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**A
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*Traditional Fields
of Agricultural Economics,
1940s to 1970s*

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editor

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**Part III. Policy for Commercial
Agriculture, 1945-71**

This review has been read by more than a dozen economists, most of whom were active in the field of farm policy during the period under discussion. Their critical comments were immensely helpful in improving the review. In some instances I felt justified in retaining interpretations objected to by one or two critics, and I assume responsibility for any questionable judgments, omissions, and outright errors that may remain. The review is limited almost entirely to literature addressed to a professional audience; to attempt to include popular and educational materials would have made the task unmanageable.

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G. E. B.

Policy for Commercial Agriculture, 1945-71

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Farm Problems and Their Economic and Social Setting

Farm price and income policy is about an actual world, not an abstraction in which simple, homogeneous resources are frictionlessly allocated to production of want-satisfying goods, free of political influence or the clash of opposing value systems. Like most of the economy, the agricultural sector is constantly changing under the impact of new technology, shifting demands, and evolving institutions. It is in such a world that unrest about the state of affairs arises and creates policy issues. It is this world that economists studying farm policy try to understand and for which they analyze, and on occasion propose, policy alternatives. This review begins, therefore, by sketching the major economic developments in agriculture bearing upon price and income policy from World War II to 1971.

The Agricultural Experience

Total crop and livestock production has risen continually in this century with only small year-to-year variations in the aggregate except during the great droughts of the mid-1930s (figure 1). During the quarter century beginning with 1947 the rate of output expansion held remarkably close to 1.7 percent per year. Even so, the composition of total output changed significantly in this era; for example, production of poultry, beef cattle, and soybeans rose strongly, while production of cotton, tobacco, wheat, and milk increased slowly or declined.

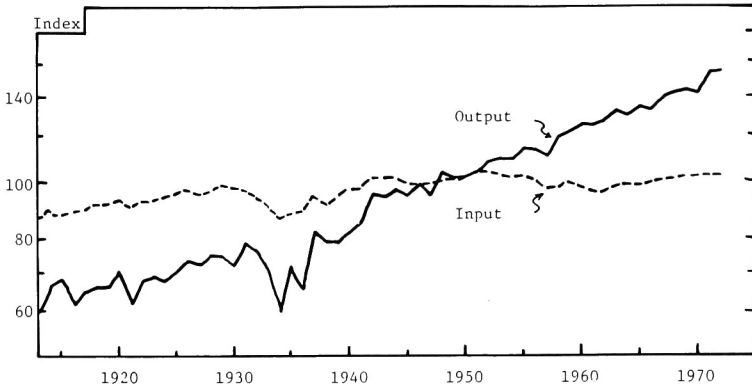


Figure 1. Total agricultural output and input, 1913-72 (1947-49=100).

Resources used in production changed dramatically. Tractors gradually began to push horses and mules aside at the end of World War I and had virtually completed the job by the late 1950s. Rapid increases in numbers, power, and versatility of farm machines followed World War II. The use of human labor, which declined slowly during the 1920s and 1930s, began to drop precipitously in the late 1940s. Farm employment was halved between 1950 and 1957 and was still falling in the early 1970s.

Large increases in the use of fertilizer and pesticides, together with the development of improved crop varieties, were instrumental in raising crop production per acre more than 50 percent in the quarter century beginning with 1947. The harvested acreage of crops, which was about the same in World War II as in World War I, declined slightly in the early 1950s and decreased again under acreage diversion programs begun in the late 1950s. The USDA index of total farm productivity (output-input ratio) rose persistently after World War II until about 1965, leveled off until 1970, and then rose again.

The number of farms varied within the narrow range of 6.5 to 6.8 million from 1920 to the late 1930s but had fallen to 6.0 million by the end of World War II. The number was 2.9 million in 1971. Farms became much larger in terms of acreage and still larger in terms of output. Except for irregular declines in persons and workers per farm, the size of the farm population and labor force followed the course of farm numbers after 1920.

Income in both the agricultural and nonagricultural sectors fluctuated widely in the 1920s and 1930s. Total agricultural income tended to decline slowly relative to total nonfarm income but averaged about one-tenth of the nonfarm amount during the two decades. Agricultural income rose somewhat more than nonagricultural income from 1939 to 1948 but took a much

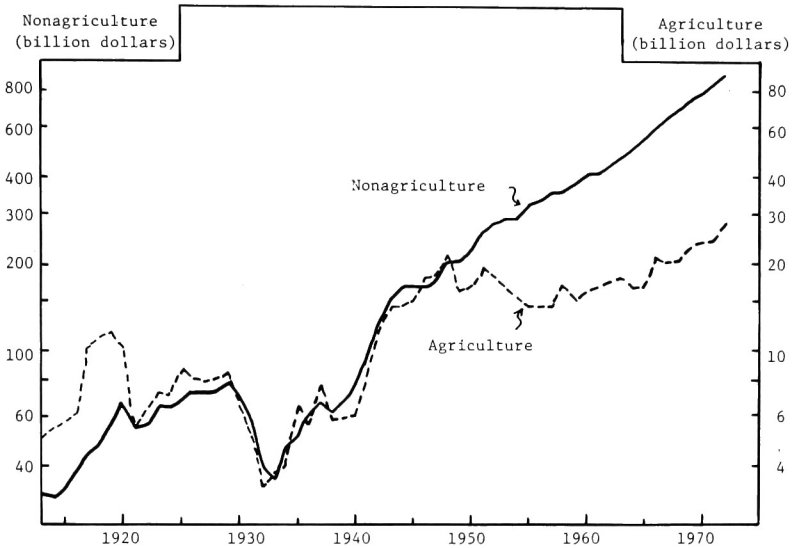


Figure 2. National income originating in agriculture and outside of agriculture, 1913-72.

different course after that, as figure 2 shows. Income originating in agriculture had fallen to 3 percent of nonagricultural income by 1971.

After World War II agricultural income was shared by a rapidly declining number of persons. Moreover, income of farm residents from off-farm sources rose from one-fourth of the total income at the end of World War II to more than one-half in 1971. A comparison of per-capita disposable personal incomes of farm and nonfarm residents shows a substantial decline in the relative position of farm people from 1948 to the mid-1950s, followed by a more than compensating gain from that point to the early 1970s. Farm residents had become so heterogeneous a group by the 1960s, however, that per-person and per-farm data tell us very little. Eighty-six percent of the income on farms with sales of less than \$5,000 was from nonfarm sources in 1971 (table 1).

Farm prices collectively were highly unstable up to the mid-1950s, and prices of most individual farm commodities were even more unstable. The famous parity ratio compares the index of prices received by farmers with the index of prices paid by farmers, both indexes on a 1910-14 base. Farm prices were much below parity as thus defined during most of the 1930s, were at or above parity from 1942 to 1952, and fell below parity by increasing margins from the early 1950s to 1971.

Both farm land prices and net farm income nearly tripled in the fifteen years from 1939 to 1954. From 1954 to 1971, however, land values rose 134

Table 1. Income Comparisons on Farms of Different Size, 1944 and 1971

Class of Farm	Percentage of Cash Receipts	Percentage of All Farms	Net Income per Farm		
			Farm Sources	Nonfarm Sources	Total
1944					
Medium and large commercial farms ^a . .	80	29	\$5,467	NA	NA
Small commercial farms ^b	15	28	1,412	NA	NA
Other farms	5	43	384	NA	NA
All farms	100	100	\$2,137	\$688	\$2,825
1971					
Sales \$20,000 or more.	79	21	\$16,913	\$4,898	\$21,811
Sales \$5,000 to \$19,999	16	27	4,723	4,442	9,165
Sales under \$5,000	5	52	1,302	7,723	9,025
All farms	100	100	\$ 5,581	\$6,230	\$11,811

^aMinimum value of products \$3,000 per farm unless value of land and buildings \$20,000 or more.
^bMinimum value of products \$1,200 per farm unless value of land and buildings \$8,000 to \$19,999.

Notes: Farm prices increased 44 percent between 1944 and 1971; prices of items bought for farm family living increased 118 percent. Averages for small farms conceal poverty among families without substantial nonfarm income. Sources: 1944 data adapted from Brandow and Allison [29], together with census number of farms; 1971 data from USDA, ERS, *Farm Income Situation*, July 1972.

percent while net farm income increased only 30 percent. Farm proprietors' equity was high in relation to the value of farm assets — 91 percent — in 1950. Despite a fivefold rise in farm debts, it was still 81 percent in 1971.

Farm problems got on the nation's policy agenda because dissatisfied farmers put them there. Dissatisfaction became widespread during the price collapse of 1920-21 and was sufficiently strong throughout the 1920s to engender much legislative activity culminating in the Federal Farm Board of 1929. Extreme distress on farms in the early 1930s was part of the nation's economic and social condition to which the New Deal was a response. Extensive federal farm programs were firmly established by the end of the 1930s. Throughout the period under review political leaders had little reason to think that the federal government could withdraw from farm markets.

Before World War II many farmers were dissatisfied with incomes which they felt to be unfairly low. The immediate and often only reason perceived for poor incomes was unfavorable prices. After World War II memories of events following World War I led farmers to press strongly for price support.

Soon thereafter additional concerns received new emphasis. The steep decline in the numbers of farms and farmers was disquieting: it seemed wrong to fundamentalists, it meant a diminution of farmers' political power, it was an implied threat to the survival of many farmers who had not yet been forced out of agriculture, and it undermined rural communities in many of the farming areas of the nation.

Vertical integration by nonfarm business firms into farm production was dramatic in the poultry and egg industries in the 1950s and tended to spread into certain other branches of agriculture. Some new large-scale farms were formed, in a few cases by industrial firms strongly bent on conglomeration, and instances in which wealthy individuals invested in one way or another in farming seemed to increase. Farmers and many other citizens frequently viewed these developments as foreboding encroachments on family farming and often attributed them to unfair commercial or tax advantages. The charge of monopolizing practices by businesses with which farmers deal—a contention that is centuries, not decades, old—continued to be pressed by some farm groups.

Farmers' interest in self-directed collective action to improve prices and other terms of sales grew during the 1950s and 1960s. Farmers contrasted their own situation with that of labor unions and corporations in concentrated industries in demanding and getting higher wages and prices. Bargaining power became a central goal of a number of producer associations, including both general farm organizations and specialized commodity groups.

A dramatic turn of events in the summer of 1972, closely related to crop failures abroad and to inflation everywhere, caused farm prices and income to soar and fears about food shortages to replace preoccupation with surpluses. The year 1971, therefore, is an opportune point at which to end a review of farm policy literature.

The Macroeconomics of Agriculture

Understanding how the agricultural economy works is obviously important to policy analysis and prescription. Much of the effort to improve such understanding has been motivated by policy purposes. As agricultural economists observed the behavior of agriculture, there gradually emerged a dominant conception of the processes and structural attributes characterizing the sector and forming the milieu in which farm economic problems developed. The general model of agriculture was not agreed upon in full; disagreement remained concerning the relative importance of different components, the quantitative values of some key functional relationships, and the speed at which particular processes operated. Yet the general model became widely

enough accepted to be the common framework within which discussions among agricultural economists about policy took place.

SCHULTZ'S 1945 ANALYSIS

Schultz's *Agriculture in an Unstable Economy* [174] is often remembered for relating farm economic fortunes to industrial instability and for a compensatory payments proposal, but most of the book was devoted to an analysis of the effects of persistent, long-term forces causing major changes in agricultural resource use, relative prices, and farm income. The ideas presented there are a convenient set around which to begin a description of the general model. Somewhat recast, the components of the Schultz model as of 1945 are as follows:

1. *Technology as an external, driving force.* Improved methods of farm production were being generated outside of agriculture — until 1945 mainly by publicly supported research institutions. The new technology caused the supply of farm products (in a schedule sense) to increase. The most dramatic current instance of this was the introduction of mechanical power on farms; as tractors replaced horses and mules, millions of acres were transferred from production of feed for draft animals to production of grain and forage for livestock for the market. Much farm machinery incorporated new technology that led to more capital and less labor in the optimal input mix.

2. *Land development.* Some new land was brought into agriculture not because farm price-cost relationships justified it but because development-minded communities had sufficient political power to induce the federal or state government to appropriate funds for irrigation, drainage, or clearing of land.

3. *Market and cost structure of agriculture.* Since agriculture was highly competitive (aside from the effects of government programs), "competition makes it necessary for farmers as producers to adopt the new technology or find themselves at a disadvantage relative to other farmers who do so." No producer restrained his output in order to influence prices. This was in contrast with oligopoly found "in the upper reaches of industry" where firms were in a position to decide whether or not to adopt technology and how much output to produce with it. Also, the importance of land and self-employed labor meant that farmers had high fixed costs that left them with no alternative but to keep their farms in full production.

4. *Slow expansion and low income elasticity of demand for farm products.* Population growth was expected to be slow. (Virtually all economists and demographers underestimated the rate of population increase that would prevail following World War II.) Since incomes in the United States were already

high, the income elasticity of demand for raw foods was low — on the order of .25. (Demand for services attached to foods after they left the farm was more income elastic.) Export demand was not expected to increase greatly, in part because other developed nations would also make technological advances in agriculture.

5. *Persistent maladjustment in farming.* Under the foregoing circumstances, the supply of agricultural products persistently advanced at a faster rate than the demand. The result was “chronic disequilibrium adverse to agriculture.” Farming was constantly burdened with excess labor as outmigration lagged behind the reduction in the number of well-paying job opportunities. Farm prices were lower in relation to nonfarm prices than would have been the case if excess agricultural labor had not existed. The effects of the war, particularly shipment of food abroad, temporarily overrode this long-run tendency.

6. *Resource mobility: labor.* Average labor earnings in agriculture were persistently well below labor earnings in industry; the gap was not fully closed even at peaks of farm prosperity. Thus, outmigration from farming depended much more upon the availability of nonfarm jobs, as reflected in data on nonagricultural employment, than upon farm prices and income. Impediments to mobility (more often implied than explicitly developed) included lack of education and skills, poor health, lack of knowledge of nonfarm job opportunities, racial discrimination, employment barriers created by organized labor, and restrictive government regulations. High birthrates on farms added to the burden on labor mobility as a means of achieving equilibrium in agriculture.

7. *Resource mobility: land.* The land base was sometimes increased, as indicated under point 2, through political rather than economic decision making. Land was slow to be taken out of farming because it had little or no value in nonfarm uses. New technology often increased the productivity of land, even to the point of bringing poor land into cultivation; on the other hand, technology impaired the comparative advantage of land not suited to machinery or other innovations.

8. *Resource mobility: capital.* Advances in farm technology made capital, such as power machinery and equipment, highly productive and attracted capital into agriculture. (Schultz gave no analysis of the farmer decision process that led to an inflow of capital despite the decline of farm prices and labor earnings accompanying technological advance. His emphasis was on the labor resource; land and capital were discussed only incidentally.)

9. *Responsiveness of output to price.* There was a strong propensity for supply to increase despite low prices. The reasons lay in the exogenous nature of technology and new land development, together with the market structure

of agriculture and the fixity of land and labor costs. Agricultural expansion was "a one-way street"; it was "virtually impossible to bring about a contraction in total agricultural output during the course of a few years."

10. *Instability in agriculture.* Agriculture was highly sensitive to instability in the industrial economy in two principal ways: (a) demand and prices for farm products were affected by the level of nonfarm income, and (b) agricultural labor mobility, the amount of excess labor in agriculture, and farm labor earnings were influenced by employment in industry. In light of the experience of the previous two decades, instability in the nonfarm sector was heavily emphasized. On the supply side, inputs into agricultural production were highly stable from year to year, and total farm output ordinarily was nearly as stable. But for particular products and regions, output was much less stable. Weather, disease, and insects caused production and price variations that often meant special hardship for particular producers. The comparative stability of total output was attributable to the averaging out of results for many products over a large nation.

Schultz was pessimistic about the outlook for farm income: "... chronic agricultural surpluses in special commodities are likely to put in their appearance within two to five years after the war ..."; prices received by farmers were expected to drop from 115 percent of parity to somewhere between 80 and 90 percent; and "there is a high probability ... that the postwar period will find American agriculture substantially over-extended."

Most of the components of Schultz's model were, of course, already among the numerous reasons that had been put forth in explanation of earlier agricultural difficulties. For example, the January 1927 issue of the *Journal of Farm Economics* contained articles in which were described "portentous technological changes," the likelihood of "enhancing productivity at a rate faster than the growth of requirements for food and raw materials," prospects for changes in comparative advantage of farming regions, implications of the fixity of farm costs, and transfer of labor from rural to urban areas. "Stated as a paradox," wrote E. G. Nourse, "the outlook for agricultural production is so good that the outlook for agricultural prosperity is distinctly bad." But this view was by no means widely accepted even in the late 1920s, and the Great Depression of the 1930s, the devastating droughts in the same decade, and the effects of World War II overwhelmed the secular changes predicted by it. To select in 1945 the relevant variables for the future, to put them together in an appropriate way, and to make essentially accurate predictions of later developments was no small accomplishment.

OTHER CONTEMPORARY VIEWS

The winning papers on policy in a contest sponsored by the American Farm Economic Association (AFEA) were more explicit about policy proposals than about underlying circumstances creating policy problems [153, 159]. Apparently almost all of the authors would have accepted most of Schultz's points as containing at least a grain of truth, and all seemed to agree on the need for labor adjustment from agriculture to industry. But most authors seemingly would have put less emphasis on technology as a source of output expansion, on its intractability to the restraints of low prices and incomes, and thus on the severity of the chronic disequilibrium facing agriculture.

The USDA's *What Peace Can Mean to American Farmers* [217-220] was consistent with Schultz's book and with current thought among agricultural economists in emphasizing the importance of high-level employment in industry for maintaining demand for farm products and for giving alternative employment opportunities to excess farm labor. Discussions of problems of farm adjustment indicated implicit agreement with Schultz's points about farm size, changes in use of capital and labor, and shifts in comparative advantage of regions. Projections of output and prices for 1950 indicated that if, as strongly suggested, farm technology continued to advance, 23 million fewer acres would be needed for crops; a proposed program to upgrade diets of poor families would absorb the output of only about one-fourth of the prospective excess acreage. More clearly than stated in the text of the study, the data indicated looming agricultural surpluses that would be difficult to deal with.

A number of studies in the mid-1940s pointed to difficult adjustment problems facing cotton and wheat producing areas. It was expected that cotton would meet increasing competition from foreign growths and man-made fibers, and much of the cotton South was particularly burdened with excess labor, too-small farms, and eroded soils. The anticipated problem in wheat was inadequate demand to provide an outlet in the form of food for all the wheat likely to be produced.

