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by

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UNCERTAIN ECONOMIC ENVIRONMENTS AND CONDITIONAL POLICIES

1. Introduction

Since the introduction of commodity-specific policies in the United States, a number of agricultural policy crises or disequilibria have arisen. Agricultural policy disequilibria emerge when significant changes occur in the agricultural economy which the government is attempting to influence. These policies are generally structured on the basis of perceived conditions at the time of policy formulation. If and when these perceived conditions prove false, a policy disequilibrium arises; and pressure mounts for changes in policy instruments or even changes in the mix of policy instruments (Rausser).

Numerous cases of policy disequilibrium have occurred in individual agricultural commodity systems. Two dramatic illustrations, however, have cut across all major agricultural commodities for which policies have been defined. The first occurred in 1972-73 when the magnitude of increases in farm product and food prices surprised almost everyone within the public and private sectors. The move to flexible exchange rates, the rapid expansion of international markets, and the decreasing barriers between the agricultural economy and other domestic economic sectors all resulted in significant changes in conditions in the agricultural sector. These dramatic changes came as a surprise to many farmers who had learned to operate under a set of policies that, in effect, isolated the agricultural sector from the world economy as well as from the general domestic economy. These policies were changed, in part, because huge government stocks had accumulated during the many years that the U. S. government held price supports above market-equilibrium prices. The U. S. Treasury exposure of carrying public stocks

became unbearable in the early 1970s. As a result, the "Soviet grain deal" appeared as a savior for the policy disequilibrium that existed. Owing to the desire to reduce Treasury costs and the unexpected increase in Soviet demand, the U. S. government liquidated public stocks, which then exposed the economy to the risk of large agricultural price increases. From the standpoint of officials who were struggling to contain inflation, governmental stocks were liquidated prematurely and, thus, failed to provide the stabilizing influence for which taxpayers supposedly had been paying for so long.

Another agricultural policy disequilibrium of similar significance arose 10 years later. The 1977 Food and Agriculture Act established the farmer owned reserves to again create a buffer stock to protect against rapid price escalation and to strengthen agricultural markets that were in decline from the 1972-73 boom. Because these objectives were accomplished during the term of the 1977 Act, the basic policy was perceived as working well; and the 1981 Food and Agriculture Act, which modified the provisions of the 1977 Act only slightly, was passed with little controversy. However, with substantial quantities of stocks in the farmer owned reserve, the addition in stocks from the 1981 and 1982 record crops was considered excessive for its stabilizing and food-security objectives (Spitze). In addition, the 1982-83 economic conditions of the world economy and the U. S. general economy were almost the exact opposite of conditions 10 years earlier--the dollar was appreciating rapidly rather than depreciating, real interest rates were rising significantly rather than falling, central banks throughout the industrialized world were maintaining a tight rein on money supply rather than a loose rein, and inflation was virtually nonexistent. As in most policy disequilibria, the policy-setting process did not view the conditions that arose in 1982-83 as

possibilities. With the accumulation in public stocks of more than 1 billion bushels of wheat and over 2.5 billion bushels of feed grains and the associated escalation in Treasury outlays, stronger voices of criticism surfaced; and some stopgap, crisis-driven policy provisions had to be enacted. This was first evidenced by the introduction of the Farm Crisis Act of 1982 which, if it had been passed, would have mandated controls on production. This Act, of course, was placed on the back burner and was ultimately replaced by the payment-in-kind (PIK) program. That program was precipitated primarily by the unacceptably low income for U. S. farmers, unacceptably large downward price movements, and large costs of carrying governmental stocks (including those subsidized in the farmer owned reserves). Apparently, however, the huge Treasury costs incurred by the implementation of the PIK program were unanticipated and have led to yet a further policy disequilibrium as increasing public interest has been focused on the associated subsidization of the farm sector. Partially as a result of this crisis, Congress passed a bill in the spring of 1984 lowering the 1984 target price for wheat and freezing the 1985 target prices for wheat, feed grains, cotton, and rice at the 1984 levels, thereby departing from the prescribed adjustments set out in the 1981 Food and Agriculture Act.

One proponent of this piecemeal, "fire-fighting" approach to public policy stated recently, "The goal of public policy is to find a responsive, workable solution to urgent, difficult, hurting problems" (Spitze). However, in examining the evolution of agricultural policy during the past several decades, one can easily draw the conclusion that the fire-fighting approach to policy formulation produces policies appropriate for conditions that have already materialized rather than for those which may exist after new policies are

enacted. Cochrane and Ryan have warned that setting agricultural price and income supports four years in advance (as the recent major agricultural acts have attempted to do) can only lead to trouble in a highly uncertain world. If market conditions deteriorate, target prices or loan rates may turn out to be set too far above market-clearing levels and, thus, result in unpredictably large Treasury outlays and, perhaps, a large build-up in government-controlled stocks. On the other hand, if market conditions improve unexpectedly, a policy may fail to prescribe an orderly liquidation program for accumulated stocks.

The agricultural sector faces continual and often unanticipated changes in weather conditions, the national and international economic situation, and in political forces. Such unexpected changes are likely to continue. In such an environment, one must consider whether agricultural policy should incorporate prescribed changes to each of the wide variety of conditions that can possibly occur. With built-in prescribed changes, agricultural policy can react quickly to changing market conditions and, thus, policy can become more appropriate for current market circumstances than for conditions that existed prior to passage of the most recent agricultural act. The purpose of this paper is to examine the notion of conditional policies which incorporate such prescribed changes as a means of addressing policy disequilibria and policy crises. In this paper it is argued that conditional policies, if appropriately formulated, reduce producer uncertainties and Treasury cost uncertainties. Moreover, such policies can reduce the potential for governmental failure, i.e., enactment of policies that ultimately turn out to be inappropriate. Conditional policies cannot totally eliminate government failure because not all potential economic changes can be identified. However, the wider the variety

of circumstances for which prescribed changes are incorporated into mandated conditional policy adjustments, the lower should be the probability of a policy crisis that manifests governmental failure.

This paper begins in the following section with a consideration of the rationale and objective of governmental involvement in the agricultural sector. The following sections consider policy uncertainties faced by farmers and their effects on economic efficiency of the agricultural sector, Treasury cost uncertainty faced by government, the need for correct market signals to farmers for expansion or contraction of production activity, the structure and formulation of conditional policies, the concept of policy-equilibrium rules, operational guidelines, and a specific policy proposal. Finally, section 9 presents some concluding remarks.

