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Implications of Alternative Methods for Determining Agricultural Price and Income Supports

TEXAS AGRICULTURAL EXPERIMENT STATION/Neville P. Clarke, Director
The Texas A&M University System/College Station, Texas

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E. Wesley F. Peterson*

INTRODUCTION

In modern economies, prices are determined through market forces, administrative authority, (through the actions of governments or oligopolistic firms), or both. Since the time of Adam Smith it has been recognized that prices determined within a competitive equilibrium lead to efficient resource allocation and optimum welfare levels. The appeal of Smith's invisible hand stems from the fact that individuals not only can but ought to pursue their selfish interests. In so doing, they will actually end up acting in the best interest of society. As a corollary, it is argued that the prices determined in this competitive setting are appropriate. Economists frequently suggest that the right price is one which is consistent with principles derived from the general equilibrium of an idealized economy.

One implication of these notions is that prices should be determined by the market. However, market prices can be considered optimal only if certain conditions are met. The existence of monopolies, externalities and public goods, for example, results in a misallocation of resources if price determination is left to the market. These "market failures" have frequently been offered as rationales for state intervention in markets. Even if a market conforms to the perfectly competitive model, the competitive equilibrium prices will vary with changes in the distribution of income, wealth, and property rights. Different sets of relative prices will be determined by competitive markets that are instituted differently. There is no economic criterion to assist in choosing among the possible price sets. Prices determined by market forces, thus, are no less arbitrary than prices set as a result of administrative decisions by government agencies or large private firms.

Government market intervention is extensive in the United States and most other countries. Presumably, state intervention is aimed at controlling the actions of monopolistic or oligopolistic firms, correcting market failures, or altering the distribution of income or wealth within society. Conceptually, there is little to guide government policymakers in setting these administered prices. Price levels inconsistent with supply and demand conditions will lead to surpluses or shortages. This acts as a constraint on the decisions of price administrators but generally will only serve to set fairly vague upper and lower bounds on the chosen price level. Within these bounds there is room for maneuver with the result that decisions are subject to political influence. The political aspect of administered prices is present whether prices are set by government authority or large private firms.

Agricultural prices provide an interesting example of the interplay between politics and markets. The levels at which prices for agricultural products would settle if markets were essentially left alone are generally considered to be too low or unstable. In all industrialized countries, governments intervene in agricultural markets to stabilize prices or prevent them from falling to the competitive market level. In many developing countries and occasionally in industrialized nations, there is also intervention to prevent consumer food prices from rising too high. In either case, the judgment that prices are too high or too low is essentially political. Various instruments have been developed to translate this political judgment into a constraint on market prices. In the United States loan rates for many crops insure that market prices will at least be equal to a certain minimum. Where prices finally settle, at or above this minimum, is largely left to the market.

Although agricultural support prices have primarily been the product of political processes, there have been many efforts to introduce "objective" criteria into the decision process. These efforts can be seen as attempts to remove the politics from the administrative decision on price supports. Formulas based on parity prices, cost of production, average market prices, world prices, or some other notion appear fair and objective. It should be noted, however, that the pricing rule embodied in these criteria is itself the product of political decision. No single formula represents the one, true method to objectively determine fair prices. The type of formula used to set support prices depends largely on the relative importance of goals such as

*Assistant professor, Department of Agricultural Economics, Texas A&M University.

higher farm income or export promotion.

The purpose of this report is to examine some common methods for setting policy prices and discuss the implications of some current proposals for determining U.S. price and income supports. In Part I, various methods used to determine government-administered agricultural prices are reviewed. The primary focus is the evolution of pricing concepts in the United States, including a discussion of the debate on using average costs of production to set policy prices (loan rates and target prices). A brief discussion of experience with government policy prices in other industrialized countries is also presented. Part II is devoted to an examination of the implications of using alternative pricing rules or formulas for establishing loan rates and target prices in the United States.

PART I: REVIEW OF METHODS USED TO SET ADMINISTERED AGRICULTURAL PRICES

Introduction and Historical Background

Current U.S. policy on cereal grains and cotton includes two policy prices. The loan rate serves as a price floor and helps smooth seasonal price variation. The target price is a subsidized price received by producers participating in government programs. It is generally higher than the market price and serves to support farm incomes. Prior to 1973, the loan rate was used to support farm incomes and there were pressures to set it at levels inconsistent with domestic and world demand. This situation is illustrated in Figure 1, where the loan rate (LR) has been set above the free market equilibrium. At this level of price support, producers supply quantity Q_2, while consumers are only willing to purchase quantity Q_1. The difference between Q_2 and Q_1 is the amount the government "purchases" and stores to support market prices at LR.

The introduction of target prices allowed the government to lower loan rates and has resulted in lower consumer prices. This is illustrated in Figure 2. The target price (TP) is set at a level consistent with the objective of supporting farm income. Since this is the price producers effectively receive, they will supply the quantity Q_0. The price paid by consumers is allowed to fall to P_0 which will clear the market when Q_0 is supplied. The difference between the target price and market price P_0 is paid directly to farmers in the form of a deficiency payment. This system results in two prices for the product, one paid by consumers, and a higher one received by farmers. The deficiency payment is a subsidy paid by the government to increase the price received by producers. In Figure 2, the loan rate has been set below P_0. In this situation, its purpose is to prevent market prices from falling below the loan rate at harvest when the large quantities supplied would normally depress market prices. In this example, the market is allowed to clear so no surplus is stored by the government.

A fundamental objective of U.S. farm policy has been to keep farmers' incomes from falling behind incomes received by workers in other sectors of the economy. Direct income transfers have not generally been used to achieve this objective. Instead, the prices received for the major farm products have been raised to levels where it is hoped that the resulting income would be equivalent to that in the rest of the economy. In the 1920's, farm prices were much lower than in earlier periods and farm incomes began to fall significantly behind industrial incomes (Holland, 1977). This led farm groups to call for parity, a concept which played an important historical role in setting policy prices.

The Agricultural Adjustment Act of 1933 was the first major farm bill. Although the parity concept was not explicitly mentioned in the act, the Secretary of Agriculture was charged with maintaining the purchasing power of the farm sector (Holland, 1977). In the 1938 farm bill, the word "parity" was used for the first time and a formula was constructed to determine parity prices as equal to the average price received during the 1910-14 base period multiplied by the current index of prices paid. This provided a commodity with the same purchasing power as in 1910-14. In subsequent farm legislation, this formula was modified and after 1948 the base period price was replaced by the most recent 10-year average of prices paid (Holland, 1977). For the most part, reference to parity has been dropped in recent agricultural legislation.

Another parity measure is the parity ratio defined as the index of prices received by farmers divided by an index of prices paid by farmers. Both of these indices are weighted averages with the weights periodically updated on the basis of survey information. The parity ratio and parity prices were assumed to indicate the economic well-being of the farm population (Holland, 1977). However, since they are based on prices rather than income, they are only partly related to the main objectives of agricultural policy. Throughout the 1960's and 1970's parity prices would have been much higher than the actual market prices received by farmers. Yet, many larger farms realized relatively high returns at these market prices. Some farms would have received insufficient income even if they had received the parity price (Brandow, 1977).

A major problem with the parity concept is that it does not take technological change into account. Many argue that a bushel of corn should command the same real revenue today. In addition, holding relative prices at a constant level over time inhibits the resource allocation role that prices are supposed to play in a market economy. Other problems with the parity concept include: regional differences in cost and price increases; the fact that the weighted averages used in calculating indices may lead to high returns for larger, more efficient farms while leaving other farms with very low returns; the tendency for the developement of a price spiral as products such as corn are counted in both the index of prices received and the index of prices paid; and the fact that parity is not commodity specific (Holland, 1977).

In general, price supports have not been set at 100 percent of the parity price. Brandow (1977) notes

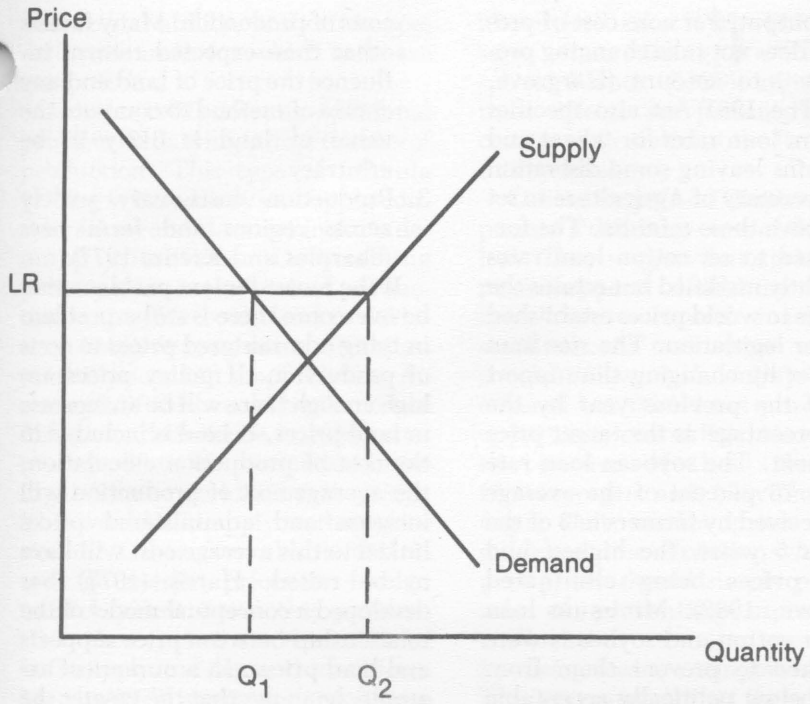


Figure 1. Operation of the Loan Rate.

