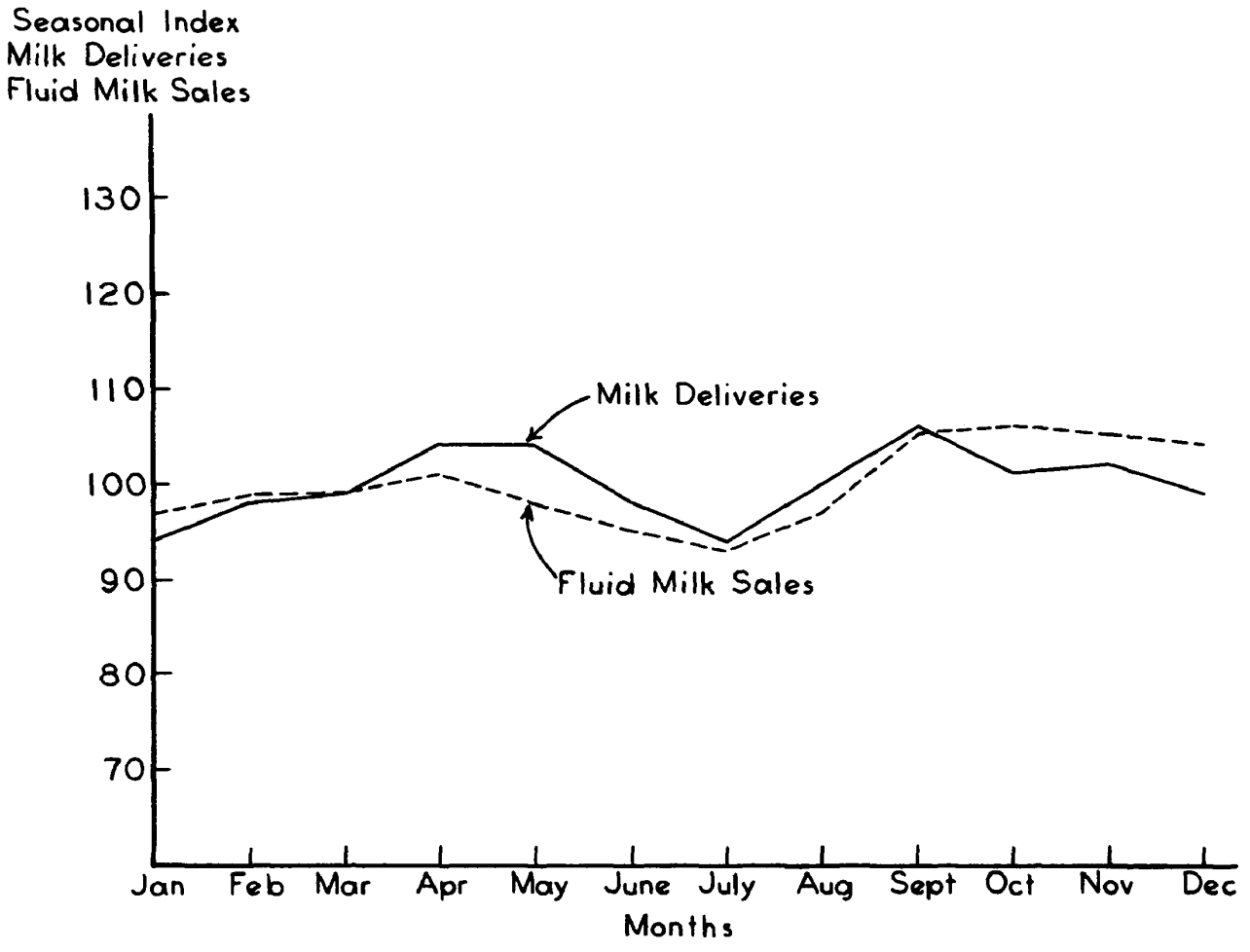

Figure 5. Seasonal pattern of milk deliveries and fluid milk sales, Roanoke, 1955

between fluid milk sales and deliveries for Roanoke for that year.[1] The Roanoke delivery pattern follows closely the corresponding sales pattern for that market, particularly with respect to the summer decline and fall increase. Its form suggests that the base plan exerted a relatively strong influence on deliveries since the months of September, October and November comprised the base-making period. The plotting of delivery variations for 1951 and 1955 did not indicate this pattern held true for all three years. However, these plottings did indicate a definite trend toward the 1955 pattern.[2]

A distinct similarity was observed between the seasonal delivery patterns in each market. This suggests that the effect of the base plan was somewhat uniform in all three markets in 1955 with regard to market seasonality of delivery. Plotting of the 1951 and 1953 data indicated a similar relationship existed in those two years.

From the market standpoint at least, the base plan used in the selected markets appeared to have successfully minimized seasonal delivery variations and to have correlated the remaining variations with seasonal changes in sales.

Distributor Situation

The market data presented above might be expected to conceal

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[1] Plotting was done on the basis of a seasonal index constructed by expressing average daily deliveries for each month as a percentage of average daily deliveries on a monthly basis for the year.

[2] The 1951 and 1953 delivery patterns reflected wartime abnormalities wherein the base plan was somewhat ineffective since practically all milk was sold for fluid purposes. Data for earlier years on the Roanoke market indicated similar abnormalities during World War II. After each such external interruption, a certain amount of time must elapse before the base plan can again exert its influence.

differences among individual distributors. Examination of individual distributor data indicated that such was the case. The range of the variation in seasonality of receipts between individual distributors in the three selected markets is shown in Table 5. The differences were a direct reflection of the seasonal patterns of the individual producers assigned to each distributor.[1] For the most part, the smaller operators in each market had the wider seasonal receipts variations. Since each one had only a few producers assigned to him, the pattern of each producer asserted itself more fully than where there were large numbers of producers whose patterns tended to counterbalance each other. Since high seasonality of receipts was confined to the smaller distributors, it was not a problem of major consequence insofar as total market receipts were concerned. It was, of course, a serious problem to the small distributors themselves.

Equalization of Milk Deliveries and Sales

The base-surplus plan used in Virginia milk markets attempts to allocate receipts of milk among individual distributors in accordance with their individual fluid milk sales requirements. The chief means used to accomplish this objective is the assignment of individual producers and their corresponding production to specific distributors with the stipulation that no shifts can be made without prior approval of

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[1] This statement is more applicable in the case of Roanoke than it is for Newport News despite the fact that the variations in Newport News appear to be wider than those for Roanoke. The calculated F values for between distributors within a given year were 1.29 and 7.73 for Newport News and Roanoke, respectively. The Newport News F value was not significant at either the 1 percent or the 5 percent level. The Roanoke F value was significant at the 5 percent level.

Table 5. Seasonality of delivery of milk, individual distributors, Roanoke, Harrisonburg and Newport News, selected years[a]

Market	1951			1953			1955		
	Number of distributors	Market high mo. / low mo.	Individual distributors range high mo. / low mo.	Number of distri-	Market high mo. / low mo.	Individual distributors range high mo. / low mo.	Number of distributors	Market high mo. / low mo.	Individual distributors range high mo. / low mo.
		(percent)	(percent)		(percent)	(percent)		(percent)	(percent)
Roanoke	4	114	115-168	4	114	114-140	4	113	111-142
Harrisonburg	1	131	131	1	127	127	2	125	123-154
Newport News	7	122	122-177	7	119	125-213	8	123	119-179

[a] Seasonality of delivery was computed by expressing average daily deliveries in the high month as a percentage of average daily deliveries in the low month.

the regulatory agency. In addition, the entry of new producers to each market is restricted. Thus, the plan attempts to provide all distributors with adequate supplies of milk at all times and to allocate the total supply of milk between distributors in such a manner as to realize the highest use value possible. This is indeed a formidable task. Two principal measures were used to evaluate the degree to which equalization efforts have been successful. These were utilization and the annual fluid milk sales-to-base ratio.

Utilization

Utilization measures two closely related yet separate market characteristics.[1] In the first instance, it indicates the extent to which individual distributors are either long or short on milk supplies.[2] If the utilization percentage plus a percentage for operating reserves is greater than 100 percent for any given distributor, it means that he is short of milk. Conversely, a percentage less than 100 percent means he is long with respect to his fluid milk needs. Secondly, the utilization percentage measures the extent to which producer deliveries are directed to the highest value outlets.

Adequacy of supply

Attempts to control production may result in too fine a line being drawn between the sales of individual distributors and the production

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[1] Utilization as used in this thesis has a specialized meaning. It refers to the percentage of baseholder deliveries sold by distributors in fluid form. It was computed by dividing fluid sales for any specified period by deliveries during that same period.

[2] After some figure is added for necessary operating reserves.

assigned to them. The extent to which selected market distributors were undersupplied and oversupplied is shown in Table 6.[1] Only one Roanoke distributor was undersupplied on an annual average basis in 1951. None were undersupplied on that basis in 1953 and two were undersupplied in 1955. Close cooperation between Roanoke distributors minimized this problem. Historically, that market has operated on a low operating reserve margin.

In contrast, all Newport News distributors except two were undersupplied both annually and seasonally in 1951 and 1953. In 1955, the situation was considerably improved with only two distributors undersupplied on an annual average basis.

The Harrisonburg market was substantially oversupplied until a new distributor was added in 1955. This new distributor was undersupplied both annually and seasonally in 1955.

The undersupply problem in Newport News was largely the result of: (1) a very rapidly expanding population; (2) relatively poor distributor-distributor relations; and (3) the inability of the regulatory agency to correct certain marketing practices which tended to nullify the effectiveness of the base-surplus plan.[2]

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[1] The actual utilization figures are shown in this tabulation in order that the same table can be used in discussing the direction of milk to the highest value outlets. An operating reserve figure must be added to the above figures to reflect the adequacy of supply situation. In the discussion on this point, an operating reserve of 10 percent is assumed.

[2] The presence of large federal military installations in the Newport News area and the contract bidding for milk supplies to these installations is a never-ending threat to market stability in that market.

Table 6. Percentage of deliveries utilized in fluid milk sales, individual distributors, Roanoke, Harrisonburg and Newport News, selected years[a]

Market and distributor	1951			1953			1955		
	Annual market utilization	Annual distributor utilization	Range distributor's seasonal utilization	Annual market utilization	Annual distributor utilization	Range distributor's seasonal utilization	Annual market utilization	Annual distributor utilization	Range distributor's seasonal utilization
	percent								
Roanoke	89			89			92		
1		91	70- 96		90	84- 95		94	88- 99
2		78	71- 91		87	78-109		90	81-101
3		97	75-127		90	70-114		94	77-117
4		88	82- 93		89	83- 93		90	84- 98
Harrisonburg	86			84			81		
1		--	--		--	--		96	83-120
2		86	73- 98		84	67- 93		80	72- 91
Newport News	98			95			91		
1		174	158-184		145	123-187		89	80-125
2		110	88-142		108	86-173		90	82- 99
3		78	68-113		74	62- 98		72	52- 90
4		107	84-161		114	100-144		74	60-100
5		--	--		--	--		125	63-177
6		99	87-112		92	69-108		94	83-112
7		99	85-115		110	100-125		87	78- 95
8		84	70-105		78	69- 90		88	81- 99

[a] Utilization refers to the percentage of baseholder deliveries used in fluid form. To determine the adequacy of supply for individual distributors, an operating reserve of 10 percent must be added to the above figures. Thus, any figure in the above table higher than 90 percent is indicative of undersupply.

The principal point of emphasis in this section is the extent of undersupply resulting from a deliberate attempt to maintain a close balance between milk receipts and sales. Data for the Roanoke and Harrisonburg markets indicate that undersupply was not a problem in these two markets. In Newport News, a definite undersupply problem did exist in 1951 and 1953, and to a lesser extent in 1955.[1] The Newport News problem cannot be attributed entirely to the base-surplus plan. However, it seems likely that the problem could have been alleviated somewhat, had the plan been tailored more specifically to that market's needs. For example, producers could have been given more encouragement to increase the size of their operation by permitting them to gain substantial increases in base during successive base-making periods.

Highest value usage

Table 6, viewed in a slightly different respect, indicates also the extent to which milk was allocated among distributors so as to achieve the highest value outlets and a uniform utilization among distributors. This is an important aspect of equalization. Annual distributor utilization appeared to be the best measure to use. The Roanoke market was better balanced than either of the other two markets in 1955. The maximum difference between distributors in annual

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[1] Nine markets other than Roanoke, Harrisonburg and Newport News were examined on an annual utilization basis. Three of these markets were undersupplied on an annual basis in 1955. Examination of similar information for 1951 and 1953 indicated that in the same group of markets four were short in 1951 and three in 1953. Two of these markets, Winchester and Martinsville, were short in all three years. This analysis does not take into account the possibility that some of these markets may be able to operate on less than a 10 percent reserve.

utilization in Roanoke was 4 percent as compared to 16 percent in Harrisonburg and 53 percent in Newport News. In 1951 and 1953 there was an even greater difference between the within-market variation for Roanoke and the Newport News market. However, most Newport News producers were not adversely affected since they received the Class I price for practically all milk delivered during those years.

Conversely, the utilization percentage indicates also the proportion of producer deliveries going into surplus usage. The amount of milk used in surplus form was comparatively small in all three markets, both seasonally and annually.[1]

The results observed indicate that the equalization of milk supplies and sales in terms of utilization was not uniformly successful in all three selected markets. This problem is discussed further in Chapter V.

Fluid Milk Sales-to-Base Ratio

A second important measure of equalization is the relationship between annual fluid milk sales and annual base allotments. This relationship is expressed in ratio form. The ratio measures the extent to which bases are established in proper proportion to fluid milk sales and held in balance with sales by shifting producers between distributors as the need arises.[2]

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[1] As compared to the "surplus" situation in some eastern and midwestern areas.

[2] The prior measure, utilization, described the relationship between actual deliveries and fluid milk sales. The present measure describes the relationship between fluid milk sales and base, not actual deliveries. It was calculated by dividing annual fluid milk sales by annual base allotments and expressing the result as a ratio of fluid milk sales-to-base.

Distributor situation

Table 7 shows the fluid milk sales-to-base ratio for selected market distributors and the market average ratio for each market. Variations from .95 indicate the degree to which individual distributors were underbased or overbased in each year.[1] Harrisonburg had less variation from the .95 ratio than either of the other two markets. The variation which was present in Roanoke was in the underbase direction.[2] In Newport News, the variations were both in the underbase and overbase directions.

Any evaluation of the fluid milk sales-to-base ratio must take the variability of sales into account. Considering this factor, it appears that a close relationship was established and held between fluid milk sales and assigned base in the selected markets in 1955.[3] A lesser degree of success was achieved in 1951 and 1953.

The ratio of fluid milk sales-to-base was analyzed also for markets other than the selected markets on an annual market basis only. The ratio ranged from a low of .87 to a high of 1.20. This indicates that a similar degree of success was achieved in these markets as compared to the selected markets.

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[1] A 1:1 ratio means that base allotments are exactly equal to fluid milk sales. The Milk Commission attempts to set total base assigned at 105 percent of fluid milk sales so that a ratio of .95:1 will be the more accurate test from its point of view.

[2] Since fluid milk sales were greater than assigned base.

[3] The obvious exceptions were distributors three, four and five in Newport News in 1955. The major criticism may actually be directed toward too conservative an approach to increasing base since several of the distributors were underbased.

Table 7. Ratio of fluid milk sales-to-base, individual distributors, Roanoke, Harrisonburg and Newport News, selected years[a]

Market and distributor	1951 Ratio fluid milk sales-to-base	1953 Ratio fluid milk sales-to-base	1955 Ratio fluid milk sales-to-base
Roanoke	.97	.99	1.03
1	1.00	1.00	1.06
2	.78	.94	.99
3	1.09	1.13	1.14
4	.98	.99	1.00
Harrisonburg	1.02	.95	1.00
1	--	--	1.04
2	1.02	.95	.99
Newport News	1.10	1.04	.96
1	2.03	1.69	1.10
2	1.22	1.01	1.00
3	.92	.90	.71
4	1.30	1.13	.73
5	--	--	1.32
6	1.06	.95	.96
7	1.00	1.28	.93
8	.96	.85	.91

[a] Ratio computed by dividing annual fluid milk sales by annual base allotments assigned.

Producer relationship

Mention was made earlier of the advantage offered by a base plan in terms of providing individual producers with prior knowledge of the approximate quantity of milk for which they could expect to receive the Class I price. Possession of such knowledge should enable them to better plan their farm operation. The relationship between individual producer base allotments and the fluid milk sales credited to each in 1955 was plotted and then examined by means of regression analysis.

The dot chart, Figure 6, illustrates the observed relationship for Roanoke. Relatively high correlation coefficients were obtained in all three markets.[1] Variation in size of individual producer base allotments accounted for 69 percent, 97 percent and 98 percent of the variation in fluid milk sales credited to each individual producer in the Roanoke, Harrisonburg and Newport News markets, respectively. There was a close relationship between base allotments and fluid milk sales credited to individual producers in the Harrisonburg and Newport News markets. From a predictive standpoint, the relationship in Roanoke was not as close. In that market, on the average, producer base allotments understated the amount of fluid milk sales credited to each producer.

The relationship observed suggests that an individual's base allotment was a good estimate of the amount of fluid milk sales he could expect.

Annual Production Control

Control of production is a major objective of the base-surplus plan used in Virginia milk markets. The establishment of a base for each producer, which represents a proportionate share of the market's fluid milk sales and for which the Class I price will be paid, is the method by which control is attempted.[2] The success of such a method is directly

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[1] The correlation coefficients and simple regression equations where X = 1955 annual base allotment in pounds and Y = 1955 annual fluid milk sales were:

Roanoke - coefficient (.83), $Y = 18168 + .9525X$
Harrisonburg - coefficient (.98), $Y = 3496 + .9915X$
Newport News - coefficient (.99), $Y = -14739 + 1.0032X$

[2] Proportionate share means a proportionate percentage of all fluid milk sales in the market. If this percentage is 5 percent for a given producer he will receive 5 percent of the market's fluid milk sales.