Three questions frequently treated in the mid-1940s as basic, enduring problems were later to recede in importance. All had been prominent at least partly because of the special circumstances of the 1930s. One was soil conservation: Serious erosion in some areas was obvious; soil depletion had been forced on farmers by financial stringencies in the 1930s; memories of the dust bowl days were fresh. A second was farm credit: the difficulties faced by farmers in the 1930s had not been forgotten; needs for credit to finance reorganization and mechanization of farms in the future were im-

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pressive. The third was farm tenancy: renting by low-income operators had increased during the Great Depression; sharecropping was still important in the South. Better farm incomes in the 1950s and 1960s than in the depression years helped to ease all of these problems. Institutions created in the 1930s and modified later helped to overcome difficulties in soil conservation and farm credit. Some problems were partially eliminated if not solved by the onrush of events, as when many sharecroppers and small farmers with special credit needs disappeared from the scene. And, of course, some problems in these areas remain or have assumed new forms.

Events following World War II demonstrated that severe depression of the nonfarm economy was unlikely to be the source of agricultural difficulties that it had been in the 1930s. Events also demonstrated a pervasiveness and vigor of farm technological advance that had not been fully anticipated even by economists who had most emphasized the probable impact of new production methods. Accordingly, the general model was elaborated and modified in several respects described in the following sections.

AGGREGATE SUPPLY AND DEMAND

In a series of publications beginning in 1947 [50] and ending with his *Farm Prices, Myth and Reality* [51] in 1958, Cochrane emphasized the concept of the farm sector as an aggregate and presented a statistically supported analysis of a technologically based supply interacting with an inelastic demand to generate wide price gyrations. Cochrane argued that "... in the aggregate ... there is a high degree of substitution between individual farm enterprises in most areas and at the extensive margin of all areas in response to commodity price changes ... on the demand side, too, particularly in the case of foods, consumers are continuously substituting less expensive items for more expensive items." But intersectoral substitution was much less close: "To an important degree agriculture represents a water-tight compartment within which there is considerable fluidity, but the connective valve between the agricultural compartment and the rest of the economy works poorly and sometimes almost not at all."

Cochrane made no use of a long-run supply curve with all the complications of irreversibility, ratchet effects, and awkward shifts of position implied by the general model. Rather, he pictured a short-run aggregate supply curve as the relationship between planned total output and an index of "responsible prices" one production period (usually one year) earlier. This curve, he said, was perfectly inelastic or nearly so. When a shift of aggregate demand to the right caused high prices and optimistic expectations on the part of farmers, they had both the motivation and the financial resources to adopt new technology. As they did this, aggregate supply moved to the right, bringing down

prices. When demand was static or declining, as in the 1930s, supply did not contract, but there accumulated a pool of unapplied technology to be put to use whenever demand expanded. Cochrane traced out in this way the course of farm prices from before World War I to the 1950s.

Though in retrospect Cochrane's analysis is seen to be generally consistent with ideas presented earlier by other economists, probably most specifically by Schultz, it is instructive to note that Cochrane's first articles did not present it in that context and that Schultz [176] so severely criticized the details and emphasis of Cochrane's analysis as to appear to reject it. This was not the first or the last time that economic ideas subsequently seen to be closely related were initially thought of as sharply different.

GENERATION AND ADOPTION OF TECHNOLOGY

Agricultural technology has been increasingly generated outside the farming sector as instances of innovations by farmers have dwindled in frequency. Hayami and Ruttan [105] recently drew upon the idea of induced innovation to argue that "... changes in input mixes represent a process of dynamic factor substitution accompanying changes in the production surface induced by the changes in relative factor prices." They contrasted factor supply conditions and types of agricultural innovations in the United States and Japan.

An alternative interpretation is that first-generation (basic) innovations like the internal combustion engine or fixation of atmospheric nitrogen often have little or no relation to a nation's farm economic situation. Once they are made, second-generation innovations adapting them to agriculture require only competent mechanical or biological engineering plus the prospect of economic feasibility. In this interpretation factor and product prices in agriculture importantly influence economic feasibility and thus the course of second-generation innovations; agricultural factor markets may or may not influence the pathbreaking, first-generation inventions. In this sense, farm mechanization was agriculturally induced only to the extent that the low cost of capital relative to labor encouraged exploitation of the basic invention. The low relative price of nitrogen fertilizer was largely traceable to a first-generation innovation and to later developments upon it, all external to American agriculture. Both mechanization and fertilizer profoundly affected the quantity and mix of inputs used in farming.

The detailed process by which technology was adopted on millions of farms was in the background of most agricultural economists' thinking in the 1940s and 1950s but was not often explicitly set forth. The incentive for an individual farmer selling under pure competition to adopt zero-cost or low-cost innovations (e.g., hybrid seed) was easy to see, even though such action by farmers collectively was likely to reduce incomes and to force additional

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withdrawals from agriculture. Farmers' financial position and access to credit were conceived as important limitations on the adoption of innovations requiring substantial investment (for example, expensive equipment). The importance of refined calculations of marginal costs and revenues in determining annual adjustments of output or in explaining the timing of adoption of new methods was questioned because the organization of resources on most farms was known to be far from the optimum defined by standard theory of the firm. A large lag in adopting such relatively simple technology as fertilization was easily demonstrated. Wilcox [235] showed the limitations of conventional analysis in predicting the effects of prices on farm output in the real economic world characterized by technical change and chronic disequilibrium.

Work by rural sociologists on diffusion of farm practices, pioneered by Ryan and Gross [168], described characteristics of early and late adopters. It supported the hypothesis that farmers who were sufficiently well financed and enterprising to stay several jumps ahead of the crowd often could manage to realize attractive rates of return on labor and investment, especially if prices were supported, even though returns in farming as a whole were substandard.

HETEROGENEITY WITHIN AGRICULTURE

Long before the 1950s large differences in rates of return to resources in different agricultural areas of the nation had been recognized. Explanations put forward had included differences in land quality, chronic difficulties afflicting crops dominating large areas (for example, cotton), the heritage of slavery, and area discrimination in transportation policy. Schultz [175] contended that area differences were in large part a function of the way the national economy develops. Economic development, he argued, takes place in a locational matrix and is industrial-urban centered. The economic organization works best close to industrial-urban centers and most poorly at long (economic and social) distances from them. The labor market is the chief culprit: economic and cultural distance impedes the labor mobility needed for income equalization. But also, he said, "the adjustments that are required in the allocation of capital will be achieved more satisfactorily in those parts of agriculture that are situated favorably to the centers of economic development than in those at the periphery."

Especially since an economic classification of farms was begun in the agricultural census of 1945, it has been well known that agriculture at any one time has contained many nominal units, that nonfarm income has exceeded the farm income of many "farm" families, and that most farms have been too

small to achieve substantially full economies of size. Economists have recognized for decades that prices received for farm products can not solve the income problems of low-production farm families [155, 174, 220]. A closely related point, that prices and labor returns are not powerful allocators of resources in low-production agriculture, has been widely but less universally acknowledged.

ASSET FIXITY

The prevalence in family farming of inputs not recurrently purchased in markets has led to different views of the sense in which costs are fixed and the importance of fixed costs in explaining the behavior of output. In 1946 Brewster and Parsons [36] argued a position that had declining appeal in later years. On family farms, they said, the occupational unity of labor, technology management, and business management functions caused the first two functions to dominate the third. The farmer considered most costs fixed, gave little attention to marginal conditions for profit maximization, pressed output to the limit, and was not guided by price in making decisions about total output (and was only crudely guided by prices in adjusting enterprises within the farm). D. G. Johnson [125] went to the other extreme in considering labor, land, and other inputs as potentially variable costs to the farmer. He explained the behavior of farm input and output in terms of the characteristics of industry supply functions for inputs and the flexibility of certain input prices or opportunity costs.

G. L. Johnson [127, 128] reasoned that a production asset has two critical values. One is the acquisition price, which is applicable when utilization of more of the resource is being considered; another is the salvage value, which is applicable when less use is contemplated. When the marginal value product of the resource exceeds the acquisition price, the rational producer will acquire the resource and expand output. Only when the marginal value product falls below salvage value will the producer dispose of the resource and reduce output. When acquisition prices and salvage values are very different, assets will be fixed and cause no change in output despite rather wide variations in the price of output. Nonspecialized resources such as land and family labor are variable costs for particular enterprises and will be shifted from one to another in response to price. Important resources are fixed for the farm as a whole for long periods, however. G. L. Johnson's conclusions about the inelasticity of total supply in the short run, the greater responsiveness of longer-run supply to rising than to falling prices, and the concept of agriculture as an aggregate are consistent with characteristics earlier attributed to agriculture in the general model.

EFFECTS OF RISK AND UNCERTAINTY

Since the general model is intended to apply to the real world, risk and uncertainty permeate it. Especially when prices are not supported, farmers planting crops or breeding livestock are uncertain what prices will be when their products are marketed. Young men starting out in farming do not know what effects changing technology and market demands will have on the profitability of particular types of farming or of agriculture generally. Neither do producers know precisely how optimal size and organization of farms will change in the future.

Schultz and several of his associates held that uncertainty about selling prices when production decisions were made caused significant misallocation of resources. D. G. Johnson's analysis [123] pointed to undercommitment of capital, to the emergence of livestock cycles, and to similar imperfections. G. L. Johnson [128] has attacked the assumption of perfect knowledge incorporated in some models of the agricultural economy — certainly not an assumption of the general model described here — and has argued that farmers erroneously commit resources that, because of asset fixity, are not readily withdrawn though they cause excess capacity and its adverse consequences.

ECONOMISTS' VIEWS IN 1957

A study of policy for commercial agriculture by the Joint Economic Committee of Congress in 1957 produced a compendium of sixty-one articles, almost all by economists, on the existing farm situation, on underlying economic forces at work in agriculture, and on policy recommendations [132]. The concepts of the agricultural economy expressed or implied by most of the authors were generally consistent with the general model as developed to this point. That the committee chose to study policy for commercial agriculture — it had already made two studies of low-income farm families — demonstrated that heterogeneity within agriculture and its implications for policy were already well recognized.

The authors of the articles strongly emphasized the effects of technological advance and the myriad adjustments forced upon farming. Schultz added two points so far not mentioned in this review: (1) the tendency of wages in the economy, even in agriculture, to rise faster than prices of producers' goods, thus stimulating substitution of capital for labor, and (2) the rising quality of labor and managerial inputs and their effects on farm output. G. L. Johnson elaborated upon a point he and others had previously made, the increase in agricultural productivity resulting from greater specialization (1) on products by regions, (2) on products by individual farms, (3) on particular steps in production, such as hatching and growing birds in the broiler industry, and (4) on essential farm operations such as planting crops and feeding

livestock while turning over to nonfarm firms such operation as liming fields and manufacturing feed.

CROPS-LIVESTOCK DISTINCTION

An idea implicit in econometric models of the feed-livestock literature of about 1960, alluded to in some policy analyses and most explicitly dealt with by Breimyer [34], was that crops occupy a different economic position than do livestock products within the agricultural sector. Livestock production, Breimyer argued, is a processing operation converting feed into secondary products. Feed crops are primary products of agriculture, as are other crops. (The difference is not clear-cut, for livestock grazing on nonarable land is primary production, and cropland can be pastured.) Production of meat animals and of poultry and eggs has been increasingly separated from feed production, making the distinction even sharper. Crop production, particularly because of its close association with land, has high fixed costs; feed is a highly important variable cost in livestock production. The major field crops are highly processed (including feed crops processed by livestock) before they reach the consumer; thus derived demands for feed crops at the farm level are particularly price inelastic.

Especially since much new technology has raised crop yields, some economists — not necessarily Breimyer — saw crop producers as being more vulnerable to the impact of technology than were livestock producers. Incomes were likely to be more severely depressed in crop production than in livestock production; and because of the low opportunity cost of most farmland, disequilibrium would persist longer in crops. Breimyer, with others, believed that the increasing use of inputs of nonfarm origin in both crop and livestock production increased the elasticity of farm supply, but he did not take into account greater specialization within agriculture and rising fixed costs associated with durable equipment.

GENERAL ECONOMIC CONDITIONS AND AGRICULTURE

The general model of agriculture continued to imply that a deep and prolonged economic depression would hurt agriculture through the product market, but expectations that such an event would occur faded if they did not entirely disappear. Several statistical studies confirmed the model's implication that slackness of industrial employment impeded the flow of labor from agriculture, with the likely consequence of prolonging farm-nonfarm disequilibrium.

Hathaway [99] argued in 1957 that farm output was more highly correlated with expansions and contractions of the business cycle than generally believed, but his data was largely for the years before World War II. Expe-

rience since the mid-1950s shows little, if any, relation between annual non-farm employment and farm output. Hathaway also argued, however, that the nonfarm economy affected agriculture through the prices of purchased inputs and that the effect was becoming more important as the use of such inputs increased. His expectation that mild business expansions would not have a positive contemporary effect on farm income (because of higher input prices) seems to have been confirmed.

MARKET STRUCTURES OF AGRICULTURE AND INDUSTRY

The significance attached to the purely competitive structure of agriculture as presented in Schultz's model of 1945 has continued to be accepted, with a modification here and an elaboration there, by most economists, though Schultz seems seldom to have mentioned it since then. But at no time has there been a consensus about the effect on agriculture of the varying degrees of oligopoly, oligopsony, and product differentiation often found on the other side of markets where farmers buy or sell.

Local markets for farm products or farm supplies are often highly concentrated, and instances unquestionably arise in the short run in which farmers receive less or pay more than if markets were purely competitive on both sides. The situation is a very old one and quite possibly has eased as local transportation has improved and as alternatives open to farmers have become more varied. It is not a reason why incomes of farmers collectively have been worse at any one time than they were one or five decades earlier. Concentration is high in a number of industries that process and distribute farm products or that manufacture farm supplies; accordingly, input prices and so-called marketing margins are more inflexible over time than they otherwise would be. But it is difficult to show that excess profits (above a competitive level) in such industries collectively are large in relation to prices received or paid by farmers or that the burden of any excess profits falls, in the long run, more on the farmers than on the general public.

Boulding [18] has argued that the mobility of farm resources largely vitiates any long-run effect of monopoly-like behavior in farm-related industries on earnings in agriculture. He has also contended that, the "relative stability of the [farmer] cooperative sector of the market . . . is evidence that the problem is no longer serious, and that there are no longer any areas of unusual profit for the cooperatives to undermine." He was unsure whether industrial oligopoly (he did not mention labor unions) impeded labor mobility from agriculture.

A contrasting view is illustrated in an article by Lanzilotti [140]. He concluded from observed concentration in processing and distribution industries

and from actions by antitrust agencies that "farmers, as sellers, have found themselves at the mercy of oligopolies, collusion, and monopsony." He also contended that barriers to entry in industry were large and important in reducing labor mobility out of agriculture — again, no mention of the industrial labor market.

Several closely related ideas about the suitability of purely competitive structure for agriculture in a modern industrial world are most conveniently incorporated in the following section.

INDUSTRIALIZATION OF AGRICULTURE

The phrase "industrialization of agriculture" has been in the literature of agriculture at least since the 1920s. Then it usually meant a transformation of agriculture from a way of life to farming as a commercial business, a change that the general model of agriculture under discussion here assumes to be largely completed. Now the phrase often connotes, however vaguely, the presence of self-perpetuating technological and organizational forces sweeping through agriculture and industry alike and linking the two so intimately that the farming sector — itself becoming less identifiable — can be analyzed only in the context of the total industrial setting. The spirit and much of the content of "industrialization of agriculture" are contained in an article by Shaffer [181]. Galbraith [78] has displayed the role of management and planning in the larger framework of the total economy and has illuminated the organizational changes occurring in the economic environment of agriculture.

Two ideas are perhaps central to the implications of industrialization for agriculture. One is that production of technological change has become institutionalized as a means by which private economic units, mainly large corporations, achieve their varied (not merely profit) goals; together with such basic changes as increasing affluence of consumers, technology both outside and inside agriculture virtually requires redefinition of production processes, reorganization of firms, and reorganization of relations among firms. Heavy pressures are brought to bear on agriculture to rationalize supply and to operate in the fashion of an industry.

The second idea is the declining role of markets and prices as the means of coordinating economic activities, together with the growing role of administrative devices. Once, particular production processes, or at most closely related clusters of processes, were commonly associated with individual firms, and the activities of firms were coordinated by the price system. Increasingly, however, large blocks of activities, especially those in vertical sequence, are proving to be better coordinated administratively than through the market.

Either the activities are brought under the ownership of a single firm or firms use contracts or other arrangements to tie together their activities. The scope for planning, managing, and mutually supportive investing is greatly enlarged.

The literature of such fields as agricultural marketing and industrial organization develops these points much more fully. Vertical integration in the broiler industry and specification buying of farm products, together with the pressures exerted on the organization of farming, are familiar examples.

Ideas from industrial organization economics about oligopoly and administered prices (in the sense that firms have some control of prices) remain important. But probably more significant for the organization of agriculture and the discontent of farmers are "industrialization" forces at work and the ability of large firms to give effect to them, to capitalize upon them, and sometimes to absorb, subordinate, or outcompete the family farm. The suitability of price coordination of purely competitive firms independently specializing on particular production processes as a means of organizing agriculture is called seriously into question: the instability of purely competitive markets seems excessive for industrial-age farms with high investments; the consequences of full use of fixed resources to produce surpluses when yield-increasing technology becomes available seem unnecessarily disruptive; and administrative coordination apparently is more efficient than price coordination in a growing number of agricultural subsectors.

Breimyer [33] in particular has written on the forces reorganizing agriculture and on alternative ways of preserving what he calls the sociopolitical values of a system of independent farms. "Who will control agriculture?" became a challenge and a slogan among farmers and farm cooperatives; its economic implications are discussed in [238].

The hired farm labor force is also taking on an industrial character. Minimum wages and unionization increasingly mean that the farm wage is not a passive equater of supply and demand. Farming plays a reduced role as an absorber of unskilled labor because wages are less flexible as well as because farm employment is falling and a larger portion of remaining jobs require skills. Cost rigidities for producers collectively increase as wages become more uniform and inflexible under administrative determination.

THE GENERAL MODEL IN THE EARLY 1970S

Most of the modifications and elaborations of the general model of agriculture as Schultz described it in 1945 can be incorporated without basically revising it. Precisely how all the parts fit together is sometimes not entirely clear, though in principle they seem consistent. Individual agricultural economists differ in the emphasis given to different parts of the model, and they sometimes disagree rather widely on the quantitative value of key parameters.

Tweeten [202] has questioned the validity of asset fixity and other elements of the general model. Perhaps the principal exception to wide acceptance of some version of the general model concerns "industrialization of agriculture."