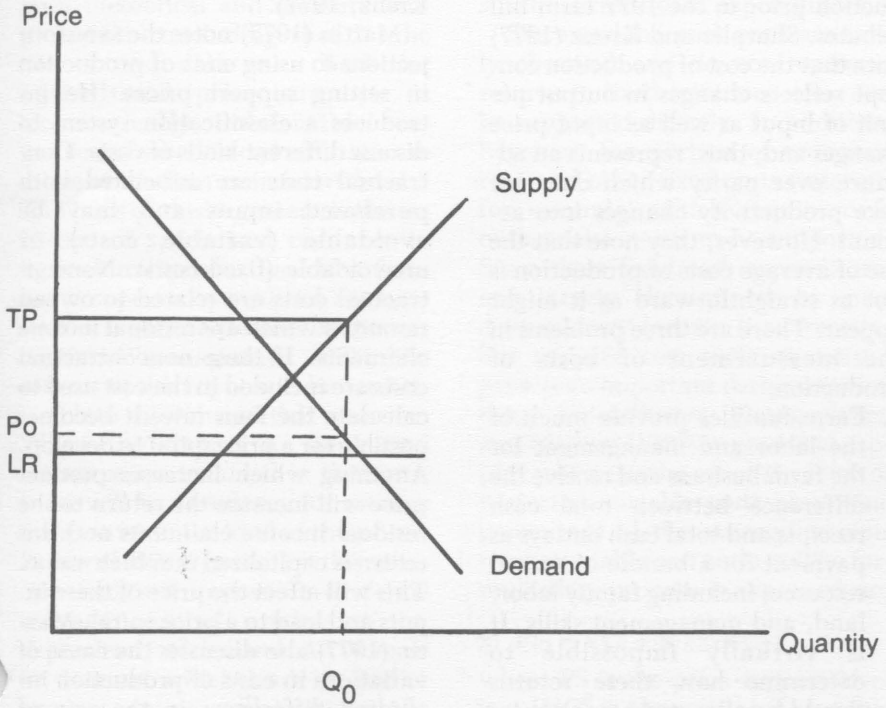


Figure 2. Operation of the Target Price and Loan Rate.

that most economists have not favored fixed percentages of parity as a policy goal. Instead, they view flexible parity percentages, moving averages, administrative discretion, and other approaches to setting support prices as preferable. It had become apparent in the 1960's that loan rates set in relation to parity reduced the ability of the United States to export. High inflation in the 1970's led to high parity prices. Between 1974 and 1981 the support price for corn averaged around 50 percent of the parity price (USDA, 1982). In this context, the parity concept came under attack and the idea of basing policy prices on costs of production was suggested as an alternative.

The Agriculture and Consumer Protection Act of 1973 represented a transition from primary reliance on parity to determine support prices toward using costs of production. At the time this legislation was adopted, some felt the traditional problem of excess capacity in agriculture was no longer relevant as the world moved into a situation of resource scarcity. Less emphasis was placed on limiting production. The major policy innovation was the use of target price and deficiency payments with the loan rate set below market levels to act as a floor price. Parity was still used for setting some loan rates but there were many discretionary aspects (minimum loan rate levels) and other considerations (such as average market prices) were taken into account. For cotton the loan rate was set in relation to world prices for American cotton with no reference to parity (Rasmussen and Baker, 1979). Target prices were set for 1975 and a formula was introduced to adjust these prices for the 1976-77 crop years. The adjustments were based on changes in USDA's index of prices paid for production items, interest, taxes, and wage rates (PI) and changes in a 3-year moving average of crop yields (Y). Letting TP represent the target price, the formula used for adjustment in year t is:

1) $TP_t = TP_{t-1} (1 + \Delta PI - \Delta Y)$

with the provision that TP cannot be less than TP_{t-1} (Penn and Brown, 1977). This formula represents an effort to incorporate technological

change into the calculation of target prices.

The 1973 Act also included instructions to USDA to initiate studies of the average costs of production for major commodities. Although there was no provision for using this information to set policy prices, the act prepared the way for the use of this concept in subsequent legislation (Sharples and Krenz, 1977). In the Food and Agriculture Act of 1977, target prices for wheat and feed grains were set for 1977-78 and a formula was used for adjusting these prices for the 1979 to 1981 crop years. This formula was based on a 2-year average of production costs including expenditures for interest, insurance, replacement of machinery, general overhead, and direct production outlays. It did not allow target prices to be lowered as yields increased. A return to land and management was used in setting the initial target prices in 1977 and 1978 but was excluded from the adjustment formula (Rasmussen and Baker, 1979; Johnson, 1982). Loan rate levels were set at the discretion of the Secretary of Agriculture although minimum levels were specified. For cotton, a procedure similar to that for wheat and feed grains was used to set target prices, but loan rates were determined as the lesser of 85 percent of average market prices; or 90 percent of world market price. The cost of production concept was used to adjust target prices for rice although parity was retained in setting milk price supports (Rasmussen and Baker, 1979). In general, the 1977 Act represented a movement toward greater reliance on costs of production in setting target prices. On the other hand, loan rates were set largely through administrative discretion constrained by a variety of rules and legislated minima.

The 1981 Act reveals a tendency to move away from the strict application of formulas in setting prices. Minimum target prices were set for wheat, feed grains, cotton and rice for the 1982-85 crop years. The Secretary of Agriculture can set higher target prices using the cost of production per acre as a guide. In the previous law the formula was based on the cost of production per unit of output. Per acre cost of production does not take changing productivity into account (Hargrove, 1982). The 1981 Act also specifies minimum loan rates for wheat and feed grains leaving some discretion to the Secretary of Agriculture to set them above these minima. The formula used to set cotton loan rates was slightly modified but retains the reference to world prices established in earlier legislation. The rice loan rate is set by changing the support price of the previous year by the same percentage as the target price adjustment. The soybean loan rate is set as 75 percent of the average price received by farmers in 3 of the previous 5 years, the highest and lowest prices being eliminated (Hargrove, 1982). Minimum loan rates for cotton and soybeans were established to prevent them from falling below politically acceptable levels. The Secretary of Agriculture was given some discretionary authority to reduce loan rates for cotton, wheat, and feedgrains if stocks began to build up.

The Debate on Cost of Production

Sharples and Krenz (1977), and Martin (1977) addressed the issue of replacing parity with costs of production prior to the 1977 farm bill debates. Sharples and Krenz (1977) note that the cost of production concept reflects changes in output per unit of input as well as input price changes and, thus, represents an advance over parity which does not take productivity changes into account. However, they note that the use of average costs of production is not as straightforward as it might appear. There are three problems in the measurement of costs of production.

1. Farm families provide much of the labor and management for the farm business and receive the difference between total cash receipts and total cash outlays as payment for a bundle of owned resources including family labor, land, and management skills. It is virtually impossible to determine how these returns should be allocated among these inputs.
2. Land cost is another element difficult to calculate in determining costs of production. Many factors other than expected returns influence the price of land and any choice of method to compute the value of land is likely to be arbitrary.
3. Production costs vary widely across regions and farm sizes (Sharples and Krenz, 1977).

If the measurement problems can be overcome there is still a problem in tying administered prices to costs of production. If policy prices are high enough there will be an increase in land prices. If land is included in the cost of production calculation, the average cost of production will increase and administered prices linked to this average cost will have to be raised. Harris (1977) has developed a conceptual model of the relationship between price supports and land prices. In a numerical example, he shows that the greater the proportion of land costs included in the calculation of support prices, the higher is the equilibrium price of land. If support price calculations include 70 percent or more of the land charges, Harris' example shows that price supports and land values spiral upward. To avoid this price spiral, land costs must be excluded or held constant over time (Sharples and Krenz, 1977).

Martin (1977) notes the same objections to using costs of production in setting support prices. He introduces a classification system to discuss different kinds of costs. Contractual costs are associated with purchased inputs and may be avoidable (variable costs) or unavoidable (fixed costs). Noncontractual costs are related to owned resources which are residual income claimants. If these noncontractual costs are included in the cost used to calculate the loan rate, it becomes possible for a price spiral to develop. Anything which increases product price will increase the return to the residual income claimants and this return is capitalized into their value. This will affect the price of these inputs and lead to a price spiral. Martin (1977) also discusses the cause of variations in costs of production including differences in the rate of adoption of new technology across geographic regions, regional differences in farm size, variations in

managerial ability, and differences across the units for which costs are computed.

Martin (1977) notes an additional problem with tying prices to costs of production. This type of formula pricing is based only on supply considerations and does not include demand conditions. Determining policy prices on the basis of production costs alone could lead to deviations between long-run equilibrium market prices and support levels. An example of this would be the loss of foreign markets if loan rates based on average costs of production were higher than world market prices. This would also apply to the parity notion. Other formulas based on average market prices or foreign market prices avoid this problem since these prices are the result of both supply and demand conditions. Martin (1977) argues that using some form of cost of production calculations would be an advance over the 1973 target price adjustment formula which was not commodity specific but suggests that decisions on computational method are crucial and difficult to base on economic criteria.

Pasour (1980) criticizes the cost of production approach on the basis of both theoretical and measurement problems, concluding that "...the use of cost data as a basis for agricultural price supports is 'economically indefensible' regardless of whether cost estimates are made at the firm or industry level." The basis of this argument is the existence of specialized resources in agricultural production. If a farm has a superior specialized resource such as highly productive land or exceptional management skills, the returns to this input will be capitalized into the value of that resource. When the returns to specialized resources are included in the costs, there will be a tendency for average costs to rise to the level of the prices. Pasour (1980) suggests that this situation makes it impossible to define average cost of production independently of demand. An increase in demand which leads to higher product prices will increase the returns to specialized factors and result in a rise in costs which include these factors. Supporting prices above the market level will have the same effect leading to a cost/price spiral. Pasour (1980) argues that these effects are present whether costs are calculated at the firm or industry level.

Groenewegen and Clayton (1982) present a different view of the problem. They suggest that agricultural price supports should be seen as measures to control market instabilities. As such, these supports should allow cash outlays to be covered but should not provide the opportunity cost of fixed resources to the owners of these resources. Groenewegen and Clayton (1982) argue that market prices should guide resource allocation while support prices should simply play the role of preventing unnecessary reallocation of resources when market prices are temporarily low. This argument allows them to suggest that at least part of the returns to fixed resources be excluded from cost of production calculations. They suggest that costs are either purchased factor costs or economic rent, the residual return to fixed resources. Both factor costs and economic rent may involve cash outlays during a production period. Some factor costs such as depreciation do not constitute current cash expenditures.