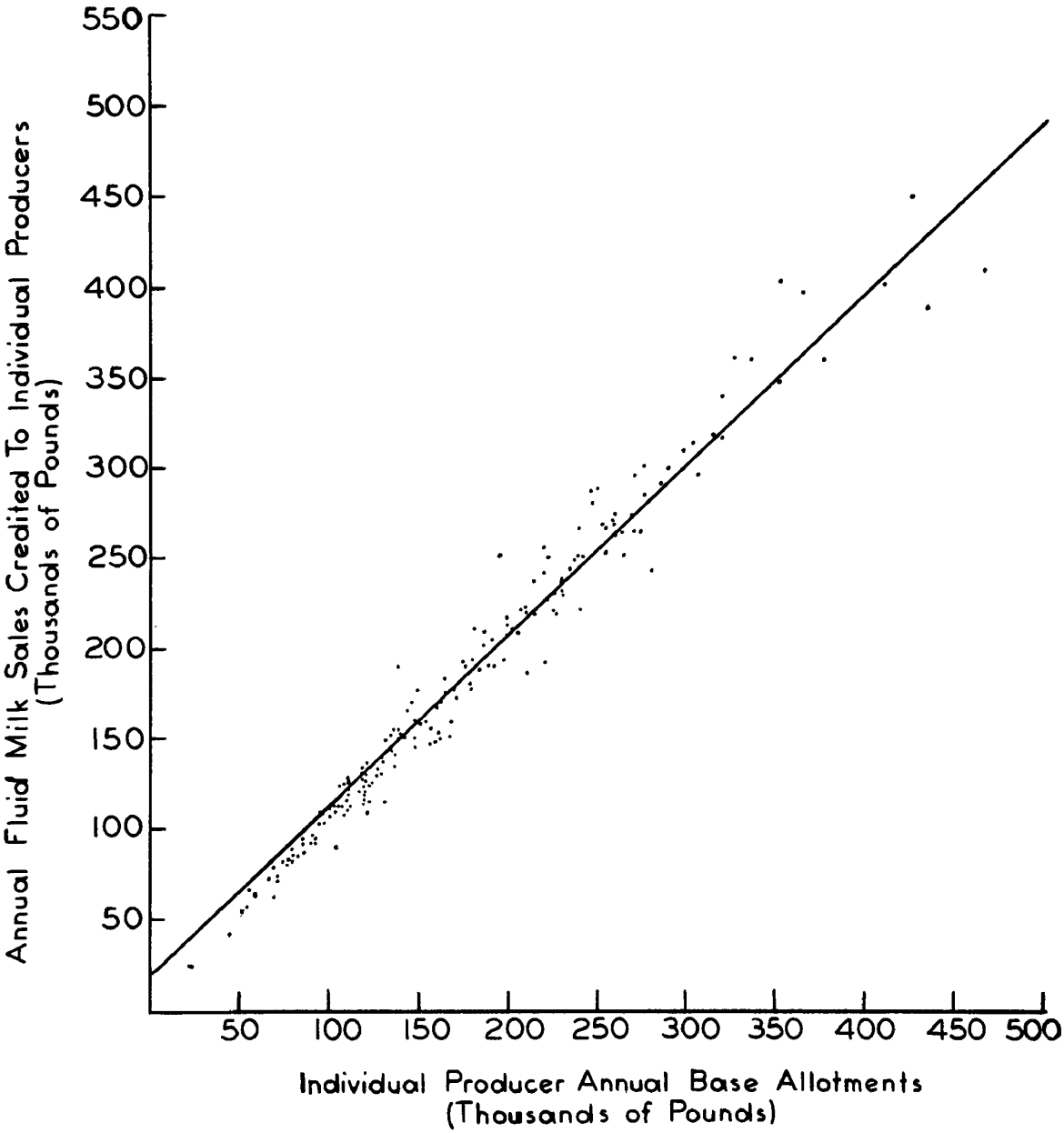

Figure 6. Relationship between individual producer base allotments and the fluid milk sales credited to each producer, Roanoke, 1955

dependent upon the response of individual producers to their assigned base quantities.

Individual Producers

The relationship between individual producer base allotments and their corresponding deliveries of milk in 1955 was plotted and then examined by regression procedures. A relatively close relationship was observed.[1] Figure 7 illustrates the relationship in the Roanoke market in 1955. The relationship between individual producer base allotments and their milk deliveries can also be expressed in terms of a ratio of deliveries-to-base.[2] Such a ratio was calculated for each producer. All producers were divided into groups delivering less than their base allotments and more than their base allotments on an annual basis. Approximately 20 percent of all producers delivered some quantity less than their assigned base. Comparable percentages for individual markets were 13 percent, 14 percent and 31 percent for Roanoke, Harrisonburg and Newport News, respectively. Thus, the majority of the producers overdelivered their assigned bases to some degree.

Relationship over Time

Data on base allotments and milk deliveries were available on 41

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[1] The correlation coefficients and simple regression equations where X = 1955 annual base allotment and Y = 1955 annual milk deliveries were as follows:

Roanoke - coefficient (.84), $Y = 54837 + .8195X$
Harrisonburg - coefficient (.88), $Y = 19358 + 1.1214X$
Newport News - coefficient (.99), $Y = -10684 + 1.0982X$

[2] The ratio was computed by dividing annual deliveries by each individual producer by their corresponding annual base allotments.

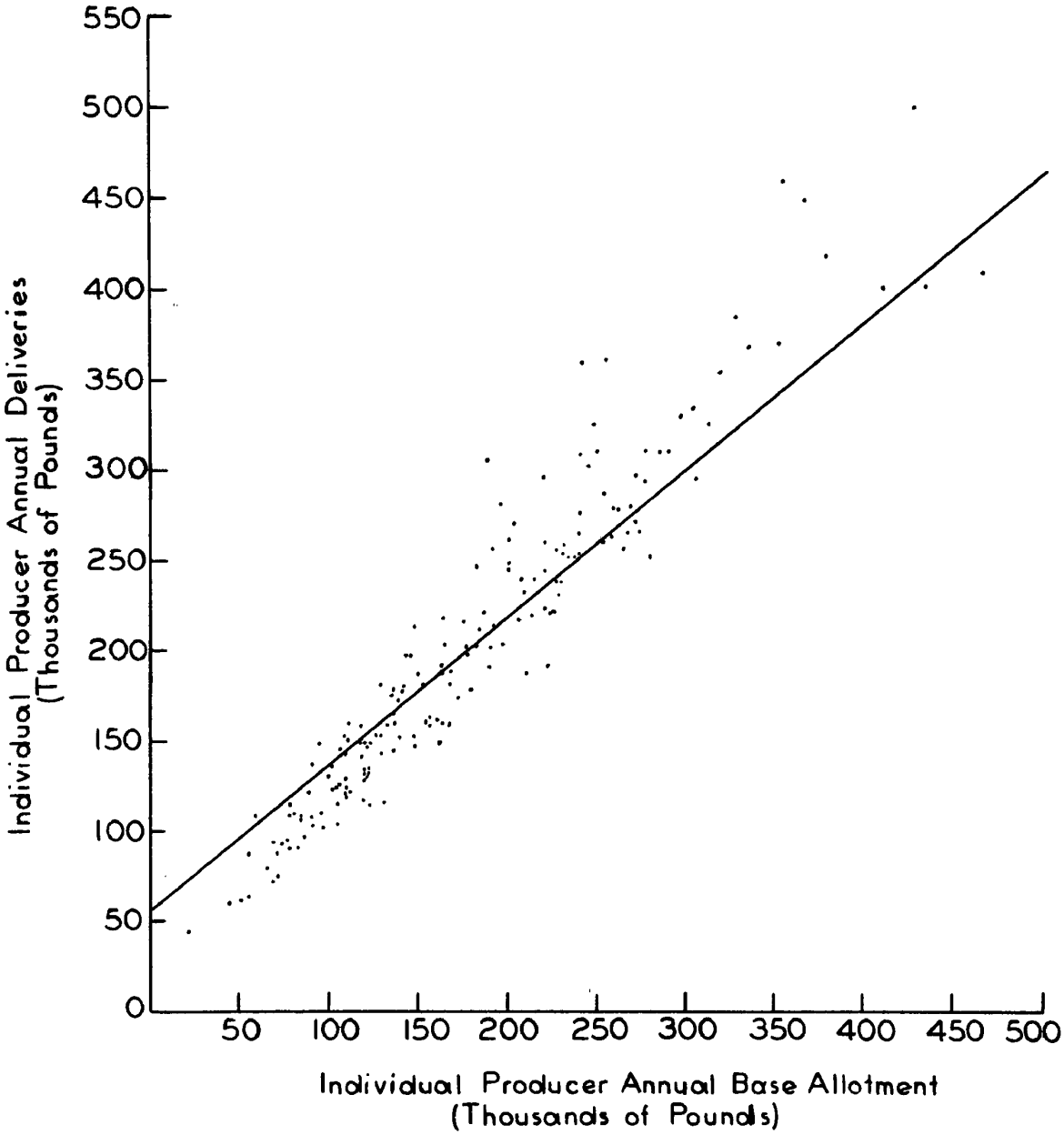

Figure 7. Relationship between individual producer base allotments and the milk deliveries credited to each producer, Roanoke, 1955

producers in the Roanoke market for the years 1939, 1947 and 1955.[1] These data were examined to determine the extent to which the relationship between an individual producer's base allotment and his production response could be expected to remain consistent over time. The results obtained indicate that in the Roanoke market at least there was a consistent relationship during the years examined.[2] This suggests that the regression equation obtained for all producers in 1955 would be a reasonably good predictor of future deliveries which Roanoke producers could be expected to make.

Markets

The deliveries-to-base ratio for several markets is shown in Table 8. The relatively close relationship previously noted for individual producers was reflected in the selected market ratios as well as in most of the other markets. There was, however, considerable variation in the ratio between markets.[3]

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[1] The data for 1939 and 1947 were obtained from unpublished data collected by the Department of Agricultural Economics, Virginia Polytechnic Institute, Blacksburg, Virginia.

[2] The individual simple regression equations for each year where X = annual base allotment in pounds and Y = annual deliveries in pounds were as follows:

$$1939 - Y = 31956 + .9170X$$
$$1947 - Y = 8972 + .9668X$$
$$1955 - Y = 27723 + .9564X$$

Sums of squares due to regression were tested by analysis of variance to determine whether the slopes in the individual equations were significantly different. The F value obtained was 1.451 compared to the tabular value of 3.94 with 1 and 120 degrees of freedom, respectively. The difference between slopes was not significant. The raw data were then pooled and one equation secured to describe the relationship. That equation was $Y = 24302 + .9452X$.

[3] Analysis of variance testing indicated that the differences were statistically significant. The calculated F value for between markets within a given year was 4.61 compared to the tabular value of 3.18 at the 1 percent level.

Table 8. Annual deliveries-to-base ratio, several Virginia milk markets, selected years[a]

Market	Annual deliveries-to-base ratio		
	1951	1953	1955
Roanoke	1.09	1.11	1.12
Harrisonburg	1.19	1.16	1.23
Newport News	1.12	1.09	1.05
Danville	1.09	1.10	1.08
Fredericksburg	1.09	1.11	1.13
Lynchburg	1.15	1.29	1.31
Martinsville	1.03	1.16	1.16
Petersburg[b]	1.09	1.10	1.08
Pulaski[c]	1.13	1.10	1.11
Staunton	1.08	1.30	1.23
Waynesboro	1.18	1.28	1.21
Winchester	1.11	1.08	1.10

[a] Ratio computed by dividing annual milk deliveries by annual assigned base allotments for each market.

[b] Petersburg-Hopewell

[c] Pulaski-Montgomery-Giles

The base-surplus plan's effort to control annual production of milk by means of individual producer base allotments appears to have been highly successful in most of the markets analyzed in this study. A large number of individual producers did overdeliver their assigned

base allotments, but the quantities of excess delivery were not large. This demonstration of control is impressive.[1]

Evaluation and Implications

The analysis presented in this chapter appears to substantiate the two hypotheses stated on page 66. The bulk of the milk moving to market was delivered on a relatively even seasonal basis and the total amount of delivery was not excessive with respect to each market's fluid milk needs. Total receipts of milk were relatively well allocated among individual distributors. The degree of success in achieving these objectives was relative in nature with the most success achieved in Roanoke and the least in Harrisonburg. The evidence available indicates that the base-surplus plan exerted a major influence upon the maintenance of an appropriate supply for the needs of the markets.

These results do not imply that the semi-closed base plan used in these selected markets would necessarily exert the same influence in all other milk markets.[2] The differences observed between the markets examined give evidence of this. However, they do suggest that

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[1] Particularly in light of the fact that many producers were known to have small base allotments. The size of allotments is discussed in Chapter VI.

[2] Historically, the southern region of the United States has been slow to develop as a dairying area. It might be argued that this slow development helps to account for smaller amounts of surplus than found in other areas. It is believed that while this may have been a factor in Virginia markets, its contribution has been small. The base plan has been in effect over a long period of years. All available evidence suggests that it has been the most important factor in holding supplies in relative balance with fluid milk sales.

effective control of supply is possible where marketing quotas are employed. The effects of production control on prices returned to producers and on producer growth problems are discussed in succeeding chapters.

CHAPTER V

PRICES PAID TO PRODUCERS

The ultimate objective of the base-surplus plan is to return to producers prices for their milk which are consistent with established Class I price levels. Efforts toward equalization of supply and production control are means to this end. Chapter IV presented data on the effectiveness of Virginia's administrative efforts to even out seasonal supply patterns, to equalize milk receipts among distributors and to control production. In the present chapter, the effect of these efforts on prices paid to producers from a market average standpoint is considered. The relationships between prices received by individual producers and their seasonal delivery characteristics as well as other related characteristics are considered also. Data are presented relative to two of the hypotheses stated in Chapter I. These are: (1) that the base-surplus plan used in the selected Virginia markets has maintained average prices to producers at a high level relative to established Class I prices and (2) that this plan has provided a substantial price incentives to producers with even delivery patterns.

Market Average Prices

Most milk markets use some form of classified pricing to determine how distributors must pay for the milk which they receive from producers. These price plans always set the fluid milk price at a

higher level than the price paid for milk used in manufactured dairy products. The consensus is that State price control regulations have generally attempted to fix fluid prices at higher levels than have other types of regulation. This may encourage inter-market movement of milk. Even if there are institutional barriers to such movement, there remains an element of danger in this procedure since high consumer prices may adversely effect consumption. If most of the higher price can be returned to producers, the risk may be worthwhile from the producer's viewpoint. However, if production is substantially in excess of fluid milk requirements, prices returned to producers will be materially below the Class I price.[1] This is the untenable situation which exists in some markets. A semi-closed base plan offers a means of alleviating this problem.

Prior discussion has described the fluid milk deliveries and sales situation in the selected markets. The observed supply-demand characteristics together with the fixed class prices determine the average price paid to producers in each market. The relationship between Class I prices and market average prices paid to producers is shown in Table 9. As might have been anticipated from the previous supply analysis, the differences between Class I prices and average prices paid producers were the smallest in Roanoke and the highest in Harrisonburg. The Harrisonburg market had the highest seasonality of delivery, the

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[1] Historically, producers have attempted to combat low prices resulting from low utilization by demanding higher Class I prices. It is difficult to materially raise prices to producers by increasing Class I prices when utilization is already low and total supply is not effectively controlled. Generally speaking, such a move merely aggravates the problem.

Table 9. Comparison of Class I prices and average prices paid to producers, selected Virginia milk markets, 1955

Month	Roanoke			Harrisonburg			Newport News		
	Class I price[a]	Market average price[b]	Difference	Class I price	Market average price	Difference	Class I price	Market average price	Difference
	dollars per hundredweight								
January	6.50	6.38	.12	6.41	6.23	.18	6.76	6.24	.52
February	6.50	6.36	.14	6.41	6.05	.36	6.76	6.18	.58
March	6.50	6.32	.18	6.41	5.95	.46	6.76	6.02	.74
April	6.50	6.02	.48	6.20	5.57	.63	6.35	5.50	.85
May	6.50	5.91	.59	6.20	5.39	.81	6.35	5.46	.89
June	6.50	6.06	.44	6.20	5.16	1.04	6.35	5.62	.73
July	6.50	6.17	.33	6.20	5.26	.94	6.35	5.84	.51
August	6.50	6.14	.36	6.20	5.11	1.09	6.35	5.73	.62
September	6.50	6.21	.29	6.20	5.13	1.07	6.35	5.75	.60
October	6.50	6.33	.17	6.20	5.24	.96	6.55	5.92	.63
November	6.50	6.25	.25	6.20	5.29	.91	6.55	6.05	.50
December	6.50	6.31	.19	6.20	5.15	1.05	6.55	6.13	.42
Weighted average	6.50	6.23	.27	6.25	5.43	.82	6.50	5.89	.61

[a] Class I prices were obtained from State Milk Commission Price Orders.

[b] F.O.B. market. These average price estimates were computed from raw data obtained from the Milk Commission. They were calculated by dividing the total value of all milk delivered to each market by the total amount of milk delivered and adjusting to 4 percent butterfat. Due to minor differences in classification and a hauling differential allowed one distributor in the Newport News market, the above price estimates slightly understate the Roanoke differences and slightly overstate the Newport News differences on an inter-market comparison basis. The form in which the data were available made it impossible to completely eliminate these factors.

highest deliveries-to-base ratio and the lowest annual utilization of any of the three markets. Conversely, Roanoke had the lowest seasonality of delivery, the highest fluid milk sales-to-base ratio and the highest annual utilization. The wider differences in Harrisonburg were largely the result of a greater overdelivery of established base allotments than was true for the other two markets.

A measure of the differences between payment on the base-surplus plan used in the three selected markets and that expected under a straight blend price system was obtained by comparing the average prices paid to producers in these three markets to average prices paid in markets where the straight blend price system of payment is used. Two markets, Richmond and Washington, D. C., were chosen for comparative purposes.[1] A comparison of the differences within each market between the Class I price and the market average price for the five markets is shown in Table 10. The Roanoke and Newport News differences were substantially less than those observed for Washington and, to a lesser degree, than those observed for Richmond. The Harrisonburg differences also were substantially less than Washington, but larger than those for Richmond during some months of the year.[2]

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[1] These two markets were selected because they are geographically contiguous to the selected markets and their Class I price levels are similar to those of the selected markets. Some caution must be exercised in drawing conclusions from this comparison since there are differences in marketing conditions and also in classification which would have some effect on the prices observed. Nevertheless, the comparisons shown in Table 10 serve to illustrate the relative differences.

[2] On a simple average basis, the differences for Richmond were approximately 9 cents higher than for Harrisonburg.

Table 10. Differences between Class I prices and average prices paid to producers, selected Virginia milk markets, Richmond and Washington, D. C., 1955[a]

Month	Class I price less average price paid to producers				
	Roanoke	Harrisonburg	Newport News	Richmond	Washington
	dollars per hundredweight				
January	.12	.18	.52	1.05	1.23
February	.14	.36	.58	.97	1.49
March	.18	.46	.74	1.02	1.53
April	.48	.63	.85	1.16	1.62
May	.59	.81	.89	1.04	1.78
June	.44	1.04	.73	.86	1.48
July	.33	.94	.51	.79	1.43
August	.36	1.09	.62	.76	1.42
September	.29	1.07	.60	.68	1.52
October	.17	.96	.63	.59	1.34
November	.25	.91	.50	.80	1.12
December	.19	1.05	.42	.83	1.08
Weighted average	.27	.82	.61	--	--

[a] Average prices paid in Richmond and Washington were taken from monthly issues of the Fluid Milk and Cream Report, AMS, USDA, Washington, D. C., 1955.

These data do not prove that the Roanoke market, for example, would have experienced greater differences between the Class I price and the average price paid to producers, had that market operated on a straight blend price system rather than the base-surplus plan. However, the data do support a presumption in that direction.

The important point of emphasis is the relative size of the price differences in the selected markets compared to those in the blend price markets. While the method of payment to producers was not the only factor contributing to the size of the price differences, it appears to have played an important role in the creation of the observed differences.[1]

Individual Producer Prices

Factors That Affect Individual Producer Prices

Under the Virginia base-surplus plan, there are at least five major factors which affect the average annual price which an individual producer receives for his milk. These are: (1) his seasonal pattern of delivery; (2) the utilization pattern of his distributor; (3) the level of the Class I and II prices; (4) the size of his base in relation to his actual deliveries of milk; and (5) the extent to which any deliveries over base which he may make are matched with under-base deliveries by other producers.

Highly seasonal producers can expect to have sizeable portions of their total deliveries paid for at the surplus price simply because

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[1] The use of a market-wide pool in Richmond and an association pool in Washington may have exerted some influence toward widening the differences in those two markets.

market fluid milk sales cannot absorb their excess production during their peak period. Seasonal producers whose peak period occurs during the fall months usually do not encounter as severe a price penalty as do seasonal producers whose peak period occurs during other seasons of the year.

In similar fashion, the manner in which a given distributor utilizes his milk and the prices which he is required to pay for each type of usage determines the total value of all milk received from his producers. If distributors are not able to use relatively high percentages of their total receipts from producers in Class I, prices returned to producers will be lowered accordingly.