2. Policy Rationale

As stated in the enabling legislation, the general purpose of U. S. agricultural policy is "to provide price and income protection for farmers, assure consumers an abundance of food and fiber at reasonable prices, continue food assistance to low-income households, and for other purposes" (U. S. Congress, 1981). Given this general purpose, the rationale for government involvement in the domestic agricultural sector includes a number of perspectives, inter alia: (1) farmers are, in some sense, an economically hard pressed--if not deprived--group; (2) the principal reason for farmers' economic status is their relatively disadvantaged position in the marketplace; and (3) in the absence of governmental intervention, there would be an intolerable degree of instability in commodity markets adversely affecting not only farmers but also consumers of food and fiber (Langley).

The most persuasive rationale for an active U. S. agricultural policy, given recent experience, is the market failure associated with risk and uncertainty. The other rationale, namely, that farmers are in some sense an economically hard pressed if not deprived group and that farmers do not have sufficient economic power and, thus, are in a relatively disadvantaged position in the marketplace, can be dismissed. Without doubt, what poverty exists in agriculture cannot be remedied effectively through price supports or other commodity-oriented farm programs. The same observation holds with regard to the potential marketing power of large corporations and food processors in agriculture vis a vis farmers.

For the purpose of this paper, the market-failure justification for governmental intervention is assumed to be the unacceptable level of riskiness in the production and consumption of U. S. agricultural products. This rationale for governmental intervention is based on the stochastic character of both commodity prices and production and arises from the inability of farmers to trade their risk adequately to other agents of the economy. Inherent instability results from the significant dependence of production on weather patterns; the inelastic nature of aggregate demand; rapid technological change; asset fixity and atomistic behavior; and the significant integration of U. S. agriculture into international markets influenced by supply and demand fluctuations in other countries, changes in trade policies, and variations in exchange rates.

Furthermore, the inherent riskiness and uncertainty of the U. S. agricultural sector can be increased by unstable fiscal and monetary policies. For example, a flex-price specification of agricultural commodity markets and a fixed-price specification of labor, manufacturing prices, and the like cause

highly volatile real rates of interest and exchange rates (resulting from unstable fiscal and monetary policies) to lead to overshooting in agricultural sector markets (Freebairn, Rausser, and de Gorter). These "macroeconomic externalities" introduce further instabilities into a sector that already is unstable. The tendency of the private sector (unencumbered by governmental intervention) to yield different results than are regarded as socially optimal has been recognized at least tacitly by policymakers.¹

3. The Private Cost of Policy Uncertainty

Many instances in U. S. agricultural policy can be cited where the political system has failed, i.e., policies that have been established to accomplish some task have led to contrary results. Such outcomes can be avoided by appropriately designed conditional policies. Before defining such policies and outlining their principal characteristics, however, it is useful to distinguish two often overlooked important concepts that should guide policy formulation: the private cost of policy uncertainty and the public cost of Treasury cost uncertainty. The first is discussed in this section, and the second is discussed in section 4.

For U. S. agricultural policy, conventional wisdom has long held the view that unstable markets can and should be stabilized by conscious economic policies of the federal government. The previous section argues that the principal incentive for governmental intervention in commodity markets is the basic instability of the private sector. However, the conventional view that government can positively influence the future of an economic system that is perceived to be well understood neglects the fact that past government policies have failed because such perceptions proved ultimately to be

inappropriate; policy analyses and formulation in such a conventional framework "sweep under the rug" the instability and imperfections in the political-administrative system (Rausser and Stonehouse). Political or governmental failure may, in fact, introduce more instability and uncertainty through the form and shape of governmental intervention than the instability or uncertainty that existed in the private sector prior to such intervention (Just). In essence, policymakers must recognize and treat explicitly instabilities and imperfections in both governmental and political-administrative systems.

Formally, unanticipated changes in policy are an additional source of risk and uncertainty that may affect farmers adversely. Uncertainty about which policy alternatives will be enacted, whether in terms of policy mixes or settings on the levels of policy instruments, is a policy-induced risk (or, simply, a policy risk) faced by the private agricultural sector. To be sure, different policies lead to different expectations of commodity prices, availability of credit, cost of inputs, terms of trade, etc. As a result, the risk effects of changes in policies must be considered in terms of their implications for economic efficiency of the agricultural sector.

Agricultural policy uncertainty has typically resulted from two sources: (1) legislative changes and (2) adjustment of policy instrument levels promulgated by administrative officers under given legislative authority. As an example of the latter, the 1977 "act" enabled the U. S. Secretary of Agriculture to base adjustments in deficiency payments on a discretionary allocation factor. This factor was unknown to farmers when they enrolled in the program. Legislative change, however, is the more important type of uncertainty because it often involves major and abrupt changes and, thus, can have significant implications for physical or human capital investments or disinvestments.

Policy uncertainty is a crucial issue simply because of the adjustment costs private agents incur in adapting to new policy eras. This is also normally reflected in farmers' incurring costs to maintain sufficient flexibility to respond to new, unanticipated changes in policy. Moreover, once a particular set of policy controls is authorized by law, the levels of the controls change from one production period to the next. Under the 1981 legislation, price-support levels, target prices, and setaside requirements are subject to change annually with varying degrees of lead time. The Secretary has explicit power to impose varying levels of setaside requirements in each new production period depending on the outcome during the previous crop year. In the face of this short-run uncertainty, farmers must make a number of decisions, the outcomes of which have long horizons. This includes the purchase of land, machinery, equipment, and livestock. When future levels of policy controls cannot be anticipated, the farmer experiences increased risk and must provide for such risk by maintaining a more flexible business organization.

To be more concrete, the effects of policy risk can be illustrated by two classical expectation-formation patterns, namely, adaptive and rational expectations. Suppose that a farmer forms perceptions of price distributions adaptively in response to his experience and the flows of market information. As a new policy is instituted, the farmer will begin to observe prices from a new distribution. Thus, his perception of risk will increase initially if the new distribution is different than the old one. As time passes, the perception of risk will diminish gradually as information from the previous distribution decays in his adaptive process. Thus, a policy change could increase risk for the farmer until effects of the new policy are observed over a sufficient period of time. Also, decisions immediately following policy

changes may be subject to substantial allocative errors because perceptions have not yet adapted to the new policy regime. With frequent changes in policy, this may never be possible.

Now, suppose a farmer forms perceptions of price distributions rationally. In this case, the period of policy formulation imposes additional risk on the farmer, although risk may not be excessive once a new policy is finally instituted. As Congress considers alternative policy controls for a new agricultural act or as the Secretary of Agriculture or Congress is deciding how to revise existing controls, a farmer with rational expectations will determine a price distribution under each policy alternative and then attach subjective probabilities to each policy choice. Thus, his subjective risk will be greater, the larger the divergence of policy alternatives under congressional consideration. By contrast, the adaptive-expectations decision-maker does not perceive increased risk in the policy formulation period although he may turn out to be poorly adapted to a new policy once it is instituted. Reality, most likely, lies between these two specifications of adaptive and rational expectations; thus, policy risk has adverse implications for farmers both before and after policy changes.