Even if industrialization operates as outlined, much of the general model remains relevant, for most of agriculture still consists of independent, purely competitive firms (aside from government programs). The implications for agricultural supply, resource adjustments between farming and other sectors, and farm income remain largely valid. But new relations must be brought into the model even for current use. Reasons outside of agriculture for vertically coordinating farm and nonfarm activities, together with the possibility that this can be done better by administrative arrangements than through the price system, need to be recognized. This point also has implications for size of farm and for availability of capital for farm production.

The most important implication of the industrialization thesis relates to the use of the general model for future situations. The ideal or target state implied by the early model was an agriculture in which firms achieved full economies of size but were still numerous enough to be purely competitive; resources were used in just such quantities and mixes that unrestrained output resulted in prices that returned to factors of production in agriculture rates of earnings just equal to rates elsewhere; and the price system and resource mobility held agriculture in the ideal state or exerted a pull toward it whenever the real world went off the track. It is now doubtful whether this ideal well suggests the future organization of agriculture or is a reliable guiding star for policy analysis. The needs of an industrializing agriculture for stability and for more effective coordination both internally and with outside firms seem likely to be met in part by organizational devices common to industry. But agriculture is still so far from industrylike organization, and it is so influenced by biological and weather uncertainties, that other means will be selectively needed for a long time. Government programs and cooperative action by farmers are means already in use and are potentially subject to large modification. Conflicts about the distribution of income generated in the system are likely to become sharper as administrative devices increasingly replace pure competition among producers and in labor markets. The resource allocation criteria implied by the early model will remain relevant, but the means of allocation seem likely to include large doses of private, cooperative, and government administration.

Empirical Knowledge about Key Economic Relations

Empirical work in price analysis, farm management, agricultural marketing, and related fields has been highly useful in supplying concrete information about key relationships in the general model of the agricultural sector.

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The literature of those fields is discussed in other review articles. Only a few comments on particularly important points are included here.

Research in agricultural price analysis (for example, [23, 81]) has shown that demands for most of the leading farm products, especially at the farm level of marketing, are distinctly price inelastic. Despite some conclusions to the contrary (for example, [240]), long-run demands for most products do not seem notably less price inelastic than the demands usually inferred from year-to-year changes in prices and consumption. The principal exception is that persistently high prices may stimulate development of new substitute products; specific information on this point is poor, partly because new products often grow out of technological innovations not related to price. Demand for the aggregate output of agriculture is generally considered highly price inelastic despite the growing importance of exports, for which demands are more price elastic. Tweeten [200], however, argued on the basis of highly special assumptions and data that export demand is so price elastic as to make aggregate demand slightly elastic. Income elasticities of demand for most agricultural raw materials are low, and their weighted average probably is 0.2 or less.

Information about supply elasticities is less satisfactory than for demand, in part because technological advance and effects of government programs so often obscure pure output response to price. Houck and Ryan [117] found that more than 95 percent of the variation in corn acreage after World War II was associated with policy variables. The aggregate supply function for agriculture has been especially difficult to analyze. Griliches [86] and Tweeten and Quance [207] found very low short-run aggregate elasticities. Griliches did not succeed in showing a much higher long-run elasticity, but Tweeten and Quance, in an article evoking extensive critical discussion in subsequent issues of the *American Journal of Agricultural Economics*, found long-run elasticities of 1.5 for rising prices and 0.8 for falling prices. Whether the concept of a long-run agricultural supply function is operationally meaningful in a dynamic agriculture is doubtful. Cochrane's approach (discussed earlier) may be more useful, but how much shift of the short-run supply schedule to expect in different situations remains in doubt.

An alternative method is to use linear programming to estimate profit-maximizing adjustments of output in response to price changes for different type-of-farming areas of the United States and to combine the results into regional and national supply functions. The Economic Research Service of the USDA [182] has developed a model having this capability in order "to help answer policy questions asked by the Administration and Congress." The method seems highly useful for identifying the direction of output adjustments likely to result from hypothesized external impacts, including policy

revisions, on agriculture. As the model builders recognized, however, the speed of adjustment is extremely difficult to predict.

Econometric analysis of the farm labor market (for example, [172]) has found that the short-run effects of farm wages and prices on farm employment are low, and that the effect of nonfarm employment opportunities is greater. Long-run adjustment of the labor force is best viewed as a process in which the following considerations apply: (1) income improvement is a highly important but not exclusive motivation of individuals' decisions; (2) age, family responsibilities, and ownership status greatly modify individuals' alternatives; (3) education and skills, both much influenced by society's investment in people, are critical for farm-reared individuals' opportunities to better their lot; (4) racial discrimination is an obstacle to successful mobility of members of minority groups; (5) institutions of the industrial labor market obstruct the process; (6) net mobility of labor from agriculture is the result of a large outflow partly offset by a substantial backflow; and (7) much of the transfer from the farm to nonfarm sector takes place when young people decide not to follow their parents in farming. Studies by Clawson [48], Hathaway and Perkins [103], and Hendrix [111] have effectively described elements of the total process. Adjustment of the farm labor force can be speeded up or slowed down, but large changes cannot be expected in a few years, and great changes require the turnover of generations.

Production Capacity, Current and Prospective

A continuing problem for framing future farm policy has been the need to know whether agricultural capacity generally would run ahead of or behind growth of the total market. If ahead, the nation would face, in Schultz's phraseology, a *farm* problem; if behind, a *food* problem.

As has already been indicated, Schultz in his *Agriculture in an Unstable Economy* and the USDA in its series *What Peace Can Mean to American Farmers* correctly anticipated overcapacity in agriculture in the post-World War II era. Schultz expected this to be a long-lasting situation. A USDA study [221] made in 1948 at the behest of the House Committee on Agriculture projected modest increases in crop yields to 1965 (which hindsight shows were grossly underestimated) and concluded that, if the rest of the economy was prosperous, production and markets would be in balance at about parity prices. The Korean War created concern about food supplies, and a joint USDA and land-grant college report [209] estimated that under favorable circumstances for producers farm output could be increased one-fifth in five years.

Black and Bonnen [12] concluded in 1956 that "rapid advances in technology . . . promise to continue with little slackening to 1965 unless prices

are reduced to levels clearly below those now politically acceptable." A number of other economic studies of differing degrees of thoroughness in the 1950s indicated that no difficulty would be met in expanding farm output to keep pace with market growth, and some suggested that less cropland would be used if surpluses were not produced. Clark [47], viewing the American scene from Oxford, disagreed; he predicted in 1954 that by 1975 the United States would be importing half the farm products it consumed.

Several projections made in the 1960s showed that excess agricultural capacity was likely in the years ahead. A USDA study by Abel and Rojko [3] and others by Heady and associates at the Center for Agricultural and Economic Development at Iowa State University (for example, [108]) concluded that excess grain acreage continued to be likely in the United States. Tweeten and Quance [206], using a simulation model, concluded that excess capacity would persist in agriculture through the 1970s if the farm program of 1969 was continued.

In making projections of output capacity, agricultural economists generally drew upon their knowledge that recent trends were largely the result of technology-producing processes not likely to be ended soon or to cease to be productive. Nevertheless, simple extrapolation played a large role. The mistaken conclusion of the study made by the USDA [221] in 1948 resulted from departing from trend projections: "But yields cannot be expected to continue at this [recent years'] rate." In 1960 USDA economists worked closely with agricultural scientists in making rationalized yield estimates for 1975 [165]; actual yields of several important crops in 1971 already exceeded by 30 to 60 percent those estimated as "economic attainable" in 1975. Until 1972 extrapolation had a better record than more reasoned approaches; and no reasoned approach predicted the tight supply situation of 1972-73, for which a demand shift was largely responsible.

Excess capacity in agriculture usually has been taken to mean approximately the amount by which production would exceed market outlets at current prices if utilization subsidies, diversion to storage, and restrictions on output were discontinued. Tyner and Tweeten [208] estimated that excess capacity ranged from about 8 to 13 percent of potential output from 1955 to 1961. If certain disposals such as P. L. 480 were considered of some value, they said, the range might be lowered to 5 to 11 percent. This was consistent with estimates made on somewhat different bases by other writers (for example, [133]). Tweeten and Quance [206] put average excess capacity at the beginning of the 1970s at 6 percent.

Excess plant capacity in manufacturing as estimated by the Federal Reserve Board ranged from 8 to 25 percent over the period 1960-71. Though the concepts are not identical, plant capacity spontaneously withheld by

manufacturing industries seems to have exceeded excess agricultural capacity dealt with in one way or another by farm programs.

Parity and Income Comparisons

Policy questions have required agricultural economists to attempt to measure personal incomes and returns to classes of resources in agriculture, to compare them with analogous incomes and returns outside of agriculture, to study the personal distribution of income, and to appraise legislatively defined standards for incomes and prices. For a few years following World War II much attention was given to parity prices and parity income as officially adopted objectives of farm programs.

The parity price formula was written into the Agricultural Adjustment Act of 1933. (For the history, basic indexes, and computation of parity, see [216].) In the main, the formula defined parity prices of farm products, both individually and collectively, as prices that had changed by the same percentage since 1910-14 as had an index of prices paid by farmers (the parity index). There had been, however, some changes in product base periods and in parity index components, usually to raise computed parity prices. The report of a committee appointed by the American Farm Economic Association to study redefinition of parity prices and incomes [155] summarized economists' views in 1947 and well reflected their traumas in dealing with the parity question.

Economists maintained that prices could not both allocate resources toward efficiency norms and raise farm income. The controversy over free markets versus government programs (described later in this review) spilled over into discussions of quantifying an equity norm for agriculture. Parity price relationships, depending as they did on a period already long past, were shown to be poor guides for future production and consumption. Full parity prices were accurately foreseen as leading to unmarketable surpluses; these, in turn, would require production controls and subsidies, to which many economists were opposed.

The AFEA committee recommended abandonment of parity prices for parity income, a concept already in the law but not used to that time (or later). If parity prices were to be retained, the committee proposed that the base be moved from 1910-14 to the latest peacetime period of high employment and that relationships among parity prices for individual commodities be made to reflect market price relationships in the most recent five or ten years. Congress adopted the second suggestion — a ten-year period was used — in 1950.

During the 1950s and 1960s farm policy literature increasingly contained the idea that a suitable policy goal was rates of return on labor and invest-

ment on efficient farms that were equal to rates earned on comparable resources outside of agriculture. Economies-of-size criteria were suggested, at least implicitly, as means of identifying efficient farms. No pretense was to be made that farm price programs could solve whatever income problems operators of seriously inadequate farms might have. Masucci [145] estimated the quantities of resources used on farms in two different size ranges in 1961, applied to resources rates of return deemed representative of rates earned in comparable circumstances outside of agriculture, computed the net income farmers would need to realize such nonfarm rates of return, and compared this parity returns income with income actually received. A later study by the USDA [156] provided similar computations for 1966 but introduced certain refinements, the most important of which was consideration of capital gains within and outside of agriculture.

Results showed that in 1961 the larger farms had average net incomes modestly below the parity returns standard and that in 1966, a particularly prosperous farm year, farms with sales of \$20,000 or more had average net incomes somewhat above the standard. Net farm incomes on small farms were much below the standard, which was itself low because of the small resource base. (Nonfarm income was not included; many small farmers had substantial nonfarm income.) Farm prices would have had nearly to triple in 1966 to bring net income on farms with sales of less than \$5,000 up to the parity returns standard. Taking capital gains into account did not drastically change results.

The two studies indirectly demonstrated the importance of more or less arbitrary judgments about valuation of farm assets and about comparable rates of earnings that must be made for a parity returns computation. Land poses an especially difficult problem. It is commonly inventoried at current value rather than at acquisition cost to farmers. If the value of land depends on income to be earned from farming it, how can one justify using the value of land to compute an independent standard for farm income? The wide range of choices to be made in calculations leaves much room for disagreement about whether or not any standard is fair.

Two studies [74, 156] of parity standards for different types of farming showed that one type may be much closer than another to attaining its standard in the same year, even if the commodities produced are much the same. Problems of translating a parity *returns* standard into a parity *price* standard for price support purposes are formidable.

The purchasing power of a dollar of net farm income may not be entirely comparable with that of a dollar of income received by nonfarmers because home-produced food consumed by farmers is valued at farm rather than retail prices, prices of goods and services are not necessarily the same in farm

and urban areas, and for other reasons. Estimates made by Koffsky, Puterbaugh, and Hathaway (summarized by Hathaway [102]), indicate that the purchasing powers of farm and urban dollars tended to converge from 1941 to the late 1950s and that in 1959 the purchasing power of the farm dollar in consumption was about 6 percent greater than that of the urban dollar. More recently, the much reduced importance of home-produced food in farm consumption and the lower supply and sometimes inferior quality of social services in farm areas have led to the frequent conclusion that the purchasing power of income is about the same in farm and urban areas.

Age, sex, education, and similar characteristics of the farm labor force would result in a lower average rate of labor earnings in farming than in manufacturing even if labor of comparable earning power received the same reward in both sectors. D. G. Johnson [124] was the first to demonstrate this. A calculation taking into account three such factors was made for 1959 in connection with the resource-parity study by the Economic Research Service [156]. Various classes of farm labor were given the following ratings (ratios of labor earning power) in comparison with manufacturing workers: operators of large farms, 1.06; operators of small farms, 0.82; unpaid family workers, 0.73; and hired farm workers, 0.70.

Values, Beliefs, and Goals

The values and beliefs of farmers have much influenced American farm policy. Agricultural fundamentalism was strong throughout the history of the country, but it has declined in the decades following World War II. In its pure form, agricultural fundamentalism has strong religious, political, and economic components: as tillers of the soil who are close to nature, farmers are "the chosen people of God" (Jefferson) and provide the moral fiber of the nation; independent farmers are the bastion of democracy and the one true defense against tyranny; and as most wealth originates on the farm, the prosperity of farmers determines the prosperity of the nation. Papers by Fite [68] and Hadwiger [90] treated the subject at length and showed why in the 1950s and 1960s fundamentalism had little appeal to social scientists. Griswold [87] examined agricultural fundamentalism historically and in several countries; his findings amounted to a sympathetic deflation of its claims.

An analysis by Brewster [35] was particularly relevant to farm policy issues. He saw farmers in the era following World War II as torn by deeply held values and beliefs that had been well suited to agriculture as it had developed in the United States but were not consistent with rapid technological advance. The work ethic of this value-belief system gave the farmer a feeling of merit from his own industriousness; it offered justice in that men were

believed to be duly rewarded for their efforts; and it promised that all might fulfill their ambitions. The democratic creed asserted the equal worth of all men and denied the right of any to have dictatorial power over others. The enterprise creed held that proprietors deserved full control of their businesses, free of government intervention. In an expanding America the family farm had been an efficient production unit, land had been plentiful, laissez-faire was an effective means of organizing agriculture, and both personal and national goals were well served by policy and conduct consistent with the dominant value-belief system.

But dramatic output-increasing technology in agriculture drove a wedge into the system. Technology's ability to increase production fitted well with the farmer's work ethic. When enlarged output pressed upon limited markets, however, the rewards were negative, not positive. "But, even though he may thus live under the very crack of doom, no article of faith is more deep seated than his unquestioning identification of technical advance with progress. Though it slay him, yet will he trust it." Should the farmer accept government programs to control output or support price? The enterprise creed said no.

Brewster's analysis captured much of the underlying explanation for farmers' political attitudes and their frustration with farm policy issues. It could have been expanded to other issues appearing to require a growing role for government. Disunity among farm groups grew after 1950 as the once dominant value-belief system broke down and farmers aligned themselves with different political-economic approaches to the farm problem.

Attitudes toward specific policy proposals may be determined by opinions of persons or organizations with whom the proposals originate, as Hathaway and Witt [104] found in a Michigan study at the time the Brannan Plan was an issue. The farmers who were interviewed were not well informed about direct payments but were not particularly hostile to the idea; they did, however, oppose by seven to one the Brannan Plan when it was identified by name (its principal novelty was direct payments).

Two collections of papers [41, 42] provide a sample of other views on policy and goals of agricultural economists. The topics on which goals have most frequently been formulated are (1) the responsibility of agriculture to produce an abundance of food and fiber for other sectors of society, (2) the income to which farmers are entitled in return, (3) farmers' preference for freedom of decision in operating their farms, (4) the desire for stability, (5) preservation of the family farm and the number of farmers, and (6) consistency of farm policy with other economic policy (for example, in international trade). Rarely have the statements of goals by economists included the situation of hired farm workers.

Economists have repeatedly said that farm policy goals conflict and that compromises must be made. The conflict arises not in the sense that high farm incomes, economic freedom, and other goals are mutually exclusive but in the sense that they cannot be achieved simultaneously under the circumstances often prevailing in agriculture. Hathaway [98] argued that most people do not have discrete priorities for individual goals (or values); rather substitution is rationally made at the margin — a little freedom may be given up for a little income — and maximization of satisfaction means getting on the highest iso-utility surface attainable under the constraints imposed by circumstances at the time. Cast in these terms, the obstacle to reaching consensus on policy goals is that different individuals have much different preference maps and have different degrees of knowledge (none perfect) about the possibilities available to them collectively.

The Politics of Farm Policy

The politics of farm policy is really too important to receive only the token treatment accorded it here. It is a difficult topic to discuss briefly, and much of what might be said belongs more to the field of political science than to agricultural economics. Extensive and fairly recent studies are provided by Talbot and Hadwiger [195] and Hardin [97], all political scientists who have given substantial attention to agricultural policy.

Much of what could be said about the politics of farm policy describes the workings of the American political system as it relates to a particular economic group. Farmers have their organizations and pressure groups (more divided than is usually the case), their strongholds in Congress, their contacts with administrative agencies, their political party affiliations, and their ways of influencing policy decisions. The great decline in the proportion of farmers in the total population and election reform giving the rural and city voter equal influence in electing legislators have much diminished farmers' political power. Significant power remains, nevertheless. Related groups such as the agricultural processing and supply industries exercise considerable influence on farm policy, but the general public is usually apathetic, poorly informed, and reacts to initiatives taken by interest groups instead of originating policy.

Is the USDA too politically vulnerable to permit it to do objective policy analysis of controversial issues involving deeply held values and beliefs of agricultural groups? The question was raised by the experience of the Bureau of Agricultural Economics from 1938 to its dissolution in 1953. Its economic investigations touched upon program objectives, commodity interests, and social conditions in ways that aroused the animosity of certain farm organizations, members of Congress, and rival parts of the bureaucracy. Hardin [96] examined a portion of this experience in a classic article. Later,

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Cochrane [54] contended that evaluative policy research and policy education could best be done in the universities, in part because of its political vulnerability in a government agency.