The fourth and fifth factors listed above are closely tied together. Under the pay-off procedure used in the selected markets, each individual producer usually will receive the Class I price for the full amount of his base and the surplus price for milk delivered in excess of that amount. The exact amount received in each class depends upon the percentage of his total assigned base that his distributor uses in the various classifications. If a distributor uses 100 percent of his assigned base in Class I, then all his producers are eligible to receive all of their base in Class I. If he uses 90 or 110 percent of his assigned base in Class I, individual producers will have the same percentages applied to their individual base quantities. In the event an individual producer does not deliver enough milk to cover the full amount of the Class I sales he is eligible to receive, the difference between the amount he is eligible to receive and the amount he actually delivers is prorated among other producers according

to the amount of base they hold rather than to the amount of surplus milk which they may deliver.[1] This method of prorating "unused" base among remaining producers is distinctly different from the procedure followed under most other base-surplus plans wherein the "unused" base is prorated among producers according to their excess production rather than to their base quantity.

Several of the previously discussed factors affecting producer prices for milk are beyond the control of any individual producer. However, both his seasonal pattern of delivery and the actual quantity which he delivers during any specific time period are subject to some degree of control by the individual. If certain assumptions are made regarding those factors not under his direct control, it is possible to indicate the effect of varying the conditions of those factors under his control on the average annual price he receives. The theoretical price incentives between different seasonal production patterns under specified assumptions can be computed and compared with the actual price differences prevailing in 1955.

Theoretical Price Incentives

Theoretical price incentives were computed to illustrate three specific situations: (1) where producers are free to increase their bases substantially each new base-making period; (2) where producers are not able to increase their bases by production to any appreciable degree and (3) where producers are paid on a straight blend price plan.

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[1] Complete instructions on the pay-off procedure are included in Appendix C.

The first two situations illustrate the price incentives that are available theoretically for leveling production under the Virginia base-surplus plan both as an open system and as a semi-closed base system.

Method used

Price incentives for various seasonal delivery patterns can be determined if the following information is known: (1) the seasonal delivery pattern itself, (2) monthly level of Class I and II prices, and (3) the size of an individual producer's base. With such information at hand and additional assumptions made regarding utilization and butterfat test, average annual prices received can be computed for producers with different seasonal delivery patterns. The same method was used to determine the theoretically possible incentives under both the open and semi-closed systems.

The technique employed can be summarized as follows:[1] (1) determine a set of theoretical seasonal delivery patterns which might represent the various types of seasonal producers found in the selected markets; (2) specify some total amount of milk delivered by each type of producer annually, and, using the predetermined delivery pattern, calculate the amount of milk delivered each month; (3) determine the average monthly deliveries during September, October and November for each specific delivery pattern and establish this average as the

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[1] Quackenbush and Homme used the general technique described below in their study. See G. G. Quackenbush and H. A. Homme, Seasonal Price Incentives of the Base and Excess Plan in the Detroit Milk Market, Michigan Agricultural Experiment Station Technical Bulletin 228, March, 1952.

base for the respective types of producers; and (4) multiply the amount of the base delivery in each month by the Class I price and the amount of the surplus delivery each month by the Class II price for each delivery pattern. Sum the total value of milk for each month and divide by the total amount of milk shipped during the year. This gives an average annual price per hundredweight. In determining the price incentives which follow, the actual Class I and II prices which prevailed in each of the selected markets during 1955 were applied to the theoretical delivery patterns. Two assumptions were made: (1) Class I sales of distributors are identical to their assigned bases and (2) the butterfat test of milk delivered is 4 percent.

The price incentives which would have resulted from payment on a straight blend price basis were similarly computed by substituting market blend prices for Class I and Class II prices in the above described computational technique. Incentives thus obtained were compared with those obtained under the base-surplus system to ascertain which method of payment offered the greatest incentive for even delivery throughout the year.

Relevant price information

The calculation of average annual prices paid to producers necessitated prior knowledge of the monthly level of Class I and Class II prices. Table 11 summarizes these prices for each of the selected markets for 1955. Under the Virginia Milk Commission's regulatory framework, the Class II price is determined by formula. This price

Table 11. Class I and Class II prices for 4 percent butterfat milk, selected Virginia milk markets, 1955

Month	Market					
	Roanoke		Harrisonburg		Newport News	
	Class I	Class II	Class I	Class II	Class I	Class II
	dollars per hundredweight					
January	6.50	3.08	6.41	3.08	6.76	3.08
February	6.50	3.07	6.41	3.07	6.76	3.07
March	6.50	3.07	6.41	3.07	6.76	3.07
April	6.50	2.32	6.20	2.32	6.35	2.32
May	6.50	2.31	6.20	2.31	6.35	2.31
June	6.50	2.31	6.20	2.31	6.35	2.31
July	6.50	2.31	6.20	2.31	6.35	2.31
August	6.50	2.33	6.20	2.33	6.35	2.33
September	6.50	2.36	6.20	2.36	6.35	2.36
October	6.50	3.09	6.20	3.09	6.55	3.09
November	6.50	3.08	6.20	3.08	6.55	3.08
December	6.50	3.10	6.20	3.10	6.55	3.10

varies from month to month as specified by the formula.[1] On the other hand, the Class I price is a fixed price which does not fluctuate from month to month. Its level is determined on the basis of testimony presented at public hearings. Once a price is set in this manner, it remains in effect until another hearing is held. It may, however, change

[1] The formula in effect during 1955 contained the following specifications: to determine the Class II price for any month multiply the average New York 92 Score butter price for that month by the percent butterfat in the milk and add 75 cents except for the months of April through September. In these months the 75 cents was not added. For example, the price for May, 1955 was determined as follows: 57.85 cents x 4 = $2.31.

seasonally from spring to fall either as the result of a provision in the order or of a public hearing called for that purpose. Orders for the Newport News and Harrisonburg markets contained a provision for seasonal changes in the Class I price.

The average price paid to producers must also be known in order to compute the price incentives which would have occurred had producers been paid on a straight blend price basis rather than on the base-surplus plan. Table 12 summarizes these prices for each market for 1955. These prices were computed by dividing the total value of milk in each market each month by the total deliveries to the market expressed in hundredweights. The resultant figure was adjusted for butterfat test to 4 percent. Basic data for the computation of all price information were taken from the records of the Virginia Milk Commission.

Situation one - open base incentives

Six different seasonal delivery patterns were constructed to measure the incentives available between different seasonal patterns. These patterns are portrayed graphically in Figure 8. They are similar in nature to individual patterns actually existing in the selected markets. They range from a perfectly even pattern FF to a highly seasonal pattern EE, in which deliveries during September are only one-fourth as large as deliveries during May. Pattern AA represents the actual average market pattern previously observed (Figure 5), while pattern BB is constructed to represent the exact opposite of AA. Patterns CC and DD represent the delivery of two-thirds as much milk

Table 12. Average price paid to producers for 4 percent butterfat milk, selected Virginia milk markets, 1955

Month	Market		
	Roanoke	Harrisonburg	Newport News
	dollars per hundredweight		
January	6.38	6.23	6.24
February	6.36	6.05	6.18
March	6.32	5.95	6.02
April	6.02	5.57	5.50
May	5.91	5.39	5.46
June	6.06	5.16	5.62
July	6.17	5.26	5.84
August	6.14	5.11	5.73
September	6.21	5.13	5.75
October	6.33	5.24	5.92
November	6.25	5.29	6.05
December	6.31	5.15	6.13

in September as in May and the delivery of 50 percent more milk in September than in May, respectively.

In applying the relevant price information to these seasonal patterns by the technique previously described, it was assumed that each producer delivered a total of 1200 hundredweight of milk during the year. This total amount was divided between months in accordance with the patterns portrayed in Figure 8. The bases established under the various patterns are of different sizes. Any other assumed amount of total delivery by each producer would yield the same average annual prices.

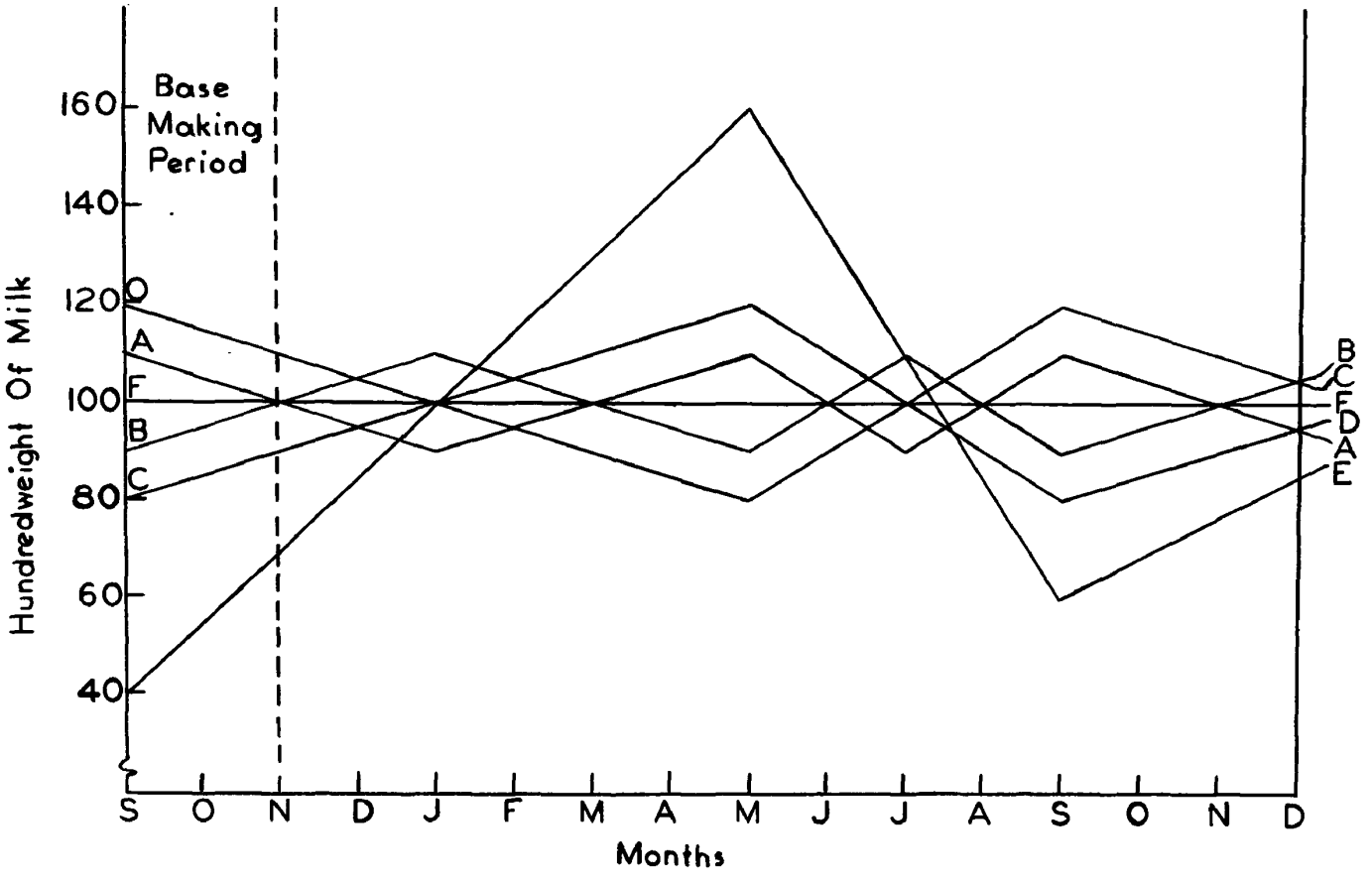

Figure 8. Theoretical milk delivery patterns

Table 13 summarizes the average annual prices which would have been paid to producers with the specified delivery patterns shown in Figure 8 under both an open base-surplus plan of payment and the straight blend price system of payment. It is apparent that in all three markets an open base-surplus plan would have offered substantial incentives for evening out seasonal delivery patterns. A producer with the completely even pattern FF would have received $1.79 hundredweight, $1.68 per hundredweight and $1.79 per hundredweight more in the Roanoke, Harrisonburg and Newport News markets, respectively, than a producer whose pattern was the most seasonal, EE. Likewise, a reduction in seasonality illustrated by a change from EE to CC would have increased an individual producer's average annual price by $1.19 per hundredweight, $1.12 per hundredweight and $1.20 per hundredweight in Roanoke, Harrisonburg and Newport News, respectively.

Table 13 illustrates also the fact that a seasonal production pattern having its peak in the base-making period will return a higher price than a seasonal pattern which results in a peak at a time other than the base-making period. This may be observed by comparing pattern DD with pattern CC. The price difference in favor of DD was 58 cents per hundredweight, 54 cents per hundredweight and 57 cents per hundredweight in Roanoke, Harrisonburg and Newport News, respectively.

Examination of the average annual prices that would result from the blend price system of payment indicated that this method offers very little incentive for reducing seasonality. The biggest single difference between prices received by producers with the seasonal patterns presented in Figure 8 would have been 8 cents per hundredweight

Table 13. Average annual prices received by producers with specified seasonal milk delivery patterns under two methods of payment, selected Virginia milk markets, 1955

Type of delivery pattern[a]	Roanoke		Harrisonburg		Newport News	
	Base-Surplus method	Straight blend price method	Base-Surplus method	Straight blend price method	Base-Surplus method	Straight blend price method
	dollars per hundredweight					
AA	6.47	6.21	6.22	5.45	6.46	5.86
BB	6.28	6.22	6.05	5.47	6.29	5.88
CC	5.90	6.21	5.69	5.48	5.91	5.86
DD	6.48	6.22	6.23	5.44	6.48	5.88
EE	4.71	6.19	4.57	5.52	4.71	5.84
FF	6.50	6.22	6.25	5.46	6.50	5.87

[a] AA - Average market deliveries.
BB - Exactly opposite to that of AA.
CC - Deliveries in September two-thirds as high as in May.
DD - Deliveries in September 50 percent greater than in May.
EE - Highly seasonal, September deliveries one-fourth of May deliveries.
FF - Perfectly even deliveries.

in Harrisonburg between patterns DD and EE. Under the price and delivery conditions stipulated for these markets during 1955, the blend price system of payment actually would have returned the highly seasonal producer a higher price than the base-surplus plan. The difference in the incentives offered by the two types of payment plans for Newport News is graphically portrayed in Figure 9. The difference between the incentives which would be offered by each method is very much in evidence.

The rather wide spread between Class I and Class II prices in the selected markets is an important factor affecting the size of the price incentives which would be offered by an open base plan for evening out seasonal deliveries of milk. On a simple average basis, the spread was $3.80 per hundredweight in Roanoke, $3.55 per hundredweight in Harrisonburg and $3.80 per hundredweight in Newport News. Assume for illustrative purposes that the spread in the Roanoke market had only been $2.00 per hundredweight rather than $3.80 per hundredweight. The price incentive offered to the highly seasonal producer EE to lower his seasonal variation to that of pattern CC would have been 64 cents per hundredweight in Roanoke rather than the $1.19 per hundredweight available under the actual $3.80 spread.

Situation two - semi-closed base incentives

Under the semi-closed base plan actually operating in the selected markets, individual producers probably would not make the seasonal shifts indicated in the previous discussion unless they purchased some

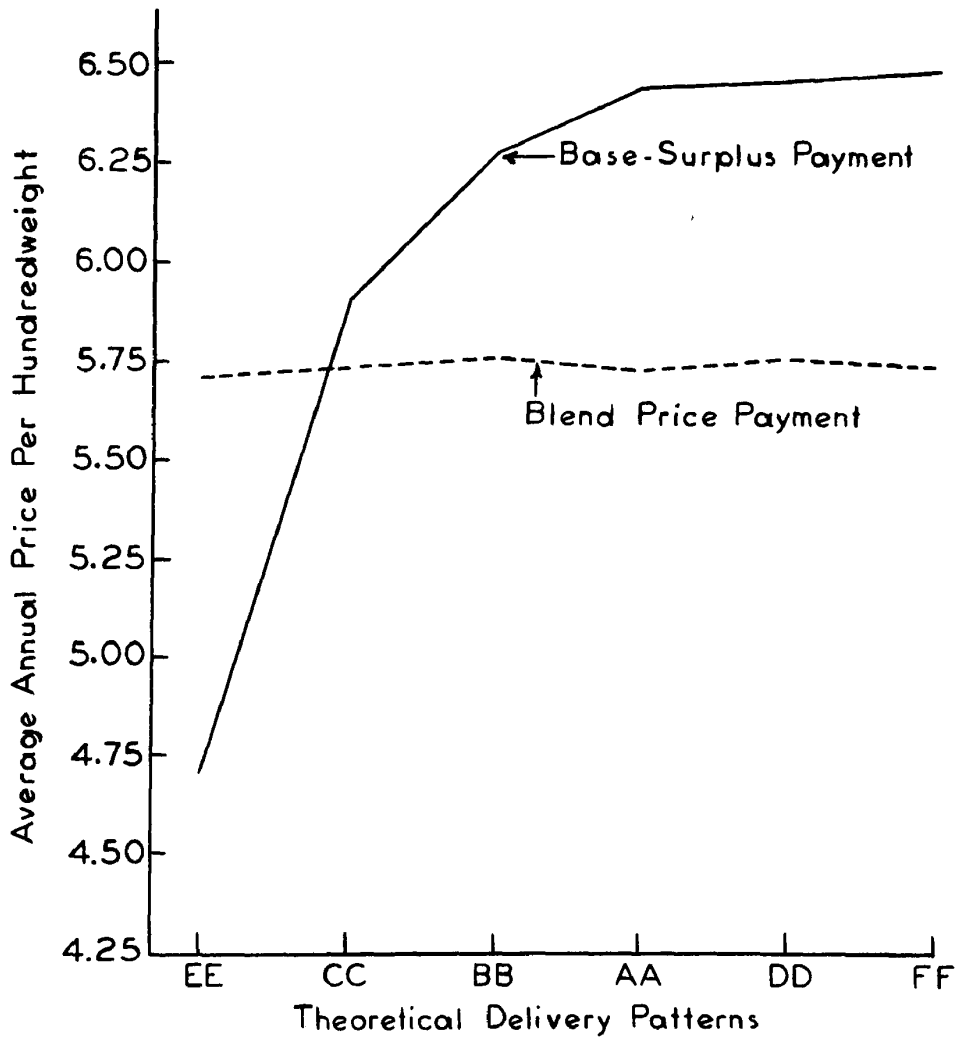

Figure 9. Average annual prices--under a base-surplus payment plan and a blend price payment plan, Newport News, 1955

additional base from other producers.[1] Under the semi-closed plan year-to-year base changes are quite small; consequently, the only price incentive available is that offered by delivery of a given quantity of base (whatever the size) on an even monthly basis. Figure 10 illustrates three delivery patterns--all with the same size base in the Roanoke market. A producer with seasonal delivery pattern AB or AC would receive $6.22 per hundredweight average annual price compared to $6.50 for a producer with pattern AD. Thus, 28 cents could be obtained by leveling production. This price incentive is much smaller than those indicated under the open base-surplus plan when both types of plans are superimposed on the same Class I and II price conditions.

Six months base plan

At various times in recent years, consideration has been given to the possibility of paying producers on the base-surplus plan only during certain months of the year and paying on a straight blend price basis during the remaining months. One such proposal was that producers be paid on the base-surplus plan during the period March through August inclusive and on a blend price basis the remaining months.[2]

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[1] Under the semi-closed plan, base increases by increased production are very small from year to year. It would not be possible to make the substantial shifts assumed under the open base system unless additional base was purchased.