These notions have been examined empirically by very few analysts. One of the few empirical studies is presented by Just, who examined the cost of policy risk for the adaptive-expectations paradigm. He compared the effects of the farmer owned grain reserve program on prices, quantities and, real income for grain and livestock markets relative to the case of no farmer-owned reserve. Using a 34-equation, nonlinear, simultaneous equation model of the U. S. wheat, feed grain, and livestock economy, his results suggest that a serious problem with the farmer owned reserve in its first few years was its

sharp departure from the previous policy and the long time period required to adapt to the new policy. The adjustment problem occurred not only for grain farmers but, also, for livestock producers who faced grain prices that were significantly different from those that would have existed in the absence of the farmer owned reserve in its early build-up phase; that is, initial price adjustments differed from long-run equilibrium levels and, thus, caused false price signals to producers. These false price signals caused substantial maladjustment in the livestock industry because of long lags in livestock production that fed back into the grain markets causing maladjustment to persist for some time. These results led to the conclusion that the practice of changing agricultural policies substantially every four years imposes unnecessary costs on the agricultural sector. The livestock industry can be continually in a state of trying to adjust to new policies because of its inability to adjust instantaneously. Because of the close link between livestock and feed grain markets, these problems "feed back" and cause sustained maladjustment of grain producers as well.

The above costs pertain only to the postpolicy change period and, thus, ignore any risk imposed on the agricultural sector in the prepolicy change period because of uncertainties about what future policies were going to be. Economic inefficiencies resulting from unrealized anticipations about new programs can be important just as these results indicate for inefficiencies owing to incorrect anticipations about the effects of a program with given provisions. These considerations point to the importance of designing policies that incorporate clear, conditional adjustment to changing economic conditions. Thus, farmers can anticipate adjustments in policy controls through their own subjective assessment of future economic conditions.

Furthermore, if the prespecified adjustment rules respond smoothly rather than abruptly, large changes in investment are not induced which cause years of similarly large oscillatory adjustments in related markets.

Another major source of instability in the political administration of U. S. agricultural policy is international in dimension. Policy must answer to many masters including, inter alia, the U. S. Department of Agriculture, the U. S. Treasury Department, and the U. S. State Department. Policies are altered periodically as a result of changes in policies of other countries and/or of U. S. policies toward specific countries. To be sure, one of the largest shocks on record for U. S. grain markets occurred in the early 1970s when the Soviet Union purchased substantial quantities of U. S. grain rather than lowering their internal standards for meat consumption. In an attempt to reduce the risk for U. S. farmers and consumers of future shocks from Soviet grain policy, the United States negotiated a long-term trade agreement effective October 1, 1976. Nevertheless, another substantial shock occurred on January 4, 1980, when President Carter suspended delivery to the Soviet Union of any U. S. grain exceeding the minimum of eight million metric tons that was specified in the agreement. This embargo occurred at a time when the Soviet Union already held contracts for delivery of 21.8 million tons of grain. An embargo of soybeans in 1973 caused similar problems, and some would argue that it led to the rapid growth of soybean production in Brazil and Argentina.

The effects of these changes in international policies could have been dampened by appropriate design of domestic policies. If this is accomplished by revising existing policy in a piecemeal fashion, farmers may suffer both from international policy risk and from policy risk associated with unanticipated corrective measures. When the Soviet embargo was announced, for

example, the effects on U. S. agriculture and possible compensatory policies for U. S. farmers were highly uncertain. Later, the Secretary of Agriculture increased loan rates, release levels, and call levels for wheat and corn in order to mitigate the effects of the embargo on U. S. farmers. While this change closely followed the embargo, it illustrates the tendency for U. S. agricultural policy to respond to immediate needs in a piecemeal fashion. Thus, farmers must bear policy risk about the response of the government to various situations; in addition, new risks for farmers may arise from a lack of familiarity with the new policies and their instruments.

4. U. S. Treasury Cost Uncertainty

Evidence of a policy disequilibrium often appears in the form of huge and unanticipated increases in the Treasury cost of maintaining a particular commodity program. As argued in the Introduction, the Soviet grain agreement in 1972 was viewed initially as a "savior" for policies of the 1950s and 1960s that had resulted in huge carrying costs of large public stocks. Similarly, a policy disequilibrium for the dairy industry was precipitated by huge costs of maintaining public stocks.

Formally, Treasury cost uncertainty may be defined as uncertainty about unanticipated government costs of implementing policies such as commodity support programs. For many programs, the Treasury exposure is not well bounded. The open-ended nature of many commodity support programs in terms of Commodity Credit Corporation acquisitions or deficiency payments has led to policy disequilibrium owing to unexpected increases in Treasury costs. Time and again, unanticipated Treasury cost exposure has resulted in changes in the levels of policy instruments and in the introduction of new policy

instruments. For example, the rapid accumulation of stocks held by the Commodity Credit Corporation in the early 1950s resulted in the Agricultural Trade and Development Act of 1954 and in the payment of substantial export subsidies on several farm products. The rapid accumulation of stocks in the late 1960s and the associated carrying costs resulted, in part, in the Soviet grain deal in 1972. The significant fall in world sugar prices in 1982-83 resulted in the reimposition of sugar import quotas. The large public stocks of wheat, corn, and other feed grains held in various forms and the depressed prices and incomes of U. S. farmers led to the PIK program in 1983. Similarly, the huge governmental stocks of cheese and other manufactured dairy products resulted, in part, in the dairy PIK program. We could go on and on with examples.

The level and risk of Treasury costs emanating from alternative agricultural policies is, indeed, an important dimension of governmental behavior. It explains the potential for administrative instability of food and agricultural policy. A key normative issue is whether or not government should operate as a risk-neutral decision-maker with respect to Treasury cost uncertainty. Several schools of thought exist regarding this issue (Just, et al.). One maintains that, since the government is very large and undertakes many projects, it can spread or absorb risk easily and, hence, should act as a risk-neutral decision-maker in absorbing risks from the private sector. A second school of thought argues that risk should be discounted by the public sector although not at market rates. Rather, a national policy should be established on appropriate rates of discount for both expected effects and risk. A third school argues that public-sector risks should be discounted at private rates because private individuals generally bear the risk--if not directly, then indirectly through taxes. Which of these three schools of thought is

appropriate depends on the conditions surrounding specific policy decisions. Namely, before the government can act as a risk-neutral decision-maker, one of the following conditions must hold: (1) the benefits (or costs) of a policy must be spread over a large number of individuals, the project must not affect private risk from market activities, and the project must not involve public goods; or (2) the project must be small and have benefits that are independent of economic benefits (Just et al.).