Often the power structure centered around commercial agriculture has been lukewarm or even hostile to the development of policy to deal with rural poverty or with stimulation of nonfarm economic activities in rural areas. The research and education system of the land-grant colleges and the USDA has always received its principal political support from the agricultural power structure; but tensions grew within the system and between it and its political base as the dominance of commercial agriculture ebbed. In a slashing article Bonnen [15] attacked the failure of the agricultural establishment as he defined it to recognize the need for multiple goals and to adjust its policies to changing times. In a similar vein, Soth [192] called for acknowledgment that the day of agrarianism had ended.

Much farm legislation has been enacted in an ad hoc way with regard mainly for short-run results, with emphasis on particular commodities and corresponding neglect of aggregate problems, and with high vulnerability to doctoring in favor of special groups. One means proposed to bring greater rationality to the process has been an agricultural board having something of the quasi-independent status of the Federal Reserve Board. Tweeten endorsed the idea in his textbook [201, p. 355]; Hathaway opposed it in his [102, pp. 207-208].

Policy Issues and Proposals

Much of the economics literature on farm price and income policy deals with normative questions about what the nation's policy should be. This section contains a review of economists' proposals concerning farm policy and a very sketchy indication of the course that policy actually took. Analyses of the effects of particular types of programs will be examined in the next section.

Histories of Commercial Farm Policy

Though the substantive ideas in this section are presented chronologically, the section is not a history of farm policy. The most comprehensive history is Benedict's [9], which describes policy development over a broad front up to 1950. Another book by Benedict [8] deals with farm programs in a general way, and one by Benedict and Stine [10] concentrates on details of commodity programs; the coverage in both books terminates in the early 1950s. Short reviews of farm programs to the middle or late 1960s have been provided by Rasmussen and Baker [160] and Tweeten [201, pp. 300-321]. Hadwiger [91] made an intensive study of wheat programs to the late 1960s,

and numerous articles give short sketches of particular programs. No comprehensive history taking up where Benedict's left off had been written as the 1970s began.

Evaluations and Proposals, 1945-50

THE GENERAL POSITION

As World War II drew to a close, both the central body of standard economic theory and the traditional economic policy of the nation emphasized free markets as the means of allocating resources and distributing income, and to this position most economists subscribed. Particularly among agricultural economists, however, experience with depression and droughts in the 1930s had created a common belief that a wholly free market policy would be defective in ways that required supplementary action by government. Departure from strictly laissez-faire views was also stimulated by observation of obstacles to resource mobility that helped to keep the agricultural sector chronically out of equilibrium both internally and with the rest of the economy.

The principal shortcomings of wholly free markets explicitly identified or implied in the writings of a number of agricultural economists were the following: (1) the industrial economy was subject to depressions that bore harshly upon farmers; (2) the need to adjust some portions of agriculture (for example, southern cotton and Great Plains wheat) and to correct the problem of inefficiently small farms was so formidable as to require government assistance; (3) price uncertainty inhibited optimal allocation of resources; (4) agriculture tended to be excessively unstable because of weather, production cycles, and other reasons not related to industrial instability; (5) even in a high-employment economy, but especially in depression, there were socially significant needs for food that were not adequately expressed through market demand; and (6) labor mobility out of agriculture was much impeded by lack of skills and job information and by frequent unemployment in industry. These views typically led to recommendations that reflected a strong loyalty to the free market yet proposed supplementary measures to improve its performance.

A poll of members of the American Farm Economic Association in 1945 [4] showed that 40 percent favored government price support or payments to prevent sudden changes in farm income but not gradual changes. Another 37 percent favored support of farm income in depression but no intervention at other times. About one-fifth (19 percent) favored wholly free markets, and very few members (4 percent) favored aggressive programs to achieve 90 percent of parity prices. The eighteen winning papers on policy in a contest sponsored by the association in 1945 [153, 159] all proposed at least some modification of free markets. The AFEA committee on parity

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[155] took a strong free market stand in 1947 but endorsed payments to farmers in depressions

Policy statements influenced by agricultural economists in the mid-1940s included a report [7] by the Committee on Agricultural Policy of the Association of Land-Grant Colleges and Universities in 1944. The report was strongly free-market oriented yet said that "the right mixture of freedom and control is needed." This report endorsed payments to farmers in times of severe depression, aid for production adjustments in problem areas of the country, and a long list of measures to improve social and living conditions for rural people. The USDA's *What Peace Can Mean to American Farmers* [220] was more specific and ambitious in suggesting ways to adjust agriculture in problem areas, and it admitted the feasibility of short-term price supports; but it argued for direct payments to farmers during depression and for food consumption subsidies as alternatives to supports. It, too, supported social services for farm people.

PAYMENTS DURING DEPRESSION

Proposals by D. G. Johnson, W. H. Nicholls, and others to make direct payments to farmers in time of depression appeared in [159]. Schultz [174] proposed compensatory payments to make up the difference between actual farm prices and perhaps 85 percent of predepression prices. Payments were expected to have little effect on resource allocation, would require no storage, and would not be conditional on farmers' compliance with any form of production control.

Norton and Working [154], as well as some of the winners in the AFEA policy contest, favored payments tied to farmers' incomes rather than to prices, mainly because compensatory price payments were considered capable of distorting the farm output mix. In the Norton and Working proposal, payments were to be a percentage of each farmer's sales less purchases of feed and livestock. The years in which payments were to be made and the amounts of the payments were to depend on the relationship of farm to nonfarm income rather than on industrial employment.

Several proponents of direct payments appealed to the ideas of Keynes' *General Theory*, published a decade earlier, to argue that payments to farmers would be countercyclical and thus stabilizing to the general economy. Later, the argument lost most of its force as fear of another major depression waned and as changes in net farm income were seen to have little positive correlation with minor business cycles.

AGRICULTURAL ADJUSTMENTS

The USDA's *What Peace Can Mean to American Farmers* [220] pro-

posed a six-point program to convert certain southern and Great Plains areas to a more viable agriculture and to remedy the problem of inefficiently small farms. Competitive prices were to replace price supports in order to encourage resource shifts in the right directions; gradually declining payments were to be available to farmers for a limited time to cushion shifts from supported to competitive prices; supervised loans were to be made to some operators of small farms to build up their businesses; payments would also assist farmers to convert to other types of agriculture; assistance for soil and water conservation was to be provided; and retraining and job information were to be given to farm people wishing to leave agriculture. Most of the suggestions made by economists regarding agricultural adjustment following World War II were touched upon in one form or another in this publication.

J. D. Black was a leading advocate of extensive farm adjustment. He proposed [13] that payments due to farmers under an income support program be made in the form of assistance for carrying out farm and home plans that all farmers would be required to develop. The *Journal of Farm Economics* published numerous papers in the 1940s on research, extension, and policy aspects of agricultural adjustment.

UNCERTAINTY AND MISALLOCATION OF RESOURCES

T. W. Schultz, his close associates, and several other economists argued for "forward pricing" to reduce uncertainty and thereby to increase agricultural efficiency. This proposal, most fully developed by D. G. Johnson [123], called for government to announce expected equilibrium prices in advance of planting or breeding dates and to ensure that farmers received those prices, or a close approximation to them, at the time of marketing. Though the government might use a price support and storage program to make price guarantees for storable products effective, the preferred device was to make compensatory payments to farmers whenever market prices turned out to be significantly below the forward prices.

That fourteen of the eighteen winners in the AFEA's policy contest [153] favored some form of forward pricing was evidence of the proposals's attractiveness to agricultural economists in the mid-1940s. Advocacy of forward pricing ebbed as questions arose concerning (1) the government's ability to predict equilibrium prices, (2) the relative importance of the misallocation problems that forward pricing might remedy, and (3) the vulnerability of such a program to perversion to high-level price support. In 1957 D. G. Johnson [122] commented, "I am not now convinced that the American political system provides a setting that would permit forward prices to function in a manner that would reduce uncertainty without also being used as a means of raising the general level of farm prices." Announcement of sup-

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port prices in advance of planting dates or marketing years became common practice under farm programs, but the prices were not expected equilibrium prices.

INSTABILITY FROM WEATHER, CYCLES

Forward prices were expected to stabilize farmers' realized prices (market prices plus payments) and output in addition to reducing uncertainty. Storage programs, usually accompanied by commodity loans, were favored by a majority of the AFEA policy contest winners [153] as a means of stabilizing supplies and prices. Proposals typically were aimed at stabilization rather than long-term price enhancement and were seldom tied to fixed percentages of parity. Farm and political leaders, however, frequently used "stabilization" to mean steady prices well above levels likely to prevail in free markets. As with forward pricing, perversion of stabilization programs to income support programs appeared to require only a short step.

FOOD CONSUMPTION SUBSIDIES

In the 1930s the presence of food surpluses on the one hand and obvious nutritional needs on the other had led to domestic food consumption programs, principally the food stamp plan, school lunches, and direct distribution to the poor. A majority of winners in the AFEA's policy contest [153] and the USDA's *What Peace Can Mean to American Farmers* [220] proposed consumption subsidies. The most popular version of the food stamp plan provided for selling sufficient food purchase coupons for an adequate diet to poor families for a fixed percentage of their income [52, 170]; the subsidy to the poorest families would be substantial, but the not-so-poor would find the program unattractive. J. D. Black and M. E. Kiefer [13] advocated a variety of nutritional programs ranging from improved diets for infants to in-plant feeding of industrial employees.

The potential for increasing demand for food through consumption subsidies was generally thought to be substantial. Meats, poultry, eggs, and dairy products then had comparatively high income elasticities of demand and were deemed to upgrade the nutritional quality of diets. Such products were high-resource-using foods and would increase utilization of agriculture's production capacity even if the consumption of calories did not rise. Factors leading later to declining per capita consumption of eggs, several dairy products, and fatty meats were not foreseen.

INCREASING LABOR MOBILITY

Better education for rural people was strongly emphasized in policy rec-

ommendations as a means of facilitating the shift from farm to nonfarm occupations as well as a valued end in itself. The land-grant policy report [7] candidly described the frequently squalid conditions and inadequate curricula of rural schools, the low-paid and poorly trained teachers, and the lack of financial support. Arguing that many rural areas were not able to afford good schools, the report recommended increased state aid and — when the idea was still anathema in many rural areas — federal aid for education. The USDA's *What Peace Can Mean to American Farmers* [220] took a similar position. Schultz [174] argued that education was an investment in people, increasing their productivity and mobility, and that the nation as a whole had an interest in and a responsibility for financing it. He particularly emphasized the need for preparing farm youth for nonfarm occupations.

Proposals for more directly facilitating labor mobility included a national job information service [159, 174]. Vocational training for displaced farm workers, location of new jobs for them, and payment of their transportation expenses also were recommended [159]. Later emphasis on rural development was foreshadowed by proposals by D. G. Johnson and W. H. Nicholls [159] for industrialization of depressed rural areas. Elimination of barriers to entry in nonfarm employment received some attention [159].

ADDITIONAL COMMENTS

Virtually all economists taking one or more of the positions discussed here rejected fixed percentages of parity prices as policy goals or guides. When some sort of price standard was needed, predepression prices, projected equilibrium prices, recent moving averages, a wide range of percentages of parity, or complete administrative discretion was suggested as a more flexible alternative. There was strong insistence on keeping prices near the path they would follow if high employment prevailed in industry and if weather and other short-term disturbances did not affect agriculture.

Individual economists emphasized particular combinations of the approaches considered in this section. W. O. Jones [134] identified a group of economists who tended to approach policy analysis in a particular way and who came to similar policy conclusions; this group, which he called the Schultzsians, included T. W. Schultz, D. G. Johnson, W. H. Nicholls, O. H. Brownlee, and R. Schickele. A group in the USDA Bureau of Agricultural Economics largely responsible for the ideas in *What Peace Can Mean to American Farmers* [217-220] owed much to the leadership of H. R. Tolley and included, among others, B. W. Allin, W. W. Cochrane, J. G. Maddox, O. C. Stine, and O. V. Wells; J. D. Black in his pragmatic way worked closely with the Tolley group, S. E. Johnson, J. P. Cavin, and others in the USDA.

Widening Differences during the 1950s

DECLINING CONFIDENCE IN THE SUFFICIENCY OF PROPOSALS OF THE 1940s

Economists' proposals for aid to agriculture in depression, for ways of hastening agricultural adjustment, and for stabilizing farm income without raising it did not square well with the desires of the large body of farmers who wanted to stay in agriculture and to be prosperous there. The sharp decline of farm prices in the late 1940s increased farmers' concern about income support, a concern only temporarily abated by price inflation during the Korean War. The concern was fully reflected if not exaggerated by numerous farm leaders and political representatives from farm areas. The policy questions presented through the political process for resolution were not, in the main, those for which positive policy recommendations were being made by economists.

Three papers given at a symposium in 1952 expressed divergent opinions about how economists might deal with such a situation. Waugh [229] argued that public acceptability was a warranted requisite of policy proposals in a democratic society and that economists should not ignore equity issues involved in the farm policy controversy. Jesness [120] may be interpreted as arguing that participants in the policy debate did not fully understand—or were willing to ignore—the consequences of their proposals and that economists, with their greater insight, might well reject popular demands outright. Schultz [179] emphasized his own valuation of what was important: poverty was the significant equity question, and many farmers were not in poverty. Holding such divergent views and facing the fact that income support for farmers collectively was the main policy issue, economists took different positions on policy questions.

The decline in the importance of industrial depression as a source of farm difficulties and the impressive onrush of agricultural technology caused some reevaluation of farm policy positions common at the close of World War II. In a review of *Agriculture in an Unstable Economy* Davis [59] argued that Schultz had overstated both low earnings in agriculture and the severity of the pressures on farmers to be expected in the future, but, Davis commented "... it is gravely to be doubted whether the maximum progress along these lines [Schultz's proposals to increase labor mobility] can possibly solve the problems of underemployment and low earnings in agriculture, if these are of the magnitude that Schultz envisages." When events demonstrated that the burden placed on labor mobility by advancing farm technology had by no means been overstated, many agricultural economists (though not Schultz or Davis) gave greater attention to measures to support farm income.

Food consumption subsidies for the poor, relied upon by some econ-

omists in the 1940s as a means of disposing of surpluses, appeared less likely to be sufficient to absorb food surpluses as agriculture's production capacity grew [231]. Though interest among agricultural economists in food subsidies continued because of their potential significance to the poor, some consumption subsidy advocates turned to additional measures to support farm income.

THE FREE MARKET POSITION

Despite growing reservations, the mainstream of thought among agricultural economists in the early 1950s continued to oppose lasting farm income subsidies, support of prices above free market levels, production control, and export subsidies. General (that is, not agricultural) economists who occasionally interested themselves in farm policy were even more likely to be purists in their allegiance to strictly market solutions. It is barely a caricature of much respectable economic thought in the early 1950s to say that resource allocation was held to be the overwhelmingly important test of farm policy, that allocation problems were viewed within the framework of static models, that free market prices were considered to be virtually identical with good resource allocation, and that if any trade-offs with progressiveness or equity were recognized, the conflicts were to be resolved in favor of resource allocation.

In 1954 Galbraith [76] made the (for him) unlikely error of not going far enough in criticizing conventional thought but then may have overcorrected in a scathing commentary on agricultural economists' approach to policy issues [80]. *Turning the Searchlight on Farm Policy* [63], prepared by a committee of agricultural economists in 1952, became a symbol of conservative policy recommendations. It held that the outlook for American agriculture was "basically strong." Proposals "for a prosperous American agriculture that is sound in its basic fundamentals and consistent with the principles of maximum individual freedom" included direct payments to farmers in the event of severe depression, abandonment of price supports, no government storage except perhaps in depression and for military stockpiling, full development of educational and advisory services to help farmers make informed choices, and unspecified programs for noncommercial farmers.

High hopes were held by a few agricultural economists and numerous businessmen and politicians that promotion of farm products or development of new industrial uses would solve the excess capacity problem in agriculture within the framework of traditional free market operations. DeGraff [60] argued that a modest increase in consumption of livestock products would be adequate and could be achieved by promotion. McMillen [149] explained the "chemurgy" idea and urged that research on new industrial uses of farm products be increased. A common opinion among agricul-

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tural economists was that the science of chemistry was doing more to develop substitutes for farm products than to find new uses and that the high cost of basic compounds contained in farm products made this trend likely to continue.

DIRECT PAYMENTS FOR INCOME SUPPORT

Secretary of Agriculture C. F. Brannan [46] proposed in 1949 a new set of farm programs that gave direct payments a prominent role in supporting farm income year in and out. The plan (1) substituted a new parity formula for the old one, (2) set price targets generally higher than 90 percent of the old parity, (3) provided for price supports and output restrictions on leading storable crops, (4) called for direct payments on livestock products whenever their prices fell below target prices, (5) suggested that marketing quotas on livestock products might later prove desirable, and (6) limited the amount of payments a single producer might receive.

The proposed role for direct payments was a sharp departure from use only in depression or to effectuate forward pricing. Numerous economists who favored payments for the latter purposes opposed Brannan's proposed use of them. Several other economists willing to see payments used for continuing income support believed that the price targets were too high or that the plan would in practice restrict output and have little of the argued advantage of permitting a full flow of food to consumers at modest prices. Some economists supported the plan. The controversy well demonstrated that a tag such as "direct payments" is an insufficient basis upon which to identify and evaluate a program.

The Brannan plan failed to win congressional approval, but economists' proposals to support farm income with direct payments became more frequent. The Norton-Working type of proposal had preceded the Brannan plan.¹ Galbraith [77] argued in 1955 for direct payments with no price support or production control. Brandow [25] proposed that direct payments be made on a base amount of each farmer's output to support income but that marginal amounts of output be sold for market prices in order to promote resource allocation; he developed a more elaborate version of this proposal later [21]. Several proposals for direct payments included limitation on amounts going to individual producers.

PRICE SUPPORT AND SUPPLY CONTROL

As early as the Agricultural Adjustment Act of 1938 the idea of flexible price supports had been introduced into legislation. "Flexible" in this context meant that the support price for a crop was to be raised according to a prescribed formula when the supply was below normal and was to be reduced

when the supply was above normal. Flexible supports had been written into the acts of 1948 and 1949 but had been superseded by other provisions of law [9, pp. 474-482]. Flexible supports became identified with groups favoring substantial reliance upon the market for resource allocation and income distribution, whereas the Brannan plan or supports at 90 percent of parity were favored by groups hoping to do more for farmers. From 1953 to 1960 flexible supports at low average levels were endorsed by Secretary of Agriculture Ezra Benson in his unflagging efforts to move toward a free market policy; basing price support on the average of recent market prices was also favored by Benson [11, pp. 184-201].