Since variable cash costs are easily observed and do not represent returns to fixed resources, they can be supported directly. In addition, however, the portion of economic rent and other fixed costs (interest, for example) which require cash outlays also needs to be supported. Since these fixed cash expenditures are largely determined by past discretionary income (i.e., receipts less variable cost outlays), output price is an important determinant of these expenditures. Groenewegen and Clayton (1982) suggest that support prices can be set at the level of projected variable costs plus some percentage of the average receipts minus variable cost outlays. The formula they propose is expressed as:

$$2)\quad PS_t = VC_t^p + K\ (P\text{-}VC)$$

where PS is the price support level in t, VC^p is the projected variable costs per unit of output, P is a moving average price per unit of output, VC is a similar moving average of variable costs, and K is a proportionality constant to be determined. They suggest that a value of about 0.5 might be reasonable for K.

Groenewegen and Clayton (1982) believe the suggested formula will allow price supports to be set so as to prevent unnecessary adjustments while avoiding the cost price spiral resulting from a capitalization of the residual returns into land and other fixed resource costs. Belongia (1983) criticizes the suggestions of Groenewegen and Clayton (1982) on two counts. First, he suggests that they represent an attempt to provide an objective economic basis for price supports. He argues that this is not possible since any price different from that determined within a competitive equilibrium is necessarily arbitrary. His second criticism rests on the notion that producer decisions are based on normally distributed price expectations. A price support truncates the distribution and leads necessarily to price expectations greater than those that would prevail if there were no price support. Since the expected price is increased by the support, derived demand for resources will be increased and their value will rise unless resource supply is perfectly elastic. He concludes that any formula leading to prices above market equilibrium levels will result in continually increasing resource values.

Pasour (1983) also criticizes the Groenewegen-Clayton (1982) proposal. He argues that opportunity cost, not cash outlays, is the variable that influences producer decisions and resource adjustments. Short-term negative cash flows may not lead to unnecessary adjustment and setting prices to cover cash expenses may not prevent adjustment. Pasour (1983) agrees with Belongia (1983) that any effective price support will attract additional resources into the sector. Pasour (1983) also notes that there is no objective basis for determining an appropriate value for K. Regardless of how the value of the second term in the formula is determined, the resulting support price will lead to increased prices of land or other specialized resources as long as it is above the competitive equilibrium price. The main point of both the Belongia (1983) and Pasour

(1982) comments is that costs will rise to the level of any support price regardless of how it is determined as long as it is above the long-run equilibrium price.

Groenewegen and Clayton (1983) make several points in replying to these criticisms. They admit that the decision to support prices and the mechanisms used to set price levels involve value judgments but disagree with Pasour (1982) and Belongia (1983) who argue that economists have nothing to contribute to these value decisions. The second point concerns the goals underlying price supports. Groenewegen and Clayton (1982) suggest that the explicit policy objective reflected in the formula is to stablilize farm incomes, not to enhance them as is implied in the two comments. Finally, they argue that there are policy measures which serve as price ceilings. The fact that supply shortages will pull stocks into the market keeps prices from rising as much as they would without the programs. As a result, the distribution of price expectations is truncated at both ends and, if the policies are carried out properly, the price supports can be set equal to the expected price of an untruncated distribution.

The conceptual issues raised in this debate have not been resolved. There are, nevertheless, several important notions which can be retained from the discussion. First, the existence of specialized resources in agriculture means that costs will rise to any support level set above the market price no matter how that level is chosen. Second, the choice of decision rules for setting price supports reflects value judgments that include criteria not normally considered to be part of economics. Depending on one's philosophical orientation, there is or is not a role for economists in determing the decision rule. A third concept is that the levels at which policy prices are set should be closely related to the underlying policy objectives. Setting support prices to protect farm incomes may be inconsistent with promoting exports. Discussions of the appropriate level for support prices are often confusing since the assumed policy objective is not made explicit. There are also pratical issues in tying support prices to cost of production. In addition to deciding what costs to include it is necessary to decide which cost structure is appropriate. If support prices are set to reflect the average cost of a large farm in a low-cost production area, they will be seen as too low by many farmers. Another question concerns the unit for which the costs are computed. The 1981 change from cost per bushel to cost per acre removes one of the advantages of the cost of production approach over the parity concept. While costs of production remain commodity-specific, a per acre basis excludes productivity changes.

If the political decision is made to use average costs of production as a basis for setting policy prices, these conceptual and practical questions must be resolved through decisions on the specific set of computational rules to be employed. This will require prior decisions on the way in which the intervention system is expected to work. For example, target prices could be tied to production costs while loan rates are set in relation to world prices. The constraint here is that if the target price influences producer decisions, costs will rise to that level and a cost/price spiral could develop. This could lead to continually increasing deficiency payments. Clearly the use of this concept does not result in the simple application of a universally accepted formula which eliminates the political aspects of the policy process.

Policy Prices in Other Countries

Most industrialized countries have instituted policies to support agricultural incomes through manipulation of prices. These countries face the same difficulties as the United States in determining the levels at which to set these prices as well as the rules for setting them. The following discussion is not intended to be exhaustive and will be limited to experiences in three economic units: Japan, Canada, and the European Community (EC). These countries have used pricing rules similar to those found in the United States.

Japan

Agricultural policy in Japan includes many forms of intervention. Rice, the most important food product, is under direct state control while semi-governmental organizations are charged with market intervention for pork. In addition to using a variety of mechanisms to achieve policy goals, the intervention prices are determined on the basis of various principles depending on the product. Intervention prices are set annually by the government after study by commodity-specific government councils. The government purchase price for rice is established through the use of a cost of production formula. Production costs of an average rice producer are determined with family labor valued at the average urban wage rate. From 1960-69 the rice support price rose by more than 9 percent per year, due largely to increasing urban wages. This rapid increase in rice price resulted in a surplus. In the 1970's, the formula was complemented by discretionary support price freezes and adjustments (Organization for Economic Cooperation and Development, February 1974).

In the case of wheat and barley, the government purchase prices were set on the basis of prices in the early 1950's, adjusted by an agricultural parity index. Since government selling prices were maintained at about the same level, the program led to large government expenditures in the early 1970's. These government costs were partially offset since the price for imported wheat was below the selling price and the government retained the difference. In the case of milk, a target price and minimum guaranteed price are set for manufacturing milk and deficiency payments are made. The guaranteed producer price is determined on the basis of average production costs as in the case of rice. For most meats, intervention is designed to stabilize wholesale prices within limits determined by past wholesale prices, supply and demand considerations, and other factors (Organization for Economic Cooperation and Development, 1974). These pricing rules are clearly similar to those in the United States including parity, cost of production, and average market price approaches to determining policy prices.

Canada

Until 1975, many products were covered by a deficiency payment system designed to raise final producer prices to at least 80 percent of the average market price in the preceding 10 years. In 1975, the period used in averaging market prices was shortened to 5 years and the minimum percentage raised to 90 percent. In addition, the 5-year average prices were adjusted for changes in cash costs over the 5-year period. The effect of this change in the formula was to raise producer prices considerably above what they would have been under the old formula, although in 1974-75 market prices were high enough to make the supports inoperative (Organization for Economic Cooperation and Development, 1973, 1978).

The Canadian Wheat Board controls the marketing of most wheat grown in western Canada as well as a large proportion of the feed grains and oilseeds. During the 1970's, feed grain policies were modified to maintain the competitiveness of grains produced in Western Canada with U.S. corn delivered in Eastern Canada. By 1976, feed grain policy was in place and included a formula to determine the Wheat Board price for Western feed grains. This formula is based on the relative feeding value of Canadian grain and U.S. corn as determined by the energy and protein content of the grains. The unit value of protein and energy is computed from the relationship between soybean prices and U.S. corn prices in Montreal. The objective of this policy is to determine an equal base price for feed grains across Canada which will result in competitive prices in Eastern Canada, a feed grain deficit area (Bray, 1978).

The notion of developing a relative price structure for grains on the basis of their nutritional value in livestock feed rations is an approach to setting policy prices which has not been used extensively in the United States. The advantage of such a method is that properly set relative prices should lead to better coordination of supplies and the derived demand for these inputs. Other countries have also attempted to set support prices for grains in terms of the relative value or need for the output. While not related to nutritional value, Spain has historically adjusted wheat and barley prices to encourage or discourage the production of these substitute crops in light of surpluses or deficits (Peterson, et al., 1983; Organization for Economic Cooperation and Development, 1974).

Other Canadian commodities are supported on the basis of formulas. Price supports for milk and poultry, for example, are established through a formula designed to insure a return to production resources with adjustments for changes in the cost of living (Organization for Economic Cooperation and Development, 1978). During the 1970's these prices increased rapidly as a result of general inflation. The inclusion of changes in cash costs in the formula for other commodities based on average market prices also leads to escalation of the support prices. The situation in Canada is somewhat peculiar in that prices cannot deviate greatly from prices in the United States without the implementation of extensive trade barriers. In a sense, U.S. prices act as a constraint on the price support levels set by the Canadian authorities.

The European Community

Since the EC is made up of 10 independent nations, setting common support prices is more complicated than in the United States. Each year the Ministers of Agriculture from the member states meet to determine the amounts by which common prices will be increased. All price changes are considered together and the entire package must be adopted. In addition, unanimity is required for the final decision so that each state effectively has veto power over the price package. The unanimity principle has been maintained in general although the 1982 price support package was adopted over the objections of Great Britain. Under these conditions, national political interests play an important role in the final decision and the annual price negotiations can be long and controversial.

The Agricultural Ministers use proposals from the EC Agriculture Commission as a starting point in their price debates. The Commission is a kind of multinational civil service which has used a variety of methods to develop its price proposals. In the mid-1970's, the Commission adopted the "objective method" to determine proposed increases. The principle behind this method is that prices should be high enough to allow modern, efficient farms to remain that way. Modern farms were defined as those yielding income comparable to incomes in other sectors. The approach was operationalized by studying the cost structure of a set of reference farms. Using the changes in farm costs over a 3-year reference period and the changes in nonagricultural incomes, the commission computed the needed changes in support prices. An arbitrary figure of 1.5 percent was used to correct the results for annual productivity changes (Fennell, 1979).