Obviously, government intervention in U. S. agriculture satisfies neither of these conditions; thus, the government, with respect to Treasury cost uncertainty, should act as a risk-averse decision-maker. This means that government should be sensitive to Treasury cost uncertainty in policy formulation and, in fact, use private risk-discounting factors associated with individuals who actually bear the risk, namely, taxpayers.

5. Market Signals and Policy Disequilibria

Another important consideration in agricultural policy formulation is that, if policymakers choose to isolate farmers from market signals, they must ultimately "face the music" in the form of large increases in Treasury costs or program ineffectiveness as the economy diverges from perceptions of market conditions at the time of policy formulation. When such events occur, enormous incentives for policy change accumulate and, thus, induce policy risk. The Nelson and Cochrane simulation study, for example, shows that government policy programs that kept farm prices and incomes higher than they otherwise would have been from 1953 to 1965 provided economic incentives to expand output sufficiently to keep farm prices lower than they would have been from 1968 to 1972. The prices were lower, in large part, because of the huge

stocks that were being carried by the U. S. government which at some point had to find their way back to private markets. As Johnson (1984, p. 18) noted in his presentation,

"What is clear or should be is that, even with very low price elasticities of supply, the increase in output induced by a price just 10 percent above the market-clearing levels soon results in a substantial excess production that must either be stored, disposed of in some manner, or eliminated through output reduction."

If the long-run price elasticity of the U. S. wheat supply is near 0.8 (with the short-run elasticity near 0.45) and if the long-run elasticity for coarse grains is near 0.75, then, for reasonable estimates of the elasticity of demand, "it is easy to see how a 15 percent price increase above market-clearing levels could result in stocks equal to a third of the annual output in two or three years" (Johnson, 1984, p. 19). In a still-earlier paper, Johnson (1981) noted:

"The most immediate effective limit on the level of target prices is the budgetary cost. Price-support or loan levels are limited by the desire to export freely and by the rapid accumulation of stocks when the levels are set too high. The output-stimulating effects of high target prices become apparent rather slowly. And, for a brief period, perhaps two or three years, the output effects can be contained by setasides and acreage-diversion programs. But recent experience indicates that expenditures required to elicit voluntary participation in acreage-diversion programs can be

substantial if significant output effects are desired. And it needs to be recognized that the magnitude of the required output adjustment is a function of the level of the target prices. Consequently, high target prices impose two budget costs--the deficiency payments and the cost of achieving additional diversion."

In the early 1980s, the rigid price supports and unrealistically high target prices (particularly for wheat and cotton) were totally inappropriate for the economic conditions that emerged from 1981 to 1983 even though these policies would have been quite appropriate for the economic conditions of 1972-73. However, from 1981 to 1983, the exchange value of the dollar rose sharply and, as a result, destroyed the hope for effective policy performance under the 1981 Act. As Johnson has noted (1984), "after all the attention that had been given to the increased instability that emerged post-1972, it was wholly inappropriate that legislation with so much inflexibility had become the law of the land."

What this means is that neither private agents nor policymakers can be allowed to be insulated from market signals. Such insulation creates the necessary conditions for policy disequilibrium which, in turn, leads to large Treasury cost uncertainties and policy uncertainties. Market signals can, of course, be modified; but they cannot be grossly distorted without adverse longer term implications. This general observation holds not only with respect to agricultural and food policy but with respect to all forms of government intervention.

In summary, because market conditions change, inflexible policies cannot be expected to filter market signals appropriately. What is needed are

self-adjusting policies (conditional policies) that permit smoother, more orderly adjustments in producer prices that transmit at least some appropriate adjustment signals between farmers and consumers. As argued in the remainder of this paper, policy formulation along these lines could reduce farmers' policy risk, reduce governmental Treasury risk, and provide for more orderly investment and growth.

6. Conditional Policies

Conditional policies are simply policies that follow a formal specification for change in policy instruments or instrument levels as a result of changes in economic conditions. A number of conditional policies have been enacted at various times. For example, under the Agricultural Adjustment Act of 1938, the Secretary of Agriculture had discretion in establishing the nonrecourse loan rate between 50 and 72 percent of parity for wheat and cotton. The specific formula-regulated loan rate for corn was to be 75 percent of parity if the supply was not expected to exceed domestic consumption plus exports for the year and 52 percent of parity if the supply was expected to exceed domestic consumption plus exports for the year by 25 percent. From the standpoint of an efficiency norm, however, these conditional policies are nonoptimal; they did not prove to be sufficiently adaptive for an economy with rapidly changing technology, input markets, farm scale, etc.

Conditional policies can be of many types, forms, and shapes. Policies can be discretely conditional or continuously conditional. In either case, some policies can be allowed to change intraseasonally while others can change only interseasonally. Numerous studies show that optimal policies must be conditioned on the economic environment (Rausser and Hochman). Wallace was

able to demonstrate this result by evaluating three discrete policy alternatives, a Cochrane-type plan for production quotas, a Brannan-type policy of price subsidy, and an input-restriction program for reducing agricultural output. His results show that, as supply and demand elasticities change, the policy set that minimizes social cost or inefficiency losses changes.²

Without formal specifications of conditional policies, agricultural programs contain potential flaws such as Firch (p. 29) has pointed out regarding the cotton program, namely,

"There is no mechanism in the current legislation that will insure that the real loan and target prices will move down over time at the natural rate of decline of commodity prices. Without this device for moving the real program prices down over time, it is quite possible that the program prices will rise relative to free-market prices and the program could be a major drain on the Treasury and a major distorter of prices and resource allocations."

Similarly, Babb (p. 15), in the context of the dairy program, argues that programs "featuring price supports above long-term, market-clearing levels in the absence of some form of supply management are not feasible without continuing purchases and out-of-Treasury cost. The higher support levels might result in less variation in price and production and reduce the number of dairy farm exits, but they would also introduce economic distortions."

