The effects of a domestic parity plan on Montanas wheat industry
by George A Nielsen

A THESIS Submitted to the Graduate Faculty in partial fulfillment of the requirements for the degree of Master of Science in Agricultural Economics
Montana State University

Abstract:
This study is concerned with the effects of a domestic parity program for wheat on Montana's wheat industry. The effects of two general types of domestic parity programs are analyzed. The first type treats all wheat as one commodity. The second type differs from the first one mainly in that it recognizes and provides for classes of wheat. In addition to the two main plans, two variations of the first and one variation of the second are also analyzed. The variations embody provisions for surplus reduction and the use of different time periods within which normal yield data necessary for quota calculations are determined.

The total revenue accruing to the Montana wheat industry under each of the various plans and under the present wheat program is the main criterion by which they are compared. This revenue is calculated at both 1958 and 1959 prices. In the case of the domestic parity plans, these revenue calculations are based on the various bushel quotas provided by them and on the 1949-1958 Montana average wheat and barley yields. Total revenue under the present program is based on the 1958 Montana wheat acreage allotment and on the 1949-1958 Montana average wheat and barley yields. The same price series is used for all revenue calculations.

The results of the study indicate that the revenue accruing to the Montana wheat industry would be greater under a domestic parity plan than under the present wheat program — provided that the domestic parity program which becomes a reality, if and when one does, is not significantly different from those studied herein. The results indicate only slight differences in the revenues accruing under the various domestic parity plans studied. However, they do point out that a given production or marketing restriction would reduce revenue to the wheat industry less under a domestic parity plan than under the present wheat program.

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GEORGE A. NIELSEN

A THESIS

Submitted to the Graduate Faculty

in

partial fulfillment of the requirements

for the degree of

Master of Science in Agricultural Economics

at

Montana State College

Approved:

J. L. Fischer
Head, Major Department

Maurice C. Taylor
Chairman, Examining Committee

Leon H. Johnson
Dean, Graduate Division

Bozeman, Montana
August, 1959

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ACKNOWLEDGMENT

The author wishes to express sincere thanks and appreciation to Mr. Maurice C. Taylor, chairman, Mr. William J. Ewasiuk, and Dr. Clive R. Harston of the thesis committee for their encouragement, guidance, and critical review of this thesis. Special thanks are also extended to Dr. John L. Fischer and Mr. Helmer Holje of the Department of Agricultural Economics and Rural Sociology and to Dr. Robert G. Dunbar of the Department of History, Government, and Philosophy.

Sincere thanks are expressed to the secretarial staff of the Department of Agricultural Economics and Rural Sociology for their most excellent and efficient cooperation in preparing the manuscript.

Also deserving special recognition is Mr. LeRoy Rude of the Agricultural Research Service who supplied some of the data used herein.

Any errors or omissions in this study are the responsibility of the author.

ABSTRACT

This study is concerned with the effects of a domestic parity program for wheat on Montana's wheat industry. The effects of two general types of domestic parity programs are analyzed. The first type treats all wheat as one commodity. The second type differs from the first one mainly in that it recognizes and provides for classes of wheat. In addition to the two main plans, two variations of the first and one variation of the second are also analyzed. The variations embody provisions for surplus reduction and the use of different time periods within which normal yield data necessary for quota calculations are determined.

The total revenue accruing to the Montana wheat industry under each of the various plans and under the present wheat program is the main criterion by which they are compared. This revenue is calculated at both 1958 and 1959 prices. In the case of the domestic parity plans, these revenue calculations are based on the various bushel quotas provided by them and on the 1949-1958 Montana average wheat and barley yields. Total revenue under the present program is based on the 1958 Montana wheat acreage allotment and on the 1949-1958 Montana average wheat and barley yields. The same price series is used for all revenue calculations.

The results of the study indicate that the revenue accruing to the Montana wheat industry would be greater under a domestic parity plan than under the present wheat program -- provided that the domestic parity program which becomes a reality, if and when one does, is not significantly different from those studied herein. The results indicate only slight differences in the revenues accruing under the various domestic parity plans studied. However, they do point out that a given production or marketing restriction would reduce revenue to the wheat industry less under a domestic parity plan than under the present wheat program.