[2] Fred J. Saunders, Jr., "First Aid for the Base-Surplus Plan in Virginia Controlled Markets", Virginia Farm Economics, Department of Agricultural Economics, Virginia Polytechnic Institute, Blacksburg, Virginia, No. 132, August,1952, pp. 30-33.

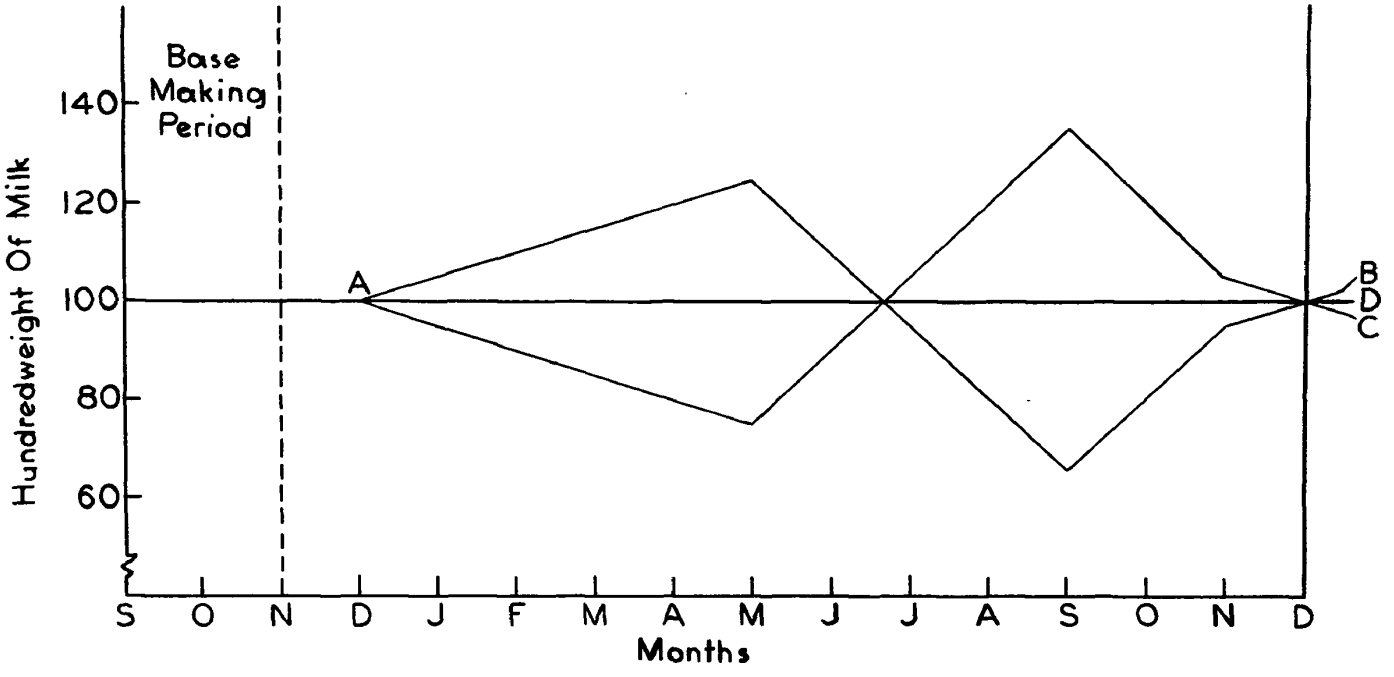

Figure 10. Theoretical milk delivery patterns, semi-closed base plan, Roanoke, 1955

There are numerous advantages and disadvantages which might be cited with regard to such a change. For the purposes of this study, only the effect on the theoretical seasonal price incentives was considered. The method used in determining price incentives under the above described payment stipulations was identical to that previously used for determination of average annual prices (situation one) with one exception. Average market prices from Table 12 were applied to the delivery patterns of Figure 8 for January, February, September, October, November and December while the Class I and II prices from Table 11 were used for the period March through August inclusive.

Since it already has been demonstrated that payment on the blend price alone would greatly reduce price incentives for leveling production, it was expected that payment on a combination of base and blend price also would offer less price incentive than payment on base alone. Calculation of incentives under the combination base and blend price system indicated that this was true. Figure 11 illustrates the differences in theoretical incentives for the Roanoke market between paying the entire year on the base system and only paying six months on that system. If it had been employed for only six months, the incentive for reducing seasonality from pattern EE to pattern FF would have been $1.33 per hundredweight compared to the $1.79 incentive available for the same change under twelve months' use of the base plan. Similarly, a shift from EE to CC would have resulted in an incentive of 89 cents per hundredweight under the six months base payment plan as compared to $1.19 per hundredweight under the twelve months plan.

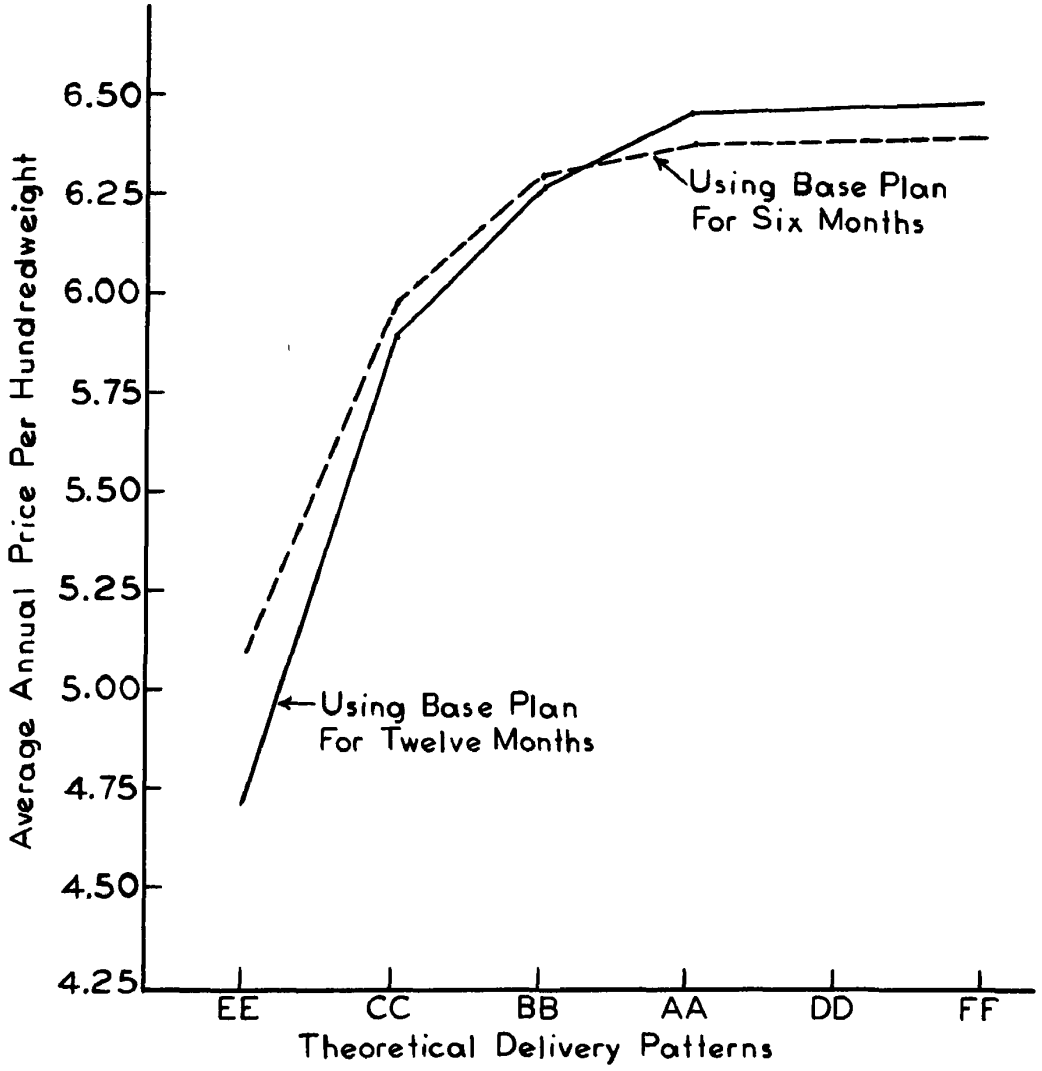

Figure 11. Average annual prices--under six months and twelve months usage of the base-surplus plan, Roanoke, 1955

The direction of incentive changes were the same for Harrisonburg and Newport News as for Roanoke but the magnitude of the decrease in price incentives was somewhat greater in these two markets. For example, the price incentive in Harrisonburg between patterns EE and FF under the twelve months base payment plan was $1.68 per hundredweight. Under the six months base payment plan the corresponding incentive was only $1.15 per hundredweight. A change to the six months plan would have decreased the incentive by 32 percent. In the comparable situation described previously for Roanoke, the decrease in incentive would have been 26 percent.

Actual Price Differences

The analysis of theoretical price incentives under a semi-closed base system (situation two) indicated that incentives for evening out deliveries are likely to be small. Consequently, in the absence of large incentives, the seasonal variations in deliveries for individual producers might be expected to be large. The seasonal delivery patterns of individual producers in the selected markets were examined to determine the extent to which wide variations did exist. As a basis for this analysis, three categories representing varying degrees of seasonality were established. With the relationship of the high month-to-low month expressed as an index, the three categories were delineated as follows: 150 percent and under, 151-186 percent and 187 percent and over.[1] The number of producers in each category along with attendant

[1] Seasonality of delivery was computed by dividing each individual producer's deliveries during his low month into his deliveries during his peak month of delivery.

average annual price information is shown in Table 14. On the basis of the categories listed above, 64 percent, 93 percent and 74 percent of the producers in Roanoke, Harrisonburg and Newport News, respectively, delivered at least 51 percent more milk in their peak delivery month than they delivered in their low month. Twenty-six percent, 41 percent and 38 percent of the producers in these same markets delivered at least 87 percent more milk during their peak month.[1] These wide variations conform to the expectation, developed earlier in this chapter, that individual producers may have highly seasonal delivery patterns under the semi-closed base system since it provides a relatively weak incentive for leveling production.

The differences in average annual prices shown in Table 14 are indicative of the lack of a large, consistent price advantage to be gained by evening out seasonality of delivery under the semi-closed base plan.[2] The size of these price differences probably would not encourage very many producers to make material changes toward leveling out their individual seasonal delivery patterns.

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[1] Cross-classification of the seasonality of delivery categories by size of 1955 base allotment indicated that small producers were definitely more seasonal in their deliveries than were their larger counterparts.

[2] These price differences are not strictly comparable to the price incentives previously discussed. For this reason they are labeled price differences rather than incentives. Price differences are the result of the actual seasonality of delivery patterns of individual producers and are affected by changes in the seasonal utilization patterns of the various distributors as well as other related factors. Some of these factors were held static by assumption in the previous analysis. However, these price differences do reflect the general magnitude of the actual price incentives between the lower and higher seasonal delivery variations.

Table 14. Producers classified by seasonality of delivery and the price differences between categories, selected Virginia milk markets, 1955

Market and distributor	Number of producers in seasonality categories				Average difference in average annual price between lowest and highest seasonality categories
	150 percent and under	151-186 percent	187 percent and over	Totals	
					(cents)
Roanoke	64	67	47	178	--
1	32	34	18	84	+.16
2	27	28	19	74	+.24
3	4	2	6	12	+.03
4	1	3	4	8	-.09
Harrisonburg	3	22	17	42	--
1	3	21	13	37	+.17
2	0	1	4	5	-.01
Newport News	32	44	46	122	--
1	5	7	7	19	+.10
2	2	4	4	10	+.31
3	0	4	1	5	-.18
4	3	3	2	8	+.42
5	1	0	4	5	-.16
6	2	4	10	16	-.40
7	5	6	2	13	-.18
8	14	16	16	46	-.08

The discussion of individual producer deliveries thus far has not considered the months of the year where the high and low points were located. If the high points were scattered uniformly throughout the year, the semi-closed base plan could still achieve its major seasonal objective of reducing market seasonality of supply.[1] To determine the

[1] Evidence was presented in Chapter IV that this objective had been attained. The present discussion attempts to explain how this was possible in the face of high individual producer seasonality of delivery.

distribution of peak deliveries for individual producers throughout the year 1955, each producer was classified according to the calendar quarter in which his peak delivery occurred. The results of this classification are shown in Table 15. Individual producers were well distributed among the four quarters, especially in Roanoke and Newport News. It is particularly significant that 67 percent, 59 percent and 75 percent of the producers in Roanoke, Harrisonburg and Newport News, respectively, delivered their peak quantity of milk during some month other than April, May or June. For all practical purposes, the third and fourth quarters can be considered together since most third quarter producers' high month was September. Such a grouping includes a majority of the producers in each market indicating the influence of the base-making period on deliveries despite the fact that each individual producer was not likely to gain a sizeable increase in his base. This influence appears to have exerted itself in two ways: (1) in order to get any increase in base an individual must increase his deliveries substantially during September, October and November (the 110 percent rule) and (2) if he does not at least maintain the level of his present base during the base-making period, his new base will be smaller. The results observed suggest that even though the semi-closed base plan did not offer large price incentives for leveling production, its internal provisions (those applying to the base-making period) were of such a nature as to encourage substantial number of producers to concentrate their production emphasis on the normally short months.

Table 15. Producers classified by high quarter of delivery, selected Virginia milk markets, 1955

Market and distributor	Number of producers				
	First quarter[a]	Second quarter[b]	Third quarter[c]	Fourth quarter[d]	Total
Roanoke	24	58	60	36	178
1	9	28	24	22	83
2	15	21	27	12	75
3	0	4	6	2	12
4	0	5	3	0	8
Harrisonburg	3	17	11	11	42
1	3	15	10	9	37
2	0	2	1	2	5
Newport News	20	30	32	40	122
1	7	5	0	7	19
2	1	6	2	1	10
3	1	1	3	0	5
4	0	2	5	1	8
5	0	2	2	1	5
6	5	2	3	6	16
7	1	2	6	4	13
8	5	10	11	20	46

[a] January - March

[b] April - June

[c] July - September

[d] October - December

Deliveries-to-Base Ratio

A final aspect of individual producer prices is their relationship to each producer's annual deliveries-to-base ratio. The total amount of milk which an individual producer delivers during the year relative to his established base has an important influence on the average annual price he receives. Table 16 shows this influence very clearly. The

deliveries-to-base ratios were divided into five size groups: less than 1.00, 1.00-1.10, 1.11-1.21, 1.22-1.32 and 1.33 and over.[1] A definite relationship existed between the ratio and the average annual prices received by producers. Progressive increases in the quantity of milk delivered relative to assigned base resulted in correspondingly lower average annual prices. On a simple average basis, the difference between the highest and lowest ratio groups was 70 cents, 43 cents and 76 cents in Roanoke, Harrisonburg and Newport News, respectively.

Table 16. Average annual prices received by producers in various deliveries-to-base ratio classifications, selected Virginia milk markets, 1955

Distributor	Deliveries-to-base ratio classifications				
	Less than 1.00	1.00-1.10	1.11-1.21	1.22-1.32	1.33 and over
	dollars per hundredweight				
Roanoke					
1	6.47	6.46	6.28	6.17	5.93
2	6.41	6.36	6.16	5.95	5.51
3	6.48	6.27	6.21	6.01	5.62
4	6.50	6.43	6.32	6.05	5.99
Harrisonburg					
1	6.09	6.07	5.89	5.79	5.40
2	6.24	--	6.22	6.06	--
Newport News					
1	6.50	5.93	6.15	--	5.16
2	6.39	6.05	6.03	5.91	--
3	6.32	6.20	--	--	5.60
4	5.73	5.31	4.88	4.93	--
5	6.41	6.39	6.08	6.13	--
6	6.25	6.18	5.87	--	--
7	6.43	6.02	5.81	5.44	5.26
8	6.30	6.10	5.88	5.66	5.40

[1] The results are shown in terms of the producers shipping to each distributor in order to hold distributor utilization constant while comparing ratios to average annual prices received.

Alternatively, the relationship between amount of milk delivered relative to assigned base and average annual price can be expressed in terms of a simple regression equation. Correlation coefficients, coefficients of determination and regression equations are shown by individual distributors for each market in Table 17. In most instances relatively high correlation coefficients were obtained.

Table 17. Regression analysis of the relationship between deliveries-to-base ratio and average annual prices received by individual producers, selected Virginia milk markets, 1955

Distributor	Correlation coefficient	Coefficient of determination	Simple regression equation[a]
		(percent)	
Roanoke			
1	-.845	71.4	Y = 7.84 - 1.3584X
2	-.917	84.1	Y = 8.06 - 1.6629X
3	-.706	49.8	Y = 7.81 - 1.4201X
4	-.857	73.4	Y = 7.61 - 1.1646X
Harrisonburg			
1	-.900	81.0	Y = 7.03 - .9783X
2	-.810	65.6	Y = 7.00 - .8465X
Newport News			
1	-.614	37.7	Y = 7.28 - 1.0253X
2	-.764	58.4	Y = 7.90 - 1.6388X
3	-.977	95.5	Y = 8.12 - 1.8771X
4	-.898	80.6	Y = 7.88 - 2.4310X
5	-.835	69.7	Y = 7.01 - .7179X
6	-.383	14.7	Y = 7.53 - 1.3730X
7	-.992	98.4	Y = 8.51 - 2.3505X
8	-.928	86.1	Y = 7.77 - 1.6278X

[a] Where X = deliveries-to-base ratio and Y = estimated average annual price.

Evaluation and Implications

Analysis of average prices returned to producers indicated that in most instances average prices received by producers in the selected markets were consistent with the level of established Class I prices. Average prices paid to producers in the selected markets were generally more favorable than those received by producers in contiguous markets using the straight blend price payment system.

The semi-closed base plan was found to offer relatively small price incentives for leveling seasonal milk deliveries.[1] As a result, most individual producers were found to have highly seasonal delivery patterns. However, the peak points of delivery were remarkably well distributed throughout the year in each market, rather than concentrated in the months of April, May and June. This suggests that, where a semi-closed base plan encourages a relatively even distribution of peak deliveries over the year, it is not essential that individual producers completely level their deliveries.

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[1] This is contrary to the hypothesis stated in Chapter I.

CHAPTER VI

PRODUCER GROWTH AND BASE TRANSFERS

Any production control program is likely to have some impact on the growth and resource allocation problems of the individuals over whom the control is exercised. Since production control is an important objective of the base-surplus plan used in Virginia milk markets, consideration was given to the nature of the plan's influence and impact on growth and resource adjustment.[1] This chapter presents the analysis of data relevant to the hypothesis that the semi-closed base plan has tended to retard individual producer growth over time, thus perpetuating substantial numbers of uneconomical and inefficient production units.

The general agricultural trend of fewer but larger production units appears to hold true for most of the Nation's important dairy areas. New technological developments, such as farm bulk tanks, pipe line milkers and milking parlors, have combined with rising costs to exert a strong influence toward individual firm expansion. The necessity for growth has been felt as keenly in Virginia as elsewhere.

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[1] The purpose of this chapter is to indicate the direction of the impact. No attempt has been made to examine in detail the actual resource combination problems and other related factors on individual farms. However, plans have been initiated for future investigation along those lines.

