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Drought, Agriculture, and the Economy

This article was prepared by John Rosine and Nicholas Walraven of the Board's Division of Research and Statistics. Diana Liston Stella contributed research assistance.

In 1988, for the fourth time in the past fifteen years, drought and its repercussions dominated agricultural developments. The drought came in a year of reduced plantings and cut the total output of crops to a level 20 percent below the average of the four preceding years; it shriveled the output of feed grains to roughly half the four-year average. The loss of production caused a steep rise in the prices received by farmers for crops, 23 percent overall from March to August. The price of soybeans increased nearly 40 percent over that period, and corn prices surged despite huge surpluses from previous harvests.

The drought had a noticeable effect on overall measures of U.S. economic performance in 1988. According to estimates by the Department of Commerce, the output losses in agriculture reduced the annual rate of real growth in the gross national product nearly a full percentage point, on average, over the last three quarters of 1988. In addition, the initial shock to crop prices began showing up quickly at the consumer level and added to the rate of increase in the consumer price index over the summer months and into early autumn. Other repercussions of the sharp rise in crop prices, including the effects on livestock and meat prices, probably still are working their way through the economy, but perhaps with less intensity than many observers had expected initially.

In the farm sector itself, the drought's effects were dramatic, but uneven. At one extreme, those producers with little or no loss in production and large stockpiles from previous harvests benefited enormously from the steep rise of crop prices and ended up better off than they would have been had the drought not occurred. However, a number of other producers suffered set-

backs that may have been only partly offset by insurance indemnities or federal disaster payments.

Overall, farmers probably were better positioned to withstand drought losses in 1988 than they would have been three or four years earlier, when the farm financial problems of the 1980s were at their most intense. A recovery in the farm economy that began in 1986 picked up momentum in 1987, and most of the readings for 1988 look favorable despite the drought. In particular, most farmers continue to have an ample cash flow that should enable them to service debt in the period ahead; and, while some drought-induced loan defaults may occur, most farm lenders should be able to handle them without incurring a serious decline in profitability.

DROUGHT LOSSES AND REAL GNP

In most years, changes in farm output do not have a marked influence on the growth in gross national product. However, as was evident in 1988, swings in farm output sometimes are big enough to have a sizable influence on GNP growth, at least over the relatively short span of three or four quarters. These swings pose special challenges for national income accountants at the Department of Commerce, and they also necessitate added caution in the interpretation of incoming GNP data.

Economic Considerations

The broad economic effects of the drought are relatively straightforward. Drought causes a one-time reduction in farm crop output and in the economy's aggregate output. Usually, this reduction is reflected in gross national product mainly as drawdowns in the inventories of crops owned by farmers and those owned or financed by the government's Commodity Credit Corporation.

On the demand side, the price increases caused by drought reduce both the volume of farm exports and the real income and spending of households; when inventories are small initially, the price increases will be larger, requiring that real consumer spending and exports absorb more of the shock to output. The rate of growth of real GNP slackens as crop losses mount, but then bounces back when the drought ends. Typically, farm crop output has rebounded in the year after a drought (chart 1). During the rebound the effects of the losses on GNP are reversed, and, for a time, real GNP growth is higher than would otherwise be the case.

Accounting Considerations

The challenges of measuring the changes in farm output in the national income and product accounts stem largely from the annual nature of the crop production process and the difficulties of dividing that process into quarterly segments. Because farm output is influencing GNP growth so heavily at present, it is worthwhile sorting through some of these accounting issues in detail.

Many production processes that are captured in GNP are of short duration. Some services—haircuts, for example—are produced each day, and a quarterly estimate of the production of these services can be obtained by adding up the

daily output during the quarter. Similarly, one can determine the quarterly output of many goods by counting the number of items that come off assembly lines each day; or, alternatively, one can infer output from the labor and capital inputs that are employed on the assembly line. Some production processes (building a skyscraper, for example) may take a relatively long time, but the value added in the process is virtually certain to yield a finished product. Hence, progress in production can reasonably be allocated to appropriate quarters.

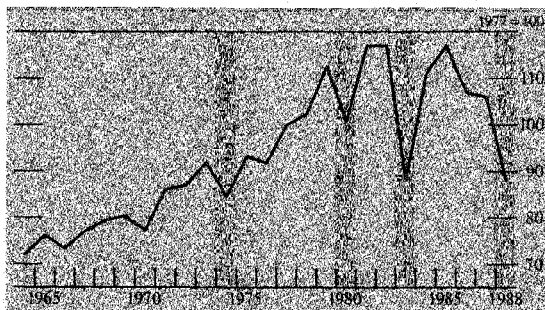
Agriculture differs from these production processes. Crop production takes a relatively long time, a year for many crops; and, because natural disaster poses a risk during the growing season, there is no certainty until harvest that an actual product will result. In addition, inferring output from the spending on purchased inputs is difficult because rainfall—a given of nature—often is the dominant influence on crop production.

As a result of these difficulties, the Department of Commerce, in the early part of the annual crop cycle, is forced to devise quarterly estimates of farm output from a *forecast*, prepared by the Department of Agriculture, of what annual production eventually will be. Drought, of course, causes production to deviate from its anticipated course. However, evidence that output is irreversibly off track often will not be available until midyear or later. Because analysts cannot predict the duration of the drought, they cannot know for sure how much production was lost until late in the year. Along the way, considerable judgment necessarily enters into the quarterly estimates of farm output.