Prices of several leading crops and of dairy products were supported at higher than free market levels from the late 1940s to the 1970s except during the Korean War inflation. Stocks accumulated rapidly after 1952. Acreage restraints in use before 1956 either had little effect on output or merely shifted acreage from controlled to uncontrolled crops. The Agricultural Trade Development and Assistance Act of 1954 (P. L. 480) opened the way for large exports of agricultural products outside of commercial trade channels to poor countries under highly concessional terms.² Such exports may have kept the price support program from breaking down completely in the late 1950s, but they did not prevent stock accumulation.

Effective production control obviously was one approach to the farm policy dilemma. The Soil Bank program of 1956-58 experimented gingerly with payments to farmers to remove cropland entirely from production in order to avoid chasing surpluses from crop to crop. Bottum [16, 17] analyzed the cost and the expected results of different forms of land retirement in return for government payments and urged that policy move in that direction. Alternatives included (1) annual contracts for withdrawing from all production a portion of the crop acreage on participating farms, (2) annual contracts for diverting acreage from row crops to grass, and (3) long-term retirement of all cropland completely from production.

Cochrane [51] characterized the economic processes at work in farming as the agricultural treadmill—farmers adopted new technology in order to reduce unit production costs, but the resulting increase in total output forced prices and incomes down in highly competitive markets with inelastic demands; the farmers ran hard but went nowhere. He proposed comprehensive supply control to apply to substantially all of agriculture in order to attain fair prices (not necessarily parity prices) as defined by Congress [53]. Negotiable quotas on farmers' marketings were to be the principal administrative device. Much of the discussion among agricultural economists about the farm situation and supply control at the end of the 1950s centered on Cochrane's diagnosis and prescription.

MARKETING ORDERS

An important but rather detached component of policy from the mid-1930s onward consisted of marketing orders and agreements (the latter of only minor significance). Orders were authorized under federal and state legislation for certain commodities, mainly fruits, vegetables, and milk for fresh consumption. When approved by farmers, the orders applied to particular production areas or (for milk) to market areas rather than to the whole nation. In general, they were designed to increase producers' returns from sales by such means as grade and size regulation, smoothing the geographic and temporal flow of products to market, diversion of supplies to secondary uses, and (for milk eligible for fresh use) minimum producer prices. Usually their essential function, one that farmers' associations could seldom perform, was to apply measures of the type described to *all* handlers and producers in the relevant geographic area. The orders were (and are) government operated, but producers had substantial influence on them.

Marketing orders were the keystone for pricing milk eligible for fresh consumption from the mid-1930s onward. The work of dairy economists on the topic has been far too extensive to review here. Numerous economists regarded milk orders as important, even essential, for stability in milk markets. A smaller number favored their use to raise the average level of producers' returns. The proponents of orders for other commodities usually regarded orders as capable of increasing price stability and modestly raising producers' returns under some circumstances.

Marketing orders are closely related to the farmers' bargaining power issue because they provide areawide powers that producers' associations often cannot attain. Usually, economists have considered the marketing order approach as inadequate for dealing with such problems as excess national capacity for field crop production.

An Approximate Policy Equilibrium Emerging in the 1960s

THE EARLY 1960S

The high visibility of rising surplus stocks and government costs was forcing a change in farm policy as the 1960s began. Economists' work, of both positive and normative types, was perhaps more directly relevant to current policy decisions in the early and mid-1960s than in any other similar period.

A series of studies of the short-run effects of going entirely or nearly to a free market policy (to be discussed further in the next section of this review) showed that the immediate consequences for farmers would be severe. The Iowa State University Center for Agricultural and Economic Development,

under the directorship of E. O. Heady, began publication of a series of studies of policy alternatives (for example, [43]); the series was still being continued in 1972 [108]. The Economic Research Service, a newly organized version of the old Bureau of Agricultural Economics, increased the USDA's output of policy analyses (several of these are cited in the next section). Economists outside these groups remained active in the ongoing policy debate. In 1967, the National Advisory Commission on Food and Fiber issued a report [151] containing majority and minority recommendations and a staff analysis of farm economic problems, together with several technical studies.

As before, policy recommendations pointed in widely different directions. Proposals for return to an essentially free market for farm products after a transitional period of five or more years were made by the Committee for Economic Development [55], by Houthakker [118], and by the minority group of the National Advisory Commission on Food and Fiber [151]. Declining direct payments not tied to farmers' current production (in order not to inhibit farm adjustments) were suggested to cushion the change from supported to free markets. Assistance for farm adjustments was advocated. The Committee for Economic Development especially emphasized measures to upgrade human skills and to increase labor mobility.

The administration elected in 1960 tried to swing farm policy toward comprehensive supply control of the Cochrane type, but Congress would not agree. The feed grain program initiated in 1961 relied upon annual retirement of a portion of the feed grain acreage on participating farms in return for a government payment (voluntary acreage control). A referendum among wheat growers in 1963 rejected compulsory acreage control and was followed by enactment of a voluntary acreage control program for wheat. The Food and Agriculture Act of 1965 combined the basic elements of the two programs with a similar one for cotton. Price supports on feed grains and cotton had been lowered sufficiently so that no export subsidy was required, and only a small export subsidy was needed on wheat. High payment rates on cotton and wheat supported growers' income despite lower prices. Production control under the modified programs of the 1960s reduced stocks generally to levels bearing some relation to stabilization requirements. Dairy supports continued. The 1965 act struck a balance of economic and political pressures bearing on farm policy, and policy became more settled than at any time since World War II.

FARMER BARGAINING POWER

An old but intensified issue, the bargaining power of farmers, received considerable attention from agricultural economists in the 1960s. Farmers had long sought to improve their incomes through cooperatives. The Sapiro move-

ment of the 1920s [9, pp. 194-198] aimed at sufficient market control by large cooperatives to control marketing and prices. In the late 1950s and in the 1960s farmers were again strongly attracted by the idea of collective bargaining to increase their economic returns independently of government intervention. Roy [166] described the status of farm bargaining at the close of the 1960s.

Most agricultural economists' writing on collective bargaining for farmers has been descriptive or analytical rather than strongly advocative. The need for supply control and the apparent difficulty of voluntary farm organizations in exercising it frequently led to deflation of farmers' more glowing expectations. Examples may be found in [211]. Proposals for legislation conferring exclusive bargaining rights and authority to control supply upon farm organizations originated mainly with farm and political leaders. Economists taking a strong stand in favor of bargaining often were commodity specialists, especially in dairy marketing. An article by S. Johnson [131] provides an example, but frequently the work of this group was presented in reports or conference papers not part of the readily available literature. Fuller [71], among others, emphasized the importance of nonprice terms of sale, fringe benefits, and farmers' sense of self-reliance as potential benefits of collective bargaining.

SUBSIDING INTEREST IN FARM POLICY

The activity of agricultural economists in the area of farm policy declined in the late 1960s and the early 1970s. The set of programs largely incorporated in the Food and Agriculture Act of 1965 and continued without major change in 1970 was working well enough to reduce political pressure on farm policy. Growing concern about rural development, and in less degree rural poverty, attracted an enlarged proportion of research and educational resources. Environmental protection was a new field of substantial importance to agriculture and rural areas. The dramatic change from agricultural surpluses to shortages in 1972-73 drew attention once again to commercial farm policy, but the problems as then presented were much different from those of the preceding twenty-five years.

Farm Policy Analysis

This section is focused upon literature presenting analyses of the expected or observed effects of alternative farm policies. Particular types of programs are discussed one by one to show their effects on prices, production, product utilization, farm income, and related variables of interest to groups immediately involved in policy. Broader consequences such as those for economic

efficiency and personal distribution of income are considered following the program-by-program review.

The Free Market

The first part of this paper, with its description of the economic model of agriculture and its brief comments on the quantitative values of key economic relations within the system, outlined in general terms how a free market for agriculture might have been expected to work during the period under review. Since government intervention was extensive, actual experience could not demonstrate the exact consequences of a free market policy. Neither was it possible to estimate the consequences with sufficient reliability to force consensus among economists whose judgments in the realms of both positive and normative economics otherwise would lead to disagreement on several issues.

One question on which methodology was sufficiently good to produce wide if not complete agreement was the short-term impact of abandoning programs in effect from the late 1950s to the early 1970s. Wilcox [236] estimated in 1958 that farm programs had accounted for one-fourth to one-half of net farm income. Beginning in 1960, several elaborate projections were made to show short-range results to be expected from a return to free markets. The usual assumption was that farmers would use available family labor, equipment, and land to the full, that variable inputs such as fertilizer would not be greatly reduced, that production methods would continue to be improved, and that market supplies of farm products would increase as production controls and diversions of products from commercial markets were dropped. Prices would fall to clear unsubsidized markets.

Five such studies [164, 187, 203, 224, 233] made in the early 1960s produced fairly consistent results when differences in assumptions about programs not eliminated were taken into account. The median projections of percentage changes from earlier levels are listed in the tabulation on the next page.

By implication, at least, the studies indicated that net incomes from field crop production would be hit harder than net incomes from livestock and poultry production. Later studies, including several projections made by E. O. Heady and associates at Iowa State University, were generally consistent with these results, although the reduction of price support levels and the rising use of direct payments of the 1960s altered the way in which termination of farm programs would affect net farm income.

Long-run consequences of a free market policy were not nearly so well agreed upon. Most economists making short-run projections thought that over a longer period production would be negatively affected by low prices

Prices:	<i>Percentage Change</i>
Corn	-25
Wheat	-50
Cotton	-27 ^a
Hogs	-19
Beef cattle	-34
All farm products	-17 ^b
Gross farm income	-7.5 ^a
Production expenses	+ 5
Net income	-37

^aBased on four studies reporting the figure.

^bChange in farm prices of foods given in [224].

and incomes and that some recovery of prices and farm income would be expected. In a book reflecting much of the work on farm program alternatives at the Iowa State Center [108], Heady, Mayer, and Madsen made both short-run and long-run projections for a free market and compared them with the actual situation in 1967. Corn prices were expected to drop 33 percent in the short run but only 7 percent in the long run; the corresponding percentage changes for wheat prices were 39 and 12 and those for net farm income were 32 and 23. Loss of government payments was an important reason for the decline in net farm income.

Price Support

Separation of price support from several other programs is somewhat artificial, for price support usually must be accompanied by storage, production control, or disposal programs. Discussions of other programs and of combinations of programs follow this section on price support.

Price support at above the free market level increases gross and net farm income if the real support price can be maintained without production control. Support creates incentives for increased production and reduced utilization; information on supply and demand behavior, already reviewed, is highly relevant to the expected magnitude and timing of such response.

Added to the usual tendency of high prices to stimulate production sooner or later is the reduction of uncertainty resulting from support promised for the future. G. L. Johnson [126] concluded in 1952 that reduced uncertainty as a result of price support for burley tobacco led farmers to increase per-acre yields, though no way of distinguishing between the effects of increased certainty and of new technology was available. Gray, Sorenson, and Cochrane [84] found that (1) yields of potatoes increased in states not specializing in potato production under price support in the 1940s (though the trend of yields in specializing states was not altered), (2) price support encouraged specialization in potato production, and (3) price support eliminated a tendency toward cyclical potato production.

Farm policy literature, especially that published before 1960, abounds with conclusions, apparently taken to be self-evident, that price support leads to misallocation of resources and to reduction of welfare. Peterson's *The Great Farm Problem* [157] provides an extreme example. Such conclusions seem obvious to an economist who thinks in terms only of the perfect competition model, believes that free markets closely correspond to it, and accepts the resource endowments that underlie personal income distribution and market demands. But agriculture has been in chronic disequilibrium because of external forces acting upon it, modification of free market prices may have minor effects at most on basic long-run adjustments of resources, benefits of technology are often negative for producers, and opinions about the proper personal distribution of income are value judgments. Moreover, resource allocation and product utilization may be powerfully affected by production control or disposal programs associated with supports. Though price support raises extremely important questions about economic efficiency and equity, the questions are not answered simply by appeal to an unverified model; they must be answered by analysis of actual situations.

The most common device for supporting prices has been nonrecourse loans. Market prices can drop somewhat below loan levels, especially at harvest time, even when all producers are eligible for loans. Another support device, unlimited government purchases, has been effective for manufactured dairy products. Since outright waste is unacceptable, perishable products can feasibly be price supported only if they are first made storable by processing. The higher price of processed goods adds to the government's investment in price support stocks and often to its program losses.

Any loan program must establish an intricate system of loan values of different classes and qualities of product in different locations. Especially in cotton [67] the use of too narrow a range of premiums and discounts has at times caused government accumulation of less desirable qualities. Support of grain prices led to an enormous expansion of grain storage facilities in the 1950s. The government's participation in markets has affected the handling and processing industries, as well as the commodity exchanges, in numerous ways, many of them minor but nonetheless controversial; six discussions of the topic were published in the *Journal of Farm Economics* of December 1963.

Domestic Consumption Subsidies

The principal programs have been (a) direct distribution of food to needy families, (b) subsidies given to the poor in a form useful only for increased food expenditures (the food stamp plan), (c) the school lunch, special milk, and other programs for school children, and (d) assistance to institutions such

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as hospitals and to nutritionally vulnerable groups. The history of domestic consumption subsidies is given by Wetmore et al. [231] and Hoover and Maddox [115].

Southworth [193] summarized in 1945 most of the expected economic effects of food consumption subsidies. Direct cash grants to consumers are spent approximately as consumers would spend any income increment, with only a minor share going for food. Direct distribution of food largely replaces usual food expenditures by recipients and thus has much the same effect as cash grants (except that food consumption is concentrated on the types of food distributed). Effectively directed subsidies of the stamp plan type increase the food consumption and presumably the nutrition of the poor if supply is highly elastic; prices are then little affected. But if supply is highly inelastic, the subsidy to the poor tends principally to bid up prices as higher-income consumers, whose demands are inelastic, reduce their consumption only a little; then nutritional benefits to the poor are small but price benefits to producers large. When free choice is given to consumers to purchase the kinds of foods they want, demand for meats, certain fruits and vegetables, and other foods with relatively high income elasticities is increased; demand for bread, dry beans, and so on may be decreased.

If the objective of food consumption subsidies is to improve nutrition or to help farmers, programs that require the subsidy to be used only for food are preferred to cash grants or to programs having similar effects. But if recipients of subsidies are well qualified to judge what is best for their families, unrestricted cash grants should increase the welfare of the poor more than would any specialized subsidy of equivalent monetary value. Controversy exists about the accuracy of the assumption. Theory, once held unequivocally to support cash grants, gives indeterminate results when the desires of those who pay the subsidy are admitted into the consideration of welfare [57].

Near the close of the 1950s a comprehensive study at the University of Minnesota [2, 231] analyzed the potential effects of several approaches to demand expansion. The authors concluded, "There is little possibility that the surplus problem in agriculture can be fully alleviated by lifting the income restriction on food consumption for low-income families." [231]. They regarded the approach as a partial solution, one that might be justified entirely by the welfare of the poor.

Emphasis on the food stamp plan increased sharply at the close of the 1960s and raised a number of questions about operational details [115]. Some recent research suggests that the nutritional effects of the food stamp plan [142] and of a similar pilot program for infants and pregnant women [241] are minor; expenditure effects seem more like those of cash grants.

Should further research confirm these results for food stamps, the case for unrestricted assistance to low-income families as superior to assistance presumed to be directed to nutrition would be greatly strengthened.

Export Disposal

Export disposal of both the commercial and noncommercial types is mentioned only very briefly because a separate paper on international agricultural trade is included in this volume. The possibility of conflict between farm policy and international trade policy is evident. By the 1960s the nation's adverse balance of payments made the expansion of dollar-earning agricultural exports a matter of national, not merely sectoral, concern.

Farm price and income programs have existed in so many countries, and commercial world trade in agricultural products has been so obstructed by farm and general policy barriers, that classical "world markets" and "world prices" often have not even been approximated for many leading farm products. Retaliation by other countries is a possibility seriously to be considered whenever the United States undertakes export disposal programs. Devices such as the variable levy of the European Common Market can automatically offset the normal potential of lower prices to increase exports. A number of international commodity agreements have been developed in attempts to harmonize rivalries among export nations, but results commonly have been disappointing. The large comparative advantage of the United States in producing a number of farm products, particularly soybeans and feed grains, and the growing demand abroad for feedstuffs, again favoring soybeans and feed grains, have produced a rising trend in agricultural exports and have heightened the importance of commercial export policy for the future.

In contrast, disposal of farm products in noncommercial channels abroad, as under P. L. 480, was important through the mid-1960s but appeared in the early 1970s to have receded to a lower long-term level. The effects of the program on agricultural production in developing countries, on the countries' debt obligations for the future, and on other exporting countries have been complex. Though such effects cannot be reviewed here, the easy assumption that the program has been unqualifiedly beneficial to other countries is not warranted as a generalization.

Two-Price Plans

Two-price (or multiple-price) plans have usually been discussed in the farm policy literature as elements of export disposal programs, marketing orders for milk or for fruits and vegetables, or other price-raising devices. The theory of price discrimination applies to them, although agricultural programs have

seldom carried the plans to the logical conclusions inferred from simplified assumptions by standard theory.

Multiple-price plans for agriculture were discussed in a USDA study [222] in 1954. Abel [1] used a price discrimination model in an analysis of export and import policies applying to agricultural products in the 1960s. In the 1930s Cassels [40] drew upon price discrimination theory in a realistic way in a study of fluid milk marketing, the field to which the theory has had by far its widest application in American agriculture. The literature on classified pricing of milk is too voluminous to permit more than a summary of certain conclusions here.

A classified price plan for milk eligible for fresh consumption in a particular area establishes a high price for milk sold for fluid use and essentially accepts whatever lower price is necessary to move production in excess of fluid use into manufacturing outlets [146]. Since demand for fluid use is distinctly inelastic and demand for *the particular area's* contribution to the nation's manufacturing milk supply is highly elastic, the gross income of the area's producers from production of a given volume of milk is increased by two-pricing. Prices are never set high enough in the fluid-use market to equalize marginal revenues there and in the manufacturing market, however, for practical reasons not entering into the usual price discrimination models.

Neither is output ordinarily restricted, though standard theory, assuming control of output, shows that producers' net income is maximized when the equal marginal revenues in the two markets also equal marginal costs. Producers are typically paid a blend price that is the weighted average of the high price for fluid use and the low price for manufacturing use. Output increments are thus seriously overvalued, thereby increasing farmers' incentives to produce surpluses. Failure to control output impairs the effectiveness of the program in achieving producers' objectives and may lead to social waste.