Growth Over Time

In Virginia milk markets there are two methods by which individual producers can grow: (1) by producing in excess of their current base in each base-making period in order to qualify for any additional allotments available from increases in market fluid milk sales and (2) by the purchase of existing base allotments from other producers in the market. This section compares the growth over time of producers who used each method or a combination of the two methods of expansion. Table 18 summarizes the average growth pattern for four groups of producers in each market.[1] Two general observations can be made from Table 18. First, average base growth in Roanoke was small relative to the other two markets in all comparable groups except one--group III in Harrisonburg. Secondly, average growth by purchase was a greater proportion of average total growth in Roanoke producer groups (where purchases were made) than in either of the other two markets.

Groups I and II probably are more important for the purposes of this study than either of the other two groups. The average net change in base was quite small for those Roanoke producers who had been on the market since 1947, but had never purchased any base. Within that group of 43 producers, 29 increased their monthly base and 14 ended up with

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[1] The producers in each market were divided into four groups in terms of when they entered the market, how they entered and whether or not they purchased any additional base after entry was made. Each individual producer's beginning and ending base (1956) was noted. His net purchase of base (total of all purchases he made minus any sale of base he made) was also noted. His net gain in base by production was treated as a residual figure secured by subtracting his net gain by purchase (if any) from the total net difference between his beginning and ending monthly base allotment. All information on size of allotments and transfers was taken from Virginia Milk Commission records.

lower bases in 1956 than they had in 1947. Of the 29 producers who increased their base, 18 had increases of less than 2,000 pounds, while 11 had increases greater than 2,000 pounds. Of the 14 producers who ended up with smaller allotments, 6 had decreases of less than 2,000 pounds and 8 had decreases of more than 2,000 pounds.

Table 18. Average base growth, specified groups of producers, selected Virginia milk markets, 1947-56

Market and item	Group classifications[a]			
	I	II	III	IV
Roanoke				
Number of producers	43	51	59	25
Beginning monthly base, pounds	15,074	15,721	11,315	13,012
Net change by production, pounds	505	388	1,573	788
Net change by purchase, pounds	---	4,059	2,232	320
Ending monthly base, pounds	15,579	20,168	15,120	14,120
Total net change, pounds	505	4,447	3,805	1,108
Harrisonburg				
Number of producers	20	0	17	5
Beginning monthly base, pounds	11,270	---	10,288	12,100
Net change by production, pounds	5,330	---	2,741	5,060
Net change by purchase, pounds	---	---	982	2,200
Ending monthly base, pounds	16,600	---	14,011	19,360
Total net change, pounds	5,330	---	3,723	7,260
Newport News				
Number of producers	12	7	98	5
Beginning monthly base, pounds	16,142	15,257	14,200	14,480
Net change by production, pounds	6,108	3,472	3,428	5,940
Net change by purchase, pounds	---	5,771	1,382	360
Ending monthly base, pounds	22,250	24,500	19,010	20,780
Total net change, pounds	6,108	9,243	4,810	6,300

[a] I - Those producers who were on the market in 1947 and purchased no additional base.

II - Those producers who were on the market in 1947 but did purchase additional base.

III - Those producers who entered the market since 1947 by making their initial base.

IV - Those producers who entered the market since 1947 but who purchased their entering allotment.

By way of contrast, average net increase in base was considerably larger for those Roanoke producers who had been on the market since 1947 and who had purchased additional base. Within that group of 51 producers, only 5 producers ended up with smaller bases in 1956 than they had in 1947. Only 10 percent had smaller ending bases as compared with nearly 30 percent in the nonpurchase group. Of the 46 producers in the purchase group who did end up with larger bases, 14 had increases of less than 2,000 pounds and 32 had increases of more than 2,000 pounds. However, of the 46 producers who increased their base, 36 had more than 50 percent of their net increase attributed to purchases which they had made. Had they not made purchases, their increases or decreases would have been very much like those of producers in the nonpurchase group.[1]

The small average base growth in Roanoke and the apparent dependence upon base transfers for growth in that market appears to be the result of: (1) very rigid enforcement of the regulations pertaining to the allotting of new base; (2) only moderate year-to-year growth in market fluid milk sales and (3) a special effort to hold production and sales in balance.

In the Harrisonburg market, the average net increase in base was greater for those producers who were in the market in 1947 but had not purchased any base than was shown for the comparable group in Roanoke.

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[1] There were 19 producers in the total group of 51 who actually lost a portion of their net purchase through production losses. This indicates that there is always a definite possibility of losing some portion of base purchased through failure to meet the necessary quota in succeeding base-making periods.

Of the 20 producers in Harrisonburg in that group, 19 increased their base and 1 decreased. Of the 19 who increased, 15 had increases larger than 2,000 pounds. Even with the larger base growth in Harrisonburg (as compared to Roanoke), many producers in that market indicated that they needed additional base in order to utilize efficiently the resources at their disposal (this is discussed at a later point in this chapter). This would seem to indicate that even though Harrisonburg producers grew more in absolute terms, in relation to their need for base, they were in about the same situation as the producer group in Roanoke.

The Newport News market had relatively few producers who had been in the market during the entire 1947-56 period. The average base growth of those who were in the market during that time was greater than in either of the other two markets. In the group of 12 producers who did not purchase any additional base, 10 increased their base and 2 lost some base. Of those who increased, 2 had increases of less than 2,000 pounds and 8 had increases greater than 2,000 pounds. Each of the 7 producers who did purchase some additional base had base increases of more than 2,000 pounds.

A very rapid expansion of fluid milk sales (due to expanding population) was the chief stimulus to base growth in Newport News. Evidence of this expansion is reflected in the number of new producers assigned bases on the market since 1947. Nearly 85 percent of the producers in the market in 1955 had been assigned bases since 1947.[1]

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[1] Some of these producers had shipped to the market before they became baseholders.

Base growth data for those producers who had been in the Roanoke market since 1947 were examined by 1947 base size groups to appraise growth between beginning size groups. Groups I and II were subsorted on the following 1947 base size groups: 8,000 pounds and under, 8,100 - 16,100 pounds and 16,200 pounds and over. Average base growth by 1947 base size groups for those Roanoke producers who purchased additional base and those who did not purchase any base is shown in Table 19.[1] In the nonpurchase group, there appeared to be some tendency for the smaller producers to increase their allotments slightly and for the larger producers to decrease in size of base (hence the small average growth of 505 pounds shown in Table 18). Even though the smaller producers in the nonpurchase group (Group I) grew more than their larger counterparts, they were still quite small in 1956. Only 1 of the 12 producers in the 8,000 pounds or less group ended up with a base larger than 10,000 pounds.

In the group which did purchase additional base, there was a net change-by-production relationship between size groups similar to that described for the nonpurchase group. However, their base purchases offset the production changes in such a manner that all three size groups had similar average increases in pounds of base.

Base allotment data were available for 41 of the current Roanoke producers (1955) as far back as 1936. These data were examined in the same manner as that previously described for all producers. The results are shown in Table 20. The data reemphasize the fact that

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[1] The small number of producers in each size group in the other two markets did not permit effective examination of the change in those markets.

Table 19. Average base growth by 1947 base size groups, Roanoke, 1947-56

Item	1947 monthly base size groups		
	8,000 pounds or less	8,100-16,100 pounds	16,200 pounds and over
Group I - Did not purchase base			
Number of producers	12	20	11
Beginning monthly base, 1947, pounds	5,992	12,915	28,909
Net change by production, pounds	1,250	850	-945
Net change by purchase, pounds	----	----	----
Ending monthly base, 1956, pounds	7,242	13,765	27,964
Total net change, pounds	1,250	850	-945
Group II - Did purchase some base			
Number of producers	7	23	21
Beginning monthly base, 1947, pounds	6,428	11,887	23,019
Net change by production, pounds	1,443	500	-85
Net change by purchase, pounds	2,714	3,965	4,609
Ending monthly base, 1956, pounds	10,585	16,352	27,543
Total net change, pounds	4,157	4,465	4,524

Table 20. Comparison of base growth between producers purchasing and those not purchasing base, Roanoke, 1936-56

Item	Producers not purchasing base	Producers purchasing some base
Number of producers	15	26
Beginning monthly base, 1936, pounds	12,140	14,415
Net change by production, pounds	2,453	1,754
Net change by purchase, pounds	0	6,407
Ending monthly base, 1956, pounds	14,593	22,576
Total net change, pounds	2,453	8,161

average base growth tended to be small even over a 20-year period.[1] Likewise, the dependence upon base purchase for growth was indicated. Within the group of 15 producers who did not purchase any base during the 1936-56 period, 11 ended the period with a larger base and 4 ended up with a smaller base. Of the 11 who increased their base, 8 had increases of less than 10,000 pounds. In the group of 26 producers who did purchase additional base, 24 increased their base and 2 decreased their allotment during the 1936-56 period. Of the 24 who increased, 9 had increases of more than 10,000 pounds.

General Scope of Base Transfers

The importance of base transfers between producers has been emphasized in previous discussion. Such transfers have been permitted since the inception of the base-surplus plan in Virginia Milk Commission controlled markets. The number of producers involved in transfers and the size of the transfers has varied considerably from one market to another. The scope of base transfers during the period 1947-56 in the selected markets is shown in Table 21.[2] There was much more activity in the sale and transfer of base allotments among Roanoke producers than in either of the other two markets. The producers who were in that market in 1955 had engaged in transactions covering approximately 700,000 pounds of monthly base during the 1947-56 period. During that

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[1] These data were also examined by 1936 base size groups. Too few producers in some size groups made comparison difficult. However, there did appear to be a tendency for producers in the medium size group to grow more than producers in either the larger or smaller groups.

[2] By producers who shipped to the three markets during 1955.

period nearly 57 percent of the Roanoke producers made some type of purchase as compared to 17 percent and 29 percent of the producers in Harrisonburg and Newport News, respectively. The prevalence of base transfers in the Roanoke market relative to the other markets appears to be the result of: (1) a higher incidence of small base allotments with a subsequent necessity for finding some means of increasing allotments as quickly as possible; (2) greater confidence in the administration of the plan in the Roanoke market and (3) better information as to the value of base and sources from which it might be purchased.

Table 21. Transfer of monthly base allotments, selected Virginia milk markets, 1947-56[a]

Item	Market		
	Roanoke	Harrisonburg	Newport News
Number of producers	178	42	122
Purchases to enter market			
Number of producers	25	5	5
Total purchase, pounds	325,300	60,500	72,400
Purchase per producer, pounds	13,012	12,100	14,480
Additional base purchases			
Number of producers	81	3	32
Total purchase, pounds	375,087	27,694	177,633
Purchase per producer, pounds	4,631	9,231	5,551
Total number of producers making some type of purchase[b]	102	7	36
Total amount of base transferred, pounds	700,387	88,194	250,033

[a] Includes producers in each market during 1955.

[b] Those producers who purchased both beginning base allotments and additional allotments thereafter are counted only once.

As noted earlier, the base regulations established by the State regulatory agency permit the transfer of base among producers only when it is accompanied by a transfer of the cows currently filling the base. For this reason, one could expect base allotments to be capitalized into the value of cows and/or dairy herds in many Virginia markets. Base is generally quoted in terms of dollars per thousand pounds of monthly allotment. When a sale is made, a price per cow is quoted to include a specified amount for the productive value of the cow plus a specified amount for the base which goes with her.[1]

Producers in the selected markets were asked what price they would be willing to pay for additional monthly base.[2] Their replies are summarized in Table 22. Roanoke producers apparently valued base at higher levels than did producers in the other two markets. The explanation previously given for the greater prevalence of transfers in that market also serves to explain the difference in value placed on base in Roanoke relative to the other two markets.

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[1] For example, an animal, carrying 1,000 pounds of monthly base allotment, whose productive value is $300 might actually sell for $600 with her base allotment valued at $300/thousand pounds of monthly base. The amount of the allotment accompanying each individual cow is determined by dividing the individual producer's entire base by the number of milking cows in his herd.

[2] This is a subjective measure of the value of base. However, it does reflect the individual producer's concept of what additional units of base would be worth to him in his own particular situation.

Table 22. Price producers would pay for additional monthly base, selected Virginia milk markets, 1957[a]

Item	Market		
	Roanoke	Harrisonburg	Newport News
	-------- dollars per thousand pounds		----------
Simple average	271	127	115
Modal price	300	100	100
Range	100-500	9-500	15-300

[a] Includes only those producers who answered the mail questionnaire.

1956 Base Situation

It has been shown that average base growth per producer was relatively small over time. Some additional evaluation of the 1956 situation is necessary in order to properly appraise the effects of this small growth.

Size of Production Units

Each of the selected markets had a wide dispersion of base size between individual producers. Table 23 indicates the number of producers in several 1956 base size classifications. There were sizeable numbers of large producers as well as small ones. The number of producers with 15,000 pounds of monthly base or less reflects one aspect of the problem since the potential net returns on such units appear to be limited. Approximately 50 percent of the producers in the selected markets had bases of 15,000 pounds or less. Little is known with respect to the alternative opportunities open to those producers having small allotments. Practically all of the producers who answered

the questionnaire did indicate that dairying was their principal source of farm income.

Table 23. Number of producers in several base size classifications, selected Virginia milk markets, 1956

Size of 1956 monthly base	Market			
	Roanoke	Harrisonburg	Newport News	Total
(pounds)	number of producers			
5,000 or less	3	2	1	6
5,001-10,000	37	10	15	62
10,001-15,000	59	7	38	104
15,001-20,000	36	8	23	67
20,001-25,000	25	12	19	56
25,001-30,000	6	2	13	21
30,001-35,000	5	0	5	10
35,001-40,000	3	1	4	8
40,001 and over	4	0	4	8
Total	178	42	122	342

Alternatively, size of production unit was measured by annual delivery of milk in 1955. Some farm management workers have indicated that dairy farmers should attempt to produce at least 200,000 pounds of milk per man per year as a rule-of-thumb guide. Fifty-four percent, 48 percent and 53 percent of the production units in Roanoke, Harrisonburg and Newport News, respectively, delivered a total of less than 200,000 pounds of milk per unit in 1955. Such units had little opportunity to employ an operator full time efficiently. This observation does not imply that all units producing more than 200,000 pounds annually necessarily obtained the desired production per man.

Gross Income from Milk Sales

The difference in base size among individual producers was reflected

in their gross income from milk sales. Gross income from milk sales in 1955 was divided into five classifications: less than $5,000, $5,000-$10,000, $10,001-$15,000, $15,001-$20,000 and $20,001 and over. The number of producers in each of these classifications is shown in Table 24.

Table 24. Producers classified according to gross income from milk sales, selected Virginia milk markets, 1955

Gross income from milk sales	Market			
	Roanoke	Harrisonburg	Newport News	Total
	number of producers			
Less than $5,000	6	4	5	15
$5,000-$10,000	62	11	45	118
$10,001-$15,000	50	16	29	95
$15,001-$20,000	41	8	22	71
$20,001 and over	19	3	21	43
Total	178	42	122	342

A substantial percentage of the producers in each market had $10,000 or less gross income from milk sales in 1955. The exact percentages were 38 percent, 36 percent and 41 percent in Roanoke, Harrisonburg and Newport News, respectively. Approximately two-thirds of the producers in each market had gross milk sales of $15,000 or less. A gross income of $10,000 will not provide even the more efficient dairyman very much return for his labor after expenses are paid.

Additional Base Needed

Producers in the selected markets were asked if their 1956 base was large enough to allow them to use efficiently the resources of their farm. Their replies are summarized in Table 25.

Table 25. Size of 1956 base relative to individual producer's needs, selected Virginia milk markets[a]

Item	Market			
	Roanoke	Harrisonburg	Newport News	Total
Number of producers who had enough base	44	2	30	76
Number of producers who needed more base	103	24	69	196
Total	147	26	99	272

[a] Includes producers answering the mail questionnaire who were in each market in 1955. There were 31, 16 and 23 producers in the Roanoke, Harrisonburg and Newport News markets, respectively, in 1955, who did not return the questionnaire.

Approximately 70 percent, 92 percent and 70 percent of the producers answering the questionnaire in Roanoke, Harrisonburg and Newport News, respectively, indicated a need for more base than they were alloted in 1956. Space was provided on the questionnaire for those indicating a need for more base to specify the necessary amount. The amount needed ranged from as little as 100 pounds per month to as much as 30,000 pounds per month. The modal amount was 5,000 pounds per month.

A "capacity" ratio was computed for each producer who indicated a need for additional base.[1] The results of the computations are shown in Table 26.

[1] A certain amount of subjectivity and/or personal bias may be present in this ratio since its size is dependent upon the individual producer's own evaluation of the amount of additional base he needed. The ratio was computed by dividing each producer's 1956 base by his 1956 base plus the amount of additional base he needed. The ratio is expressed in percentage form.

Table 26. Producers who needed additional base classified according to their "capacity" ratio, selected Virginia milk markets, 1956

"Capacity" ratio	Market			
	Roanoke	Harrisonburg	Newport News	Total
(percent)	number of producers			
Less than 50	1	3	4	8
50 - 60	4	5	7	16
61 - 71	14	8	17	39
72 - 82	39	6	22	67
83 - 93	39	2	17	58
94 and over	6	0	2	8
Total	103	24	69	196

A substantial number of those producers indicating a need for additional base had less than 82 percent of the base they felt they needed. There was a tendency for the smaller producers in each market to have the lower percentages indicating that their base was a lower proportion of their "capacity" than was true for the larger producers in the market. However, the difference between the size groups in average "capacity" ratio was not more than 10 percent in any of the three markets.

Willingness to Purchase Base

Of those producers who said their 1956 base was not large enough, slightly less than two-thirds indicated that they would be willing to purchase additional base if it were available. As has been indicated previously, purchase of base is the only quick way to expand size under a semi-closed base plan. However, consideration must be given to the financial factors involved in a base purchase. How much will base

cost? How much time will be required to pay out on such a transaction? In an earlier portion of this chapter, data were presented relative to the prices producers were willing to pay for additional base. The modal price in the Roanoke market was $300, and $100 in each of the other two markets. If a producer were already producing milk in excess of his base, the following simple formulae provide an approximate estimate of the time required to recoup his investment or, conversely, the amount he could afford to pay within a given time limit:

$$T = \frac{P}{S}$$

or

$$P = T \times S$$

Where: T = time in months
P = price paid per hundredweight for base
S = spread between Class I and II prices per hundredweight

For example, at the modal price of $300 per thousand pounds monthly base ($30 per hundredweight) and the $3.80 per hundredweight spread in the Roanoke market in 1955, it would have taken approximately eight months to pay out.[1] The wide spread between Class I and II prices is the principal factor enabling a relatively fast recovery of investment on base purchases.[2]

For those producers who find it necessary and/or profitable to expand their operations, the purchase of additional base appears to be a

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[1] The above formulae assume that additional base purchased will result in similar increases in fluid milk sales credits to the purchaser (prior analysis indicated that this was usually true). The quantity purchased will not have any effect on price or time. If an individual producer were not already producing excess milk but still wished to expand his operation, the price he could pay for base would depend on the effect of additional production on his marginal cost structure relative to the price (marginal revenue) of base milk.

[2] In view of the size of the spread in all three markets, producers in these markets probably could afford to pay a higher price than they indicated they would be willing to pay.

profitable venture.[1] There are certain risks attached to such purchases. Primary among the possible risks is the failure to deliver the full amount of the additional base during subsequent payment periods and/or the failure to deliver at least the full amount of base (old base plus amount purchased) during succeeding base-making periods.[2] These risks are subject to a considerable degree of control by the individual producer as contrasted to other risks influenced primarily by the market.

Evaluation and Implications

Average base growth over time was rather small in the selected markets, especially in Roanoke. Those producers who purchased additional base grew much more on the average than those who made no purchases. There was some tendency for small producers to increase their size while larger producers decreased somewhat. Examination of the 1956 base situation indicated that substantial numbers of producers in each market needed additional base in order to fully utilize the resources at their disposal.