Accounting for the 1988 Losses

The 1988 drought occurred somewhat earlier in the farm production cycle than most previous droughts, and by mid-July it was fairly clear that drought losses would be severe. In its July report on real gross national product, the Commerce Department estimated an annual loss of \$11 billion. The estimate was raised to \$14 billion a month later, reflecting surveys by the Agriculture Department that showed further deterioration of crops into early August. Subsequently, crop con-

1. Crop production¹



1. The series plotted is the index of farm crop production compiled by the U.S. Department of Agriculture; the index is constructed by weighting the physical output of crops by the prices of a base period. The 1988 plot is an estimate from the U.S. Department of Agriculture, "Crop Production Report," November 9, 1988. Here and in following charts the shaded areas denote years in which losses from drought were substantial.

ditions improved slightly, and the estimate of the annual loss was scaled back a bit, to \$12.8 billion in the November GNP report.

Of the total annual loss, about one-sixth was allocated to the second quarter of 1988, roughly one-third was allocated to the third quarter, and about one-half was allocated to the fourth quarter. In arriving at this quarterly breakdown, the Department of Commerce took account both of the time at which crop losses were recognized and of the time at which the affected crops would have been harvested.

According to the estimates of drought loss in the GNP report released in late November, real farm output in the fourth quarter, at an annual rate, was more than \$25 billion below what it would have been in the absence of drought. Analysts at the Department of Agriculture have projected that farm output will rebound in 1989, as it has in years following past droughts, and officials at the Department of Commerce have indicated that this rebound will add substantially to the rate of GNP growth in the first quarter of the new year.

A Cautionary Note

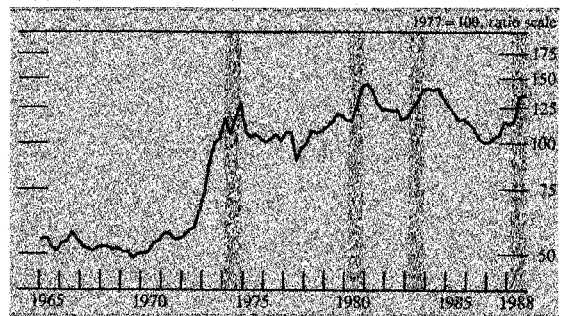
During a period of severe drought losses—and during the period of recovery from drought—the interpretation of short-run changes in gross national product requires added caution. Most economists view such changes as being caused mainly by shifts in aggregate demand; and observed changes in real GNP are used to draw inferences about the strength of demand. Such inferences may be misleading, however, if a drought-induced change in GNP is taken to be a signal of underlying growth in demand. Estimates of GNP that adjust for the drought-related swings in farm output probably provide a better gauge of the underlying course of the economy and the associated pressures of demand on the economy's resource base. Thus, fundamentally, the economy probably was stronger over the last three quarters of 1988 than was indicated by the changes in GNP alone. Likewise, the economy's fundamental strength in the first quarter of this year likely will be exaggerated by the projected rebound in farm output.

DROUGHTS AND CONSUMER FOOD PRICES

In each drought of the past fifteen years the tightening of supplies of agricultural crops has boosted crop prices (chart 2) and stirred concerns that the cost of food to consumers would rise dramatically.

However, in each of these episodes—at least up to the current one—the runup in consumer food prices, relative to the general rate of inflation, has tended to be reversed fairly quickly, with little lasting influence on overall price trends. This limited price response to drought is evident in table 1 and in chart 3, which show the behavior of food prices and other consumer prices in the three most recent episodes of drought.

2. Crop prices¹



1. The series plotted is the index of prices received by farmers for crops, compiled by the U.S. Department of Agriculture and seasonally adjusted and transformed into quarterly averages by the authors. The last plot is the average for October and November 1988.

1. Changes in consumer prices during the six quarters after the onset of selected droughts¹

Percent, compound annual rate

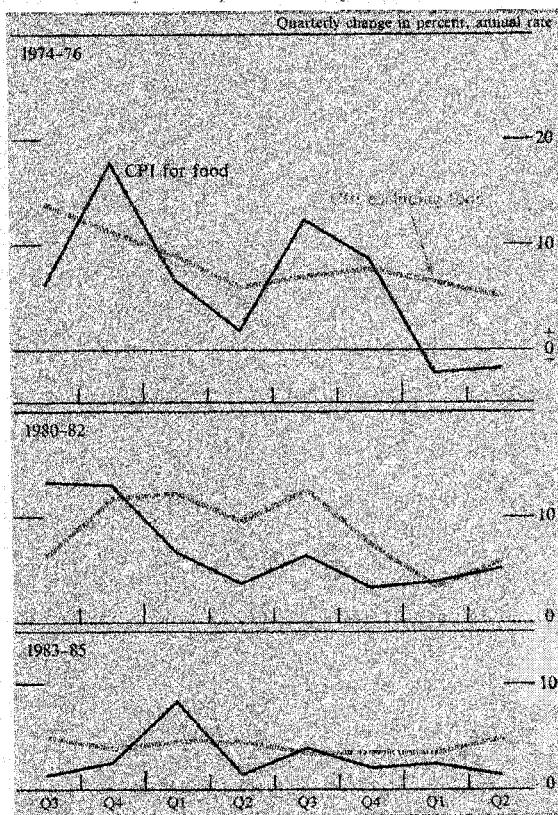
Year of drought	Food	All items excluding food	All items excluding food and energy
1974	8.8	9.2	9.0
1980	7.6	10.0	10.0
1981	1.3	4.2	4.9

1. Changes are measured from the second quarter of the year in which the drought occurred to the fourth quarter of the following year.