This result points up the difference between disposal control, which classified pricing for milk provides, and production control. Marketing order programs for fruits and vegetables usually provide for some form of disposal control — sometimes of a two-price kind — but seldom for production control.

Classified pricing of milk has prompted much interest in two-price plans for other commodities. A major handicap has been the frequent lack of a secondary market readily separable from the primary market and capable of absorbing without large price declines substantial quantities diverted from the primary market. Area fluid milk markets are virtually unique in having the national market for manufacturing purposes as a large secondary outlet, and the capacity of that market to absorb excess milk has been increased by government price support for manufactured dairy products.

Supply Control

Cochrane presented a general case for supply control in [51], supplied program specifics in [53], and later commented on his experience in working for controls in government in [54]. Numerous discussions of the specifics of supply control, including [28], [169], and [167], have appeared in the literature. Representative writings that are moderately to sharply critical of supply control include [93, 102, 122, 184, 188].

It is obvious that if control is exclusively relied upon to increase producers' net income, producers' immediate gain will be the sum of change in total revenue and reduction in total costs. Since the latter is likely to be large only in a few cases (for example, broiler production), farm-level demand usually must be distinctly inelastic if potential income advantages to producers collectively are to be significant. Long-run results for producers depend upon long-run demand elasticity, changes in costs, and capitalization effects.

CONTROL OF PRODUCERS' SALES

Control might be placed on farmers' production, sales, or inputs. Control of sales often is more feasible than control of actual quantities produced and, in the case of storable products, permits growers to deal with the vagaries of nature by storage from year to year. Programs actually used in the United States provide only limited experience with direct control of sales.

In principle, limits on sales are preferable to limits on particular resources. Sales controls are direct and precise, but input controls are indirect and loose. Farmers' choice of inputs under sales controls probably would emphasize fixed resources such as land and family labor and deemphasize variable inputs such as fertilizer [102, p. 315]; the result should be more efficient use of resources and a greater net income for farmers from a given volume of production than if land controls were employed. Quantity sales quotas probably would encourage production of high-quality products. Evidence on farmers' use of variable inputs under acreage controls suggests that some of these presumed advantages might not be great in practice, but they would be in the right direction.

Virtually all proposals for outright sales controls call for assignment of quotas to individual producers in proportion to actual sales in a base period. Certificates issued to growers annually and required to be transferred to buyers as products are sold usually would be used to enforce the program against both buyers and sellers. Quotas would take on high values, as experience under some state marketing orders for milk indicates.

One of the oldest criticisms of supply control by economists is that quotas tend to freeze the pattern of production both among farms and among regions, thus preventing the shifts of production required for efficiency.

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Cochrane [53] and most other economists have favored negotiability of quotas to avoid this. Farm leaders, especially leaders of organizations voicing concern about small farmers, usually have opposed negotiability, though injury to small farmers is not a necessary result.

A widely recognized limitation of sales controls is that they would be ineffective for commodities like feed grains that are or might readily be used on the same farm for feeding to livestock. Cochrane [53] proposed direct payments and perhaps acreage controls on feed grains if sales controls were applied to other products. Acreage controls have been the most common proposal as well as the means used in practice.

In light of farmers' inability to predetermine their production precisely, penalties for exceeding quotas on meat animals, milk, and poultry products (all perishable) probably should not prohibit sale of over-quota production but should only make it so unprofitable under normal circumstances that farmers would try to avoid it [28]. This is approximately what quota plans for fluid milk do when they assign Class I bases to producers and pay a sharply lower price for Class II milk [210]. The procedure would add administrative complications for most other perishable commodities.

For export products, some form of two-price plan would be attractive and perhaps essential under supply control. The administrative aspects would be awkward unless an export subsidy were paid for by the government. Several questions about resource allocation, income distribution, and capitalization of income benefits are deferred for consideration at the end of this section.

TAXING OUTPUT

Willingness to tax farmers' sales or production would open numerous possibilities for controlling supply and redistributing farm income. A tax might be most easily levied on processors (for example, the processing tax of the Agricultural Adjustment Act of 1933) and would ordinarily reduce farm prices. The proceeds could be used to reward farmers who complied with production or sales controls while the reduced prices would discourage farmers who did not comply. Or the proceeds could be used for payments redistributing income among farmers on some basis other than production.

A variant of the idea was discussed by Heady [107] in 1971. The government would receive a designated share of each farmer's production (say, 20 percent). The most favorable effect obtainable for farm income without production quotas would be achieved if the government simply removed its share from commercial markets (for instance, by giving the products to poor countries).

ACREAGE CONTROLS, GENERAL

Experience with supply control in the United States has been mainly with

acreage restrictions. A long-recognized problem is the diversion of land removed from one crop to production of another crop. Several studies (for example, [31, 45, 100, 212]) show that such diversion takes place, with little loss of harvested acreage or even shift to hay or pasture, when acreage controls do not require land removed from a crop to be withheld from agricultural production. If the diversion takes the form of a shift from wheat and cotton to feed grains, as happened in the 1950s, livestock production is slightly encouraged despite feed grain price support [212]. Though output of controlled crops may be substantially reduced, total farm output may be little affected. Unless their products are price-supported, producers of crops to which acreage is diverted are made worse off.

Reduced acreage does not proportionately reduce output, of course, if yields increase. Effects of acreage control on yields frequently have not been distinguished from effects of the price supports that commonly accompany control. Probably this confusion, together with observation of upward trends in crop yields, accounted for a common belief at one time that per-acre yields increased so much under acreage restrictions that control was largely vitiated. But crop yields are now known to have increased greatly for technological reasons entirely apart from effects of controls or price supports. Comparisons of production practices and crop yields of participants in control programs with practices and yields of nonparticipants, together with questioning of farmers about why they adopted yield-increasing methods, showed that acreage controls as such has at most a small effect in inducing farmers to apply more fertilizer or otherwise to increase yields [6, 17, 30, 31, 101, 114, 147, 183, 225]. Comparison of yield increases over time showed that the rate was not greater than for nonquota crops after quotas went into effect [45].

Acreage controls have affected yields in ways other than influencing the levels of inputs. Under all types of land restrictions farmers are likely to leave in production of the controlled crop the most productive land on the farm. Thus, average yields increase when restrictions are imposed [45]. If rotation of idled acreage is possible, farmers can build up productivity by rotating or fallowing fields. Some programs appeal especially to farmers in areas having poorer land (or sometimes better land) than average. Programs aimed particularly at poor land automatically raise national average yields. In a study of land idled by acreage control programs in effect in 1966 Weisgerber [230] estimated that the combined effects of land selection within farms and the differential impact among areas caused land withdrawn from production to be, on the average, 80 to 90 percent as productive as the land in crops. Lower productivities of diverted land are not necessarily program defects, for they are usually consistent with efficient use of resources, and when programs are voluntary (paid for) the cost of attracting an acre into the program probably is lower when the farmer sacrifices less by enrolling the acre.

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Acreage restrictions accompanied by price supports that did not adequately discriminate among qualities of the product have in several instances stimulated the use of varieties or cultural practices that increased yields at the expense of quality.

Whether inputs incorporating new technology would have been adopted less rapidly in a free market than under a joint program of acreage control, price support, and direct payments is a different question than the effects of acreage control alone. As indicated earlier, less technological advance and a somewhat lower level of inputs probably would have followed, with some lag, the abandonment of price and income programs.

Though rising technology and more use of fertilizer and other inputs per acre have not been much affected by acreage control alone, they have made land restriction more frustrating to farmers. When per-acre yields have risen faster than markets have expanded, as has happened at times for several crops, acreage allotments have had to be cut back. Minimum national allotments written into legislation have eventually become obstacles to effective control.

Except when whole farms are retired, acreage allotments ordinarily must be assigned to farms. Such allotments have been established, in practice, in proportion to acreages actually grown on individual farms in a base period. The use of soil conservation criteria has been proposed but given little attention. The acreage allotments or bases tend to freeze the historic pattern of production, as do sales quotas. Negotiability or administrative transfer of acreage bases is cumbersome because acreages should be translated into production equivalents if exchange of allotments between areas of different productivity is permitted.

WHOLE-FARM VERSUS PART-FARM RETIREMENT

The distinction here is between programs that retire all land on participating farms and those that retire only a minor fraction of the cropland on the farms. The principal part-farm programs—the acreage reserve of the Soil Bank program and the feed grain, wheat, and cotton retirement programs of the 1960s—retired land in proportion to past acreages of the controlled crops. In addition, upper limits were placed on the acreages of the controlled crops to be grown on participating farms. Under the Agricultural Act of 1970 the acreages to be retired were determined according to the earlier plan, but no upper limits were imposed on how much of the land permitted to be cropped could be devoted to the crops in question. In principle, the amount of land to be retired could be shifted from a specific-crop base to a total-crop base. Abandoning ties to specific crops in operating a part-farm retirement program increases the opportunity of farmers to adjust acreages of particular

crops but decreases the precision of the government's supply management policies as they relate to individual commodities.

Closely associated with the whole-farm, part-farm distinction are the duration of land retirement contracts and the productivity of the land retired. Part-farm retirement is usually though not necessarily on an annual basis and is aimed at farms of all levels of productivity; whole-farm retirement makes sense only for periods of five, ten, or more years and usually is directed at poor land.

As Bottum [16] pointed out, voluntary (paid-for) supply control should be obtainable at lower cost to the government through whole-farm retirement than through programs idling some land on many farms. When some crop acres on an operating farm are withdrawn from production, the variable costs avoided by the farmer are small, with the result that the farmer will choose to idle the land only if he is paid a large share of the gross value of expected production on the withdrawn acres. When a whole farm is retired, however, a considerably larger proportion of total cost can be avoided, including family labor if it can be employed elsewhere or if the operator puts a high value on retirement from active work.

Research by Bottum et al. [17] indicated that under certain assumptions about other cost-influencing circumstances the government's cost of achieving a given amount of supply reduction through a voluntary whole-farm retirement program would be a little less than two-thirds the cost through voluntary part-farm retirement. A much more limited study [37] estimated the proportion at 84 percent. Brandow [27] calculated that the cost of obtaining a given reduction in output with the Conservation Reserve was roughly 50 to 60 percent of the cost incurred by part-farm retirement under the Acreage Reserve and early feed grain program. A similar estimate by Christiansen and Aines [45] based on a comparison of the Acreage and Conservation Reserves put the ratio at 58 percent. The authors of a later Economic Research Service study [242] based on farmers' estimated costs and returns came to a different conclusion: achievement of a given amount of output restraint would be nearly as costly with a whole-farm retirement program, mildly restricted in the amount of land acceptable from any one county, as with a part-farm program. The preponderance of evidence is against this conclusion.

Several studies [17, 39, 45, 130, 147] show that whole-farm retirement, necessarily for an extended period of years, is attractive to elderly farmers, farmers with off-farm job opportunities, and other farmers who might especially want to do less farm work. Part-farm retirement apparently has few such effects except that farmers with off-farm work tend to participate more than others [30, 114, 183]. Whole-farm retirement is especially suited to marginal farmers as well as to marginal land.

Experience with the Conservation Reserve, recorded in references already cited, shows that whole-farm retirement on five-year to ten-year contracts speeds up the exit of land in areas going out of farming. But for the United States as a whole, most land is not shifted to trees, urban uses, or other purposes that prevent its return to agriculture, and much of it does return. To achieve permanent retirement some economists have proposed that contracts provide for easements against the use of the land for row crops or for any agricultural purpose after the contracts expire. Provisions for such easements would in most instances increase the government's cost of getting participation in a whole-farm retirement program. Easements have also been proposed as means, independently of any other device, by which to control agricultural use of land [85].

Some proposals [27, 213] for land retirement regard part-farm and whole-farm programs as complementary, as the Soil Bank program apparently did. In such proposals part-farm land retirement on an annual basis is considered an appropriate way of providing for and controlling the excess capacity needed for stability in the short run, whereas the function of whole-farm retirement is to hasten permanent withdrawal of submarginal land.

INTERFARM AND GEOGRAPHIC DISTRIBUTION OF RETIRED LAND

Theory and hypothetical calculations indicate that production can be reduced at lowest cost to government when voluntary programs are designed to retire land on which variable costs are highest in relation to value of output [186, 242]. High variable cost ratios generally are associated with low productivities of cropland. One means of giving priority to retirement of such cropland is to rate land for its productivity and to award contracts to farmers who submit the lowest bids relative to productivity ratings.³ Giving priority to farmers who offered to retire cropland at the lowest rates per acre (without comparison with productivity) would be somewhat more expensive and would shift the location of the retired land [242].

Programs can be designed to be equally attractive to owners of good and poor land. This has been the general intent of annual, part-farm programs, whereas long-term, whole-farm programs have attracted the owners of poor land. The policy was one reason why the Conservation Reserve reduced farm output at lower cost than the feed grain program.

A major objection to programs designed to reduce output at lowest relative cost or lowest per-acre cost is that poor land tends to be geographically concentrated and that an unrestricted program would withdraw large proportions of cropland in the northern plains, in the southeast, and in some smaller areas. The local economies would thus be undermined. Political resistance to

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the consequences was the principal reason why whole-farm retirement was virtually discontinued after a partial trial through the Conservation Reserve.

Provisions to limit the amount of land retired in any county or other area subdivision to some percentage (for example, 20 or 40 percent) of the eligible land base would increase the government's cost of land retirement [17]. A series of studies at Iowa State University, based on a spatial programming model, have elaborated upon the location of land retired from agriculture and have compared costs under different policies; for examples, see [232] and [108].

COMPULSORY VERSUS VOLUNTARY LAND RESTRICTION

Mandatory restriction of land to be cropped has been strongly opposed by farmers on the grounds of compulsion and probably also because it is less profitable to farmers than alternative programs, including voluntary restriction. Under a voluntary program producers are offered sufficiently high payments for compliance to induce enough participation so that overproduction is avoided at the support price accompanying the program. Farmers' net incomes will be somewhat higher with a voluntary program than they would be if prices were supported at the same level without acreage restriction, for most farmers will not participate unless they gain more than from full production.

Compulsory acreage restriction accompanied by the requirement that land diverted from one crop may not be planted to another has been little used. Voluntary control has suffered from various "slippages" reducing its effectiveness [26, 141]. Apparently an important factor not explicitly recognized may be called the selectivity effect. Despite the stability of total crop acreage, many individual farmers in any one year make significant changes in their farming operations; moreover, land is going out of farming in some areas and coming into farming in a few others. When farmers are offered payments for retiring land and reducing output, the program is attractive to those who plan to cut down anyway and is rejected by those who think they have compelling reasons for expanding. The result is that the government pays for some reductions that would occur without a program and does not affect all expansions that would normally offset them. The selectivity effect apparently operates for both part-farm and whole-farm programs.

The actual reduction in total crop acreage typically has been less than the acreage enrolled in voluntary acreage retirement. A rule of thumb that worked fairly well in the 1950s and 1960s was that actual acreage was reduced 70 percent as much as program enrollment. This apparently is one reason why "on paper" calculations of expected costs (for example, [242])

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are substantially lower than actual costs. The estimates for the Acreage Reserve and feed grain programs [27, 162, 186] generally agree that the cost of reducing the value of output by \$1.00 with part-time retirement is nearly \$1.00. Avoidance of storage and handling costs thus assumes importance as a reason why voluntary land retirement is cheaper to the government than price support without production control.

FROM ROW CROPS TO GRASS

Reduced intensity of land use and conservation have been emphasized in proposals to pay farmers for shifting from row crops to hay and pasture. Bottum et al. [17] estimated that a given reduction of crop output could be obtained a little more cheaply with a grass-use program than with complete retirement of crop land (voluntary part-farm retirement in both cases). As production of feeder cattle became an important bottleneck in agriculture in the late 1960s and early 1970s, shifting from row crops to grass became more attractive from a resource-use standpoint if not to established ranchers.

PIECEMEAL VERSUS COMPREHENSIVE SUPPLY CONTROL

Cochrane [53] argued for controls for all principal products of agriculture. Since demand is less elastic for an aggregate of competing products than for most individual products making up the aggregate, price and income effects of a given proportionate degree of supply restraint would be greater for comprehensive control than for control of one or a few products. Furthermore, producers of controlled commodities were expected to shift resources to uncontrolled commodities, with the result that all principal products would require control. Madsen and Heady [143] have defined supply control for agricultural bargaining power in a similarly comprehensive sense. The problem of getting sufficient consensus even to begin so all-encompassing a policy has led to other proposals emphasizing the desirability of control for some products but not others, with devices such as land retirement to impede shifts of resources from controlled to uncontrolled commodities.

Vertical relationships among farm products — for example, feed grains and eggs, or feeder cattle and fed cattle — complicate both the mechanics and the politics of comprehensive control. In light of farmers' attitudes, potential administrative problems, and consumers' probable objections, comprehensive supply control in Cochrane's sense ceased to appear to be a feasible policy alternative, a conclusion with which Cochrane apparently came to agree [54]. In another sense, however, comprehensive supply control became more important after 1960, for the acreage control programs intended to restrict production of particular crops without diversion of land to other crops were also significant as limitations on aggregate crop production. The "set-

aside" provision of the Agricultural act of 1970 moved further in this direction.

CONTROL OF OTHER INPUTS

Little attention has been given to administrative control of inputs other than land as a means of controlling output. Shepherd et al. [186] reviewed the principal possibilities in 1963. None seemed promising, aside from voluntary withdrawal of labor. Perhaps the leading possibility here is that concern about the environment could be combined with efforts toward production control to limit use of agricultural chemicals.

Long-standing proposals to increase labor mobility by education, training, job information, financial aid, and the like have some relation to agricultural supply, of course, but they are not control programs in the sense used here. Virtually all economists proposing or analyzing supply control for agriculture have recognized that greater mobility of the labor force would ease the problems confronted by control programs and would be necessary if not sufficient for a wholly satisfactory farm income situation.

Direct Payments

As we saw earlier, the first proposals for direct payments usually intended payments to be strictly supplements to prices or incomes to compensate for their low level; payments were not thought of as inducements to comply with production controls. The first type of payment has sometimes been called a supplemental payment and the second a compliance payment to distinguish between the two purposes. As the 1970s began, only the wool program involved pure supplemental payments. Direct payments under crop programs were either wholly or partially compliance payments. A distinctive feature of an income payment plan proposed by Clawson [49] in the late 1960s was the extension of payments to rural nonfarm people made needy by the decline of agricultural population and employment.

Payments, even of the compliance type, have provided a degree of crop insurance as the programs have operated. Eligibility for crop payments has depended on acreage adjustments made by program participants; if yield per acre was low for reasons beyond the producer's control, the amount of payment was not altered.