In the last few years, the favorable production years of 1981-82 in cotton, wheat, corn, and other agricultural commodities combined with an unusual set of related market conditions (financial markets, exchange-rate markets, and general economic trends) to create significant policy

disequilibria that motivated the PIK program of 1983. Alternatively, a set of conditional policies for target prices, loan rates, setasides, diversion payments, and the various dimensions of the farmer owned reserve program (e.g., interest-rate subsidies, storage payments, call prices, and release prices) could have been used to specify adjustments to such conditions and, thus, could have avoided this policy disequilibrium or crisis. In theory, this can be demonstrated formally. Past history, however, suggests that, whenever conditional policies were specified, they were defined in a peculiar manner from the standpoint of economic efficiency. For example, the parity concept used in 1938 is unresponsive to most major market signals. Thus, substantial Treasury cost uncertainty was incurred which ultimately led to policy uncertainty. From the standpoint of rent-seeking behavior and the demand to transfer income or wealth, such conditional policies may be reasonable; but, if such political behavior defines conditions of policy disequilibrium, it, too, must be considered in formulating appropriate conditional policies.

In addition to the parity-conditional specification, the 1973 Act specified a procedure for adjusting initial target prices in 1974-75 for wheat, feed grain, and upland cotton in accordance with measures of the cost of production. Similar specifications were provided in the 1977 Act. These conditional policies were attacked on numerous grounds. However, political intervention never actually allowed the conditioning formulae to operate. For example, target prices determined by the 1977 Act were changed occasionally by legislative action throughout the life of the bill; also, target prices were

never allowed to fall from the level of the previous year even though estimated production costs declined.

The failure of the 1977 Act in formulating target prices conditionally on cost of production (as evidenced by alteration of the provisions) can again be explained by inappropriate formulation of the conditioning factors. Fundamentally, the cost of a productive resource that is not perfectly elastic in supply cannot be determined independently of product demand because of pecuniary diseconomies of scale. Thus, an increase in the final demand for the commodity will increase the expected value of the particular inputs utilized. As Gardner (1981) has facetiously pointed out, ". . . if the price of wheat were set at \$15 per bushel, the price of scarce wheat growing resources would be bid up enough to make the cost of production \$15."

The 1981 Act abandoned the direct use of the cost of production measures to determine target prices. Nevertheless, Congress revealed in the specification of that Act that it believed it had the capacity to set target prices at reasonable nominal levels four years ahead through the crop year 1985-86. The resulting fixed annual escalation of target prices on crops created significant policy inflexibility. As market prices have declined and inflation has slowed, the drawbacks of this inflexible escalation in the target price have emerged.

Another example of conditional policies for the major commodities was introduced for the 1966 upland cotton crop. The procedure was delineated in the 1965 Act in which the loan rate for upland cotton was tied to a moving average of world prices and/or U. S. spot-market quotations compounded by a minimum level. This conditional policy proved to be effective. As noted in Cochrane and Ryan, this procedure worked to reduce cotton loan rates

significantly compared to those in previous years and was successful in regaining important export sales. This conditional policy provided the basis for eliminating the need for domestic mill and export subsidies.

In addition to the conditional target-price specification, the Food and Agriculture Act of 1977 stipulated a procedure whereby legislated loan rates could be reduced by the Secretary of Agriculture whenever necessary to maintain domestic and export markets. Specifically, loan rates for wheat and feed grains were allowed to be reduced for the next marketing year by a maximum of 10 percent if the national average price received by producers for the commodity in the current marketing year were not more than 105 percent of the loan level of the current year. A lower limit was placed on the amount that loan rates could be reduced over the life of the bill. This provision was also contained in the 1981 Act. The 1981 Act also introduced a conditional policy for determining soybean loan rates based on a five-year moving average of past market prices (excluding the high and low years) with a lower bound of \$5.02.³

The 1981 Act required rice loan rates to be adjusted by the same percentage change as are rice target prices. For example, when the rice target price is increased by 5 percent, the rice loan rate is also increased by 5 percent. The rice loan rate can be adjusted downward if the Secretary determines that the loan rate established by the formula would discourage exports and result in excessive domestic rice stocks.

For each of these conditional policies, however, much policy risk remains. In point of fact, the potential adjustment cost faced by farmers resulting from unanticipated changes could well lead to substantial inefficiencies under each one of these conditional policies. That is, most of

these policies give the Secretary of Agriculture short-run discretion in setting policy instruments. Thus, farmers can only anticipate the policy instruments within certain bounds. Furthermore, farmers cannot be sure that government will not decide to revise these policies in major ways with relatively short notice as on other occasions.

The above observations hold, also, for the discretely conditional policies that have recently been passed by both the House and the Senate for the 1984 and 1985 crop years. For example, in the 1985 feed grain program, corn is specified to have a target price of \$3 per bushel. However, if the U. S. Department of Agriculture estimates that the corn carryout as of September 30, 1985, will exceed 1.5 billion bushels, the 1985 program would include a total acreage cutback of 5 to 20 percent and a combination of acreage reduction and paid diversion of which not less than 5 percent is in advance paid diversion. The payment rate would be at least \$1.50 per bushel. In addition, any acreage reduction over 15 percent is to be proportioned equally between acreage reduction and paid diversion--meaning that paid diversion would be a maximum of 7.5 percent. Similar discretely conditional policies are specified in this legislation for each of the other major crops. In each of these instances, significant Treasury cost uncertainty and policy risk remain. The discrete intervals and specified bounds do not preclude the possibility of large and unexpected increases in Treasury costs. Moreover, given the discretionary features of these discretely conditional policies, governmental failure can well emerge again and lead to unanticipated increases in Treasury costs. The threat of these outcomes suggests further policy risk.

An appropriate specification of conditional policies should base the policies on factors that signal crises or major policy disequilibria. After

all, these are the factors that historically have led to the need for major and unanticipated policy reformulation. For example, the actual triggering factors should include Treasury costs or excessive governmental stocks in addition to farm price or income levels. These manifestations of policy disequilibrium are influenced by changes in external conditions such as exchange rates, inflation rates, real rates of interest, and the like. Therefore, conditional policies should be specified to change either directly or indirectly in accordance with exchange rates and the real rate of interest. Given the present state of knowledge, however, conditional specifications in terms of these indirect causal variables would likely involve too much "noise" from imprecisely estimated parameters. Hence, specification of policies in terms of the resultant variables--Treasury costs or public stocks, farm price, and farm income levels--is likely to be more successful. Furthermore, conditional policies must respond to these conditions over a sufficiently broad range of values of these variables. Policy rules with one or two discrete steps (such as the 1938 parity rule) may be able to react appropriately in the short run or, with little variation in economic conditions but are likely to prove increasingly inflexible.