As budget problems developed, the Commission gradually abandoned its objective approach. Proposed price increases have become smaller as the expenditures on agricultural programs increased beyond the budgetary resources of the EC. For 1984, the Commission proposed price increases averaging only 0.8 percent and in 1985 the price proposals included reductions in prices for cereals and other important commodities *(Agra Europe*, 1985). It should be emphasized, however, that the Agricultural Ministers make the final decisions on price supports. In general, the Commission's proposals are used as a basis for negotiations which often lead to much higher price levels. Each Minister is under intense political pressure from national farm groups to obtain the maximum increase. Josling and Pearson (1982) have suggested that price support increases will generally fall within upper and lower limits. The upper limit is the price increase which fully compensates all states for inflation in the previous year. The lower bound is set by the rule that nominal prices in national currencies cannot decrease in any member state. These limits are not explicitly recognized by EC legislation but are deduced by Josling and Pearson (1982) based on

past behavior. In the end, the final decision on price supports is highly political despite efforts by the Commission to use costs or budgetary constraints as a means to set policy prices.

Cereal prices have generally been increased by the same percentage each year, maintaining the initial structure of relative prices. Over time this relative price structure has gotten out of line with grain demand. This situation led to a proposal to set support prices for the various cereal grains in relation to their nutritional value in livestock feed. This is the same notion as is being used in Canada for feed grains. The approach is referred to as the silo-cathedral system and the intention was to move gradually to a structure of relative cereal prices consistent with the nutritional value of the grains (Knipscheer and Hill, 1982). In fact, only limited changes in the price structure have been realized and surplus cereals such as soft wheat and barley are still too expensive, relative to corn, for increased use in livestock feed.

In general, policymakers in the countries reviewed have considered the same kinds of approaches to setting policy prices as their counterparts in the United States. The one new approach is the use of nutritional values to set relative grain supports. The orgin of this method probably lies in the peculiar situations of the EC and Canada and the resulting distortions in relative cereal prices. As in the United States, there is a tendency for formulas or "objective" approaches to be abandoned or modified in light of political considerations, budgetary constraints, or policy-included distortions stemming from inconsistencies between support prices and basic market conditions.

Concluding Remarks

Experience with administered agricultural prices in the United States and other industrialized countries reflects the difficulties inherent in determining the levels at which to set these prices. Formulas and price-setting rules are seen as ways to limit the influence of political infighting on the final outcome. However, the choice of formula or pricing rule involves value judgments and requires subjective decisions on the way in which the rule is to be implemented. The review of formal price-setting rules shows that it is impossible to develop "objective" criteria which remove politics from the administrative decision. The issue faced by policy-makers is to choose between some form of fixed, automatic pricing rule as opposed to discretionary decisions that inevitably involve bargaining among the interested parties.

The idea of linking agricultural support prices to some measure of the costs faced by producers has frequently been advanced as a way to formalize the process of setting support prices. A major deficiency of this approach is that it neglects demand conditions. The use of average market prices or world prices as a guide in determining support levels overcomes some of the problems of basing support prices exclusively on some measure of producer costs. However, support prices linked to market or world prices may be too low to protect farm incomes at socially acceptable levels. U.S. policy provides a way out of this dilemma in that deficiency payments can be used to attain the income objective, while loan rates can be set to reduce seasonal price variation and serve as a floor in years when market prices have a tendency to fall to socially unacceptable levels. In setting these policy prices, it appears reasonable to link the loan rate to average market prices while the target price could be set in relation to some measure of average costs of production. The implications of such a formalized procedure for determining policy prices in the United States are explored in Part II.

PART II: FORMULAS FOR LOAN RATES AND TARGET PRICES

The purpose of this section is to examine the implications of using specific formulas to set loan rates and target prices. Hypothetical loan rates and target prices are computed for the period 1974-84 using formulas that link loan rates to season average market prices and target prices to average costs of production. Computed policy prices are compared with the actual loan rates, target prices, and market prices observed during the 1974-84 period. In the absence of a widely accepted method for deriving policy price formulas, a choice had to be made from among the large number of possibilities. The two formulas selected for this analysis have been proposed by other writers and will be described in detail later. The comparisons are illustrative since many other formulas could have been used. Observed market prices and cost variables are used to calculate the hypothetical loan rates and target prices. However, if formulas had actually been in place during the period considered, prices and costs would have been different from those observed. Despite these limitations, the results of the exercise are of use in explaining the implications of this type of policy.

Loan Rates

Setting loan rates in relation to market prices constitutes an effort to take supply and demand conditions into account. It is generally expected that the season average market price will be above the loan rate. The purpose of the loan rate then becomes to eliminate the fall in market price which might occur immediately after harvest and to serve as a potential floor in years when market conditions would lead to very low prices relative to general price trends. Since market prices for the current year are not known at the time loan rates for that year are announced, the most common approach has been to use some proportion of a moving average of past market prices. However, these historical prices may not reflect the particular market conditions in a given year. Market prices for many crops from 1973-75 were higher than the long-term trend. Including these prices in a moving average could result in loan rates inconsistent with the actual supply and demand conditions in subsequent years.

Langley and Price (1985) use a simulation model to evaluate several loan rate formulas. In comparing simple 3- and 5-year moving

averages of market prices, they note that loan rates based on the shorter moving average would be less stable than with averages based on a longer period if crop prices are highly variable. This can also be seen in Figure 3 where 2-, 3-, and 5-year moving average wheat prices are plotted along with actual market prices. Loan rates based on the 5-year moving average would not rise as high or fall as low as would be the case using formulas based on a shorter period. If it is expected that market prices will continue to be highly variable, the longer averaging period is preferable since it reduces the variance in the loan rate.

Following periods of high market prices, loan rates set equal to a moving average of these prices may be high enough to attract additional resources leading to excessive output. To avoid this type of problem, it has been suggested that the loan rate be set at some proportion of the moving average. In addition, excluding the highest and lowest observations would reduce some of the bias introduced by unusually high or low prices in previous years. Langley and Price (1985) examine the implications of using alternative proportions of a 5-year moving average of market prices excluding the high and low observations. They project important economic variables to 1987 under four sets of assumptions about the proportion of the moving average used to set loan rates and legislated minimum loan rate levels. With minimum loan rates set at the actual 1984 level, the use of a low proportionality factor (75 percent of the moving average) results in loan rates equal to the minima. Using a proportion of 95 percent of the moving average leads to lower exports and greater stock accumulation. Their results indicate that a formula based on 85 percent of the moving average would only interfere with the market in exceptional years.

A major conclusion from the analysis presented by Langley and Price (1985) is that imposing lower bounds on the formula-based loan rates could impede the operation of the pricing rule. They suggest that the Secretary of Agriculture should have the authority to reduce loan rates below the current legislated

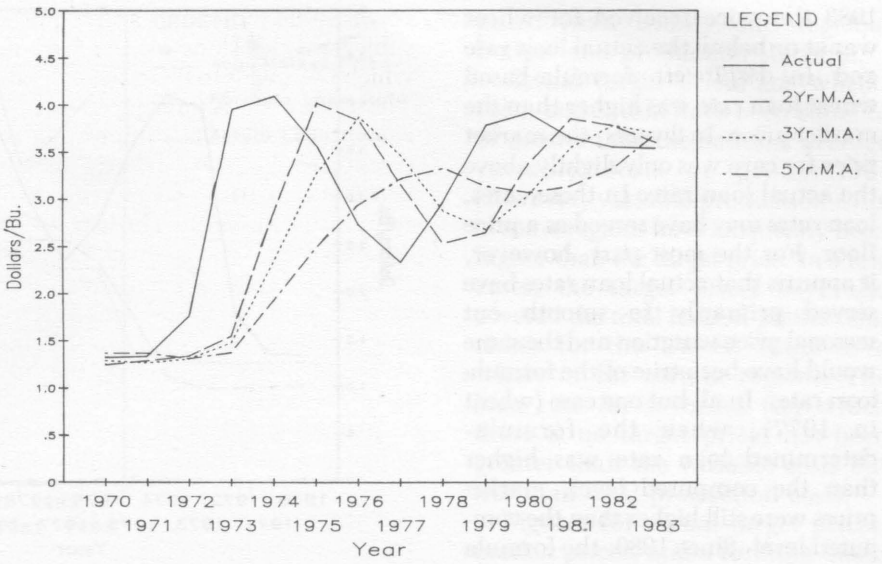


Figure 3. Actual and Moving Average Wheat Price.

minima since without that ability the constraints on the loan rate formula could render it ineffective. With no lower bounds, their results show higher export levels and less stock accumulation. However, eliminating the minimum loan rates could result in greater expenditures on deficiency payments if the gap between formula-determined loan rates and target prices widens (Langley and Price, 1985).

In its proposal for the 1985 Farm Bill, the Administration called for setting support prices as 75 percent of a 3-year moving average of market prices. Based on their analyses, Langley and Price (1985) suggest that such a formula would be ineffective if current legislated minima are maintained. This conclusion is supported by recent experience with soybean loan rates. These support prices are set as 75 percent of a 5-year moving average of market prices with the high and low observations excluded, and a legislated minimum level of $5.02 per bushel. Since 1980, the soybean loan rate has been at this lower bound.

To explore the implications of using formulas to determine loan rates, hypothetical loan rates for wheat, corn, cotton, and soybeans have been computed using the current soybean formula (75 percent of a 5-year moving average of market prices with high and low observations deleted), but without lower bounds. The results of these calculations, along with the actual loan rates and observed market prices, are presented in Figures 4 through 7 and Appendix 1. From 1970 to 1974, the formula produced loan rates for wheat, cotton and corn that were below the actual loan rates. The unusually high market prices for corn and wheat from 1973-75 led to sharp increases in the formula-determined loan rates for these crops beginning in 1975. The computed loan rate for wheat remained above the actual loan rate level until 1979, while for corn it was only higher in 1975 and 1976. Loan rates for cotton computed with the formula were below the actual loan rate throughout the period covered. Market prices for soybeans rose rapidly until 1975 and the formula loan rate was higher than the actual loan rate from 1974 until 1980. Farm legislation in 1981 introduced this formula to set soybean loan rates, but the legislated minimum has prevented its application. In recent years, the actual loan rates for all four crops have been significantly higher than levels determined by using the formula.