BASE-LIMITED PAYMENTS

Unlimited supplemental payments can induce wasteful output expansion and create high costs for the government if supply is elastic. This has been one reason for the suggestion that payments be made only on a base amount—smaller than normal production—of each farmer's output. Market prices

would then guide the farmer's marginal adjustments of production, the incentive to expand total output would be reduced (though farmers' financial ability to adopt capital-intensive technology would remain), and resource efficiency should be improved. If bases were changed each year to reflect the previous year's output, the marginal character of the plan would be lost. Freezing the bases, however, would introduce some of the inefficiency discussed in connection with supply control quotas. It would be possible at the cost of greater complexity to reduce this difficulty by relating payments to a total production base for each farm [21].

Whether because of economists' analysis or their own common sense, legislators set up the feed grain, wheat, and cotton programs as they operated in 1971 and 1972 so that producers could not enlarge the payments they received by expanding acreages beyond certain bases. Growers could, however, gradually increase their payments by raising per-acre yields.

ADJUSTING PAYMENTS TO AFFECT DISTRIBUTION OF FARM INCOME

Adjustment of direct payments of the supplemental type so that small growers received proportionately more than large growers was favored in some of the earlier direct payment proposals by economists [25, 155] and by such diverse sources as the Land-Grant College Committee on Postwar Agricultural Policy [7] and Secretary Brannan [46]. Economists' reasons included (1) the view that small farmers needed help more than large farmers and should have it, (2) large-scale farms were not generally more efficient than well organized family farms and should not be encouraged while this remained true, and (3) huge payments to a few very large farms would undermine public support for the program.

The opportunity to alter personal income distribution apparently was a leading reason for opposition by the American Farm Bureau Federation and some other groups to direct payments. The possibility that the small farms would be so heavily subsidized that inefficiency resulted was disturbing to some economists. Farmers' dependence upon highly visible appropriations for direct payments was held to be a restraint on their political freedom. Hamilton [94] gave a highly critical evaluation, mainly of supplemental payments, that summarized objections common during the 1950s.

The heavy reliance on compliance payments in conjunction with voluntary acreage control and price support in the 1960s and early 1970s complicated the issue. If payments are strictly for compliance, the principal income benefits of the joint program are realized through the market price and are not importantly modified by limiting payments to large growers. Limitations on pure compliance payments, moreover, may sharply reduce participation in production control by large growers, reduce the effectiveness

of the supply management aspects of the joint program, and have the incongruous effect of idling proportionately large acreages on small farms while leaving large farms in full operation without much income sacrifice.

Some studies [171, 191, 234] implied that a limit of \$10,000 on payments on each of the feed grain, wheat, and cotton programs would be feasible. They also pointed to a practical difficulty in limiting benefits to large farms: the owners of large farms might divide them up among family members, and lease arrangements could be made so that landowners received benefits through rent.

Farm Bargaining Power and Marketing Orders

Several article on economic, legal, and operational aspects of farm bargaining appear in [211] and in the December issues of the *Journal of Farm Economics* of 1963 and 1964. As Helmberger and Hoos [110] have remarked, standard price theory, not notably definitive for oligopoly and bilateral monopoly, usually assumes highly simplified situations and abstracts from significant elements of the total bargaining process. Helmberger and Hoos analyzed capture of excess profits of monopsonistic buyers in a setting in which producers' associations had no control of members' production. Most other writers and certainly farm bargainers have considered that higher prices to consumers, obtained through supply control, were also potential sources of benefits for producers. Moore [150] contended that profits in the food industry offer little general opportunity for large price gains by farmers through profit capture. As the tobacco industry has illustrated, high profits for processors and high prices for a farm product are not necessarily incompatible.

A point made by Ladd [138] and appearing in other terminology elsewhere distinguishes between (1) gains available to farmers by offering new service or product characteristics valued by buyers and (2) gains extracted from buyers by actual or threatened action that subjects them to losses. More efficient product assembly is an example of the first type; withholding products is an example of the second. The distinction is closely related to latent conflict between (1) the common desire of farmers to have cooperatives play a dominant role in vertical coordination wherever it develops and (2) the even more common desire to obtain higher farm prices by the exercise of economic power [26, 137]. If farmers attempt to coerce buyers in situations where substantial gains from vertical coordination are possible, the entry of buyers into farm production may be encouraged.

Economists have generally agreed that useful though not large benefits, mostly in nonprice terms of sale, are sometimes attainable by farm bargaining groups without control of market supply; but substantial price enhance-

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ment not offset by savings to buyers requires some form of supply control [26, 138, 166, 201]. Control of disposal of the product may be adequate in the short run; control of production is also necessary in the longer run. Madsen and Heady [143] analyzed bargaining power for farmers in much the same way they would analyze comprehensive supply control by the government.

Parallels as well as contrasts with collective bargaining by industrial labor have been noted [71, 166]. Several proposals for providing a broader legal base for farm bargaining are partially modeled on the Wagner Labor Act or minimum wage legislation [166, pp. 151-163]. The differing attitudes of farm groups toward such legislation, arising from their different interests and philosophies, is to some extent reflected in [198]. A proposed approach more closely resembling ordinary farm programs is the marketing board, an agency given government powers to enforce monopolylike policies for producers [239; 166, pp. 163-184].

A basic issue is the extent to which the government should create and hand over to farmers monopoly powers over production and prices. In arguing for supply control by the government Cochrane [53] contended that Congress would not and should not create unregulated monopoly for any industry. Farm groups, in contrast, often want private bargaining power partly because they resent the influence of government in ordinary farm programs. Several crucial questions involving conflict between antitrust laws and exemptions for farmers, begun under the Clayton and Capper-Volstead acts, are only partially resolved [61, 215].

Economic evaluations of the accomplishments of farm bargaining have been scarce and usually tentative. On the question of price Hoos [113] concluded in 1962 that "it is very rare that a lasting price-enhancement of as much as 10 percent emerges." The most impressive development since that time has been the formation of federated milk bargaining associations to negotiate for higher Class I prices than those provided in marketing orders and to control disposal of milk eligible for fluid use; Cook [56] concluded that direct and indirect price benefits for producers had been substantial. Appreciable savings in milk transport and handling have been made by some producers' associations formed primarily to bargain. Bits of evidence suggest that numerous gains improving the orderliness and equity of farmer-buyer relationships have been realized in several commodity fields.

The literature concerning marketing orders, especially for milk, is extensive. In 1957 a comprehensive survey of marketing agreements and orders was prepared by Hoos [112]. Farrell [64] made a detailed study of fruit and vegetable orders in 1966. Federal orders for milk through the late 1960s are described in [214].

Much of what has been said about the relation of means to ends in collec-

tive bargaining by farmers applies to marketing orders. Disposal control to effectuate two-price plans is common; production control is rare. In some instances the provisions of a marketing order and the activities of a bargaining association reinforce each other, as in the marketing of cling peaches or (in numerous markets) milk eligible for fluid use. Marketing orders have clearly increased and have stabilized the price of milk used in fluid form. Several spatial equilibrium studies suggest that the location and volume of milk production have been modified. The effects of marketing orders on other commodities have been less clear-cut, and most price effects apparently have been greater in the short run than in the long run.

Storage and Market Stabilization

Support of market prices almost requires the government to operate a storage program because disposal outlets are not likely to absorb acquisitions as they are made. During most of the period under review the government financed large stocks of price support commodities either in the Commodity Credit Corporation's inventory or pledged as collateral for CCC loans. An important by-product of the joint support and storage program, intended primarily to support farm income, was the stabilization of market supplies and prices.

Price variability of crops was reduced, though livestock cycles were not eliminated by more stable feed grain markets [32, 189]. Probably feed grain stabilization encouraged the growth of, and reduced risks on, specialized poultry, dairy, and meat animal farms not associated with grain production. When price support inventories were large, the trade usually carried only working stocks and ceded the longer-term storage function largely to government.

Sporadic attention was given to the question of how large storage stocks typically should be for stabilization purposes and how a stabilization program should be operated [70, 196, 222, 228]. Additional administrative studies were made by the USDA. It seemed generally agreed that no reserve policy could provide complete stabilization and that stocks adequate to guard against all but the most unusual circumstances would be substantially higher than private firms would normally carry in free markets.

The benefits that might justify a government stabilization program have not been agreed upon. Gustafson [89] concluded that if market demands are accepted as marginal social value functions, storage by private firms in a perfectly competitive market is optimal; the government, generally having no better information on future events than private traders have, cannot obtain better net social benefits. This result logically follows from the assumptions used in much conventional analysis.

Economists who have seen a role for government stabilization often have

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not been fully explicit about potential benefits admitted into their models, but the following considerations seem most important: (1) Specialized live-stock (including poultry) operations have been built on a base of fairly stable feed grain supplies and prices; the social costs of instability in the livestock and processing sectors resulting from instability in feed grains are unlikely to be fully reflected in the decisions of private firms regarding feed grain storage. (2) Development of commercial export markets may be aided by dependability of United States supplies. (3) Food assistance to less developed countries in emergencies is desirable but will not be physically or politically possible unless ample stocks are available in the United States. (4) The dissatisfaction of consumers with unstable prices, the relation of food prices to industrial wage rates, and so on are not fully caught up in market demand functions. (5) Difficulties from national emergencies or exceptional crop failures will be alleviated by reserve stocks. Waugh [228] discussed a similar list of possible reasons for stabilization.

The rules or guidelines by which a true stabilization program would be operated constitute a complex question. D. G. Johnson [123], Gislason [82], Gustafson [88], and others studies the question in the context of the assumptions already described for Gustafson's work, with results as summarized by Gustafson [89]. Economists working outside this framework usually have tied their analyses to physical quantities rather than to prices. Substitution among crops should be considered (Waugh [228]). How much stabilization to attempt is a matter of judgment. Price stability should be considered if it will not follow automatically from stability of market supply, and price instead of (or together with) quantity guidelines might be used.

When some form of production control is in use, reserve stocks are a first line of defense against instability, and administratively determined changes in production are a second line of defense; both should be considered in a total stabilization program. Tweeten, Kalbfleisch, and Lu [204] have included reserve stocks, production control, and price and quantity criteria in a study of stabilization for wheat. A further complication is that price and income support probably will continue to be an objective of farm policy; if stabilization is also to be a recognized objective, procedures must be designed to accomplish both. The proper combination of price and quantity criteria becomes a sticky problem, and complete clarity about the relation of the two objectives is essential to avoid the familiar domination of stabilization by income enhancement. Finally, feasible price objectives of stabilization must be distinguished from effects of economywide price inflation.

Other Programs and Combinations of Programs

The complex sugar program has had an almost independent existence from other commercial farm policy. Its feasibility has rested largely on the fact that the United States is a large importer of sugar. Perhaps no other farm program entails so large a proportionate loss of efficiency or so obstructs economic opportunities of the less developed countries. Horton [116], among others, has reviewed past sugar policy and has proposed changes for the future.

Input subsidies have been little used in the United States. Irrigation water supplied at less than full cost, subsidies for liming, terracing, and so on under the former Agricultural Conservation Program, arrangements for grazing on public lands, and credit subsidies have been exceptions. A significant literature exists on these topics. Such subsidies have intensified the problem of excess capacity and may have modified interregional competition in agriculture, but they have not been highly important nationally.

Though such devices as consumption subsidies or supplemental direct payments can operate alone, most programs are effective only in combination with others. The feed grain policy of the late 1960s and early 1970s depended on part-farm land retirement to control output, compliance payments to induce farmers' participation, price support to improve and stabilize income, and storage to make price support effective. For wheat, payments supplemented income as well as inducing participation. For cotton, price support in 1971 and 1972 was so low that it played only an insurance and inventory financing role. In contrast, the old-style tobacco, rice, and peanut policies still operating in the early 1970s relied upon compulsory acreage restrictions without control of diverted land, high price supports, storage, and some form of export subsidy.

One defect of the organization in this part of the review is that comparative analyses of alternative programs for particular commodity producers are not sufficiently identified. Numerous such studies have been made. Among the more recent are analyses for cotton [194], rice [83], wheat [199], and grains, soybeans, and cotton [108].

Capitalization of Income Benefits

Running throughout the literature of farm policy is a point much emphasized by economists disposed to favor the free market and admitted, however reluctantly, by economists favoring farm programs of one kind or another: Income increments resulting from farm programs tend to be capitalized into land or other control instruments such as sales quotas, and eventually capitalization comes to mean higher costs for future farm operators.

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Capitalization can be expected from any type of farm income program. It is most identifiable in a program like that for tobacco or peanuts wherein rights to produce for high prices are restricted to growers with allotments; farms with allotments sell for higher prices than do those without allotments [92, 109, 144, 180]. When allotments are transferable separately from land, they take on high values (for example, [62]), as do milk quotas under some state control plans. Unrestricted price support or supplemental payments for products in general would eventually raise land values, but it would not be possible to compare one farm with another to determine how much. Floyd [69] analyzed the effects of certain programs on returns to land and labor and pointed out that detaching sales quotas entirely from land would reduce land value while creating quota values.

Reinsel and Krenz [161] concluded that income benefits of farm programs are capitalized into land values at high discount rates or, alternatively, that if going rates of interest are used for discounting, a significant proportion of benefits go to resources other than land. Their findings suggested less capitalization than had usually been assumed. They calculated that only 8 percent of farm real estate values as of 1970 represented capitalized value of benefits from principal crop programs. Tweeten [201] estimated that up to one-third of land value gains from 1950 to 1963 were due to the farm programs.

The capitalization effect is considered by many economists to be a shortcoming — by some a decisive one — of long-enduring income programs for agriculture. Most members of the generation entering farming after programs are initiated, it is argued, must buy their way in at higher land values than otherwise would be the case. Program benefits become inputted to land rather than labor. Wilcox [237] argued in rebuttal that ownership turnover is so slow that the effect is long delayed, and the Reinsel-Krenz findings tended to blunt the capitalization argument. Cochrane [53] agreed that the income benefits of comprehensive supply control would be capitalized in quota values but regarded that as a cost of achieving a stabilized market at fair prices.

Program Costs

Government outlays for farm programs are not unambiguously obtainable from the federal budget, and some judgment must be exercised concerning whether certain activities are chargeable to farm price and income support. One estimate [20] of annual outlay in the late 1960s was a little more than \$5 billion. Most of the outlay transferred income from nonfarmers to farmers; one-fourth or less of the total outlay represented the absorption of resources for storage, administration, etc., useful for other purposes. Costs to consumers in the form of unduly high prices were considered low because

the rates of return to resources on efficient farms would have been well below the rates in the economy at large if direct payments — the principal government outlay — had not substantially added to net farm income.

Efficiency

Farm programs create inefficiency if they cause resources to be used less effectively, under a given state of the arts, than they could be for satisfying citizens' wants. A much-used norm for appraising efficiency is the configuration of inputs and outputs expected under perfect competition, although, as noted earlier, acceptance of the personal distribution of resource endowments and income involves a value judgment. Economic evaluation of social costs associated with particular policies has frequently employed partial equilibrium analysis and the concepts of consumers' and producers' surplus. Harberger, a leading practitioner of such analysis, has made a strong plea for its acceptance in applied welfare economics [95]. Reservations on theoretical grounds often are based on a reluctance to aggregate personal utilities and on second-best considerations.

This reviewer is unwilling to aggregate personal utilities indiscriminately. He is particularly unwilling to accept the assumption that there exist empirical counterparts of either the perfect competition situation or the equivalent situation under the constraints of a program. As the general model of the agricultural sector discussed earlier indicates, agriculture has been and is in chronic disequilibrium. One of the best demonstrations of this has been provided by Kaldor and Saupe [135]. The neat alignment of resources, output, and prices specified by the perfect competition model is far from duplicated in free markets, and the equally neat alignment assumed under the constraints of a program is not experienced when programs are in effect. In particular, areas under empirically determined supply curves are unlikely to represent opportunity costs. The basic theory is invaluable in providing a conceptual orientation for the analysis of programs, but the assumptions implicit in the literal use of simple forms of it for policy conclusions are breathtakingly heroic.

Many, perhaps most, economists do not agree, so the findings of Harberger-style studies are of interest. Wallace [227] estimated social costs for Cochrane-type comprehensive supply control and for Brannan-type direct payments for all commodities. Because exact values of aggregate supply and demand elasticities were in doubt, Wallace used various combinations of elasticities. The highest ratio of social cost to value of output was less than 2 percent for the Cochrane program and less than 5 percent for the Brannan program. Johnson [129] concluded that the social cost of the tobacco program (characterized by high price support and compulsory acreage restriction with-

out control of diverted acres) was relatively small if only the domestic market was considered and might be a net *benefit* for the nation (but not for other countries) if exploitation of the United States' presumed strong position in the export market was taken into account. Hushak [119] found that for the feed grain program during 1961-66 "in general, the net welfare costs were small and the income transfers were substantial." Dardis and Dennisson [58] compared the social costs of alternative ways of providing protection for United States wool growers; differences between programs did not exceed 6 percent of the value of domestic consumption.

Thus conceptualized and measured, the loss of efficiency as a result of farm programs is small. A similar conclusion usually has resulted from the application of comparable methods to situations presumed to cause resource misallocation (for example, as under oligopolistic departures from competitive pricing) outside of agriculture [121]. At least for agriculture, however, a more fruitful approach appears to be to set forth hypotheses on how farm programs might impair or improve the efficiency expected to be achieved in the absence of intervention and then to attempt to measure the influence of each hypothesized effect. The approach, of course, could be easily adapted to comparing the effects of different programs. Although farm policy literature contains many intuitive or judgmental statements that fit into this framework, little searching, rigorous work has been done to support hard conclusions. The following paragraphs are a personal and often subjective summary of the implications of information so scattered in bits and pieces as to defy concise documentation.

Perhaps the principal way in which farm programs might affect efficiency is by retarding or speeding up the rate at which excess farm labor finds *productive* employment elsewhere in the economy. A large proportion of persons engaged in agriculture have been under strong economic pressure to go elsewhere, and, as the brief review of the labor adjustment process indicates, short-run mobility is not much affected by farm prices. Probably farm labor mobility has not been much different with farm programs than it would have been without them. Similar judgments have been made by many others; indeed, it is difficult to find statements by agricultural economists in the last ten years to the effect that programs have done much to hold labor in agriculture. the reimposition of cotton quotas in the 1950s forced some labor out of farming [212]. Fuller [72] emphasized the point that the departure of people from agriculture is not enough to assure an increase in welfare despite the statistical improvement in farm labor productivity and incomes; those who leave must be productively employed elsewhere.