Offsetting Macroeconomic Influences

One reason why the droughts of recent years have not led to larger and more sustained increases in consumer prices is that, on each

3. Effect of poor crops on food prices



SOURCE: U.S. Department of Labor, Bureau of Labor Statistics.

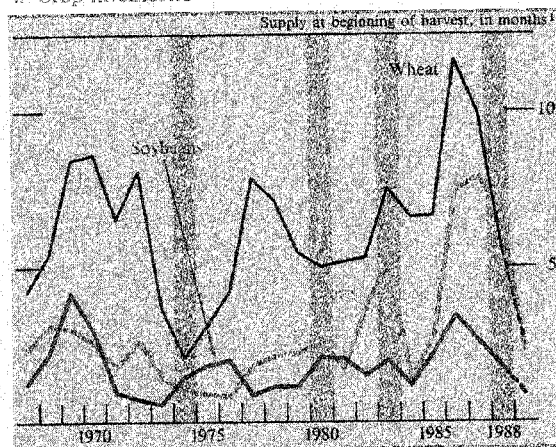
occasion, important macroeconomic influences were working in an opposite direction, helping to restrain increases in food prices. In 1974, a deepening economic recession forestalled larger price increases at the consumer level. In 1980, spiraling interest rates and sluggish growth blunted upward price pressures in farm commodity markets. In 1983, a rapidly appreciating dollar restrained price advances. Unfortunately, the effect of these countervailing influences on food prices is difficult to determine with a high degree of statistical precision because the number of drought episodes is so few and the factors influencing prices are so numerous. The coincidence of past droughts with the countervailing macroeconomic influences probably was happenstance, and in a more expansionary economy, drought losses might well generate price effects different from those observed in the past.

Adjustments within the Farm Sector

Adjustments within farming frequently have facilitated a relatively smooth adjustment of the economy to drought losses. More than most nations, the United States tends to carry large inventories of farm crops that can be drawn upon in the event of a poor harvest. In addition, consumers of farm crops, particularly farmers who fatten livestock for slaughter, often curtail demand after a small crop and thus begin relieving the pressures on crop prices fairly soon after harvest. The prospect of bringing unused acreage back into production in the next growing cycle also may help to stem upward price pressures; indeed, because futures traders tend to anticipate the next crop, crop prices may begin falling quite early in the next cycle if crops get off to a good start.

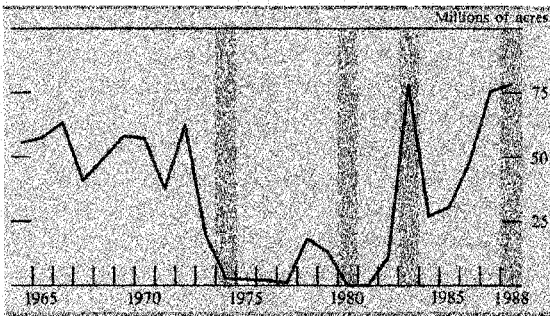
The degree to which these adjustments within farming soften the effects of drought can vary a lot, depending on initial conditions such as the size of stockpiles and on the severity and duration of drought. For example, because of the drought in 1988, stocks of the major crops are likely to be reduced considerably before the 1989 harvest (chart 4); thus, should drought recur in 1989, inventories would provide less protection

4. Crop inventories



1. Supply is measured by relating stocks at the beginning of a harvest to total use of the crop during the preceding marketing year. The primary data are from the U.S. Department of Agriculture; they have been adjusted to months' supply by the authors. For wheat, the beginning of the harvest is June 1; for corn and soybeans it is September 1. The figures for 1989 are derived from projections by the Department of Agriculture as of December 12, 1988.

5. Acreage withheld from production under government programs



SOURCE: U.S. Department of Agriculture. The figure for 1988 is preliminary.

against price increases and the associated adjustments in consumption. By contrast, more spare acres can be brought back into production in 1989 than in some previous droughts. In recent years, the government has encouraged producers to take large amounts of acreage out of production in an effort to reduce surplus stocks (chart 5). These acreage retirements were especially large in 1987 and 1988. However, with the drought causing crop inventories to contract much faster than had been expected, policy now is shifting back toward less production restraint. The amount of land taken out of production in

1989 will likely be smaller than in recent years, and plantings are expected to be larger.

Transmission of a Drought Shock to Consumers

Other ways in which the impact of the drought is cushioned center around the mechanisms by which the initial shock to farm crop production spreads through the economy. The transmission process works through many channels. Some carry the output shock through farm prices quickly and directly to consumers. Other channels carry the effects so slowly and indirectly that when they finally show up at the supermarket, they may be diffused and inextricably entangled with other influences. In some instances, the initial price increases due to the drought already are being reversed by the time the later price effects appear to consumers. To categorize these channels more rigorously, it is convenient to consider three kinds of food commodities that differ mainly in the timing of their production responses to drought. Although the discussion focuses on drought effects, other influences, such as the trends in labor costs, also have been shaping price developments over this period and would need to be considered in a more general discussion of price determination.