Some further observations can be made on the basis of these results. First, season average market prices during 1970-83 have almost always been higher than both the actual and computed loan rates. In 1982 and

1983 the price received for wheat was at or below the actual loan rate and in 1977 the formula-based wheat loan rate was higher than the market price. In 2 years, the market price for corn was only slightly above the actual loan rate. In these cases, loan rates may have served as a price floor. For the most part, however, it appears that actual loan rates have served primarily to smooth out seasonal price variation and the same would have been true of the formula loan rates. In all but one case (wheat in 1977), when the formula-determined loan rate was higher than the computed level, market prices were still higher than the computed level. Since 1980, the formula loan rates would have been much lower than the legislated levels adopted in the 1981 Farm Bill.

Another observation to be made in this context concerns the movement through time of loan rate levels. From 1970-83, actual loan rates were never reduced from 1 year to the next, although in several cases, they were left at the same level. The strict application of the formula, however, allows the loan rate to fall as market prices decline. This raises questions about the political feasibility of applying the formula without restrictions. One type of restriction is the legislated minimum used for soybeans. Another approach to this issue would be to set the loan rate in year t equal to the loan rate in year t-1 if the formula indicated a decline in the support level. This additional rule would have resulted in constant loan rates for wheat and corn from 1978-81, although they would generally have been below actual loan rate levels. Of course, the use of these additional rules shelters support prices from the full effects of market forces, compromising the purpose for which the formulas are designed.

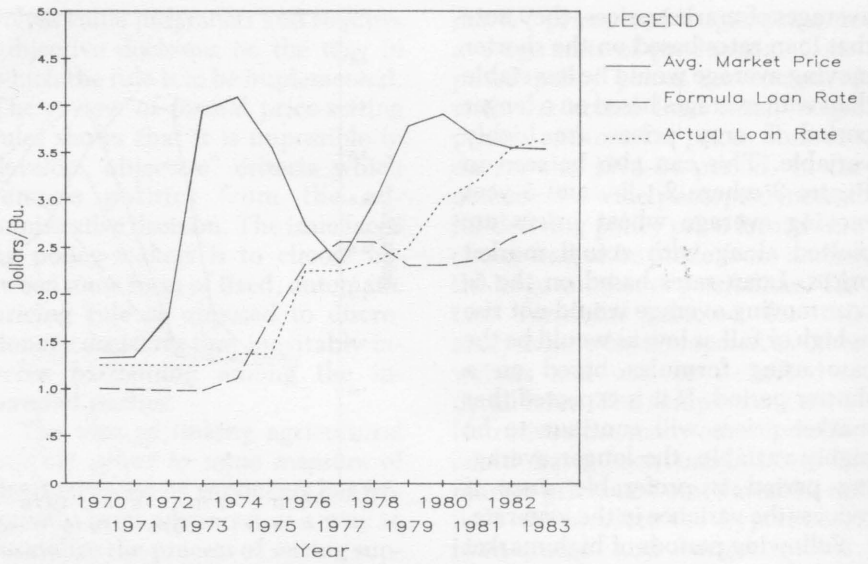


Figure 4. Market Prices, Actual Loan Rates, and Formula Loan Rates for Wheat.

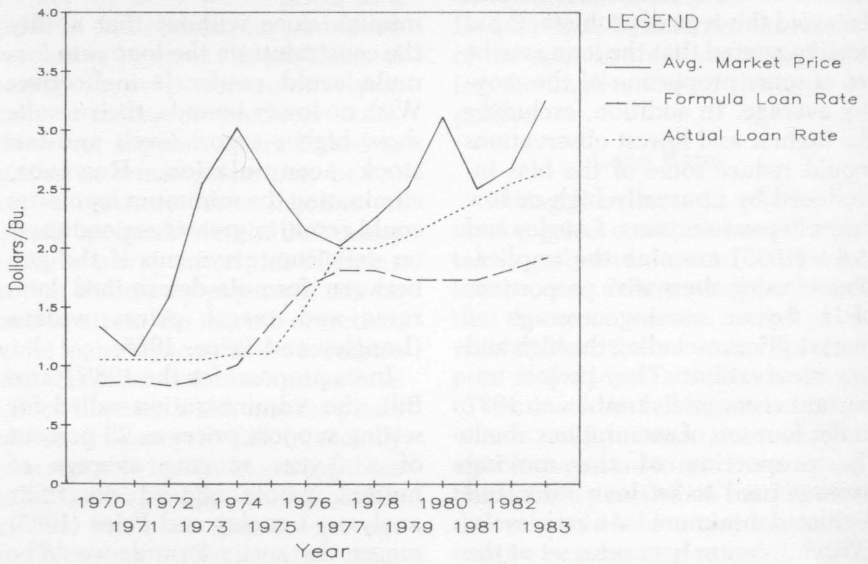


Figure 5. Market Prices, Actual Loan Rates, and Formula Loan Rates for Corn.

Target Prices

Loan rates set as a proportion of average market prices may be inadequate to insure sufficient income for many producers. Variable costs of production, total costs of production (including a return to land), actual loan rates, and formula-based loan rates (from Appendix 1) are presented in Table 1. Actual loan rates for wheat, corn, and soybeans are greater than the variable costs of production but generally less than total costs. The formula-based loan rates are higher than variable soybean costs but generally lower than variable costs of production for wheat and corn. Neither loan rate covers the variable production cost for cotton. If the formula used in the preceding section is strictly applied, there may be many occasions when the loan rate is less than the variable costs of production. This situation is likely to result in pressure to set target prices at levels that will cover some measure of production costs.

As noted in Part I, there are many difficulties in using production costs to determine administered prices. Aside from the conceptual issues raised by Belongia (1983) and Pasour (1983), perhaps the most intractable problem is deciding how to measure the costs. Measures of variable costs and total costs are presented in Tables 2-5. As might be expected,

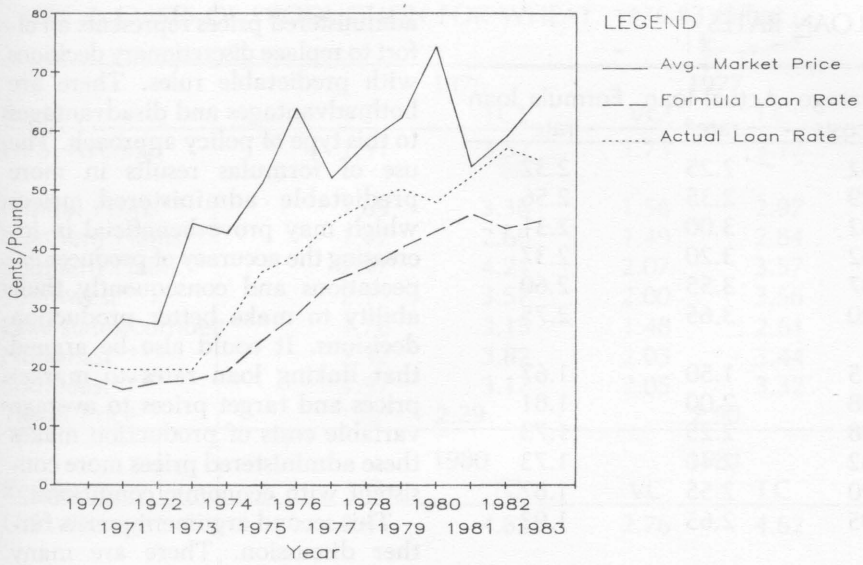


Figure 6. Market Prices, Actual Loan Rates, and Formula Loan Rates for Cotton.

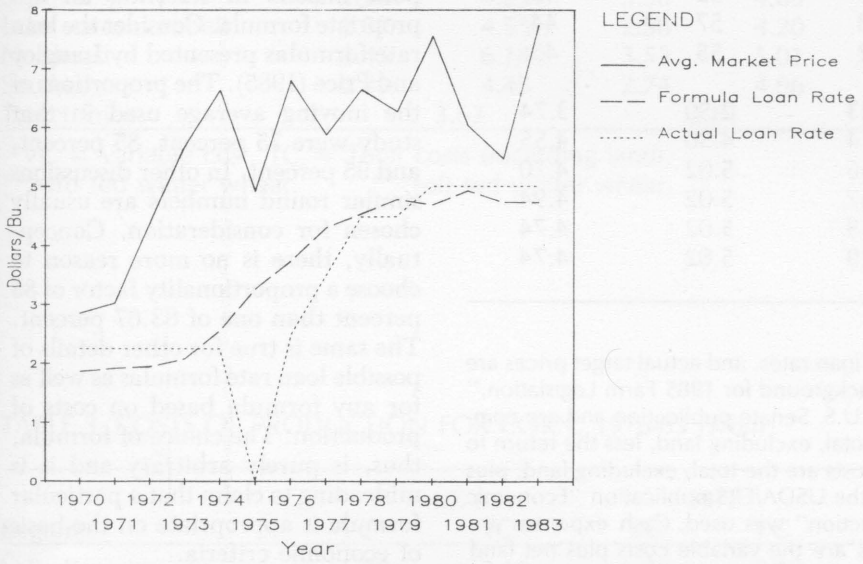


Figure 7. Market Prices, Actual Loan Rates, and Formula Loan Rates for Soybeans.

the variation across regions is substantial. The national average is not indicative of the average costs of production in any subregion of the United States. In addition to the variation across regions, the evolution through time of the various measures presents some anomalies. The region with the lowest costs in one year may not be the lowest cost area in another year. In many cases, variable costs decline from one year to the next while total costs increase. Determining average costs of production for wheat is particularly complicated since there are several types of wheat. The national average is approximately equal to a weighted average of production costs for hard red winter, soft red winter, hard red spring, and white wheats.