PART I

INTRODUCTION

The Problem Situation

The history of the government's role in agriculture in this country is almost as old as the history of American agriculture itself. This role dates back as far as 1631 when "the colonial authorities stipulated that no tobacco might be offered for purchase of English goods at a valuation of less than sixpence a pound."[1/] Other examples of government intervention can be cited all through the remaining history of American agriculture.[2/] However, since the passage of the Agricultural Marketing Act of 1929, the role of government in this field has been greatly expanded. This, of course, has meant that Federal farm policies have become increasingly important to the American farmer and the agricultural economy.

These national policies have often been designed to fit either the agricultural economy in general or some particular segment of it. A common procedure has been to classify these segments according to the type of crop produced, rather than by geographic areas, income level, or some combination thereof. This type of policy has come to be known as

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1/ John Kenneth Galbraith, American Capitalism, the Concept of Countervailing Power, Boston, Houghton Mifflin Co., 1952, p. 161.

2/ For a comprehensive review of the history of farm policies, see M. R. Benedict, The Farm Policies of the United States, 1790-1950, New York, Twentieth Century Fund, 1953.

a "commodity program." The broad scope of these economy or commodity wide policies has given rise to some problems. A national policy designed to fit such broad classifications is not always beneficial to all of the sub-classes within it. Thus, a national farm program, acceptable on the basis of its overall effect, may not be beneficial to Montana farmers because of the peculiar characteristics of Montana agriculture. These peculiar characteristics may include such things as weather, farm size, transportation costs, and marketing facilities. Insofar as these characteristics differ from the general characteristics of agriculture for which a farm policy is designed, they may prevent the benefit it is intended to create from accruing to Montana farmers. This possibility makes it desirable to determine, in advance if possible, the economic impact of Federal farm policies on Montana agriculture.

Among the current proposals for agriculture is a domestic parity plan for wheat. Some bills incorporating this plan have been introduced in this session of Congress. A domestic parity plan is essentially a two-price plan. In its broadest form, it is designed to bring the farmer a parity price for that portion of his production that is consumed as domestic food wheat and a free market price, or at least some lower price, for the remainder of his wheat crop.[1/]

1/ The word "free" is herein used to denote markets in which there is no government support price to directly interfere with normal supply and demand price formation.

A great many variations of this plan have been proposed. For example, there were five bills, known as the McNary-Haugen bills, introduced in Congress in the period from 1924 to 1928. These bills were essentially domestic parity plans, but even they differed considerably. However, in general the present day proposals are designed to operate somewhat as follows: The farmer sells his wheat in the free market. For that portion of his production that is consumed domestically as food wheat, he receives a "stabilization certificate" which has a value equal to the difference between the free market and the parity price. Thus, he receives the parity price for the wheat making up his share of the domestic food wheat market, and the free market price for the remainder of his production.

The processor, like the farmer, transacts his business in the market at free market prices. He then pays the difference between that price and parity for that portion of his purchases which he later sells in the domestic food wheat market. This payment could conceivably be made in the form of stabilization certificates which the processor purchased from the same agent that cashed them for the farmer. He would presumably pass much of this cost on to the consumer. In this way, the consumer pays and the farmer receives the parity price for wheat consumed domestically as food, while wheat not so consumed is free to move into the uses that can pay the most for it.

The Research Problem and Limitations

The Research Problem

This study is concerned with the analysis of the effects of two general types of domestic parity programs for wheat on the Montana wheat industry. One type of program treats wheat as one commodity while the other recognizes and provides for the classes of wheat. These programs will be analyzed in terms of their effect on the total revenue received by the state wheat industry in relation to such revenue under the present farm program.

Limitations to the Problem

At the time of this writing, a domestic parity program has not yet been enacted into law. This makes it necessary to fabricate a domestic parity program from which to determine operational procedures and their effects. Insofar as this hypothetical program differs from the one that becomes a reality, if and when one does, the results will be affected. However, it is believed that the hypothetical programs used in this study will be close enough to the probable one that the results will be affected only in degree and not in nature. Nevertheless, the latter possibility should not be disregarded.