2. Changes in consumer food prices, drought of 1988¹

Percent

Item	1987	Pre-drought, December 1987 to May 1988	Drought		MEMO: Relative importance in the food price index, December 1987
			May to September 1988	October	
Food.....	3.5	3.6	9.2	2	100.0
Fresh fruits and vegetables.....	17.9	-13.9	39.2	-1.1	7.2
Cereals and bakery products.....	4.2	7.3	11.4	7	8.4
Fats and oils.....	1.7	8.0	13.2	1.0	1.6
Processed fruits and vegetables.....	4.6	10.5	13.3	1.3	4.0
Poultry.....	-9.2	14.4	60.2	-3.0	2.7
Eggs.....	-17.5	17.1	62.2	2.9	9
Beef.....	6.7	9.6	7.4	-3	6.4
Pork.....	-1.8	5.4	-9.8	-8	3.8
Food away from home.....	3.6	4.3	5.0	3	38.6
Dairy.....	1.8	1.6	4.2	9	7.7
Fish.....	10.0	3.1	7	1.5	2.4
Other meats.....	4.2	0.4	2.7	2	2.6
Sugar and sweets.....	1.7	3.3	8.5	3	2.2
Nonalcoholic beverages.....	-3.5	9	4.0	1	5.1
Other prepared foods.....	4.2	2.5	6.0	8	6.4

1. Calculations are based on data from the consumer price index for all urban consumers. Changes for periods longer than one month are at compound annual rates.

Crops on a Short Production Cycle. Because fresh fruits and vegetables are perishable, retail supplies turn over quickly. Hence, production losses tend to affect consumer prices within a matter of days; but because these crops have a short growing cycle—60 to 120 days—prices can also fall quickly. This pattern apparently held in 1988. From May to September, consumer prices of fresh fruits and vegetables rose about 40 percent at an annual rate (table 2); in October, these prices fell sharply, as a new crop less affected by the summer's heat and drought began to reach consumers.

Crops on an Annual Cycle. Price increases for foodstuffs that are on annual production cycles and are storable also appear relatively quickly in the supermarket, reflecting the immediate revaluation of farm and food inventories when crop supplies tighten. In 1988, for example, higher grain prices translated directly and quickly into accelerated increases in the consumer prices of cereal and bakery products. Similarly, higher soybean prices prompted quick upward moves in the retail prices of vegetable oils. Higher farm prices for processed fruits and vegetables, many of which are grown on an annual cycle, boosted the inflation rate for these foods at the consumer level. With all else constant, prices of such products will remain at higher levels than would otherwise be the case until supplies are restored, which may take at least a year for these annual crops. Fortunately, the price of the consumer's breakfast cereal, to take one obvious example, will not rise proportionately as much as the wheat or oats that go into it because processing and marketing account for so much of the value added of such products.

Lagged Transmission through the Livestock Sector. The transmission of increases in crop prices through the livestock sector is more complicated. Changes in farm prices for poultry, which has a short production cycle, often confront consumers quickly and directly. Indeed, from May to September of 1988, poultry prices rose about 60 percent at an annual rate, reflecting the effects of both drought and strong demand.

Cattle and hogs have a more extended production cycle, and the transmission of the effects of

crop losses to the consumer level through this channel may be lengthy. The key factor affecting the transmission is how cattle and hog producers alter their breeding herds in response to drought. These herds are capital assets, whose value is determined by the number of marketable animals and the income that these assets are expected to generate over time. If farmers are not expecting income from the assets to be particularly high, the extra costs of feed imposed by a drought may trigger an extensive liquidation of herds, adding to meat supplies in the near term (and lowering prices) but reducing supplies in the longer term (and raising future prices). Conversely, when farmers expect strong earnings, many may try to absorb the temporary costs connected with drought, rather than sell off profitable assets prematurely.

In 1988, the selloff appears to have been relatively moderate, at least for cattle. After several years of liquidating herds, cattle producers are perhaps becoming more eager to hold their animals in the hope of enjoying better profits in the future. In addition, subsidies the federal government provided in the wake of the drought encouraged producers to retain their livestock. Furthermore, the nation's cattle herd has shrunk substantially since the mid-1970s, so perhaps producers find more easily the hay or rangeland needed to carry animals through a drought.

In any event, the prospective liquidation of herds that aroused concern around mid-1988 did not materialize; and beef prices, instead of falling, actually increased from May to September. As a corollary, because the liquidation was relatively small, its end should have little influence on cattle prices in 1989 (although the longer-run, cyclical rebuilding of herds may influence them). Nor did hog producers engage in a massive and immediate liquidation in the wake of drought. However, some liquidation of breeding sows may have occurred in late autumn, judging from the very low levels to which hog prices fell around early November; futures markets in early December were pointing to a fairly quick rebound in hog prices over the winter months.

The Changing Patterns of Price Transmission. Changing patterns in consumption may be causing consumer food prices to respond more

quickly to drought effects than they did in the past. For example, poultry, which responds quickly, has become more important in the consumer's diet, at the expense of beef and pork, where the price transmission tends to lag. Dietary shifts toward fresh fruits and vegetables work in the same direction. Also, the policy changes that discourage liquidation of herds tend to damp the cycle in livestock prices that would otherwise be set in motion by drought. Such changes notwithstanding, the diversity of the transmission mechanisms in the farm and food sectors still makes it difficult to know precisely how the effect of drought on food prices will play itself out in any given episode.