There is also substantial variation within the regions and within states (Table 6). Within Texas, there are frequently large differences in production costs between irrigated and dryland production. The figures in Table 6 are weighted averages computed from county and regional budget and production statistics.

Actual target prices for wheat, corn, and cotton have been equal to or greater than the national average variable costs of production. However, variable production costs in some regions have frequently been higher than the target price. In a few cases, the target prices have also covered the total costs of production, either for the United States as a whole or for certain regions. The loan rate for soybeans (for which there is no target price) has been greater than the variable costs but less than total production costs.

Figures for actual target prices, market prices, and a formula-based target price are shown in Appendix 2 and plotted in Figures 8-11. The formula used to determine the hypothetical target prices is the one suggested by Groenewegen and Clayton (1982). Target prices are computed as projected variable costs plus some proportion of the difference between a moving average of market prices and a similar moving average of variable costs of production. For this example, 3-year moving averages are used and the proportionality factor is 0.5. Since data on costs of production are available only from 1976, the 1976 target price calculations are made on the basis of the recorded variable costs for that year, rather than an average of the preceding 3 years. The 1977 target price is based on an average of recorded variable costs in 1976 and 1977. A similar procedure was used for 1978 and the exact formula is used for the remaining computations. Variable costs are the national averages shown in the tables.

From 1977-83, the formula-based target price for wheat was less than both the actual target price and the market price. For corn and cotton, on the other hand, the formula target price is occasionally higher than the actual level but generally lower than market prices. The formula-based target price for wheat would have covered the variable costs of production but not total costs. The actual target prices for wheat, particularly in recent years, were much closer to the average total costs although generally slightly lower. Actual and formula target

TABLE 1. PRODUCTION COSTS† AND LOAN RATES

		U.S. average variable costs	U.S. average total costs	Actual loan rate*	Formula loan rate*
Wheat:	1976	1.91	3.52	2.25	2.32
($/bu)	1978	1.77	3.29	2.35	2.56
	1980	2.44	4.62	3.00	2.31
	1981	2.76	4.62	3.20	2.37
	1982	2.63	4.47	3.55	2.60
	1983	2.38	4.20	3.65	2.75
Corn:	1976	1.30	2.15	1.50	1.67
($/bu)	1978	1.17	1.98	2.00	1.81
	1980	2.02	3.28	2.25	1.73
	1981	1.86	2.82	2.40	1.73
	1982	1.87	2.90	2.55	1.82
	1983	2.62	3.95	2.65	1.92
Cotton:	1976	42	65	39	29
(¢/bu)	1978	52	77	48	37
	1980	58	95	48	43
	1981	53	78	52	46
	1982	54	78	57	44
	1983	62	92	55	45
Soybeans:	1976	2.45	5.23	2.50	3.74
($/bu)	1978	2.52	5.14	4.50	4.55
	1980	3.74	7.56	5.02	4.70
	1981	3.57	6.67	5.02	4.94
	1982	3.38	6.19	5.02	4.74
	1983	4.23	8.29	5.02	4.74

*From Appendix 1.

†For Tables 1-5, data on market prices, actual loan rates, and actual target prices are from the series of USDA/ERS publications "Background for 1985 Farm Legislation." Costs of production for 1976-79 are from the U.S. Senate publication and are computed as follows: Variable costs are equal to total, excluding land, less the return to management and capital replacement; total costs are the total, excluding land, plus the acquisition value of land. From 1980-83, the USDA/ERS publication "Economic Indicators of the Farm Sector, Costs of Production" was used. Cash expenses are used to represent variable costs; total costs are the variable costs plus net land rent, labor (which includes returns to management), and capital replacement.

prices for corn and cotton cover the variable costs of production but both are less then the national average total costs. For soybeans, the introduction of a formula-based target price would result in levels that are greater than variable costs but less than total costs.

If formulas are used to determine both loan rates and target prices, the interesting question concerns the effects of these policies on deficiency payments. The strict application of the two formulas examined in this report could result in very large deficiency payments since the loan rates and target prices set by the formulas are not constrained to move together. Maximum potential deficiency payments resulting from the use of the two formulas are compared with the actual maximum deficiency payments in Table 7. For wheat and cotton, the formula-determined deficiency payments are not uniformly larger than the actual maximum payments. However, the strict application of the two formulas for corn would have resulted in potential deficiency payments much larger than the historical levels.

Conclusion

The use of formulas to determine administered prices represents an effort to replace discretionary decisions with predictable rules. There are both advantages and disadvantages to this type of policy approach. The use of formulas results in more predictable administered prices which may prove beneficial in increasing the accuracy of producer expectations and consequently their ability to make better production decisions. It could also be argued that linking loan rates to market prices and target prices to average variable costs of production makes these administered prices more consistent with economic conditions.

This second argument merits further discussion. There are many possible formulas which could be used to set administered prices and no real economic criteria to guide policymakers in selecting an appropriate formula. Consider the loan rate formulas presented by Langley and Price (1985). The proportions of the moving average used in that study were 75 percent, 85 percent, and 95 percent. In other discussions similar round numbers are usually chosen for consideration. Conceptually, there is no more reason to choose a proportionality factor of 85 percent than one of 83.67 percent. The same is true for other details of possible loan rate formulas as well as for any formula based on costs of production. The choice of formula, thus, is purely arbitrary and it is misleading to claim that a particular formula is appropriate on the basis of economic criteria.

Another problem with the use of formulas is their effectiveness through time. It is possible that particular loan rate and target price formulas would lead to desirable market performance over some period of time but become inappropriate as market conditions change. Based on the illustrative example used in this report, strict application of formula-based loan rate and target prices could result in large deficiency payments if no additional rules are instituted to coordinate the movement of these policy prices through time. Since it is difficult to accurately predict how the variables affecting the formulas will evolve, their use in setting policy parameters should be subject to periodic review.

TABLE 2. COSTS OF PRODUCTION FOR WHEAT, 1976-83 ($/bu)

Region	1976 VC*	1976 TC*	1977 VC	1977 TC	1978 VC	1978 TC	1979 VC	1979 TC
U. S. Average	1.91	3.52	1.73	3.17	1.77	3.24	2.01	3.74
Central Plains**	1.69	3.36	1.56	2.97	1.52	3.03	1.65	3.30
Northern Plains**	1.42	2.66	1.49	2.84	1.52	2.87	2.34	4.29
Southern Plains**	2.47	4.21	2.07	3.57	2.38	4.06	2.01	3.51
Southwest**	2.13	3.57	2.00	3.56	2.11	3.77	2.24	4.04
Lake states/cornbelt***	1.76	3.15	1.48	2.61	1.83	3.46	1.92	3.65
Northeast***	2.32	3.82	2.03	3.44	2.74	4.54	3.12	5.04
Southeast***	1.97	3.17	2.05	3.32	2.42	3.74	2.70	4.18
Target Price		2.29		2.90		3.40		3.40

Region	1980 VC	1980 TC	1981 VC	1981 TC	1982 VC	1982 TC	1983 VC	1983 TC
U.S. Average	2.44	4.62	2.76	4.62	2.63	4.47	2.38	4.20
Central Plains	1.97	3.91	2.77	4.78	2.33	4.17	1.88	3.63
Northern Plains	2.66	4.92	2.72	4.41	2.35	4.17	2.26	4.17
Southern Plains	2.63	4.87	3.25	5.24	3.02	4.98	2.31	4.05
Southwest	2.54	4.93	3.36	4.89	3.79	5.54	4.06	5.95
Lake states/cornbelt	2.37	4.55	2.58	4.20	2.71	4.43	2.36	4.08
Northeast	3.45	6.14	3.53	5.01	3.44	5.38	3.08	4.85
Southeast	2.89	4.43	2.74	4.06	2.90	4.33	3.07	4.67
Target Price		3.63		3.81		4.05		4.30

*VC = variable cost, TC = Total costs (including land).
**hard red winter wheat. ***soft red winter wheat.

TABLE 3. COSTS OF PRODUCTION FOR CORN, 1976-83 ($/bu)

Region	1976 VC*	1976 TC*	1977 VC	1977 TC	1978 VC	1978 TC	1979 VC	1979 TC
U.S. Average	1.30	2.15	1.28	2.13	1.17	1.98	1.27	2.16
Lake states/cornbelt	1.23	2.10	1.19	2.02	1.08	1.90	1.17	2.09
Northeast	1.31	1.98	1.38	2.14	1.42	2.14	1.54	2.35
Northern Plains	1.42	2.25	1.33	2.02	1.11	1.87	1.33	2.19
Southeast	1.58	2.33	2.29	3.37	1.91	2.79	1.82	2.70
Southwest	1.61	2.56	1.95	2.82	1.73	2.45	1.71	2.45
Target Price		1.57		2.00		2.10		2.20

Region	1980 VC	1980 TC	1981 VC	1981 TC	1982 VC	1982 TC	1983 VC	1983 TC
U.S. Average	2.02	3.28	1.86	2.82	1.87	2.90	2.62	3.95
Lake states/cornbelt	1.87	3.10	1.76	2.70	1.79	2.71	2.58	3.92
Northeast	2.77	4.05	2.09	2.81	2.07	2.83	2.73	3.76
Northern Plains	2.09	3.42	1.97	3.04	2.05	3.13	2.44	2.87
Southeast	3.26	4.71	2.46	3.50	2.07	2.90	3.45	4.74
Southwest	2.43	3.53	2.20	3.20	2.37	3.53	2.55	3.80
Target Price		2.35		2.40		2.70		2.86

*VC = variable costs, TC = total costs (including land).