7. Policy Equilibrium Rules

At an operational level, conditional policy mechanisms must be kept as simple as possible so their effects can be assessed more easily by both policymakers and farmers. On the other hand, changes in the policy must also be orderly and frequent enough to keep policy instruments closely related to current economic conditions. This is in sharp contrast to recent policies that involve setting a particular level for, say, the loan rate and then, when

it appears to be too far off-line, making a substantial revision. Experience suggests that this piecemeal approach will always be necessary when specific levels, say, loan rates, are determined only after existing levels appear to be in disequilibrium. For example, the loan rates were relatively high in 1977 and 1978 but, if sufficient inflation had occurred, the release levels would have become too low. The commodity policy actually acted more like a simple price support in early years, in which case economic welfare analysis clearly implies a net loss for society as a whole. On the other hand, if sufficient inflation had occurred, the release level would have acted as a price ceiling in the absence of set-asides--at least until the farmer owned reserves were depleted. Economic welfare analysis also clearly implies a net loss for society as a whole in this case.

Which of these cases occurs depends on which direction the general economy turns, but in neither case does the policy serve very well to meet the general policy rationale of providing (real economic) stability. In either case, the agricultural economy would be driven farther and farther from equilibrium, thus eventually precipitating a policy crisis. As a result of this type of piecemeal policy adjustment, the program can become a destabilizing influence or, at best, can promote economic inefficiency by artificially holding prices up immediately after loan-rate revisions and then artificially holding prices down after inflation and just before new revisions are made. A superior approach would be to change loan rates more frequently and in smaller amounts in accordance with observed and anticipated changes in equilibrium price levels. Then, prices could be stabilized near equilibrium or efficient price levels rather than at price levels distorted first one way and then another.

These considerations suggest that policy instruments must be revised frequently to keep policy in equilibrium--in other words, to avoid policy crisis or disequilibrium. As argued earlier, however, frequent revision of policy instruments can impose excessive policy risk on farmers if the revisions cannot be well anticipated. To avoid imposing undue policy risk on farmers, agricultural policies must specify in advance how the specific controls of the program will be changed in response to market conditions. In this fashion, farmers can more easily anticipate such changes through their own assessments of future market conditions. Thus, better investment decisions should be possible than when farmers are left to speculate about future policy control levels.

In order for agricultural policies to specify such adjustment in advance, policymakers must work out policy equilibrium rules, i.e., define the responses to be taken in various "would be" policy disequilibria. Observable conditions which signal major policy disequilibria should influence revisions of the controls and, thus, define the policy equilibrium rules. These conditions should include government-related stocks and Treasury costs. If the rent-seeking activity of interest groups is a factor affecting policy equilibria, the major variables affecting their activity must also be included; thus, inflation of food prices and farmer income levels is also a likely candidate for inclusion. Target prices and deficiency payments combined with loan rates supposedly avoid low farm incomes, while release and call levels avoid rapid food-price inflation. However, acceptable levels of farm income and consumer prices must be allowed to change with the rate of inflation.

Similarly, acreage-setaside programs are introduced, in large part, to avoid excessive governmental stocks, in whatever form they may be held, and the accompanying high Treasury costs. Hence, the setaside requirements could be keyed to the level of accumulated reserves.

Alternatively, loan rates could be tied directly to reserve stock levels. As noted above, the 1977 Act admits this possibility by authorizing the Secretary of Agriculture to reduce loan rates 5 percent if he finds that stocks are excessive; but, unfortunately, the discretionary nature of this conditional policy does not have favorable implications for policy risk. Revisions in the loan rate should not be made in a piecemeal manner that is difficult, if not impossible, to anticipate without substantial unnecessary policy risk for farmers. Conditioning the loan rate on the level of governmental reserves could be done in such a way as to reduce policy risk by using a continuous policy-equilibrium rule; for example, the loan rate could be increased (decreased) one cent per bushel for every three million bushels the government reserve is below (above) some specified target level. If farmers could anticipate this adjustment process when making their investment decisions, agricultural production should attain greater economic efficiency with less risk; in fact, with more efficient investment in the agricultural sector, lower prices may lead to the same levels of income.

Smooth and orderly changes in the release or call levels is also appropriate. If farmers believe that the loan rate and release levels establish a price corridor, the program itself alters their probability distributions by preventing "low" and "high" prices. The revised expectations may, in turn, generate ex ante production responses. In this context, government policy may offer reduced benefits when prices are near normal levels and costs of

providing some stabilizing influence are, indeed, very reasonable. On the other hand, in extreme price situations, the costs of achieving stability swamp any benefits that may be derived (Just and Schmitz).

Under inflexible policies, unexpected market developments can and do trigger large increases in reserve levels. As a result, Treasury costs can increase substantially. Conditioning the price-control levels explicitly on stock levels would ease this burden. This conditional specification could be allowed to vary interseasonally and operate in accordance with a prespecified scale.

To the extent that conditional policies are allowed to change in a smooth and predictable manner, grain farmers will be able to make more informed long-run investment decisions. By contrast to the current formulation of inflexible policies, the farmer will be better able to determine how much grain he will want to plant over the planning horizon that might be covered by a long-term investment in machinery. Similarly, the investment inefficiencies currently imposed upon the livestock sector will be reduced since these agents will be allowed to form more accurate long-term expectations of grain prices and, thus, position their long-term investments in their herds more efficiently. In this manner, governmental intervention would not be imposing additional uncertainty on farmers; in fact, the policy could then act to achieve the underlying policy rationale of reducing the market effects of existing, inherent uncertainties.

Governmental ownership of grain reserves is viewed with considerable skepticism because it concentrates power in a few individuals who make governmental buy/sell support/setaside decisions. Similar concerns hold, perhaps to a lesser degree, regarding other policies such as meat import

quotas. The conditional policies advanced here, however, avoid some of these problems because the role of the government is controlled mechanically by the conditioning variables. In this fashion, short-run randomness introduced through the political process is minimized. On the other hand, the success of mechanical rules for adjustment of policy instruments over long periods of time (sufficient to obtain the benefits of reduced policy risk) depends on appropriate conditioning of the rules. If the equilibrium rules do not prescribe an appropriate change for some type of "would be" policy disequilibrium, the policy rule may sooner or later require change. However, the wider the set of adverse conditions to which the rules respond, the less likely and less frequent should be those required changes and, thus, the less should be the policy risk faced by farmers.

The theoretical rationale for these kinds of conditional policy equilibrium rules has been developed elsewhere. Just and Schmitz have shown that the optimal governmental adjustments in stocks can be specified as a smooth function of the difference between target prices and observable prices. More recently, Meyer has shown that the only policy rule that is preferred by all agents, regardless of their utility functions, is the linear variation of price. This stochastic-dominance result implies that a self-adjusting policy specifying a simple linear function for the difference between target prices and observable prices is preferable to the usual approach of inflexible settings on loan rates, target prices, etc. Empirical justifications have also been offered for smooth and continuous policy equilibrium rules. They include the work of Cochrane and Danin; Danin; and Zwart and Mielke. These studies demonstrate the potential benefits for society of governmental intervention with built-in responses to market conditions. It should be

noted, however, that these empirical studies consider only the short-run effects; they do not take into account the longer term investment efficiencies associated with reduction in policy risk. Hence, empirical studies that take into account the longer term implications should result in even greater dominance of conditional policies geared to economic conditions.