Another limitation is the non-availability of yield and planted acreage data by states with regard to classes of wheat. Since such data are not available, the analysis of the effects of the domestic parity programs which recognize classes of wheat is restricted to the principal types of wheat grown in Montana, Hard Red Winter and Hard Red Spring.

Objectives

The main objective of this study is to determine the effects of a domestic parity program for wheat on the income of Montana's wheat industry.[1/]

Two minor objectives are: (1) to compare the effects of a domestic parity program which does not recognize classes of wheat with one which does, and (2) to compare the effects of using two time periods of different lengths for purposes of calculating normal yield data to be used in determining bushel quotas.

Hypothesis

The incorporation and implementation of a domestic parity plan for wheat in our Federal farm progarm will reduce the total revenue received by the Montana wheat industry compared to the revenue received under the present program. This income reduction will occur because: (1) the parity price will apply to too few bushels to offset the effects of the lower price which will be lower than present supports on the remaining bushels, and (2) any acres released for wheat production from the present acreage restrictions will have little effect on raising revenue because wheat produced on these acres will sell at a price which will compare with barley supports.

1/ Unless otherwise stated, the term "income" as used herein refers to gross money income.

Procedure

Part II of this study will consist of a discussion of the theoretical implications of a domestic parity plan. The plan will be analyzed from the standpoint of a government-sponsored price discrimination scheme. A theoretical analysis of price discrimination will be presented first, followed by an application of the theory to a domestic parity plan. Included will be a discussion of the method by which profit maximizing prices and levels of output for the wheat industry can be determined.

The alternatives available to the Montana commercial wheat farm under a domestic parity program and the method of choosing between such alternatives will also be discussed. This will be followed by an analysis of the method by which the farm firm can determine the optimum level of output under a domestic parity plan.

In Part III, the significant or relevant features of the several domestic parity plans studied in this work will be presented. A more detailed form of the bills themselves will be placed in Appendix E. Even in the Appendix, however, the bills are "condensed" in the sense that only factors relevant to this analysis, or those necessary for an understanding of the operation of the programs, are included.

In Part IV, the effects of the different bills and their variations will be analyzed. This analysis will be concerned with three major variables. These variables are: (1) the domestic parity plan in general in relation to the present program, (2) the difference in the

quotas provided for by the various bills, and (3) the domestic parity plan which recognizes classes of wheat in relation to one that does not.

Bill No. 1 will be considered first. The variations of this bill will be analyzed next, followed by a similar analysis of the effects of Bill No. 2 and its variations. Relevant bushel quotas and total revenue to the Montana wheat industry will be calculated for each of the plans. The bushel quotas will be based on the distribution during the marketing year beginning July 1, 1958, and total revenue will be calculated at both 1958 and 1959 prices. As a basis of comparison, total income to Montana's wheat industry under the present program will be calculated, applying the yield and price data used in this analysis and the 1958 acreage allotments.

Part V will consist of a summary of the results of the analysis. From these results, inferences will be drawn regarding the effects of a domestic parity plan.

A study shrouded with assumptions, as this one necessarily is, leaves room for much in the line of further research. Suggestions regarding this research will also be made in Part V.

PART II

THEORETICAL IMPLICATIONS OF THE PROBLEM

A program such as the domestic parity plan has significant economic implications. It creates what is essentially a "government cartel" designed to capture a portion of both the consumers' and producers' surpluses through price discrimination.[1/] The program captures consumers' surplus by raising the price to the consumers of domestic food wheat. It captures producers' surplus, which can result from a high support price by lowering the price to the users of non-food wheat.

For a price discrimination scheme to operate effectively in increasing total revenue, three conditions must be present. First, the firm (or cartel) must have monopoly power in the sense that others cannot enter the market and undersell it; second, it must be able to effectively separate the markets in which it charges different prices; and third, the price elasticities of demand for the product must be different in each market at each possible price.