The data obtained in this study do not conclusively prove that the semi-closed base plan was the limiting factor upon the growth of individual producers over time. However, the data do indicate that

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[1] Any producer whose marginal cost at the last unit purchased (including the cost of the purchase itself) is less than the Class I price would find such a purchase profitable.

[2] If producers fail to deliver at least the quantity of their current base during the base-making period, their new base will be the quantity they actually do deliver. Even so, this risk may not be as great as that incurred by spending money to increase production during the base-making period with the hope of being allotted substantial increments of base.

effective production control in a moderate growth market like Roanoke does not allow much increase in base per producer when there are a larger number of producers serving the market. This suggests that a rigidly enforced plan of the semi-closed type must necessarily have a strong influence on producer growth. This influence was not deleterious to all producers in each market. On the contrary, there were some producers who had grown under the plan. There were, however, an even larger number of producers in a less favorable position. Some of these less favored individuals would not have been in any better position had there been no production control program. The real criticism should be focused on the program's effect on those producers with the initiative, desire and ability to grow but who find their possibilities are limited by their base allotment. A partial solution to their problem may be found in the purchase of base from other producers. Many producers who were otherwise stymied did take the purchase route to growth. The wide spread between Class I and II prices makes investment in base well worth the risks involved. The principal limiting factor is the availability of base for sale.

CHAPTER VII

PRODUCER REACTIONS TO PLAN

The attitudes and opinions of producers with respect to the Virginia base-surplus plan must be considered. Their reactions will undoubtedly influence the future course of the plan. This chapter attempts to quantify and discuss some of the more important reactions of producers currently serving the selected markets. It summarizes information obtained by means of the mail questionnaire on the sale of base, entry of new producers, methods of allotting additional base, assignment to distributors and related items.

Sale and Transfer of Base

Producers consider their base to be a saleable asset. They apparently believe that it is something earned rather than a mere number assigned to their production unit.[1] Custom and habit play an important part in their attitude toward sale and transfer. Such transfers have been permitted since the inception of the base-surplus plan in all

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[1] The opposite view holds that the Commission grants the base to begin with, and when that production unit ceases to function, the base assigned to it should also be cancelled. In other words something which was given should also be taken away. In this sense base allotments would differ from distributors' sales routes since an individual distributor presumably builds up his sales by service and good will. The Commission only grants him a license. It does not guarantee him a certain share of the market's sales.

three selected markets. Since transfers are customary among producers, one might expect to find general acceptance among producers of the right to sell base. Table 27 summarizes the replies of selected market producers to the question, "Should a producer have the right to sell his base?" A very large majority of the producers in each market answered in the affirmative. The highest percentage answering no, 7 percent, was found in Newport News. The difference between the three markets in terms of the proportion of producers answering yes and no was not statistically significant.[1] Apparently, the differences in the operation of the base-surplus plan in each market and the variations in its effect on individual producers did not influence measurably their reaction to the right to sell base.

Table 27. Producer response with respect to the sale of base allotments, selected Virginia milk markets, 1957[a]

Should sales be permitted?	Market			Total
	Roanoke	Harrisonburg	Newport News	
	number of producers			
Yes	150	28	102	280
No	3	1	7	11
Total	153	29	109	291

[a] Includes all producers in these markets who answered questionnaire.

Selected market producers were also queried as to the manner in which base should be sold. Should a producer selling his base be

[1] The adjusted value of chi-square was 2.721 compared to the tabular value of 5.991 at the 5 percent probability level with 2 degrees of freedom. Hence, the hypothesis that there was no significant difference between markets was accepted.

allowed to split it between several other producers or should he be required to sell all of his base in a single transaction with one buyer? Should he also be required to sell, along with his base, the cows responsible for the production which is being transferred? These are questions concerning the administrative regulations on sales and transfers. The discussion on base regulations in Chapter II indicated that producers could split their base allotment for sale purposes; and that when base is sold, the cows responsible for that proportion of production must accompany the base to its new location. Two considerations deserve special attention. First, if producers were not allowed to split their bases for sales purposes and consequently, other producers permitted to buy split portions, the capital requirements either for getting into dairying or expanding existing operations would be raised. Those producers desiring to purchase base would be faced with the necessity of purchasing an entire herd and base. This can be a very expensive proposition. On a split portion basis, an individual producer can purchase whatever portion he needs and is financially able to carry. Thus, splitting of base for sale purposes permits greater flexibility with respect to purchases by other producers than would otherwise be the case. However, there is at least one inherent disadvantage in allowing bases to be split. An excellent opportunity is open for cow dealers and speculators to buy base and resell it for profit. If the sale of an entire base or even an entire farm were required, these people might find such transactions less attractive. The regulation stipulating that cows must accompany the transfer of base attempts to reduce the promiscuous buying and reselling of base

by various individuals. This regulation has proven most difficult to enforce because of the administrative difficulty of checking every transaction to determine whether or not the cows involved actually changed hands.

Table 28 summarizes the response of selected market producers to the question, "Should a producer be allowed to sell only part of his base or should he be required to sell it all at one time?"

Table 28. Producer response with respect to how base should be sold, selected Virginia milk markets, 1957[a]

Method of sale	Market			Total
	Roanoke	Harrisonburg	Newport News	
	number of producers			
Part of base	120	13	68	201
All of base	30	15	34	79
Total	150	28	102	280

[a] Includes only those producers who gave approval to transfer under any conditions.

There was a difference between markets with respect to the proportion of producers answering part or all. This difference was statistically significant.[1] Individual market analysis indicated that Roanoke producers favored allowing part or split sales; Harrisonburg producers did not favor one type over the other and Newport News

[1] The adjusted value of chi-square was 12.741 as compared to the tabular value of 5.991 at the 5 percent level with 2 degrees of freedom. Hence, the hypothesis that there was no difference between markets was rejected.

producers favored allowing split sales.[1] It was difficult to determine the reasons for the differences observed between the markets with regard to the base-splitting question. The ratio favoring the splitting of base was 4:1 in Roanoke and only 2:1 in Newport News. This difference may have been due to the fact that bases were somewhat smaller on the average in Roanoke than they were in Newport News; and consequently, Roanoke producers felt the need for flexibility more keenly than did Newport News producers. It may be possible also that the Newport News market experienced more speculation in base than was true in Roanoke. The indifference of Harrisonburg producers probably was due to their relative lack of experience with base transfers.

It is interesting to note that there was less than complete agreement on the base-splitting question even in Roanoke and Newport News where splitting was favored. Twenty percent and 30 percent of the producers answering in those two markets, respectively, were against splitting. It was thought that the dairy experience of a producer might have some effect on his response to this question. Would the older, better established producers react differently than younger producers? When the replies were sorted and tabulated on the basis of dairy experience groups of 10 years and under, 11-21 years and 22 years and over, it was found that there was no significant difference between the various dairy experience groups in any of the three markets with

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[1] The adjusted values of chi-square for each market (to be compared with 3.841 at the 5 percent level with 1 degree of freedom) were:

Roanoke	52.806
Harrisonburg	0.034
Newport News	10.676

regard to the proportion of producers stipulating either method of sale.[1] Experience in dairying apparently was not a contributing factor to the negative response on splitting of base.

Table 29 summarizes selected market producer response to the question, "Do you feel that producers should be required to sell their cows when they sell base?"

Table 29. Producer response with respect to selling cows when base is transferred, selected Virginia milk markets, 1957[a]

Should cows go with base?	Market			
	Roanoke	Harrisonburg	Newport News	Total
	number of producers			
Yes	53	9	65	127
No	97	19	37	153
Total	150	28	102	280

[a] Includes only those producers who gave approval to transfer under any conditions.

A difference of opinion was observed between markets. This difference was statistically significant.[2] The testing of individual market response for and against selling cows with base indicated that Roanoke producers favored the sale of base without cows while Newport News producers favored the sale of base with cows; and Harrisonburg

[1] The adjusted value of chi-square was 0.509, 0.303 and 1.698 for Roanoke, Harrisonburg and Newport News, respectively. All of these values were smaller than the tabular value of 5.991 at the 5 percent level with 2 degrees of freedom.

[2] The adjusted chi-square value was 12.741 in contrast to the tabular value of 5.991 at the 5 percent level with 2 degrees of freedom.

producers showed no significant approval or disapproval of either method.[1] The specific reasons for the differences observed are not known. However, the possibilities put forth to explain observed differences with respect to splitting of base also may apply in this case. In any event, there was a lack of uniformity in the opinions of producers with respect to the sale of base with or without cows.

Entry of New Producers

The successful operation of a semi-closed base plan will depend in some measure upon the restriction of entry into any given market.[2] It might be expected that producers already in the market would generally disapprove of the acceptance of new producers on the market. Selected market producers were asked the question, "Under present marketing conditions, should any new producers be allowed to come on your market?" Table 30 summarizes their response.

Table 30. Producer response to admitting new producers on their market, selected Virginia milk markets, 1957[a]

Should new producers be allowed to enter?	Market			Total
	Roanoke	Harrisonburg	Newport News	
	number of producers			
Yes	73	6	49	128
No	74	20	58	152
Don't know	0	3	1	4
No response	6	0	1	7
Total	153	29	109	291

[a] Includes all producers who answered questionnaire.

[1] The adjusted values of chi-square were 12.326, 2.892 and 7.146 for Roanoke, Harrisonburg and Newport News, respectively. The tabular 5 percent value was 3.841.

[2] See note three, Appendix D.

Those producers answering the question in both the Roanoke and the Newport News markets were evenly divided as to whether or not new producers should be allowed to enter their respective markets. The difference in Roanoke obviously was not significant. Statistical testing indicated that the observed difference in the Newport News market was not significant either.[1] Harrisonburg producers did register definite disapproval of the entry of new producers on that market.[2] The Harrisonburg reaction may be explained in terms of the known "surplus" aspects of that market. The entry of new producers when current production was more than adequate would only add to the existing oversupply of milk. The absence of a significantly greater negative response in the other two markets is more difficult to explain. Since milk deliveries and fluid milk sales in both markets were in close balance relative to Harrisonburg, it was expected that producers in those markets would favor any methods available for maintaining the status quo with respect to producer numbers. Whatever the reasons may be, the replies to the question on entry did not indicate an across-the-board tendency to favor the exclusion of new producers.

The above discussion on producer entry ignored the possibility that those favoring entry of new producers might insist that such producers be required to purchase the existing base of some old producer who wished to get out of the market. If this were true, the new

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[1] The adjusted value of chi-square was 0.598 as compared to the tabular value of 3.841 at the 5 percent level with 1 degree of freedom.

[2] The difference was statistically significant. The adjusted chi-square value was 14.920 compared with the tabular value of 5.991 at the 5 percent level with 2 degrees of freedom.

producer would be "new" in name only. No new production would be added to the market. To determine if this were the case, the question on entry was followed by a second question, "If yes, should they be allowed to make new bases or should they be required to purchase existing base from an old producer or producers?" The replies of the producers who favored entry are summarized in Table 31. The difference between markets in the proportion of producers favoring each type of entry was found not to be statistically significant.[1] Furthermore, an analysis of each individual market indicated that producers did not favor one type of entry over the other.[2] Thus, a significant number of those favoring entry did not specify that such entry should be by purchase rather than by the creation of new base.

Table 31. Producer response with respect to how entry of new producers should be allowed, selected Virginia milk markets, 1957[a]

What type of entry?	Market			
	Roanoke	Harrisonburg	Newport News	Total
	----------number of producers----------			
Make new base	40	4	31	75
Purchase old base	33	2	17	52
Don't know	0	0	1	1
Total	73	6	49	128

[a] Includes only those producers who answered in the affirmative with respect to entry of new producers.

[1] The adjusted value of chi-square was 0.888 as compared to the tabular value of 5.991 at the 5 percent level with 2 degrees of freedom.

[2] The adjusted chi-square values were 0.492, 0.166 and 3.520 for Roanoke, Harrisonburg and Newport News, respectively. These values were compared with the tabular value of 3.841 at the 5 percent level with 1 degree of freedom.

The entry of new producers was also considered with respect to previously defined dairy experience classifications. Was his experience in dairying a factor affecting an individual producer's reaction to the entry of new producers? Table 32 summarizes producer response by dairy experience classifications.

Table 32. Producer response to entry of new producers by dairy experience classifications, selected Virginia milk markets, 1957

Years in dairying	Market: Roanoke		Harrisonburg		Newport News		Total	
	Should new producers be allowed to enter?							
	Yes	No	Yes	No	Yes	No	Yes	No
	number of producers							
10 and under	25	12	0	4	28	33	53	49
11 to 21	26	27	3	2	14	16	43	45
22 and over	22	35	3	14	7	9	32	58
Total	73	74	6	20	49	58	128	152

The results shown were tested statistically market by market. In the Roanoke market, the difference observed between dairy experience classifications in the proportion of producers favoring entry or not favoring entry was significant.[1] In that market producers in the 10 years and under dairy experience classification favored allowing entry by new producers.[2] Neither of the other two dairy experience groups

[1] The adjusted value of chi-square was 6.368 compared to the tabular value of 5.991 at the 5 percent level with 2 degrees of freedom.

[2] The adjusted chi-square value was 6.418 compared to tabular value of 3.841 at the 5 percent level with 1 degree of freedom.

indicated a significant preference.[1] In Harrisonburg, the difference observed between dairy experience groups in the proportion of producers favoring entry or not favoring entry was not significant.[2] Analysis of response within dairy experience groups in the Harrisonburg market indicated no significant preference between entry and nonentry for the 10 year and under group and the 11-21 year group; but the 22 years and over group did express a preference for denying entry to new producers.[3] Dairy experience was not a factor at all in the Newport News market. The differences observed were found to be highly insignificant.[4] The dairy experience of an individual producer had no marked effect on his reaction to market entry by new producers with the exceptions noted for the 10 years and under group in Roanoke and the 22 years and over group in Harrisonburg. No consistent relationship was observed.

Assignment to Distributors

A key link in the chain of base regulations used in the selected markets is the expressed authority of the Milk Commission to assign individual producers to specific distributors with the attendant

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[1] The 11-21 year group obviously had no preference. The adjusted chi-square value for the 22 and over group was 2.526 as compared to 3.841 at the 5 percent level with 1 degree of freedom.

[2] The adjusted value of chi-square was 3.226 as compared to the tabular value of 5.991 at the 5 percent level with 2 degrees of freedom.

[3] The adjusted value of chi-square for the 22 years and over group was 5.882 as compared to the tabular value of 3.841 at the 5 percent level with 1 degree of freedom.

[4] The adjusted value of chi-square was 0.0.

requirement that producers cannot shift from one distributor to another without prior approval from the Commission. Through this particular regulation, the Commission attempts to equalize deliveries and fluid milk sales among individual distributors. To determine producer opinion with respect to this aspect of the base regulations, the following question was asked, "Do you feel that a dairyman should be free to change distributors at any time or be assigned to a specific distributor by a control agency?" Table 33 summarizes the response to this question.

Table 33. Producer response to assignment to specific distributors, selected Virginia milk markets, 1957

Assignment or free movement?	Market			Total
	Roanoke	Harrisonburg	Newport News	
	number of producers			
Free movement	61	23	60	144
Assigned	87	5	48	140
No response	5	1	1	7
Total	153	29	109	291

Comparison of the proportion of producers favoring assignment versus free movement in the three markets indicated that there was a significant difference between markets.[1] In the Roanoke market producers expressed a significant preference for assignment while the

[1] The adjusted value of chi-square was 15.998 compared with a tabular value of 5.991 at the 5 percent level with 2 degrees of freedom.

Harrisonburg producers expressed a significant preference for free movement.[1] Newport News producers did not express a significant preference for either method.[2] It is believed that the response of Roanoke producers was indicative of their clearer understanding of the function of assignment coupled with the absence of any sizeable degree of friction between individual producers and distributors in that market. Conversely, the absence of a clear understanding of the purpose of assignment plus the fact that nearly all of the market's surplus was with one distributor may explain the reaction of Harrisonburg producers.

The most unexpected response to the assignment question was that of Newport News producers. It was known that there was a considerable amount of friction between certain producers and certain distributors in that market.[3] In such circumstances producers might be expected to value freedom to shift very highly. Apparently this factor was not as important as previously thought.

The possible effect of years in dairying was considered in regard to producer response to the assignment question. No significant

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[1] The adjusted chi-square values were 5.632 and 10.320 for Roanoke and Harrisonburg, respectively, as compared to the tabular value of 3.841 at the 5 percent level with 1 degree of freedom.

[2] The adjusted chi-square value was 1.120 compared to the tabular value of 3.841 at the 5 percent level with 1 degree of freedom.

[3] One particular distributor was continually as much as 45 to 60 days behind in payment to producers for milk. He was the largest distributor on the market. Another distributor was known to have been constantly accused by producers of being dishonest in regard to butterfat tests and the reporting of Class I sales. Both of these distributors have been fined at one time or another by the Milk Commission for violation of various regulations.

difference was found between dairy experience groups in any of the three markets.[1]

Likewise, the assignment question was examined with respect to the possible effect of the size of a producer, as measured by his 1956 base, on his response to the question. Three size groups were examined. They were: 10,900 pounds and under per month, 11,000-21,900 pounds per month and 22,000 pounds per month and over. The only significant difference found between size groups with respect to their preference for assignment versus free movement was in the Harrisonburg market where producers in the 11,000-21,900 pound group definitely favored free movement in deference to specific assignment.[2]

Allotting Additional Base

It was pointed out in earlier chapters that the base-surplus plan used in the selected markets is a semi-closed base plan. The base which each producer makes in each successive base-making period is dependent on the market's fluid milk sales situation and the size of his previous base as well as his average deliveries during the base-making period in question. The rather strong dependence on fluid milk sales changes is the principal key to the plan's semi-closed feature. Those markets which use an open base system establish bases from deliveries during the base-making period by taking the average daily deliveries

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[1] The adjusted chi-square values were 1.161, 5.262 and 1.229 for Roanoke, Harrisonburg and Newport News, respectively. These compare with the tabular value of 5.991 at the 5 percent level with 2 degrees of freedom.

[2] The adjusted chi-square value for this group was 4.084 compared to the tabular value of 3.841 at the 5 percent level with 1 degree of freedom.

or some percentage of this average corresponding to Class I utilization.

Selected market producers were asked how they thought additional base should be allotted when producers want to increase production. Table 34 summarizes their response in four categories: (1) according to increased production alone; (2) according to market fluid milk sales and increased production; (3) by purchase of base; and (4) by a combination of increases in market fluid milk sales and purchase. Each of these categories represents a different degree of flexibility in the base plan ranging from an open base system where the base is increased according to production alone to a closed system in which bases can be increased only through purchase. The major distinction which the question attempted to establish was the choice between allotting additional base on the basis of increased production alone or on increased production relative to market fluid milk sales. Approximately 81 percent of the producers answering did specify one of these two possibilities.