DROUGHT AND THE FINANCIAL CONDITION OF FARMERS

The 1988 drought bestowed windfall gains on some farmers and inflicted painful losses on others. Some of the farmers who suffered losses will tighten their belts, draw on reserves of cash or credit, and start looking forward to another production cycle. Others who suffered big losses and whose reserves against bad luck were slimmer will face more difficult adjustments. The proportion of farmers in this latter group will become more clear only as farmers and their creditors sit down this winter to plan production and financing strategies for the next crop year. A reasonable guess at present is that, as in past droughts, most farmers will find ways to adjust, short of insolvency or radical restructuring of their farm businesses.

Boom and Bust in Agriculture

To help set the stage for a discussion of the drought's potential impact on farm finances, a brief review of the trends of the past few years is useful.

The boom in agriculture that dominated the 1970s came to an end early in the current decade, and an extended financial contraction followed. A central feature of this contraction was a massive reversal of trends that had shaped the farm balance sheet in the 1970s. Prices for farm real estate—the main asset—plunged in the 1980s,

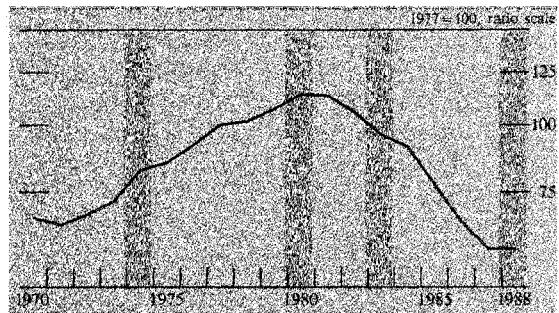
retracing the previous runup (chart 6). Farm debt, which had been used heavily in financing the boom of the 1970s, kept rising in the early 1980s, but then followed asset values downward. Farmers who had purchased land at high prices with borrowed money were squeezed in the contraction, and many went broke or were forced to sell off part of their farms in order to stay in business. Lenders who had financed the boom in land values suffered large loan losses, and many failed.

When the boom started in the 1970s, crop failures abroad and concerns about persistent world food shortages were thought to have been its dominant causes. Later on, it became clear that the boom had been rooted more deeply than many had perceived in the particular macroeconomic conditions of the 1970s: strong growth in demand in the industrial economies, a cheap dollar, accelerating inflation, and low or negative real interest rates. When these macroeconomic forces reversed in the early 1980s, the boom collapsed.

Drought and Land Prices

The frequent droughts of the past decade and a half appear to have played only a limited role in shaping the broad cycle of boom and bust. The 1974 drought helped to reinforce concerns about world food shortages in the mid-1970s; the 1980 drought stirred similar concerns. The 1983

6. Farm real estate values¹



1. The series plotted is the U.S. Department of Agriculture index of the average value per acre of farmland and buildings in the United States excluding Hawaii and Alaska. The series has been deflated by the authors using the implicit price deflator for gross national product. Data for this annual survey currently are collected around February 1; for the years 1982–85, they were collected on April 1, and for 1970–75, on March 1.

drought, coming at a time of large grain surpluses and a flagging farm economy, amplified concerns about the financial plight of farmers. Although the droughts may have affected land prices in some regions or localities, national trends in land prices did not shift significantly in any of these episodes. Land prices were rising rapidly when the 1974 drought hit, and they kept on rising. Similarly, the influence of the 1980 and 1983 droughts on trends in land prices appears to have been small.

These patterns seem consistent with theories about the determination of land prices. In forming long-run expectations of the earnings from land, farmers presumably weigh the risks of drought. As experience accumulates, land in drought-prone areas may decrease in value relative to land in areas where droughts have typically been infrequent and mild. However, prices—and the long-run expectations upon which prices depend—probably do not shift dramatically in response to a particular drought unless its length or severity is well outside normal experience.

The limited evidence on trends in land prices since mid-1988 suggests that, as in the past, the drought may have affected prices in some regions but has not disturbed national trends. After several years of steep decline, nominal land prices for the country turned up a bit in the year ended February 1, 1988; and sharp increases were apparent in some midwestern regions, including those in which previous price declines had been the steepest. Data for more recent quarters suggest that these trends have continued. In the Chicago Federal Reserve District, where crop losses were substantial, land prices kept rising in the third quarter of 1988, to a level about 12 percent above a year earlier. Prices in the Upper Midwest, where crop damage also was severe, appear to have weakened after midyear but have maintained the moderate year-to-year gains reported in previous quarters, according to surveys by the Federal Reserve Bank of Minneapolis. Land prices in the Kansas City District, where the losses to drought were small, remained on a firm uptrend in the third quarter.

The trends in prices of land in coming months will be a key determinant of the financial health of the farm economy. For highly leveraged oper-

ators, a steady or rising price of land helps preserve a cushion against insolvency. For cash-short operators, a rising price of land provides a reserve of collateral that helps to ensure continued access to credit. A continuation of the trends in prices of land seen in recent quarters would thus be a sign that the losses to drought have not seriously derailed the improvement in farm finance that has emerged over the past two years.