For exposition purposes, discriminatory pricing for a monopolist with two effectively separated markets will be discussed first. Then the analysis can be generalized to include the wheat industry and its component markets. Once the theoretical background has been established, the analysis can be applied to a domestic parity plan.

1/ For a description of the consumer's and producer's surplusses, see K. E. Boulding's Economic Analysis, Revised Edition, New York, Harper & Brothers Publishers, 1948, pp. 767-768. For a further refinement of the measurement of consumer's surplus, see J. R. Hicks, A Revision of Demand Theory, London, Oxford University Press, 1956, Chapter 10.

The method by which a monopolist in a position to sell in two or more effectively separated markets can maximize his total revenue is presented in Figure 1. For convenience, the quantity axis for Market II indicates from right to left.

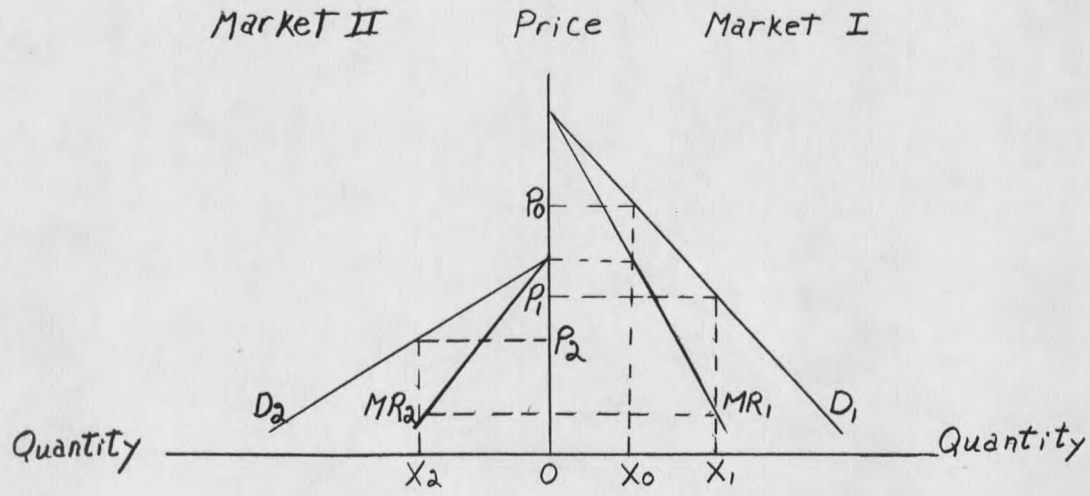

Figure 1. Price Discrimination in Two Markets.

A monopolist can maximize his total revenue by selling in the market with the highest marginal revenue. Thus, he should distribute his sales in the separate markets in such a manner that the marginal revenues are kept equal in both markets. Referring to Figure 1, if the monopolist has less than X_0 units of product, he should sell it all in Market I. However, if he has X_1 plus X_2 units of product, he should sell X_1 in Market I and amount X_2 in Market II. In this way, he is always selling in the market where the marginal revenue is equal to or greater than that in the other market.

The prices this monopolist should charge are P_1 in Market I and P_2 in Market II. This explains why different price elasticities of demand are required for a price discrimination scheme. If the price elasticities were the same, the prices to charge in each market would be equal where the marginal revenues were equal, and there would be no point in trying to separate the markets.[1/]

The profit maximizing position of the firm practicing price discrimination incorporates the concept described above with the cost curves for the firm. Since it is selling identical products in separate markets, the marginal and average cost curves for the firm's entire output can be used. Also, the demand and marginal revenue curves from both markets can be put in one diagram and the horizontal sum of the marginal revenue curves taken to form the sum of the marginal revenues curve (ΣMR). This curve shows the levels of marginal revenue corresponding to different total sales volumes. These curves are presented in Figure 2.

With this method, the profit-maximizing problem is reduced to a simple monopoly problem. The firm maximizes profits where the sum of the marginal revenues is equal to the marginal cost ($\Sigma MR = MC$). The quantity that should be sold in each market is that amount where the $MR_1 = MR_2 = \Sigma MR = MC$. All of the output will be sold at these prices since the $\Sigma MR = MR_1$ plus MR_2 and $X_3 = X_1$ plus X_2. In this way, a profit-maximizing output is produced and sold at revenue-maximizing prices.