Have programs tended to keep farms from becoming large enough to achieve the principal economies of size? In tobacco areas, yes [19]; in areas

of small cotton farms, probably; in most areas, apparently not. Acreage controls may have stimulated farm consolidation in some areas in order to get sufficient acreage of controlled crops. Though price supports are advocated by some groups to hold small farmers in agriculture and are said by some critics of supports to have done it, size and number of farms in the long run probably are determined largely by economies of size (broadly interpreted) and are little affected by the level of prices.

Have interfarm and interregional adjustments of output been impeded? Probably interfarm shifts have been substantially impaired for tobacco, and interregional shifts have been retarded or altered for cotton and milk, with significant efficiency losses. Though adjustments for other crops have also been affected, efficiency consequences seem slight.

Has the output mix been made less efficient? Significant damage may have been done to export markets and hence to production of cotton. High-cost sugar production in the United States is sheltered by sugar policy. Control programs of the late 1960s and early 1970s kept production of several crops about in line with utilization; other crops and livestock products were not controlled. Since demands for most controlled crops are distinctly inelastic, distortions of the output mix attributable to holding production in line with utilization at support prices cannot have a large value in relation to the value of total output. Expansion of cattle production in the Great Plains probably was retarded by grain programs.

Has the input mix been made less efficient? Probably substitution of variable inputs for fixed inputs, especially for land, in the production of a given volume of output has been too much encouraged. On the other hand, capital investment, which has not been generally excessive under government programs [135, 202], probably has been stimulated by higher and more stable farm incomes with programs in effect.

Have domestic consumption subsidies or export disposal in noncommercial markets created useless markets and wasted production costs? Values currently held by the majority of citizens justify most domestic consumption subsidies and, in less degree, emergency food relief abroad. If P. L. 480 has impeded agricultural development abroad, as some economists contend, the program's seeming contribution to welfare is diminished.

Has restriction of total farm output created social costs? The highly inelastic demand for aggregate output and the modest extent of output restriction suggest that the social costs incurred have been small in relation to the value of total output.

Progressiveness

The question is whether farm programs have influenced technological and

managerial innovations that affect the productivity of agriculture. As Schultz [178] and others have pointed out, most total output gains and virtually all per-capita output gains, both in the economy at large and in agriculture, have come about through the application of knowledge to production processes. Tweeten and Plaxico [205] showed that gains in agricultural productivity between 1930 and 1960 save a large portion of the inputs that would otherwise have been needed to produce the farm output of 1960. The principal component of new knowledge in agriculture — technology — calls for constant reorganization of resources. A progressive agriculture is always out of equilibrium as defined by the static theory that underlies the concept of efficiency. Criteria for an optimal mix of progressiveness and efficiency are necessarily incapable of precise definition [22].

A general argument advanced by Cochrane [53] and others [28] is that production control has little effect in slowing down development of new technology (since it is largely external to farming) or in modifying farmers' incentives to adopt it. The general model discussed in the first section of this review strongly suggests that income support speeded up the adoption of technology by putting farmers in a better position to finance the investments that were often required. Reduced price risk probably also encouraged investment. It is also likely that to the extent innovations are induced, higher product prices resulting from farm programs speed up the development of new technology.

The gradual leveling off of the ratio of aggregate output to aggregate input in agriculture in the 1960s has not been thoroughly examined and has been taken by some economists [202] as an indication that the long increase in farm productivity has ended. It is possible that the leveling off was partly a statistical illusion arising from not properly taking into account the retirement of large acreages of cropland under the programs of the 1960s. In any event, the output-input ratio rose after 1970.

The brevity of this section reflects the fact that the economic organization and institutions of American society, together with a stage of development that science was in, had produced a high rate of progressiveness in American agriculture. Inadequate progressiveness was not the problem from 1920 to 1970, and agricultural economists devoted little attention to it in an analytical sense — they merely noted the presence of technology and the dramatic consequences of it. Progress and growth remain poorly understood in agriculture as elsewhere. Economists' much greater attention to efficiency in agriculture reflected in part a preoccupation with the static models of classical economics and in part a realization that many of the potential social benefits of technology are not won unless resources are reallocated in the direction of efficiency norms as development proceeds.

Income Distribution and Equity

Most equity considerations in farm policy are associated with the personal distribution of income and wealth and with the sharing of costs, but some — for example, the necessity for many people to change their occupation and residence — are not captured in dollar figures. As already emphasized, economists have long been well aware that the income benefits of simple price support, production control, and direct payment programs are shared among the members of the target farm groups approximately in proportion to the volume of sales. The distribution of sales or production is, of course, highly unequal. Robinson [163] concluded that possible disproportionate effects among farms of different size because of different net-gross income ratios were not important in practice.

Two extensive studies [14, 148] of the distribution of payments and price support loans did not much modify the general conclusion that benefits have been in proportion to farm size. All producers of a crop benefit from the level of price support maintained by a joint program of voluntary production control and nonrecourse loans. Which farmers decide to earn compliance payments or to use the loan is of secondary importance. Supplemental payments have been distributed about in proportion to production except for modifications at the extreme ends of the distribution, as under the 1971 cotton program.

The tendency for the benefits of price and income programs to be capitalized in land values implies that principal long-run benefits accrue to owners of farmland (and their heirs) at the time of its value appreciation. Part-owners and tenants, who are among the largest farm operators in some areas, probably have benefited proportionately less than landowners, some of whom have no other connection with farming. Gaffney [75] presented a catalog of objectives to programs tending to support or increase land values.

Emphasis of price and income programs on crops (on which the adverse effects of excess agricultural capacity have tended mainly to fall) suggests that crop producers have benefited most. Producers of meat animals and poultry products have had higher feed costs and product prices than otherwise would have been the case, along with somewhat lower aggregate output, greater stability, and small net benefits or costs. Dairy producers have been the exception in the livestock group — benefits to them have been significant. The geographic areas receiving principal benefits have been those where field crop acreage and milk production (especially for fresh consumption) are concentrated.

The effects of farm programs on income distribution within agriculture are considered good or bad depending on what goals are thought appropriate.

Heady [106], among others, has contended (1) that the leading purpose of farm programs is to compensate farmers for the adverse effects of technological change of great value to the general public and (2) that stabilization is needed for an inherently unstable agriculture. Benefits in proportion to size of farm operation are appropriate in this context. To economists who acknowledge only poverty problems, the personal distribution of the benefits of farm programs means that public funds are misdirected. Price and income programs clearly are grossly inefficient as solutions to poverty: Bonnen [14] estimated that the feed grain and wheat programs expended six or seven dollars for each dollar going to the smallest 40 percent of growers.

The distribution of income between farmers and nonfarmers also raises equity questions. Nonfarmers receive some benefits from farm programs (for example, assurance of adequate supply and stable prices in an event like the corn blight of 1970), but, in the main, income is transferred to farmers from nonfarmers through the tax and food bills. Farmers who sell more than two-thirds of all farm products (table 1) and who apparently receive a like share of program benefits have higher (net) incomes and substantially more wealth than does the average American family. Sharing of costs through the food bill is regressive compared with sharing through the tax bill [190, p. 47], though other considerations also influence the choice between market-financed and tax-financed programs. As for the within-agriculture case, conclusions about the appropriateness of income distribution depend in part upon emphasis given to the compensation principle or to alleviation of poverty as policy goals.

Much equity-oriented analysis has been focused upon returns to labor on the apparent assumption that persons receiving other factor returns, especially returns to land, are not generally among the needy. For farm families who own their farms, the distinction among factor returns is not important from an income standpoint in the short run. Except to the extent that income benefits are incompletely capitalized into land or quota values, it seems impossible for any conventional type of farm program to increase farm family labor returns in the long run if excess labor persists. Thus proposals to upgrade the skills of farm people and to increase labor mobility often have been motivated by a desire to improve personal distribution of income as well as by concern about resource allocation.

Concluding Topics

Farm Policy, Rural Poverty, and Development

As the first part of this review shows, agricultural economists in the late 1940s were well aware that many farmers had few resources, were poor, con-

tributed little to total farm output, and could not be greatly helped by price support or similar programs for commercial farming. Serious examinations of policy for farm people, such as the land-grant college report on agricultural policy to follow World War II [7], the USDA's *What Peace Can Mean to American Farmers* [220], and a Senate study in 1948 of long-range policy [223], discussed the problems of low-income farmers. Included in these were such topics as education, vocational training, migration to sites of industrial employment, rural health and sanitation, nutrition, housing, electrification, recreation, Social Security for farmers, and migratory workers—indeed, virtually the whole gamut of topics to be discussed in the same connection twenty-five years later. Not until the mid-1960s, however, was the political climate right for much public attention to such matters.

Despite some concern with nonfarm economic problems of rural areas before the 1950s, agricultural economists once tended to regard the rural economy as directly or indirectly dependent on agriculture, with help here and there from forestry and mining. Not until well into the 1950s did a substantial expansion begin in resource economics and rural development in the sense of improving opportunities in, and performance of, the rural nonfarm sector. By the 1970s scarcely any economist identified rural economic problems as strictly agricultural.

The literature reflects some early ambivalence among agricultural economists about whether commercial farm policy, rural poverty, and rural development were distinct if overlapping topics. Though it was widely recognized that ameliorating the problems of commercial farmers would be of small help to the rural poor, it was less widely agreed that correcting the rural poverty problem would have little effect on commercial farmers. One view seemed to be that labor mobility was the solution to both problems; the two were on the same continuum although, of course, more education, vocational training, and so on were needed by the poor. Programs to accomplish these things for the poor, therefore, were the appropriate farm policy. The opposing view was that commercial farmers had important problems not capable of being dealt with adequately by labor mobility alone. It seems clear at present that the business characteristics of agriculture have opened up so wide a gap between commercial farming and rural poverty that policies for the two must be distinct; and, of course, many of the rural poor have no connection with farming.

Approaches and Methods

Most economists working in farm policy have been aware of the distinction between positive and normative analysis and, in principle, would have accepted the common view that the economist has no scientific basis for

choosing among the value held by different persons regarding policy or among the persons holding the values. In practice, however, farm policy economists, like economists in other areas where values play a prominent role, have behaved in many individual ways and often have introduced value judgments as criteria for policy. Not much writing was done in the post-World War II period by farm policy economists on the methodological issues involved. Shepherd [185] argued in the 1950s that economists could affect values, but his difference with the conventional position seemed largely semantic. A more or less orthodox view of the role of values and of the scope of farm policy research was given in [24].

Values and economic assumptions often mingled in unclear ways when government programs were compared with free markets, especially before the mid-1950s. Cochrane [53] argued in 1959 that economists should not ignore the ancient question of fair prices. Allin [5], one of the dwindling school of institutional economists, called for consideration of ethics and freedom and for weaving other social sciences into the analysis of policy issues. Some agricultural economists (see, for example [22]) argued for looking at the economic world as a dynamic process and for reformulating criteria for policy accordingly. Kelso [136] expanded upon the old criticism of the concept of the economic man to challenge the analytical power of sophisticated economic and econometric models to provide true answers for real world problems, especially of prediction; policy prescription, he held, is art and goes beyond the limited valid information extractable from economic science. In all of these cases, of course, agricultural economists were dealing with questions about which much more has been written by general economists, other social scientists, and philosophers.

Techniques of analysis have been nearly as diverse as the multifarious problems investigated. Studies have ranged from integrative analyses as broad as Schultz's farm sector model in his *Agriculture in an Unstable Economy* to specific firsthand surveys of what farmers in particular areas did in response to acreage controls. Numerous studies have made use of programming models, estimation techniques for simultaneous equations, and similar analytical methods as they became part of the skills of agricultural economists. Farm policy questions have been studied in the context of game theory [66; 139; 90, pp. 364-374]. Control theory as an analytical framework has been discussed [38, 197]. A "state of the art" paper on policy simulation experiments is given in [152].

Comments on the Future

Understanding the macroeconomics of agriculture will continue to be fundamental to successful policy formulation. Nothing is so useful for farm

policy analysis as accurate knowledge of how the agricultural economy works, fortified by reliable quantification of key relationships in the system. Awareness of values basic to what people want from the agricultural sector and of the political processes by which policy is made is also essential for successful work in political economy. Much of the research required is not called *policy* analysis, nor should it be; but policy analysis and prescription can make little progress without it.

The quick turnaround from farm surpluses to shortages in 1972-73 made dramatically evident the need to be able to anticipate the future supply-demand balance in agriculture. Policy should be capable of dealing with events as they unfold. This suggests the need for continuing examination of technological advance in agriculture, the availability and costs of inputs from non-farm sources, production constraints required for environmental protection and food safety, changes in domestic demand, developments in foreign markets, and still other matters. Great uncertainty about whether agriculture will produce a little too much or a little too little may be inescapable, in which case policy should be designed to cope with either outcome.

If one had much confidence in the public's ability to discern its own interest in agricultural policy, one might predict that stabilization of agricultural markets would be given a higher priority than in the past. Whether agricultural capacity proves to be generally excessive, deficient, or about right in the future, much instability can be expected in free markets. The arguments for stabilization discussed in the preceding section are applicable, and the questions identified there deserve economists' attention.

Changes in farm structure — size of farm, ownership, vertical relationships with nonfarm firms, and so on — will continue to cause discontent among farmers and to raise issues about efficiency and the distribution of power in the economy. In-depth analyses are needed on those topics that the economist can get his teeth into: economies of size in the conventional sense; benefits of size in obtaining lower input prices, higher output prices, or other advantages in dealing with other firms; potential gains of several kinds from vertical integration; strategies available to conglomerate firms in obtaining markets, allocating costs, and payment of taxes; and the economic difficulties of family businesses in transferring ownership from generation to generation.

With the growth of food exports domestic agricultural policy and international trade policy will touch at more and more points. Supplies of and demands for food abroad and policies modifying trade will be essential considerations in the formulation of domestic policy. Food aid for poor countries will be almost a new problem if surpluses cease to exist.

Probably support of farm income, or at least provision for support should

farm prices fall, will continue to be an important feature of farm policy. Questions on feasible policy alternatives and their economic consequences will remain relevant. The broader issues are well recognized among economists. A less appreciated need is for detailed knowledge of how programs actually work. There appear to have been provisions of law and administrative practices that conferred special advantages on some groups or incurred waste, neither justified by the avowed purposes of the programs. Such instances, if they exist in the future, should be widely recognized and discussed.

A particularly important aspect of policy analysis is the evaluation of the effects of programs on resource allocation or efficiency in the agricultural sector. As suggested earlier, the most fruitful appraisals are likely to come from addressing directly the real-world situations in which problems and programs are embedded, not from substituting unverified assumptions and static models for the dynamic world that actually exists. Though qualitative discussions along the lines proposed are plentiful, conclusions based on well-supported quantitative findings are scarce.

Questions bearing on personal income distribution are highly important but notably difficult to resolve. The difficulty is compounded by a common implication that commercial farm policy should deal primarily with poverty, something it does not and cannot do. Most of the economic policy problems with which the nation concerns itself are no more poverty-oriented than is farm policy. Industrial labor policy dealing with collective bargaining and unionization is not aimed at poor people; demands that the nation maintain a high level of output and employment come largely from business managers, stockholders, and workers not in poverty; inflation is denounced by almost everyone. The idea that economic policy must deal with poverty to be significant is an acceptable value judgment but obviously not one held by most citizens or economists.

That said, it can be agreed that the personal distribution of income and wealth is an important criterion for farm policy. The fact that the top farmers who market 80 percent of all farm products have higher average incomes and more wealth than the typical American family is relevant here. If generally understood, it probably would lead most citizens to conclude that support of farm income should receive a lower priority as a policy objective than in the past. The wide distribution of income among farmers, even within the strictly commercial sector, would suggest that programs should be designed, so far as they feasibly can be, to scale down benefits going to the wealthier producers. Accordingly, economists might well incorporate such equity considerations in their search for better farm policy.

Under the stresses of the 1930s and subsequent decades, farm policy became defined in practice as price and income policy. This emphasis should give way to a broader concept in which agriculture as an industry, forming part of a larger food and agricultural sector, is the contextual unit of analysis; and all aspects of the economic performance of the industry should be admitted to consideration. Farm policy specialists would be, first of all, knowledgeable about the macroeconomics of agriculture. Attention would be paid to the adequacy of agriculture's production capacity, changes in its product and factor markets, the structure of the industry, its sectoral relations to other industries, its stability, the generation and distribution of income in the industry, and the like. The position of hired farm labor, given too little attention in this review, would be included. Knowledge acquired across such an array of topics and integrated by the concept of industry is likely to be more applicable to policy issues in the future than is knowledge produced by exclusive attention to price and income questions.

The writer will indulge himself in two comments on methods and approaches. As has already been suggested, he has little confidence in the productivity of analyses anchored in the assumptions of perfect competition, focussed exclusively on resource allocation, and employing only logic, however elegant, to reach conclusions purporting to apply to policy issues. He would like to associate himself with the orientation toward the real world reflected in the presidential addresses of Leontief [141] and Galbraith [79] to the American Economic Association.

Economists would do well to go back to A. C. Pigou and forthrightly adopt his proposition that a narrowing of the personal distribution of income increases welfare if the national product is not reduced.⁴ Post-Pigou welfare economics has been an intellectually fascinating exercise using constructs that relate to the economy as chess relates to war and guided by a criterion (Pareto's) that the public does not accept as a sufficient or necessary test of satisfactory policy. Pigou's defense of his position was impressive if not value-free; the ethic expressed in it, if not too finely drawn, is widely accepted by the American public today. Pigou's rule does not permit a resolution of all farm policy issues, but it does offer guidance in dealing with such questions as who should receive income support at a cost to the public.

In summary, work in farm policy can continue to be productive for qualified agricultural economists if it has four characteristics. It should be conceived in terms of agriculture as an industry, deal with a wide range of farm economic problems of significance to society, employ realistic if sometimes necessarily inelegant models, and be guided by Pigou's rather than Pareto's principle of the relation of personal income distribution to welfare.

Notes

1. In the early 1940s Schultz [177] had proposed payments to farmers to compensate for low income. The payments were not to be related to farm size or to production (to avoid making them regressive) but were instead to be available on equal terms to all families; they were to be made in kind (for instance, as food, medical services, education), and they were to be tied to the human agent rather than to property.

2. See "Postwar Policies Relating to Trade in Agricultural Products" by D. Gale Johnson in this volume.

3. An experimental program in 1958 asked farmers to submit bids for land retirement. Rough calculations of the values of production on land offered for retirement led to the disconcerting conclusion that the ratio of output to retirement payment was highest on the most productive land [17]. The sample was necessarily restricted to land offered for retirement.

4. This was subject to minor qualifications. Pigou also held that an increase in national product not accompanied by a decrease in the product accruing to the poor increased welfare.

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