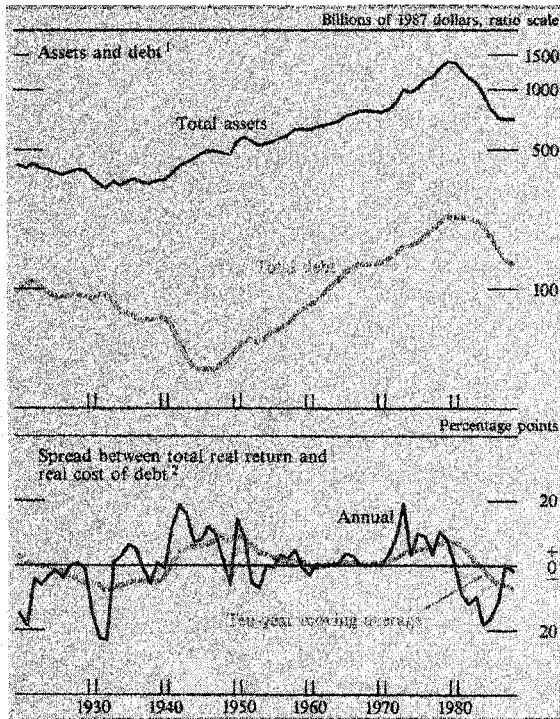
Farm Debt

Like the value of land, the value of farm debt has fallen steeply in the 1980s, especially in real terms (chart 7). And as with land, the longer-run trend in farm debt appears to have been little affected by past droughts.

One important indicator of the desirability of debt—real returns on farm assets relative to the real cost of borrowing (lower portion of chart 7)—was sharply negative in the first half of the 1980s but has rebounded in the past two years and may be helping to slow the contraction of real farm debt. In this century's previous big contraction—that of the interwar period—real farm debt continued to shrink even after the real return on farm assets had been above the cost of debt for a fairly extended period. Apparently, the scars of the long depression in farming during the 1920s and early 1930s had fostered an aversion to debt among farmers.

The reluctance to incur debt probably is less pronounced in the current episode. Although many farmers have gone through a difficult period in the 1980s, the effect of these difficulties on their attitudes toward debt may have been smaller than that in the interwar years, when the hard times lasted longer and government programs to aid farmers were much less generous. Also, farmers today probably are better positioned to recognize improved financial opportunities and take advantage of them than their predecessors of two generations ago were. Hence, if real asset values remain stable or rise, and if the relation of the return on assets to the cost of debt remains about the same as it is now, then the odds seem fairly high that the big contraction in farm debt of the 1980s is in fact about over.

7. Farm assets and debt



1. Data are for the farm sector excluding assets and debt related to farm households. To obtain measures of assets and debt in 1987 dollars, data from the U.S. Department of Agriculture on the nominal value of assets and debt have been adjusted for changes in general purchasing power, using the implicit price deflator for personal consumption expenditures.

2. The real return on farm assets is the income return to farm assets plus the capital gain (or loss) adjusted using the implicit price deflator for personal consumption expenditures.

SOURCE. Primary data are from the U.S. Department of Agriculture. See also *Agricultural Finance Databook*, Statistical Release E.15 (Board of Governors of the Federal Reserve System, forthcoming). The plots for 1988 are derived mainly from forecasts by the Department of Agriculture.

Farm Income

Even those producers who try to anticipate drought and prepare for it might temporarily need to boost their reliance on debt if drought losses cut unexpectedly deeply into the flow of cash income. At present, some farmers are being squeezed, but overall, cash flow apparently is being well maintained. According to the Agriculture Department's current projections for 1988, net cash income, a measure of farm earnings that includes the revenue from the sales of farm inventories, remained at its high 1987 level. In effect, farmers are cashing in on the inventory

investment of earlier years—investment that was undertaken, with public assistance in many cases, partly in order to take advantage of price runups such as that of 1988. By selling these inventories, farmers acquire the liquidity needed for living expenses and for debt service. At some point—probably in 1989, according to the Department of Agriculture's projections—farmers will want to rebuild stocks, and cash income therefore will drop back somewhat.

An important qualification regarding the effect of the drought on farm income is that some individuals may have lost all their crops and have had no inventories held over from previous years. But some of these producers also may have purchased crop insurance to guard against the contingency of drought, and many producers will benefit from government "disaster" payments, which are being channeled to those who suffered the largest losses from the drought.

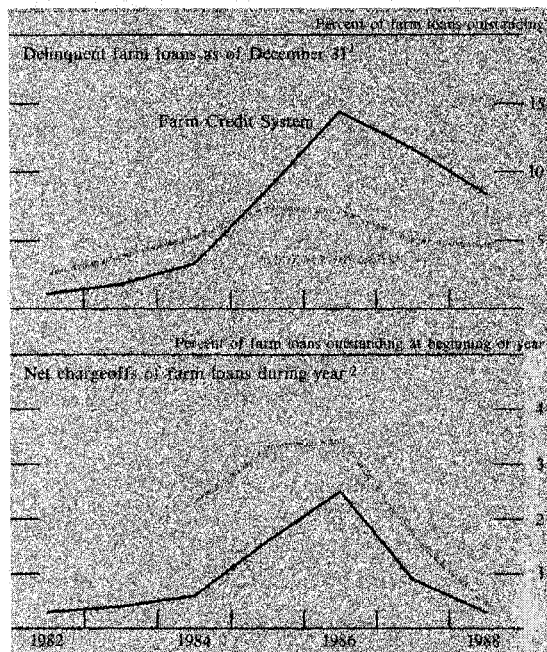
THE RECENT EXPERIENCE OF FARM LENDERS

Before the onset of the drought, farm lenders had been recovering from the financial stresses of earlier years, helped by the improvement in farm finances and some government assistance. For both the Farm Credit System and commercial banks, the volume of accruing farm loans had turned up a bit by mid-1988, and the volume of problem loans had shrunk. Profits of both sets of institutions had improved, and for most, the risk of failure had diminished. Indicators of the financial performance of farm lenders since the drought currently are sketchy; in the past, the effect of drought on lenders' performance generally was limited.