Table 34. Producer response as to how additional base should be allotted, selected Virginia milk markets, 1957

Method of allotting base	Market			Total
	Roanoke	Harrisonburg	Newport News	
	number of producers			
To production increase	42	14	32	88
To sales changes	79	12	53	144
To purchase of base	12	2	5	19
To purchase and sales	17	1	16	34
No response	3	0	3	6
Total	153	29	109	291

No significant difference was found between markets in the proportion of producers favoring the various methods when all methods were considered simultaneously.[1] However, it is more meaningful to examine each market separately with respect to each method. Comparisons were made between the following combinations in each market: (1) production alone versus fluid milk sales; (2) purchase versus purchase plus fluid milk sales: (3) production alone versus purchase; and (4) production alone versus purchase plus fluid milk sales. The results obtained in each market showed a reasonable degree of consistency although they were by no means standard. Producers in both the Roanoke and Newport News markets favored allocation on the basis of production and fluid milk sales rather than on production alone.[2] Harrisonburg producers were evenly split on that particular combination. Producers in all three markets favored production alone over purchase alone when compared on that particular basis.[3]

When the last three methods were grouped together and compared to the production alone method, a strong preference over all was indicated for closed or semi-closed methods of allotting additional base. Such a grouping included 69 percent of all producers answering the question in the three markets together and 72 percent, 52 percent and 70 percent

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[1] The adjusted chi-square value was 4.813 compared to the tabular value of 12.592 at the 5 percent level with 6 degrees of freedom.

[2] The adjusted values of chi-square were 10.710 and 4.706 for Roanoke and Newport News, respectively, as compared to the tabular value of 3.841 at the 5 percent level with 1 degree of freedom.

[3] The adjusted values of chi-square were 15.574, 7.462 and 18.270 for Roanoke, Harrisonburg and Newport News, respectively.

in Roanoke, Harrisonburg and Newport News, respectively, considering each market individually. This response tends to indicate general acceptance of the semi-closed type over the open type base plan, regardless of the disadvantages of the semi-closed type discussed in Chapter VI.

Experience in dairying was again considered as a factor which might influence response to the question of how additional base should be allotted. With respect to production alone versus the fluid milk sales and production combination, it was found that producers in the 10 year and under group favored the fluid milk sales and production combination over production alone in both the Roanoke and Newport News markets.[1] None of the other dairy experience groups in these two markets indicated any particular preference for either method. Aside from the relationship just noted, dairy experience had little influence on producer response as to choice of method for allotting additional base.

In a similar manner, the response on allotting additional base was examined on the basis of the seasonality of delivery of those producers responding. Three seasonality categories were used: 150 percent or less; 151-186 percent; and 187 percent and over. It was reasoned that producers with relatively small seasonal fluctuations would favor the production and fluid milk sales combination over production alone while highly seasonal producers would favor allotting

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[1] The adjusted chi-square values were 7.758 and 9.188 for Roanoke and Newport News, respectively, as compared with the tabular value of 3.841 at the 5 percent level with 1 degree of freedom.

additional base on the basis of production alone, particularly if their seasonal peak occurred during the base-making period. Considering all three markets together, it was found that producers in both the 150 percent or less group and those in the 151-186 percent group favored the production and fluid milk sales combination over production alone.[1] This result follows along the line of reasoning set forth above. However, when the 187 percent and over group was examined, no significant preference was expressed for either method.[2] A check on individual markets indicated that a strong preference in Roanoke for production and fluid milk sales over production alone was mostly responsible for the results obtained in each seasonality of delivery category.[3]

Finally, response to base allocation methods was considered from the standpoint of producer size as measured by each producer's assigned quantity of monthly base in 1956. Size of base was found to be a factor affecting response only in the case of the medium size group, 11,000-21,900 pounds, in the Roanoke market. This group definitely favored

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[1] The adjusted value of chi-square was 4.624 and 8.678 for the 150 percent or less and 151-186 percent groups, respectively, as compared to the tabular value of 3.841 at the 5 percent level with 1 degree of freedom.

[2] The adjusted chi-square value was 0.720 compared to the tabular value of 3.841 at the 5 percent level with 1 degree of freedom.

[3] The adjusted values of chi-square were 5.114 and 8.888 for the 150 percent or less and 151-186 percent groups, respectively, in Roanoke. Comparable Newport News values were .516 and 3.116. All values compare with the tabular value of 3.841 at the 5 percent level with 1 degree of freedom.

the fluid milk sales and production combination over production alone.[1] It was thought that producers in the small size base group would favor allocation on the basis of production alone since such a method would enable them to grow more rapidly. The absence of such a response may indicate that they felt large producers would be in a position to take advantage of them since such producers probably would have the capital and facilities necessary for expansion.

Continuance of the Base-Surplus Plan

Finally, selected market producers were queried as to whether the base surplus plan should be continued in its present form; and if not, what types of changes they would suggest. Their response is summarized in Table 35.

Table 35. Producer response to continuance of base-surplus plan in its present form, selected Virginia milk markets, 1957

Should the base-surplus plan be continued in its present form?	Market			Total
	Roanoke	Harrisonburg	Newport News	
	number of producers			
Yes	133	18	80	231
No	19	9	28	56
Don't know	1	2	1	4
Total	153	29	109	291

[1] The adjusted value of chi-square was 12.568 compared to the tabular value of 3.841 at the 5 percent level with 1 degree of freedom.

There was a significant difference between markets with respect to the proportion of producers favoring the retention of the plan in its present form.[1] A majority of the producers in all three markets favored retention, but the expression of approval was not as strong in Harrisonburg as it was in the other two markets. This response was in line with the previously noted failure of the plan to hold production and fluid milk sales in proper balance in Harrisonburg relative to the balance achieved in the other two markets.

Approximately four-fifths of the producers in all three markets considered together favored continuing the base-surplus plan in its present form.[2] The remaining one-fifth of the producers in the combined markets indicated a variety of possible changes which they thought should be made. Those most often mentioned included: (1) some means whereby "old" producers could be allowed to grow to more efficient size before "new" producers are taken on; and (2) the guaranteed payment of the Class I price for all base rather than using the distributors' Class I sales as a percentage of his assigned base as the payment criteria. The first suggestion relates to the producer growth retarding aspect of the base as discussed in Chapter VI. A number of other producers commented on the questionnaire that their operation was too small, but they apparently did not feel that this disadvantage was strong enough to suggest any changes in the base-

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[1] The adjusted value of chi-square was 10.084 as compared to the tabular value of 5.991 at the 5 percent level with 2 degrees of freedom.

[2] This result is similar to that obtained by M. C. Conner in a survey conducted in 1951 in the Roanoke, Lynchburg and Norfolk markets.

surplus plan. The second suggestion probably stems from the fact that some producers did not fully understand the payment procedure.

The response to the question asked concerning base-surplus plan continuance did not indicate complete, unqualified approval of the present plan. However, it did indicate that, in the main, selected market producers were satisfied with the present form of the plan. This feeling was more pronounced in Roanoke than in either of the other two markets.[1] This reaction might have been anticipated to some extent since previous analysis indicated that the plan apparently has enjoyed greater success in Roanoke than in either of the other two markets.

Evaluation and Implications

This analysis of producer reactions to the base-surplus plan indicated that selected market producers: (1) in general gave strong support to continuance of the plan; (2) did differ somewhat from market to market in their attitude toward specific provisions of the base regulations; (3) gave general support to the semi-closed aspect of the base plan as used in their markets; (4) gave emphatic approval to the right to sell and transfer base between producers, but were somewhat divided as to the manner in which such transfers should be handled; and (5) were evenly split on whether new producers should be granted market entry.

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[1] No less than a dozen Roanoke producers indicated that they felt the Roanoke version of the plan was most satisfactory and that they would not like to see anyone tamper with it. Cross-checking indicated that these producers were among the larger base holders on the market.

These responses imply over all approval of the base-surplus plan as administered in the three selected markets. At the same time they seem to argue that the producers concerned feel a need for greater flexibility in the plan to meet the varying production and marketing conditions prevalent in each market. Each market should be considered in the light of its own particular characteristics and the general features of the base-surplus plan tailored to fit the characteristics.[1]

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[1] Base plans are complex mechanisms with many possibilities for varying their component parts. The timing and length of the base-making period, methods of base transfer, operating reserve allowance necessary and other related factors can vary. So long as the essential feature of making the individual producer responsible for his production actions is retained, other features can be made flexible enough to fit minor variations in market characteristics. For example, Roanoke producers might be allowed to sell base without selling cows or more new producers allowed to enter the Roanoke and Newport News markets. The statement in the text to which this footnote is applicable was intended primarily to emphasize the continuing need for flexibility.

CHAPTER VIII

SUMMARY AND CONCLUSIONS

Overproduction relative to fluid milk requirements is a problem of major consequence in many fluid milk markets. This problem manifests itself in prices paid to producers that are inconsistent with prices established for fluid milk under classified pricing schemes.

The chief stimulus for overproduction appears to come from the blend price system of payment to producers for their milk. Under this system of payment, all producers are paid the same price (average value of all milk in the market) for all the milk they deliver at any specific time. There is no incentive for them to limit production as long as marginal revenue is greater than marginal cost. Under such a payment plan, the output of all producers together may greatly exceed the quantity of milk which can be sold in fluid form. The use of an allotment or quota plan offers a means of alleviating the overproduction problem by establishing a share of the market's fluid milk sales for each producer and paying only the manufacturing price for milk delivered in excess of that amount.

The purpose of this study was to investigate some of the more important economic and institutional aspects of one specific allotment plan--a base-surplus plan--as it has operated in certain Virginia milk markets.

A theoretical analysis was developed to illustrate the probable supply response under both a base plan and the blend price method of payment. Consideration was given also to the possible effect of a base plan on general welfare.

Data were collected from the Virginia Milk Commission and other secondary sources on milk deliveries to plants, fluid milk sales, individual producer base allotments, the transfer of allotments among producers over time and other related items for the three Virginia milk markets--Roanoke, Harrisonburg and Newport News.[1] These markets were chosen on the basis of predetermined market differences so as to permit examination of the operation of the plan under heterogeneous conditions. Certain primary data were obtained by mail questionnaire and personal visitation. These data were processed and analyzed to test certain hypotheses dealing with the effect of the Virginia base-surplus plan on seasonal variations in milk supply, total milk supply relative to fluid milk sales, prices returned to producers for milk and producer base growth over time. An analysis also was made with respect to producer attitudes and opinions about the plan.

Findings[2]

In 1955, the greatest seasonal variation in supply in any market examined (including all markets for which milk delivery data were obtained) was 127 percent (high month of delivery was 27 percent greater

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[1] In addition, certain information on market base allotments, milk deliveries and fluid milk sales was also collected and analyzed for nine other Virginia milk markets using the base-surplus plan.

[2] See note four, Appendix D.

than low month). Similar seasonal supply variations for Roanoke, Harrisonburg and Newport News were 113 percent, 125 percent and 123 percent, respectively. A comparative analysis of both milk deliveries and fluid milk sales variations indicated that the seasonal variations in deliveries were closely aligned with seasonal variations in sales.

From the annual production control standpoint, producers were encouraged to limit the excess of deliveries over established base allotments to rather small percentages. Total annual deliveries of milk were 12 percent, 23 percent and 5 percent greater than total assigned base allotments in Roanoke, Harrisonburg and Newport News, respectively, in 1955.

In terms of utilization, 92 percent, 81 percent and 91 percent of base-holding producers' deliveries went into fluid usage in 1955 in Roanoke, Harrisonburg and Newport News, respectively.

The relative success of market equalization and production control efforts was reflected in the average price paid to producers for their milk. The weighted average annual price paid per hundredweight in 1955 was $6.23, $5.43 and $5.89 in Roanoke, Harrisonburg and Newport News, respectively. The Class I price (fluid price) in these same markets was $6.50, $6.25 and $6.50, respectively. The difference between the Class I price and the average price paid to producers was relatively small for Roanoke and Newport News. Harrisonburg producers did not fare quite as well. A comparison of the three selected markets with other contiguous markets using a straight blend price system indicated that the difference between the Class I price and the average price paid to producers was greater in the markets using the

straight blend price system of payment.

The Virginia base-surplus plan was found to offer relatively small price incentives for leveling production. Consequently, individual producers were found to vary greatly in their high month-to-low month deliveries. However, the high months were scattered remarkably well throughout the year. There was reason to believe that the timing of the base-making period had considerable influence on the time of peak delivery. The results obtained suggest that even though an open base plan offers much greater price incentives for evening out production (this was demonstrated analytically), the objective of reasonably even market supply can be achieved by a semi-closed base plan (as exemplified by the Virginia base-surplus plan) if the internal provisions of the plan are properly designed.

Individual base allotments over time were examined to determine the extent of growth. Average base growth was small, especially where no additional base had been purchased. Limited growth was particularly evident in Roanoke where moderate year-to-year increases in fluid milk sales were coupled with relatively rigid enforcement of the base regulation pertaining to the allotting of additional base. In the Roanoke market, there was some evidence that since 1947 smaller producers had grown relative to producers with larger beginning base allotments. However, the growth was not very pronounced. Those producers who were in the smaller size group in 1947 were for the most part still in the smaller size group in 1956.

Examination of the 1956 base situation indicated that approximately 50 percent of the producers in the three selected markets had

base allotments of 15,000 pounds per month or less. The potential net returns on such units appear to be limited irrespective of the level of efficiency attained in producing the assigned allotment. Approximately two-thirds of the producers who answered the mail questionnaire indicated a need for additional base in order to fully utilize the resources at their disposal. Just under two-thirds of those same producers indicated they would be willing to purchase additional base from other producers if it were offered for sale. A considerable number of producers did make purchases to increase the size of their allotments during the 1947-56 period.

The producers shipping milk to each of the selected markets in 1956 gave strong support to the continuance of the base-surplus plan in its present form. Slightly less than 20 percent of those producers answering the questionnaire indicated that they felt definite changes should be made. Emphatic approval was given to the right of individual producers to sell and transfer base. There was much less agreement on the question of whether or not new producers should be allowed to enter the respective markets. Hypothetically, a strong reaction against market entry by new producers might have been expected. However, such a reaction was not evident.

Conclusions

The analytical results obtained in this study appear to support the following conclusions within the time periods examined:

(1) The Virginia base-surplus plan generally has achieved its objective of maintaining supplies of milk in relative balance with fluid

milk needs; and subsequently, has maintained prices paid to producers consistent with established Class I prices in the markets selected for study. There was a positive relationship between the degree of success and the rigidity of enforcement of base regulations (Roanoke).

(2) If the necessary administrative machinery is available or can be made available, there appears to be no particular reason why other milk markets with similar market characteristics could not achieve a similar degree of success in meeting their overproduction problems by using a base plan of the type described in this study.[1]

(3) Some definite producer growth problems arose as a result of the use of the methods necessary for achieving the above objective. Achievement of price and market stability (as in Roanoke for example) appeared to necessitate rather definite "freezing" of size (except where allotments were purchased from other producers). Adjusting production to maximize returns under changing cost relationships and/or technological developments becomes extremely difficult under such conditions.

In terms of welfare and efficiency, the Virginia base-surplus plan appears to have:

(1) facilitated the transfer of income from milk consumers to those milk producers who held base allotments.

(2) provided some productive efficiencies emanating from reduction of price and income uncertainty. These efficiencies may have been offset wholly or in part by the loss of that productive efficiency attainable by freeing those best able and most willing to produce milk

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[1] See note five, Appendix D.

under unrestricted conditions.

(3) reinforced the classified pricing plan in increasing the bargaining power of producers.

(4) sacrificed some freedom and initiative on the part of the more progressive and capable managers.

(5) not passed on to consumers the benefits of technological advance in a manner consistent with public tax monies expended in the development of technological innovations.

Final judgment of the relative merits of these procedures and results must be expressed through the legislative process in terms of the value system of those affected by the program.

Limitations to Study

There appear to be two important limitations to the work reported in this study: (1) no detailed analysis was made of the impact of the semi-closed base plan on enterprise combination and related factors on individual farms (although plans have been initiated for future work along these lines) and (2) it would have been helpful to have had more specific information over the entire twenty-two years of operation of the plan.

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APPENDIX A

MAIL QUESTIONNAIRE

COPY - MAIL QUESTIONNAIRE - COPY

VIRGINIA AGRICULTURAL EXPERIMENT STATION

BASE SYSTEM STUDY

Dear_____:

Many farmers ask questions about our Virginia base-surplus plan. How should bases be determined each year? Should all producers share equally in the fluid sales of a given market? Are present bases too small to permit efficient operation of Virginia dairy farms?

As a service to the dairy industry, we here at V.P.I. are attempting to obtain answers to these and other questions. The answers to these questions can only be gotten through your assistance. Doubtless, you would also be interested in the answers yourself. By filling in the questionnaire below and returning it in the enclosed self-addressed envelope, you will be helping yourself and others. We will send you a copy of the findings of this study. Your reply will be greatly appreciated and will be kept strictly confidential.

Sincerely yours,

/s/ Carl J. Arnold

Carl J. Arnold
Dairy Marketing Specialist

A. BASE-SURPLUS INFORMATION

1. (a) Should a producer have the right to sell his base? Yes___ No___

   (b) If yes, should he be allowed to sell only part of it_____ or should he be required to sell all of it at one time_____? (check one)

   (c) Do you feel that producers should be required to sell their cows when they sell base? Yes___ No___

Turn Page for Questions on the Inside

2. (a) Was your 1956 base allotment large enough to allow you to produce all the milk you could efficiently with the resources of your farm? Yes___ No___

   (b) If not, approximately how much additional base did you need? _____pounds

3. (a) Under present marketing conditions, should any new producers be allowed to come on your market? Yes___ No___

   (b) If yes, should they be allowed to make new bases_____, or should they be required to purchase existing base from an old producer or producers_____? (check one)

4. (a) If sufficient base were available, would you be willing to purchase any? Yes___ No___

   (b) If no, why not?_____

   _____

   (c) If you would be willing to purchase some base, how much would you be willing to pay per 1,000 pounds? _____dollars/1,000#

5. Do you feel that a dairyman should be: (check one)

   ____ (a) Free to change distributors at any time

   or

   ____ (b) Assigned to a specific distributor by a control agency

6. Setting original base allotments is relatively simple. It is a matter of dividing market fluid sales at the time among producers according to their production. Problems arise when someone wants to increase production. What would you suggest be done if any individual desires to increase his production? (check one)

   ____ (a) Increase his base in proportion to his increased production

   ____ (b) Increase his base only if there were an increase in market fluid sales

   ____ (c) Increase his base only if he bought additional base

7. (a) Do you feel that the base-surplus plan should be continued in its present form in your market? Yes___ No___

   (b) If no, what changes do you think are desirable?_____

   _____

   _____

B. GENERAL INFORMATION

Please give us a description of your farm by supplying the following general information:

1. How many dairy cows do you have in your herd? _____cows
2. How many dairy heifers of all ages do you usually carry? ____heifers
3. Are you a member of D.H.I.A.? Yes____ No____
4. How long have you been shipping to your present market? _____years
5. How many years have you been in dairying? _____years
6. Is dairying your major source of farm income? Yes____ No____
7. Do you have enough labor and/or equipment to handle more milk than you are currently producing? Yes___ No___
8. How much longer do you expect to continue to farm?_____years
9. How many beef cattle of all ages do you usually carry? _____head
10. How many acres of open land are you presently farming? _____acres
11. How much of the above acreage do you usually have in crops____acres
12. How many acres do you usually have in hay? _____acres
13. How much of your hay acreage do you usually have in alfalfa hay? _____acres
14. How many acres do you normally have in silage? _____acres
15. How much of your silage acreage is corn silage?_____acres
16. Approximately what percent of your grain concentrates are purchased? _____%
17. Is your pasture land mostly native_____or seeded_____? (check one)

Thanks Very Much for Your Contribution

Note: If you have any additional comments you would like to make, space is provided below

_____

_____

_____

APPENDIX B

BASE REGULATIONS, ROANOKE MARKET, 1955

BASE REGULATIONS, ROANOKE MARKET, 1955

A. Each distributor in the established sales area, upon obtaining his initial license, shall file with the Local Milk Board within ten days after being licensed by the Commission to handle milk, the base of each producer delivering milk to him.