8. Operational Simplicity

To minimize policy risk, equilibrium policy rules must be understood easily and anticipated by all actors in the U. S. food and agricultural system. This suggests, for example, that optimal stochastic or adaptive control formulations with their complete decision rules cannot be utilized to determine the conditional policies that should be imposed. Such formulations are simply too complicated and would put weights on too many state variables in determining optimal "feedback rules" (Rausser and Hochman).⁵ Optimal stochastic control feedback rules may also be dominated by simple conditioning rules simply because of an inability to properly specify and estimate the system.

As noted previously, the recent 1984 legislation passed by both the House and Senate offers some discrete conditional specifications for a number of policy instruments. Some of these conditions give stepwise adjustments with a number of steps that almost approximate a smooth rule. However, these conditional specifications not only allow unanticipated discretion to the Secretary of Agriculture in application, but the discrete jumps lead to policy risk measures which exceed those that would result from self-adjusting policies that admit changes in a smooth and orderly fashion. One must also question

whether rules with many steps are more easily understood than are linear rules stated in the simple examples above, e.g., a one-million-bushel public stock transaction for every one-cent change in price.

9. A Policy Proposal

The task remains to specify a policy that balances Treasury cost uncertainty with private market risk in a manner that minimizes policy risk and transmits sufficient market signals for efficient long-term private-sector adjustments while maintaining an operational simplicity understandable by farmers and policymakers. The policy proposed here to satisfy these concerns is a significant departure from that of the 1981 Act. It involves a difference in the set of policy instruments as well as a difference in how the levels of the policy instruments are set. The policy proposal is motivated by the understanding that the rationale for commodity-specific agricultural policy is the inherent instability in agricultural production and marketing and that concerns for equity or the need to transfer wealth can be accomplished more efficiently by means other than commodity-specific policies.

Given this perspective, a number of the policy instruments included under the 1981 program are inappropriate. First, the release and call levels associated with the farmer owned reserve are inappropriate because they cannot be set conditionally in a smooth and graduated manner. They establish a fixed price band intraseasonally and thus lead to excessive Treasury cost uncertainty and market distortion in abnormal conditions while providing no benefits in normal conditions. The loan rate suffers from the same problems. Even when varied intraseasonally, a loan rate cannot induce smooth behavior by

individuals in accordance with market prices, i.e., once a farmer has his crop under loan, he will not be affected by additional market signals during the crop year as long as price is below the loan rate. Given that release and call levels and loan rates are not appropriate agricultural policy instruments, it follows that neither the farmer owned reserve nor the loan program is an appropriate agricultural policy. In addition, the storage payment and interest rate subsidy associated with the farmer owned reserve have distorting properties and promote long-run inefficiency.

Two arguments suggest that setaside and deficiency payment instruments are also inappropriate. Deficiency payments are motivated by a desire to transfer wealth, and acreage setasides have become necessary because of a long history of distorted market signals associated with inflexible policies of the past. First, when conditional policies are employed that transmit to the private sector sufficient market signals for adjustment, the need for input or output controls is eliminated. Second, any need for transferring wealth is better met by other noncommodity-specific policies as noted earlier. The use of deficiency payments and acreage setaside instruments for the transfer of wealth can only promote continued inefficiency and chronic long-term adjustment problems.

These arguments imply that neither the existing loan program nor the farmer owned reserve should continue to operate; rather, any public stock ownership should be taken directly by government. Of course, government ownership has traditionally suffered from problems of excessive storage cost, quality deterioration, transactions costs associated with the spatial distribution of a commodity, etc., as well as possible costs associated with selling at a price lower than that at which governmental purchases took place.

However, as demonstrated below, market institutions exist that can eliminate many of these costs.

The policy proposed here is as follows. Rather than offering to buy all grain at a specific loan rate, the government should specify an easily understandable linear stock purchase/sales rule. For example, the government could specify that, say, one million bushels of grain would be purchased for every one cent per bushel the actual market price falls below some specified target price level. Similarly, the government could sell one million bushels from stocks for every one cent per bushel the price is above a specified target price. If these transactions occur at competitive market prices, which farmer's grain was actually purchased by the government would make no difference. Note, also, that the actual market price used in determining these transactions is the one that occurs with government intervention rather than in absence of intervention.

This procedure would provide some stabilizing influence when prices are near equilibrium where stability comes at a very low cost. On the other hand, the policy would not put a "cap" on possible price variations that could lead to high Treasury costs and policy disequilibrium. Thus, the policy is capable of maintaining a balance between the private cost of price uncertainty borne by farmers and the public cost of Treasury uncertainty borne by government. Furthermore, under this type of policy, the stabilizing influence can possibly be provided throughout a marketing season. As the price increases, the government could sell stocks to ease price increases; as price starts downward, the government could buy stocks to ease price declines. Thus, the announced policy of a one-million-bushel transaction for a one-cent change in price would be an equilibrium relationship that could be applied continuously

in determining governmental stock transactions. Of course, the time interval between transactions should not be too long because, otherwise, prices may be too far out of line or cause too much price unsettlement when transactions finally occur.

To make this stabilization policy adjust itself appropriately interseasonally, a conditional policy must be specified for the modification of target prices in a way that is sensitive to changing economic conditions. To do this, a simply understandable linear rule could be specified for modifying the target price from year to year based on accumulated reserves. For example, the target price could be increased (decreased) by one cent per bushel for every three million bushels actual reserves are below (above) a target reserve stock.⁴ Finally, the target reserve stock should be specified as a simple function of real Treasury costs and other concerns that signal policy disequilibrium. With such policies, market signals can still be passed on to producers, albeit in a filtered form, so that the agricultural economy does not stray too far from equilibrium. Also, with specific conditions governing adjustment of policy instruments from year to year, farmers can anticipate governmental policies over the longer run based on their own perception of market prospects; thus, policy risk is minimized, and inappropriate levels of investment are not encouraged. Furthermore, with this type of adjustment, the policy can be self-correcting with respect to unanticipated Treasury costs, inflation, variation in nominal interest rates and exchange rates, technological development, and other changes in conditions of the agricultural and general economies.

Operationally, there are two ways to implement this policy. One is to have the government perform transactions in terms of the physical commodity.