TABLE 4. COST OF PRODUCTION FOR COTTON, 1976-83 (¢/lb)

Region	1976 VC*	1976 TC*	1977 VC	1977 TC	1978 VC	1978 TC	1979 VC	1979 TC
U.S. Average	42	65	43	59	52	77	49	72
Delta	52	80	41	63	51	76	49	72
Southeast	57	80	75	107	61	85	64	96
Southern Plains	38	62	34	53	47	70	46	68
Southwest	35	52	39	58	60	87	51	74
Target Price		43.2		47.8		52.0		57.7

Region	1980 VC	1980 TC	1981 VC	1981 TC	1982 VC	1982 TC	1983 VC	1983 TC
U.S. Average	58	95	53	78	54	78	62	92
Delta	63	97	54	78	47	67	62	87
Southeast	82	119	60	82	50	68	86	117
Southern Plains	64	112	50	74	57	87	56	90
Southwest	49	77	56	76	60	85	64	92
Target Price		58.4		70.9		71.0		76.0

*VC = variable costs, TC = total costs (including land); values have been rounded to the nearest cent.

TABLE 5. COSTS OF PRODUCTION FOR SOYBEANS, 1976-83 ($/bu)

Region	1976 VC*	1976 TC*	1977 VC	1977 TC	1978 VC	1978 TC	1979 VC	1979 TC
U.S. Average	2.45	5.23	2.34	4.79	2.52	5.14	2.69	5.31
Delta	3.15	5.63	3.29	5.83	3.55	6.03	3.45	5.78
Lake states/cornbelt	2.08	4.99	1.93	4.36	1.98	4.72	2.25	5.08
Northern Plains	2.78	5.83	1.88	3.95	2.10	4.29	2.08	4.12
Southeast	3.32	5.42	3.58	6.15	4.13	6.46	3.92	6.20
Loan rate		2.50		3.50		4.50		4.50

Region	1980 VC	1980 TC	1981 VC	1981 TC	1982 VC	1982 TC	1983 VC	1983 TC
U.S. Average	3.74	7.56	3.57	6.67	3.38	6.19	4.23	8.29
Delta	5.48	10.34	4.66	7.58	3.92	6.28	4.72	8.14
Lake states/cornbelt	3.05	6.66	3.18	6.46	3.08	6.10	3.78	8.08
Northern Plains	3.20	6.13	2.91	5.39	2.95	5.52	3.94	7.83
Southeast	6.62	11.13	4.72	7.43	4.35	6.75	6.30	9.82
Loan Rate		5.02		5.02		5.02		5.02

*VC = variable costs, TC = total costs (including land).

TABLE 6. COST OF PRODUCTION IN TEXAS, 1983-84

Crop		1983	1984
1. Wheat ($/bu)			
a. dryland			
-variable costs		2.28	2.28
-total costs		3.83	3.94
b. irrigated			
-variable		4.07	4.47
-total		5.93	6.31
2. Corn ($/bu)			
a. dryland			
-variable		1.84	2.38
-total		2.91	3.76
b. irrigated			
-variable		2.02	2.38
-total		2.96	3.37
3. Cotton (¢/lb)			
a. dryland			
-variable:	high	70	80
	low	30	31
	average	44	45
-total:	high	121	146
	low	61	66
	average	76	82
b. irrigated			
-variable:	high	62	63
	low	32	41
	average	53	55
-total:	high	99	102
	low	62	71
	average	79	82
4. Soybeans ($/bu)			
-variable		4.60	4.39
-total		8.38	8.49

Source: Budgets for Texas Crops and Livestock.

In the 1981 Farm Bill, loan rates and target prices were determined for the life of the legislation. There is substantial evidence that this procedure resulted in loan rates inconsistent with world demand and prices and may have contributed to the fall in U.S. exports. This could be construed as an argument against leaving policy prices to the discretion of Congress or policymakers in USDA subject to political pressures. In reality, this experience with discretionary policy prices suggests that it is not wise to set prices 3 or 4 years in advance. In the EC, policy prices are set each year by the Ministers of Agriculture in a setting of political confrontation through a process of bargaining subject to constraints imposed by the budget. The results of this largely discretionary procedure have not always been appropriate but support prices have been reduced in recent years. It is not inconceivable that a purely discretionary process carried out annually would result in policy prices that are as effective in achieving agricultural policy goals as would be the case with formal pricing rules.

Perhaps the best procedure for determining loan rates and target prices would include formulas and some degree of discretionary authority. The use of specific formulas would bring a degree of predictability that might aid farmers in making long-term decisions. At the same time, allowing discretionary adjustments or revisions of the formulas might be necessary to prevent the administered prices from settling at levels that are inappropriate from a political, budgetary, or some other point of view. In a sense, the use of formal price-setting rules shifts the political confrontation from a debate on the levels of administered prices to a debate on the formulas to be used. Either way, the decisionmaking process is political and this fact should be recognized in any effort to formalize it. In addition, the types of formulas and discretionary allowances that are used can only be judged as appropriate in light of the underlying policy goals. If export expansion is an important policy objective, a different loan rate formula might be required than if the objective is to reduce production to conserve soil and water resources. Policymakers should make the link between basic objectives and formalized decisionmaking processes explicit.

Some of the questions raised in this report can be explored in greater detail with more sophisticated modeling approaches. One issue on which further research would be useful is the link between alternative formulas for loan rates and target prices. It is possible that specific formulas could be developed to prevent too great a divergence between loan rates and target prices through time. Simulation models incorporating the impact of these policy parameters on market prices could contribute to a greater understanding of the implications of alternative formulas. In addition, further research on the effect of target prices on the costs of production is needed in order to determine the extent to which an escalation of target prices would result from tying them to various measures of production costs. Finally, alternatives to formal price-setting rules and purely discretionary methods need to be evaluated. For example, it might be possible to institute formal bargaining procedures among government, producer, and consumer groups as an alternative to both the formulas and current forms of discretionary price-setting. Other approaches might be developed and evaluated in an effort to determine the best approach to setting administered prices.

Figure 8. Actual Target Prices, Formula Target Prices, and Market Prices for Wheat.

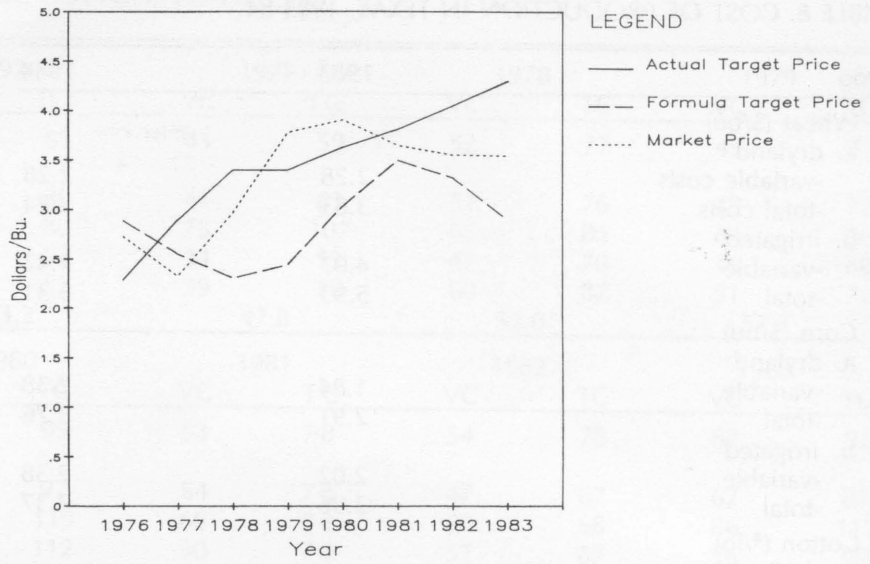


Figure 9. Actual Target Prices, Formula Target Prices, and Market Prices for Corn.

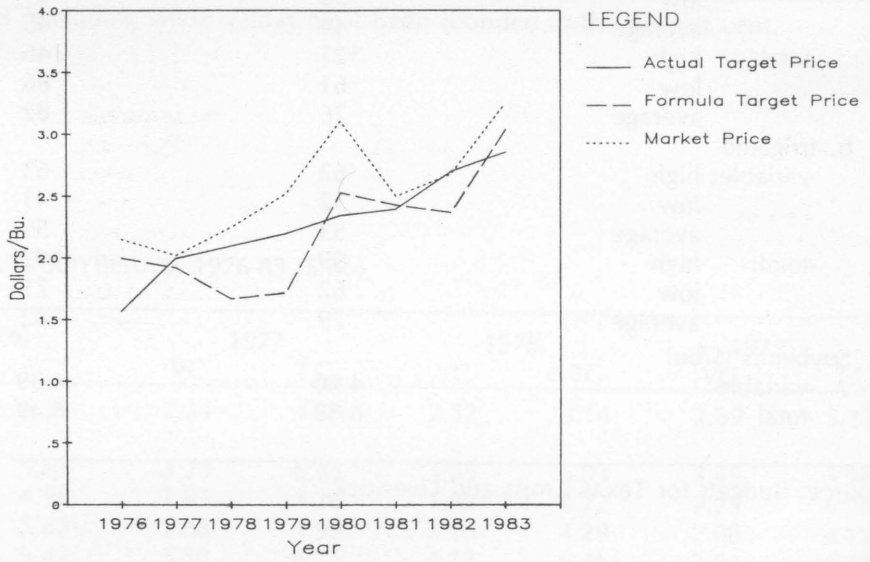
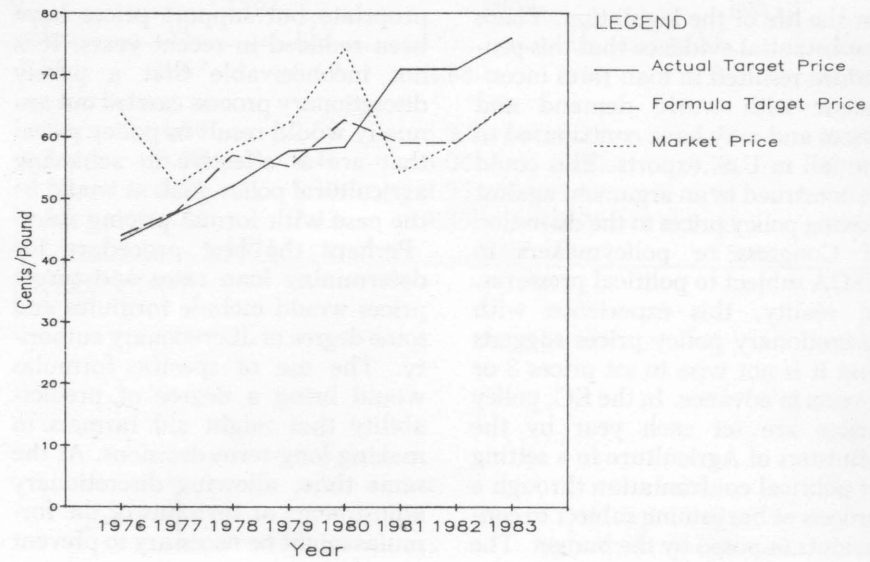


Figure 10. Actual Target Prices, Formula Target Prices, and Market Prices for Cotton.