B. No distributor shall take on a producer or in any way accept milk from a baseholding producer assigned to the plant of another distributor without first having obtained the written consent of the Commission. A producer-distributor who discontinues distributing milk or cream and becomes a wholesale producer of milk shall have his base established and assigned to a distributor by the Local Milk Board and approved by the Commission on an equitable basis with all other producers.

C. New producers shall be taken on the market in order of their applications, upon the presentation to the Commission of satisfactory evidence showing the need of additional milk and cream in the market.

D. A new producer shall receive for his total deliveries, during his first four full delivery periods, the lowest price paid by his distributor for milk. After that time his base shall be set up by the Commission on a basis equitable with other producers having bases previously established.

E. Bases to be in effect for each calendar year, shall be determined with reference to the average monthly deliveries of milk during

the months of September, October and November of the preceding calendar year, and adjustments to be made in existing bases each year thereafter, as follows:

1. If the average monthly delivery of milk is less than the base then in effect, then the producer shall be given a temporary base equal to his average monthly deliveries of milk for this last base-making period, but shall be allowed to recover his former base if his average monthly deliveries of milk for either of the next two regular base-making periods shall be sufficient. If, however, he shall fail three successive attempts to maintain his former base, then he shall be assigned a new base equal to his average monthly deliveries of milk for the last regular base-making period, without any recourse.
2. If the average monthly delivery of milk by a producer is in excess of 110 percent of his base, that part in excess of 110 percent shall be eligible for additional base, if any is to be allotted. However, if he shall sell a part of his base, then he shall not be eligible for any increase in base under the 110 percent rule until he has purchased as much as he has sold.
3. However, the total aggregate bases of all producers shall not exceed the average monthly sales of fluid milk and fluid cream by distributors for the previous twelve months by more than 5 percent.

F. A renter or tenant, provided he is the owner of the entire herd,

who is a producer holding a base on the market, may retain his base in the event he moves from one farm to another, in this production area, and he may retain a percentage of the base in proportion to his ownership of a jointly owned herd and base.

An owner of a base and herd, or a part thereof, may sell and transfer, subject to the approval of the Commission, his base and herd, or his part thereof, to any producer, or person desiring to become a producer, provided however, that any application for the sale and transfer of a base must be accompanied by satisfactory evidence, produced before the Commission showing a bona fide sale of the entire herd and base, or his entire part of such herd and base, and that the approval of such sale by the Commission will promote the best interest of the entire milk market. Further, that if a producer who failed by a certain amount to maintain his base at the previous base-making period shall sell his entire base, or a part of his base, he can sell and transfer only his current base and cannot transfer to the buyer any of his privilege under Regulation No. 5 of regaining base lost at the previous base-making period.

G. Producers shall at all times deliver regularly to their distributors all milk produced by them except such milk as may be needed for home consumption, provided, however, producers shall not be required to deliver regularly milk produced by them in excess of 110 percent of their base allotment. No producer shall have a base in more than one market.

No producer, or association of producers, shall buy or obtain

otherwise any additional milk, from any source whatsoever, and deliver it to his, or its, distributor for the purpose of retaining or increasing his or its members' base or bases. No producer shall have a base for a given production unit, in more than one market, nor shall more than one base be assigned to the owner, or owners, of one production unit.

H. On and after the effective date of this Regulation, no new base shall be established at the plant of another distributor, for any licensee operating as a producer-distributor, nor shall any base-holding producer be granted a license to distribute milk, unless and until he has surrendered the base held by him at the plant of another distributor. This Regulation shall not prohibit, however, persons who have heretofore been licensed to distribute milk and who have also been given a base at the plant of another distributor, from continuing to operate in this dual capacity until such time as he shall voluntarily discontinue to so operate.

I. Should a producer fail to deliver to his distributor the quantity of milk for which he has a base due to the effects of disease in his herd, fire, or other unavoidable cause, the Commission, may, in its discretion, adjust his base upon fair and reasonable principles, provided he shall, within thirty days after the cause or causes of his failure shall have occurred, notify the Chairman or Secretary of the Local Milk Board and the Secretary of the Milk Commission of the cause or causes for which he seeks a readjustment of his base, and shall accompany his request for adjustment with proof of the cause or causes of his failure to make deliveries.

J. A producer having a base on the market, approved by the Commission, shall have the right to continue to ship all of his milk and/or cream to the distributor at whose plant such base is established. The milk delivered by such producer shall not be rejected by the distributor so long as the milk and/or cream is delivered regularly, is merchantable, and meets all requirements of the Local and State Health Laws and Regulations.

No producer having a base, established in the market, and assigned to a distributing plant by the Commission, can transfer his base and deliveries to another distributing plant, without having first obtained the written approval of the Local Milk Board. The decision of the Local Milk Board in all such transfers shall be subject to an appeal to the Milk Commission.

K. Notwithstanding other provisions of this Regulation covering the establishment or adjustment of bases, the Commission, may in its discretion, adopt other formulas for the fixing or adjustment of bases whenever in its judgment conditions exist requiring the use of other methods for the establishment or adjustment of bases, necessary to meet conditions of the market.

L. The Commission may suspend or revoke a base held by a producer, upon due notice to the producer, and after a hearing where the Commission is convinced from the evidence that such base-holding producer has knowingly violated any of the provisions of these Regulations.

APPENDIX C

BASE PAY-OFF PROCEDURE

VIRGINIA MILK COMMISSION MARKETS, 1955

BASE PAY-OFF PROCEDURE

VIRGINIA MILK COMMISSION MARKETS, 1955

The following method of payment by distributors to producers is required in each market.

To determine the payment of breed or certified milk that is delivered by one or more producers, for which the premium price is paid, the amount sold as such shall be deducted from his or their bases and the remaining bases will be used to determine the equitable distribution for the remaining amount of milk with other producers.

When the breed or certified milk has been determined, the remaining milk shall be apportioned as follows:

Producer	Bases	Deliveries	Class I	Class II	Class III
A	10,000	9,000	7,647	1,000	353
B	5,000	4,750	3,824	500	426
C	3,000	1,000	1,000		
D	2,000	2,250	1,529	200	521
	20,000	17,000	14,000	1,700	1,300
			70%	10%	
			76.47%		

The total Class I sales are divided by the total bases to get the Class I percentage. EX. 14000 ÷ 20000 = 70%

This percentage is to be applied to each individual base. Producer C did not deliver the 70% of his base (2100 pounds), which he is allowed in Class I. Therefore, he is given all of his deliveries in Class I and a new percentage must be obtained so that the remainder of his base (1100 pounds) may be divided between the other producers. This is obtained by subtracting the pounds C is given in Class I from the total Class I sales. EX. 14000 - 1000 = 13000 pounds

The base belonging to C is subtracted from the total bases in the same manner. EX. 20000 - 3000 = 17000 pounds

The new percentage is obtained by dividing the new Class I total by the new base total. EX. 13000 ÷ 17000 = 76.47%

This percentage shall be multiplied by each individual base. The poundage obtained is given each producer in Class I as his Class I sales.

EX.	A	10000 x 76.47% =	7,647 pounds
	B	5000 x 76.47% =	3,824 pounds
	C	Already obtained	1,000 pounds
	D	2000 x 76.47% =	1,529 pounds
This should total			14,000 pounds Total Class I

****

The total Class II sales are divided by the last aggregate bases obtained in working Class I. EX. 1700 ÷ 17000 = 10%

Each of the individual bases is multiplied by the 10% and the amount obtained is the amount put in Class II.

EX.	A	10000 x 10% =	1000 pounds
	B	5000 x 10% =	500 pounds
	C		
	D	2000 x 10% =	200 pounds
This should total			1700 pounds Total Class II

****

Class III is made up by subtracting from each producer's deliveries his Class I and Class II pounds. The remainder goes into Class III including purchases of milk and/or cream from sources other than from base-holding producers.

****

A producer who fails to deliver milk that meets the State and Local Health requirements for fluid milk and fluid cream in each market, shall have his base reduced by one-thirtieth (1/30) for each day of the failure.

APPENDIX D

SPECIAL NOTES

SPECIAL NOTES

Note One

Some of the reasons for the choice of 1955 as the year for securing detailed data on individual producer sales and deliveries have been outlined in the text. Some additional comment seems appropriate. As is discussed in the text, a maximum of five years data (1951-1955) were available (records for all prior years had been destroyed). Since the individual producer sales and delivery analysis constituted only one part of the entire analysis (as contrasted to the market analysis done for 1951, 1953 and 1955 and the chapter on individual producer base growth done over the period 1947-1956), 1955 was chosen as being the most recent year available at the time the data were obtained. It was considered to be the least abnormal year of the five years for which data were available.

It is difficult to ascertain with any precise accuracy just what defines a "normal" year. As far as the author is able to determine, 1955 was a "normal" or "typical" year. It was a year in which both Grade A receipts at plants and fluid milk sales continued their long time upward trend in the markets selected for detailed study as well as most other Virginia markets. Nineteen fifty-five was a relatively drought free year in Virginia with pasture conditions about the same percentage of normal as the average of the past five years. The average milk-feed ratio for Virginia for 1955 was 1.33 compared to 1.29 for 1954

and the 1949-1953 average of 1.32.

The Class II price (surplus price) was approximately 30-35 cents lower in 1955 than the 1950-1954 average. The Class I price in 1955 for Roanoke and Harrisonburg was higher than the 1951 price but lower than the 1953 price (about 30 cents difference each way in both markets). The Class I price in Newport News in 1955 was the same as in 1951 but lower than 1953 (by approximately 30 cents). The differences in the surplus and Class I prices for 1955 as compared to the other years probably had some effect on 1955 production. However data provided on the delivery-to-base ratio on page 85 do not indicate significant differences in the ratios between the three years for most of the markets examined.

There were provisions for seasonal changes in the Class I price in Newport News and Harrisonburg during 1953-1955. There was no seasonal pricing in Roanoke. The seasonal price movements in Newport News and Harrisonburg were not related by formula to changes in Class I sales.

The semi-permanent nature of dairying (as compared to the relative ease with which one can shift in and out of hog and beef production) and its relatively fixed production patterns (at least in the short run as contrasted to the ease of expansion or contraction in some other types of agricultural production) appear to render it less susceptible to dramatic fluctuations in supply from year to year. The choice of 1955, which was at least as "normal" as any of the years available, seemed to be the best of the limited alternative choices which could be made.

Note Two

The term atomistic, as used in this study, does not apply to the entire dairy marketing system nor is it used to describe any segment of the Virginia dairy industry operating under State price control regulations. No contention is made that the supply response under the base-surplus plan is atomistic. Atomistic as used in this study is not meant to infer that a perfect market exists. It refers only to the supply response of individual producers where a blend price payment system is used. The purpose of the theoretical discussion is to examine what the conditions are in markets where blend prices are paid (not the Virginia markets) and how the use of a semi-closed base plan could possibly help the situation. Atomistic infers that each individual producer's production is small relative to the total production of the market and consequently his own production decisions will have a relatively small effect on the market average price. The production decisions of all producers together will have an effect on the market average price (but not the action of any one individual). Used in this context, atomistic supply conditions do not conflict with the price bargaining operations of cooperatives which may approach a monopoly position. Atomistic supply response refers to actions taken by individual producers after the various class prices have been established either by collective bargaining or by some regulatory agency.

It is felt that the term atomistic accurately characterizes the supply response of individual producers in markets where the number of producers is relatively large, each producer's production is small

relative to the market total and where no arrangement exists for limiting the production of individual producers either by cooperatives or by governmental regulation. This does not rule out the presence of cooperatives and/or price regulations which may influence the prices paid for various classes of milk. Again it is emphasized that atomistic supply response by individual producers may exist side by side with monopolistic or oligopolistic pricing. The problem is one of reflecting to the producer any gains from such pricing.

Note Three

Mention is made of restriction of entry to each market at various stages of this report. The question arises as to what extent sanitary regulations may act as barriers to entry. There is considerable variation between markets in the sanitary requirements which must be met by producers serving those markets. This situation is not unlike the situation in most other states with respect to differences in sanitary requirements between individual markets. To the extent that there are differences between markets, producers attempting to change from one market to another would have to change their operation in accordance with the specific requirements of the new market they desire to enter. As far as the writer has been able to determine, sanitary requirements have not been used to reinforce the restriction of producer entry under the base-surplus plan.

The Virginia Milk Commission is not charged with any responsibility for sanitary regulations; nor does it have any power to determine who is or is not properly qualified to produce milk in terms of sanitary

standards. The Commission does require that each applicant for a base on any of its controlled markets must first secure a Grade A health permit before it (the Commission) will accept his application and/or give him any consideration.

Restriction of entry as used in this study refers primarily to the Commission's policy of requiring prospective producers to substantiate the need for their milk on the market they desire to enter. Sanitary regulations are not considered to be of any special significance in this respect.

Note Four

In the absence of the development (either by this study or by other studies) of any satisfactory criteria for measuring the minimum seasonal variation feasible under varying production conditions and the maximum Class I utilization attainable under varying market conditions, a comparison of the magnitude of these variables for several other markets provides a means of appraising the effectiveness of the base-surplus plan. This note is designed to indicate the magnitude of these variables in some other milk markets as a basis for such a comparison.

A study published in 1957 provides some comparative data on the New York, Boston, Philadelphia, Baltimore and Washington, D. C. markets for 1954.[1] The seasonality of delivery (high month as a percentage of low month) was as follows: New York (165 percent); Boston (156 percent);

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[1] Arthur D. Jeffrey, The Production-Consumption Balance of Milk in the Northeast Region, Northeast Regional Publication No. 29, Cornell University Agricultural Experiment Station, Ithaca, New York, June, 1957.

Philadelphia (130 percent); Washington, D. C. (123 percent) and Baltimore (124 percent). The Class I utilization for these markets was as follows: New York (64 percent); Boston (71 percent); Philadelphia (79 percent); Washington, D. C. (72 percent) and Baltimore (67 percent). The average annual difference between the Class I price and the average price received by producers was: New York ($1.59/cwt.); Boston (88 cents/cwt.); Philadelphia (62 cents/cwt.); Washington ($1.36/cwt.) and Baltimore ($1.11/cwt.).

With respect to seasonality of delivery, Jeffrey indicates that a high month to low month ratio of 130 percent or less is considered to be indicative of uniform or even deliveries to plants.[1] Quackenbush and Homme also indicate that a high to low variation of 30 percent achieved in the Detroit market is a commendable and enviable record.[2] A random sample of ten Federal Order markets was selected from markets reported in the Fluid Milk and Cream Report for 1955. Computation of the high month to low month delivery variations yielded the following percentages: Cleveland (143), Chicago (142), Milwaukee (129), St. Louis (140), Springfield, Mass. (137), Nashville (125), New Orleans (118), North Texas (124), Wichita, Kansas (122), and Puget Sound, Wash. (140).

With respect to Class I utilization, fifteen Federal Order markets were selected at random and the Class I utilization as a percentage of

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[1] Ibid., p. 7.

[2] G. G. Quackenbush and H. A. Homme, Seasonal Price Incentives of the Base and Excess Plan in the Detroit Milk Market, Michigan Agricultural Experiment Station Technical Bulletin 228, March, 1952, pp. 4 and 32.

total receipts secured for the period 1951 through 1956.[1] These percentages are shown in the following tabulation:

Class I utilization as a percentage of total purchases, fifteen Federal Order markets, 1951-1956.

Market	Year					
	1951	1952	1953	1954	1955	1956
	percent					
Cleveland	76	68	66	65	69	72
Detroit	85	74	71	70	73	71
Toledo	83	85	82	84	85	89
Columbus	74	75	72	71	73	74
Springfield, Mass.	83	83	79	77	77	75
Milwaukee	79	77	73	77	81	79
Chicago	55	53	47	47	52	49
Minneapolis	62	63	59	62	74	67
St. Louis	88	89	82	79	82	79
Wichita, Kansas	78	77	66	70	75	69
Louisville	78	78	74	72	73	69
Nashville	83	86	76	77	80	75
New Orleans	81	80	77	72	70	68
North Texas	98	90	81	82	83	78
Puget Sound, Washington	80	74	66	62	60	60

By way of comparison to the differences between the Class I price and average price paid to producers in the selected Virginia markets for

[1] Dairy Statistics, Statistical Bulletin No. 218, Agricultural Marketing Service, Department of Agriculture, Washington, D. C., October, 1957, p. 354.

1955, the same information for 1951 and 1953 is shown in the following tabulation:

Market	Class I price		Average price paid to producers		Difference	
	1951	1953	1951	1953	1951	1953
	----------dollars per hundredweight----------					
Roanoke	6.20	6.85	6.01	6.50	.19	.35
Harrisonburg	5.85	6.51	5.60	5.92	.25	.59
Newport News	6.50	6.82	6.40	6.49	.10	.33

Examination of these data indicates that there was less difference between the Class I price and average price paid to producers in Harrisonburg and Newport News in 1951 and 1953 than there was in 1955. At least a portion of this difference can be ascribed to "abnormal" Class I demand associated with the Korean War.

The comparison of the data included in this note with the data included in the text suggests that the base-surplus plan was successful in attaining its objectives in a relative sense (relative to other markets not using a production control plan). This is the context in which the term successful is used in the text. It is not used to infer success in any absolute context.

Note Five

Attention has been given to the competitive structure within which the base-surplus plan operates in Virginia Milk Commission markets. A brief resume is offered at this point as a basis for indicating the prerequisite conditions for successful operation of the

base-surplus plan in other markets. In the markets selected for study, the authority of the Milk Commission is used as the basis for restricting the entry of new producers on each market, for assigning specific producers to specific distributors, for promulgating certain specific regulatory provisions for allotting of new base and the sale and transfer of base among producers, and in general to determine who may produce and sell fluid milk and how much they may sell. The general effect of the use of such authority on competition is to insulate each individual producer on the market from the competitive actions of other producers in the market as well as from the competitive actions of potential producers not currently on the market.

The necessary market characteristics or conditions for successful operation of the base-surplus plan in other markets appear to include the following:

(1) Some type of administrative machinery which can either restrict or retard market entry of new producers as well as equalize market deliveries and sales by shifting production when sales change. This would seem to suggest that some type of State control regulation would be necessary since the present regulations governing Federal Milk Marketing Orders do not permit closed or semi-closed base systems. This does not rule out the possibility that a cooperative could operate a semi-closed base plan itself without any type of control at all. However, the effectiveness of such an operation would hinge on how much control the cooperative had over total market deliveries.

(2) Some provision should be made for local boards or committees to oversee the operation of the plan in each locality. This

would be especially true if the market were large or if one agency were supervising several markets.

(3) The availability of alternative markets to relieve the pressure of potential base-seekers is of considerable importance (the Washington, D. C. and Bristol markets help out the Virginia markets studied in this respect).

(4) Some protection from inter-state milk flows is also important.

(5) There should be a steady increase in fluid milk sales from year to year to alleviate the otherwise strong pressure on individual producer growth and to permit the addition of a few new producers periodically.

(6) There appears to be no particular limit as to the size of market (in terms of producer numbers) for successful operation of a semi-closed base plan. However, very large markets may encounter considerable administrative problems with respect to enforcement of the necessary regulations.

Some other general observations might include the following:

(1) The particular base plan discussed in this study (within the administrative machinery set up) could operate in the complete absence of any cooperative action on the part of producers and mention has been made of the fact that the cooperatives serving the markets studied are relatively weak. However, this does not infer that a strong cooperative would be a deterrent to the plan's successful functioning.

(2) Although the base-surplus plan described herein has been

operated on an individual handler pool basis, there appears to be no particular reason why it could not also operate under a market-wide pool.