Problem Loans

The improvement in the farm loan situation is illustrated by the reductions in the proportion of farm loans that are delinquent, shown in the upper part of chart 8. These problem loans are those on which payment in full of principal and interest is not expected; thus the stock of these loans increases as borrowers miss repayment deadlines or as lenders estimate that the likeli-

8. Problem farm loans, major lenders



1. For the Farm Credit System, delinquent farm loans are defined as nonaccrual loans; the data include loans by the Bank for Cooperatives. The data for 1988 are as of September 30 for the Farm Credit System and June 30 for commercial banks.

For commercial banks, the data cover farm loans, other than those on real estate, that are past due 90 days or more or are in nonaccrual status. The data include estimates for the minority of banks that are not required to report delinquencies; these estimates assume that those banks experienced the same delinquency rate as did the banks that do report.

2. The data for commercial banks cover farm loans other than those on real estate; they are not available before 1984. Data for 1988 include the actual observations through midyear for commercial banks and through the first three quarters for the Farm Credit System and an estimate for the balance of the year that assumes that net chargeoffs continue at the same rate for both groups of lenders.

SOURCE: Data for commercial banks are from their quarterly reports of condition; data for the Farm Credit System are from *Farm Credit System, Quarterly Information Statements*, selected issues.

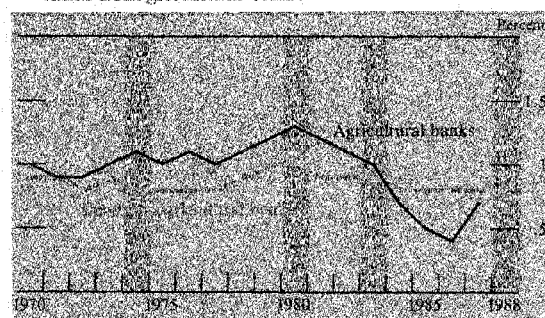
hood of repayment has fallen. The level of problem loans decreases as loans are charged off or as the outlook for repayment becomes brighter and the loans are returned to regular loan status. As may be seen, the share of past-due and nonaccrual loans in total farm loans peaked during 1986 and, while still fairly high, has been moving steadily downward since then. In addition, the proportion of these problem loans charged off by banks in the first half of 1988 was less than ½ percent of loans outstanding (lower panel of chart 8). Chargeoffs by the Farm Credit System during the first three quarters of 1988 were less

than ¼ percent of loans outstanding. In large part, this improvement has coincided with the recent stability in the nominal value of farmland and the strength in farm income, which together have limited the inflow of new loans into delinquency and have helped improve some loans enough to remove them from nonaccrual status.

The 1988 drought seems unlikely to reverse the improvement in lenders' portfolios of farm loans over the past two years. As was discussed earlier, many farmers appear likely to have ample cash to meet debt payments as they sell their inventories at much higher prices. Farmers who had poor yields and small stocks of previous crops have suffered a reduction in income, of course. But overall, the farm sector will have ample cash on hand to service debt, and at present, widespread increases in problem loans due to the drought appear unlikely.

Profits of Farm Lenders

Agricultural banks (those who lend more heavily to farmers than do banks in general) were consistently more profitable than nonagricultural banks of a similar size throughout the 1970s, but with the onset of farm financial difficulties in 1982, they rapidly became less profitable (chart 9). However, the decline in the profitability of agricultural banks apparently bottomed in 1986, when net chargeoffs peaked; subsequently, the rate of return for agricultural banks has rebounded. The profits of farm banks overall do

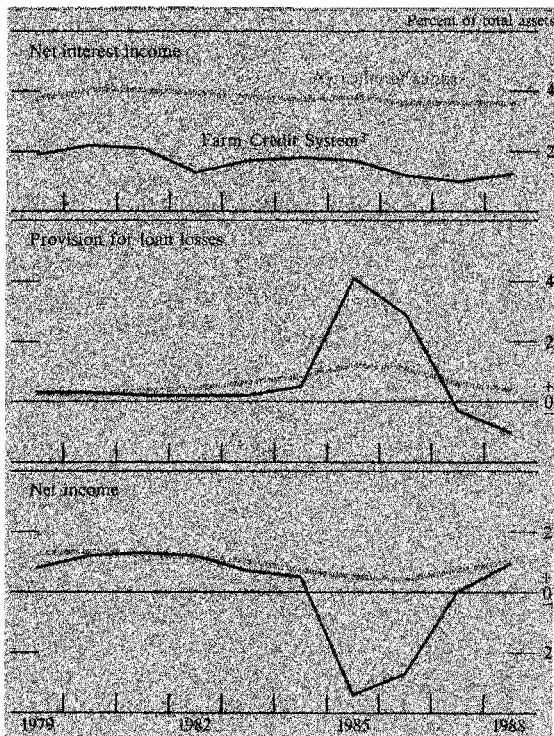
9. Profitability of agricultural and small nonagricultural banks¹

1. Profitability is defined as net income after taxes as a percentage of total assets on December 31. Agricultural banks are defined as insured commercial banks at which the ratio of total farm loans to total loans is above the unweighted average of that ratio for all banks.

not seem to have been much affected by either the drought of 1974 or the two earlier droughts of the 1980s.