The other is to hold the right to buy or sell physical units of the commodity, i.e., to take positions on the futures market. Actual transactions in terms of the physical commodity, however, suffer from significant problems of implementation. Where would the commodity be purchased? Where would the commodity be stored? How would storage costs be paid? What would be the frequency and timing of transactions? Alternatively, the futures market approach solves the problems about where the transaction would take place and where the storage would take place (no physical storage would be involved) and provides much greater flexibility regarding timing and frequency of transactions. Furthermore, the futures market approach eliminates many of the other costs associated with carrying physical stocks such as physical deterioration, payments for physical storage facilities, transactions costs associated with spatial distribution of a commodity, and most if not all of the interest expense (the margin required for futures market transactions is typically only about 5 to 10 percent of the value of the associated physical commodity and can be held in the form of interest-bearing treasury bills). Also, the costs of administering this program through the futures market are orders of magnitude less than with the current program. All of the governmental activity could be accomplished through a small trading office enacting the mechanical rules on one or a few futures trading exchanges as opposed to placing an enormous administrative burden on local ASCS offices all across the country.

Besides the target reserve stock, this policy has the simplicity of requiring a choice of only two parameters: The ratio of stock transactions to the price differential from target (the stock transaction ratio) and the ratio of target price adjustment to the reserve stock differential from target (the target price adjustment ratio). These parameters provide for both short-run

and long-run flexibility of the policy in adapting to changing economic conditions. They also allow both short-run and long-run anticipation of farmers in their planning process.

The justification for all of the features of this proposed policy is beyond the scope and space of this paper. However, the success of the policy clearly depends on making the right choices of the above two policy parameters. The choice of the stock transaction ratio determines the trade-off between Treasury cost risk and private price risk. A high ratio is associated with high Treasury cost risk and low private price risk and vice versa. Too high a value of the ratio will lead to policy failure because of excessive Treasury risk, while too low a value will not reduce private price risk. Nevertheless, previous policy experiences give rich evidence for choice of an appropriate level.

The choice of the target price adjustment ratio determines the adaptability of the policy to changing economic conditions. Too low a ratio could lead to eventual government failure because of insufficient adaptability, while too high a ratio could make the policy adapt so quickly to changing conditions that no stabilizing influence is provided or that overshooting occurs. Again, however, previous policy experiences and market information exist so that reasonably good choices should be possible. Furthermore, the information required to select appropriate levels of the ratios, which define these policy equilibrium rules, is no different than that needed to formulate changes in traditional policy instruments. Finally, any particular levels of instruments required to enact the initial policy are not crucial to its success beyond the short run. For example, if the initial target price setting

is too high, stocks will begin to accumulate beyond the reserve stock target and automatically draw the target price down.

10. Concluding Remarks

The inherent instability and riskiness of the U. S. food and agriculture system is the market-failure justification for U. S. agricultural policy. The implementation of policies to address such market failures is often confronted with government failure. Political-administrative instabilities resulting from government failure can exceed the inherent instabilities of the private sector. This paper argues that an operational approach for dealing with both types of failure is the specification of appropriate conditional policies. Such policies must be designed to balance Treasury cost uncertainty with policy risk while transmitting sufficient market signals for long-term adjustment.

Very recently, economists have begun to realize the potential benefits of policy controls that are determined automatically by market conditions. Theoretical and empirical studies have been done to analyze the type of policies advocated here. In each of these studies, the conclusion has been reached that such policies dominate the fixed policies that have been pursued by and large since the 1930s for U. S. agriculture. Moreover, these studies are short run in nature and, therefore, do not take into account the additional benefits of longer term investment efficiencies that can be obtained from more orderly agricultural policies with built-in self-adjustments that can be well anticipated.

Operationally, the specification of smooth and orderly policy equilibrium rules depends on the risk-sharing arrangement between the public and private

sectors. A particular conditional policy design implies a particular level of Treasury cost risk, a particular level of policy risk, and particular levels of output and price risk for the private sector. A fixed loan rate or target price can place much of the risk of fluctuating prices on the government (depending on levels) and is reflected in terms of Treasury cost exposure. If, however, the policy is designed so that both government and the private sector incur some of the losses when prices fall, the risk of market price variation is shared by government and the private sector. Such risk sharing would be preferred by farmers if the fact that government bears all of the risk means that it is more likely to "randomly" change policies; increased stability for the government means a more stable policy environment.⁶

Footnotes

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¹Farm policies, such as price stabilization schemes and crop insurance, are designed to affect directly the ability of the agricultural sector to cope with and respond to the capricious nature of its physical and economic environment.

²The same point is made in the framework developed by Becker and applied to agricultural commodity markets by Gardner (1983). The most efficient redistribution policy depends upon the elasticities of supply and demand. For example, inelastic demand favors production controls while inelastic supply favors a deficiency-payment policy. For some elasticities, the Cochrane plan dominates the other two plans whereas, for other elasticities, the Cochrane plan is dominated. What this analysis shows is that, if export-demand elasticity is not constant from one year to another but depends critically upon production shortfalls in major importing countries (such as the Soviet Union or China), in one year some policy instrument should be set to zero whereas, in another year, that same policy instrument should be at an active level (nonzero).

³An exception to this rule is when the loan rate does not exceed the market price by more than 5 percent, in which case the downward adjustment discussed above is applicable with an absolute minimum of \$4.50.

⁴Alternatively, an appropriate conditional policy for the storage subsidy could be specified to depend upon the accumulated size of the farmer-owner reserve. For example, the new target subsidy could be determined by

subtracting (adding) five cents per bushel for every million tons the farmer-owned reserve is above (below) some goal level for the reserve size. If this revision rule were known well in advance by producers, the effects of current and expected future market developments could be taken into account; and the uncertainty associated with unanticipated storage-subsidy changes could be avoided. Furthermore, with this type of rule, revisions would be assured so that the reserve would not begin to accumulate indefinitely and lead to excessive Treasury cost. Moreover, the reserve would not be depleted over a period of many years.

⁵Of course, if the stochastic control formulation were specified properly and recognized the cost of adjustment and the cost of information collection and monitoring by private agents, a derivation of the optimal feedback rules would, presumably, be simple and easily understood and anticipated by private agents. Because of inability to recognize or measure properly these costs of adjustments, the optimal stochastic control approach is not feasible in this context.

⁶Once a desirable risk-sharing arrangement has been determined, the frequency by which the conditional policies are allowed to self-adjust can be specified. For example, under the current set of policy instruments, acreage set-asides and target prices must be set on an annual basis well before any resource-allocation decisions are made by farmers, i.e., prior to planting time. All of the remaining instruments (e.g., loan rate, storage payments, interest rate subsidies, call and release prices, and public stock sales) could be allowed to adjust intraseasonally.

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