1/ This is further explained by the relationship, $MR = P - P/E$. For a complete analysis of this, see Richard H. Leftwich, The Price System and Resource Allocation, New York, Rinehart & Co., Inc., 1957, pp. 199 and 213.

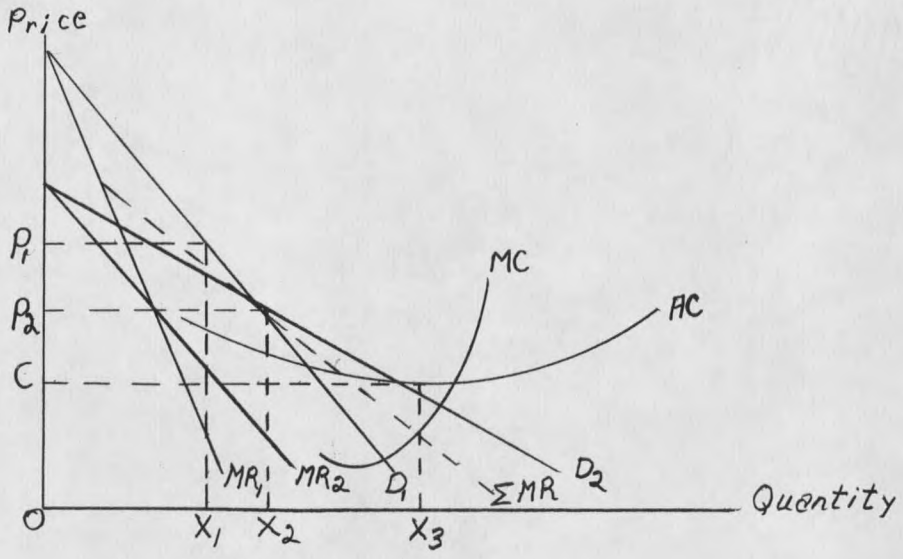

Figure 2. Optimum Level of Output When a Product Sells In Two Markets.

The firm's total profits from the enterprise in Figure 2, would be equal to CP_1 times X_1 plus CP_2 times X_2.

The above analysis can now be applied to the wheat industry. Under government control, a price discrimination scheme for this industry could conceivably be put into effect. The three necessary conditions mentioned above for such a scheme could be created under a government-sponsored plan. The "government cartel" can create the necessary monopoly power. Also, with the proper controls, it could effectively separate the various markets. The condition of different price elasticities is not quite so easily established. There is ample evidence to indicate a significant difference between the price elasticities for domestic food wheat and the aggregate of the export and the domestic

feed wheat markets.[1] This would justify a two-price plan. However, there is also reason to believe there is a significant difference between the domestic food, the export, and the domestic feed wheat markets. The domestic food wheat market is definitely less elastic than the other two. It will be assumed herein that the export market is less elastic than the domestic feed wheat market within the price range likely to be encountered but more elastic than the domestic food wheat market. This condition would give us the three demand curves presented in Figure 3.

The demand and marginal revenue curves in Figure 3 are labeled as D_1 and MR_1 for the domestic food wheat market; D_2 and MR_2 for the wheat export market; and D_3 and MR_3 for the feed wheat market. The average and marginal cost curves are those for the entire wheat industry.

According to the demand and cost curves presented in Figure 3, the wheat industry should produce an output of X_4. It should sell X_1 of this output in the domestic food market at price P_1, X_2 bushels of wheat in the export market at price P_2, and X_3 bushels at price P_3 in the feed wheat market. The total profits for the industry would be equal to CP_1 times X_1 plus CP_2 times X_2 plus CP_3 times X_3.

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[1] Kenneth W. Meinken, The Demand and Price Structure for Wheat, United States Department of Agriculture, Technical Bulletin No. 1136, Washington, D.C., United States Government Printing Office, November, 1955.