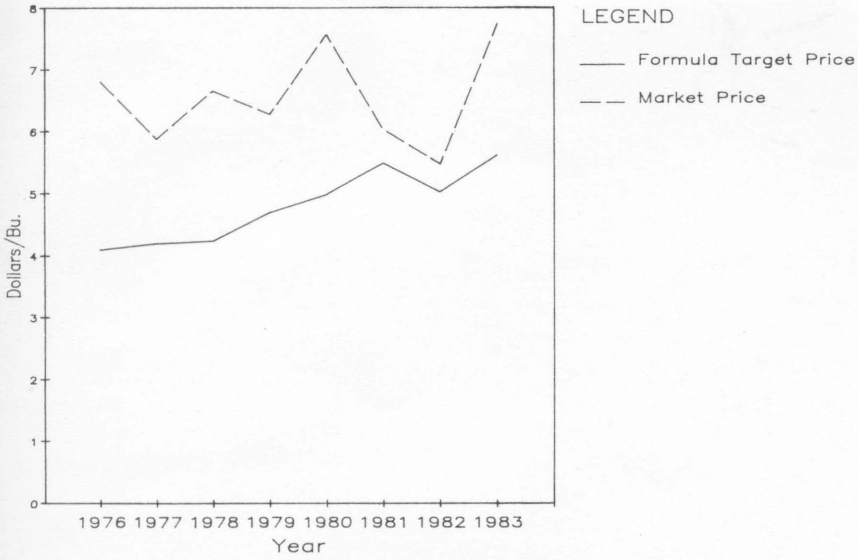


Figure 11. Formula Target Prices and Market Prices for Soybeans.

TABLE 7. ACTUAL AND POTENTIAL MAXIMUM DEFICIENCY PAYMENTS

	1976	1977	1978	1979	1980	1981	1982	1983
I. Wheat ($/bu)								
A. Computed loan rate*	2.32	2.56	2.56	2.31	2.31	2.37	2.60	2.74
B. Formula target price*	2.87	2.55	2.31	2.45	3.04	3.50	3.32	2.90
C. Potential payment rate*	.57	0	0	.14	.73	1.13	.72	.20
D. Actual max. pay. rate*	.04	.65	1.05	.90	.63	.61	.50	.65
E. Potential exposure*	1225	0	0	299	1738	3147	1991	363
F. Actual exposure*	86	1330	1865	1921	1500	1699	1383	1573
II. Corn ($/bu)								
A. Computed loan rate	1.67	1.81	1.81	1.73	1.73	1.73	1.82	1.92
B. Formula target price	2.00	1.92	1.67	1.72	2.53	2.43	2.37	3.04
C. Potential payment rate	.33	.11	0	0	.80	.70	.55	1.12
D. Actual max. pay. rate	.07	0	.10	.10	.10	0	.15	.21
E. Potential exposure	2075	715	0	0	5116	5683	4529	4666
F. Acutal exposure	440	0	727	793	640	0	1235	875
III. Cotton (¢/lb)								
A. Computed loan rate	28.79	34.55	36.90	40.32	43.13	46.05	43.60	44.87
B. Formula target price	44.03	48.02	57.00	55.17	62.75	58.97	59.12	65.75
C. Potential payment rate	15.24	13.47	20.10	14.85	19.67	12.92	15.52	20.88
D. Actual max. pay. rate	4.28	3.17	4.00	7.47	10.40	18.41	13.92	21.00
E. Potential exposure	769	923	1038	1036	1037	965	884	769
F. Actual exposure	216	217	207	521	550	1376	793	774
IV. Soybeans ($/bu)								
A. Computed loan rate	3.74	4.31	4.55	4.79	4.70	4.94	4.74	4.74
B. Formula price support	4.10	4.20	4.24	4.70	4.99	5.50	5.03	5.63
C. Differences (B-A)	.36	-.11	-.31	-.09	.29	.56	.29	.89
V. Deficiency Payments (million $)								
I E + II E + III E	4069	1638	1038	1335	7891	9795	7404	5798
I F + II F + III F	742	1547	2799	3235	2690	3075	3411	3211
Actual deficiency payment for the three crops	0	0	1085	619	1	1	1173	1625

* A. Computed loan rate: 75 percent of 5-year moving average market prices, high and low excluded.
B. Formula target price: computed using formula suggested by Groenewegen and Clayton (1982).
C. Difference between A and B.
D. Difference between actual loan rates and target prices.
E. Payment rate (C) multiplied by total production (million $).
F. Payment rate (E) multiplied by total production (million $).

Source: Background for 1985 Farm Legislation.

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APPENDIX 1. MARKET PRICES, ACTUAL LOAN RATES, AND FORMULA LOAN RATES

	Wheat ($/bu)			Corn ($/bu)			Cotton ($/bu)			Soybeans ($/bu)		
Year	A	B	C	A	B	C	A	B	C	A	B	C
1970	1.33	1.00	1.25	1.33	0.85	1.05	21.86	18.07	20.25	2.85	1.86	2.25
1971	1.34	0.99	1.25	1.08	0.87	1.05	28.07	16.20	19.50	3.03	1.92	2.25
1972	1.76	0.98	1.25	1.57	0.83	1.05	27.20	17.32	19.50	4.37	1.94	2.25
1973	3.95	0.98	1.25	2.55	0.89	1.05	44.40	17.77	19.50	5.68	2.08	2.25
1974	4.09	1.11	1.37	3.02	1.01	1.10	42.70	19.28	27.06	6.64	2.56	2.25
1975	3.56	1.76	1.37	2.54	1.36	1.10	51.10	24.49	36.12	4.92	3.27	0
1976	2.73	2.32	2.25	2.15	1.67	1.50	63.80	28.79	38.92	6.81	3.74	2.50
1977	2.33	2.56	2.25	2.02	1.81	2.00	52.10	34.55	44.63	5.88	4.31	3.50
1978	2.97	2.56	2.35	2.25	1.81	2.00	58.10	36.90	48.00	6.66	4.55	4.50
1979	3.78	2.31	2.50	2.52	1.73	2.10	62.30	40.32	50.23	6.28	4.79	4.50
1980	3.91	2.31	3.00	3.11	1.73	2.25	74.40	43.13	48.00	7.57	4.70	5.02
1981	3.65	2.37	3.20	2.50	1.73	2.40	54.00	46.05	52.46	6.04	4.94	5.02
1982	3.55	2.60	3.55	2.68	1.82	2.55	59.10	43.60	57.08	5.48	4.74	5.02
1983	3.54	2.75	3.65	3.25	1.92	2.65	66.10	44.87	55.00	7.75	4.74	5.02

A: season average market price.
B: loan rate computed as 75 percent of 5-year moving average, high and low prices removed.
C: actual loan rate.

Data on market prices, actual loan rates, and actual target prices are from a series of USDA/ERS publications "Background for 1985 Farm Legislation." Costs of production for 1976-79 are from the U.S. Senate publication and are computed as follows: variable costs are equal to total, excluding land, less the return to management and capital replacement; total costs are the total , excluding land, plus the acquisition value of land. From 1980-83, the USDA/ERS publication "Economic Indicators of the Farm Sector, Costs of Production" was used. Cash expenses are used to represent variable costs; total costs are the variable costs plus net land rent, labor (which includes returns to management), and capital replacement.

APPENDIX 2. TARGET PRICES AND MARKET PRICES

Crop/Year	Actual Target Price	Formula Target Price	Market Price
Wheat ($/bu)			
1976	2.29	2.89	2.73
1977	2.90	2.55	2.33
1978	3.40	2.31	2.97
1979	3.40	2.45	3.78
1980	3.63	3.04	3.91
1981	3.81	3.50	3.65
1982	4.05	3.32	3.55
1983	4.30	2.90	3.54
Corn ($/bu)			
1976	1.57	2.00	2.15
1977	2.00	1.92	2.02
1978	2.10	1.67	2.25
1979	2.20	1.72	2.52
1980	2.35	2.53	3.11
1981	2.40	2.43	2.50
1982	2.70	2.37	2.68
1983	2.86	3.04	3.25
Cotton (¢/lb)			
1976	43.2	44.0	63.8
1977	47.8	48.0	52.1
1978	52.0	57.0	58.1
1979	57.7	55.2	62.3
1980	58.4	62.8	74.4
1981	70.9	59.0	54.0
1982	71.0	59.1	59.1
1983	76.0	65.8	66.1
Soybeans ($/bu)			
1976		4.10	6.81
1977		4.20	5.88
1978		4.24	6.66
1979		4.70	6.28
1980		4.99	7.57
1981		5.50	6.04
1982		5.03	5.48
1983		5.63	7.75

Data on market prices, actual loan rates, and actual target prices are from a series of USDA/ERS publications "Background for 1985 Farm Legislation." Costs of production for 1976-79 are from the U.S. Senate publication and are computed as follows: variable costs are equal to total, excluding land, less the return to management and capital replacement; total costs are the total, excluding land, plus the acquisition value of land. From 1980-83, the USDA/ERS publication "Economic Indicators of the Farm Sector, Costs of Production" was used. Cash expenses are used to represent variable costs; total costs are the variable costs plus net land rent, labor (which includes returns to management), and capital replacement.

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