A detailed look at the factors influencing the rate of return of agricultural banks and the Farm Credit System is provided in chart 10. Net interest income, the difference between interest received from borrowers and interest paid, expressed as a percent of total assets, declined somewhat in the 1980s. In addition, as problem loans mounted in the mid-1980s, increases in the provision for loan losses (the middle panel) pushed down profit margins. More recently, the need to provide for additional loan losses has diminished for both banks and the institutions of the Farm Credit System, and profit margins have improved. However, the improved profit margin

10. Factors determining income of agricultural banks and the Farm Credit System¹

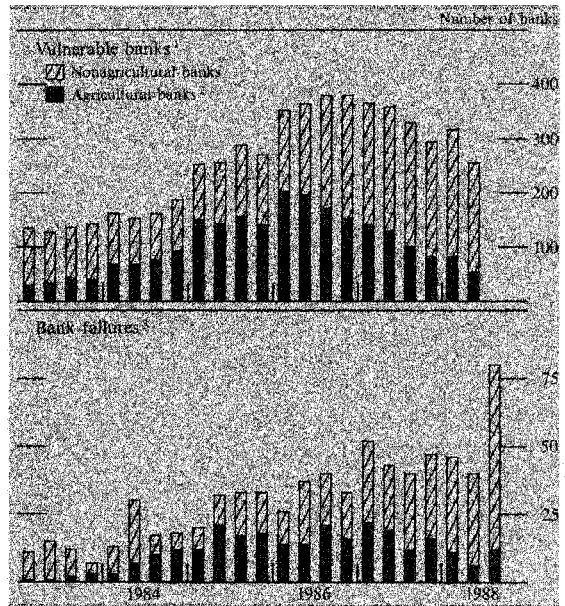


1. The plots for 1988 are the observations for the first half of the year for commercial banks and for the first three quarters of the year for the Farm Credit System, both adjusted to an annual rate.

2. See chart 9, note 1, for the definition of agricultural banks.

3. Data for the Farm Credit System include data from the Bank for Cooperatives.

11. Vulnerable banks and bank failures



1. Vulnerable banks are defined as those having nonperforming loans greater than total capital.

2. See chart 9, note 1.

3. Bank failures in 1988 include the failure of 41 subsidiaries of First Republic Bank Corporation, each of which is counted separately.

of the Farm Credit System masks a steep decline in the system's dollar level of loans—its primary asset—since 1982.

As shown in the lower two panels of chart 10, agricultural bankers generally replenished their provision for loan losses as loans were charged off and avoided drastic swings in net income. In contrast, the Farm Credit System initially provided less for loan losses, and then, in 1985 and 1986, made huge provisions that caused net income to fall precipitously. Losses have failed to materialize to the extent that was expected, and in recent quarters, negative provisions for losses on loans have boosted net income for the system.

Bank Failures

A number of banks experienced severe financial stress while dealing with the large volume of problem farm loans, and many failed. The ratio of nonperforming loans to total capital has proven a useful indicator of the degree of diffi-

culties at banks. Chart 11 shows the number of banks with nonperforming loans greater than capital and the number of bank failures. Agricultural banks accounted for fewer and fewer of all vulnerable banks as well as bank failures as the farm situation began to improve in 1986 and problems in the oil patch began to mount.

In addition, table 3 shows the skewed distribution of agricultural banks with a large amount of problem loans. Most agricultural banks never have had a large volume of problem loans relative to their capital. Furthermore, those having a large quantity of problem loans compared to total capital are increasingly in the minority. Thus, most agricultural banks probably were reasonably well positioned in mid-1988 to handle potential increases in problem loans due to the 1988 drought.

3. Distribution of agricultural banks by ratio of problem loans to total capital, June 30, 1983-88¹

Percent

Problem loans as a percent of total capital	1983	1984	1985	1986	1987	1988
All banks	100.0	100.0	100.0	100.0	100.0	100.0
Under 25	83.6	76.3	69.0	66.6	74.2	84.4
25 to 49	12.5	16.3	19.6	19.4	16.1	10.5
50 to 74	2.3	4.4	6.1	6.8	4.8	2.8
75 to 99	.9	1.6	2.3	3.0	2.1	1.0
100 to 124	.3	.6	1.3	1.4	1.1	.2
125 to 149	.1	.3	.8	.8	.5	.2
150 to 174	.4	.2	.4	.6	.3	.3
175 to 199	.1	.1	.2	.3	.2	.2
200 and over	.2	.2	.4	1.0	.7	.4

1. Problem loans are loans that are past due 90 days or more or are in nonaccrual status.

2. Includes banks with negative capital.

*Less than 0.05 percent.