

AGRICULTURAL POLICY AND FINANCIAL STRESS

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CARD Series 85-2

April 1985

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INTRODUCTION

Many farmers are currently facing severe financial stress resulting in asset liquidations, problems in obtaining credit, and even bankruptcy. An important question in policy analysis is the applicability of traditional farm policy approaches to the problem of financial stress in agriculture. This is a particularly relevant question given that the 1983 PIK program was one of the most expensive and largest government transfer programs for agriculture in recent history, and yet many farms are still facing severe financial problems. In this discussion the causes of current financial stress in agriculture and the role of past price and income support, credit and tax policies in mitigating or contributing to this stress will be assessed. Then alternative policy options to relieve the stress will be identified and evaluated. Selected options will be quantitatively analyzed using micro and macro econometric simulation models. Finally, conclusions will be drawn.

FINANCIAL STRESS: EXISTENCE AND CAUSES

Existence

Melichar [January, 1984] has documented the financial condition of the agricultural sector; that data will not be repeated in detail here. A key dimension of this documentation is the distribution of debt (Table 1). This distribution indicates that approximately 58 percent of the farms in the United States have leverage ratios of 10 percent or

less, 24 percent have ratios from 11-40 percent, 11 percent have ratios of 41-70 percent and eight percent have leverage ratios in excess of 70 percent. This highly leveraged category (greater than 70 percent) control 31 percent of the debt and eight percent of the assets in U.S. agriculture. With current price, cost, and productivity relationships in agriculture, these highly leveraged farms are unable to make interest payments on their indebtedness, let alone repay any principal. In fact, Melichar's calculations suggest that farms with debt-to-asset ratios exceeding 30 percent will likely encounter some financial stress at current interest rates and rates of return on assets.

Survey data from individual Iowa farms corroborates Melichar's results and implications [Jolly, 1984]. Of the 1,231 farmers surveyed, 31 percent had no real estate or nonreal estate debt and exhibited debt-to-asset ratios averaging 1.8 percent; these farmers are not financially stressed by the current economic conditions in agriculture. In contrast, 40 percent of the farmers have both real estate and non-real estate debt and a debt-to-asset ratio averaging 41.7 percent. Of those with real estate loans (57 percent of the sample), 90 percent were current on interest and principal payments, 3.7 percent were current on interest payments only, and 6.3 percent were delinquent on both principal and interest payments. For those with operating loans (51 percent of the sample), 73 percent were current on principal and interest payments, 18 percent were current on interest only, and 9 percent were delinquent on principal and interest.

Table 2 indicates the distribution of operators, assets, and liabilities for the Iowa sample by debt-to-asset category; the distributional results are very similar to those in Table 1 from Melichar's work. Size classification of the data (Table 3) suggests that financial stress problems are not unique to a particular size firm--firms of all sizes are encountering such stress.

More recent studies corroborate that the financial stress in agriculture is not unique to Iowa. A national survey in January, 1985, by Farm Journal and the Food and Agricultural Policy Research Institute indicates that nationwide, 15.4 percent of farmers have debt-to-asset ratios exceeding 70 percent, and 17.9 percent have debt-to-asset ratios of 40-70 percent; these farmers account for 30.8 percent and 34.9 percent of the debt respectively [Farm Journal, March 1985]. For the Central States, the data indicates a more severe problem; 21.0 percent of the farmers have debt-to-asset ratios exceeding 70 percent and 21.5 percent have ratios of 40-70 percent. Comparing these numbers to those obtained for Iowa in 1984 suggests that the financial conditions have deteriorated significantly in just one year.

A recently released USDA study also documents the nationwide characteristics of the problem [U.S.D.A., 1985]. That study estimated that as of January, 1985, 6.3 percent of family sized farms in the U.S. holding 9.3 percent of the debt are insolvent; 7.4 percent of the farms holding 11.1 percent of the debt have debt-to-asset ratios from 70-100

percent, and 20 percent of the farms holding 25.9 percent of the debt have debt-to-asset ratios of 40-70 percent [Boehlje's Senate testimony, 1985].

Financial management strategies and enhanced farm and off-farm income can be used to relieve the stress for many farms, but those with higher leverage ratios (for example, 70 percent or greater) will likely not be able to obtain sufficient relief from various financial and farm management strategies to stave off asset liquidation or default. In essence, at least 8-10 percent of U.S. farm assets must find a new owner in the next year or so, or the debt secured by those assets will not be serviced. Even those with debt-to-asset ratios of 40-70 percent will experience declining equity (even if land values stabilize) unless commodity prices rise, interest rates and other input prices fall, or productivity increases. In essence, the financial stress is significant for a subset of the farm population.

Causes and Characteristics

The roots of the financial problems of farmers today can be traced to the environment of the 1970s and the dramatic changes in that environment during the early 1980s. The decade of the 1970s can be characterized by high inflation rates, growing foreign and domestic demand for farm products, very low or negative real rates of interest, and a willingness to substitute asset appreciation for current earnings. Farmers borrowed heavily to purchase capital inputs and farmland and to aggressively expand their operations. Then in the 1980s interest rates

rose to unprecedented high levels, foreign and domestic demand for farm commodities declined significantly because of world wide recession, incomes dropped dramatically, and land values began a steady and relatively steep decline. Those farmers with high debt loads found it difficult to collateralize and service that debt with high interest rates, low incomes, and decreasing land values [Boehlje's Senate testimony, 1985].

To evaluate the relevance of public policy and, in particular, traditional farm income and price support programs, to the current financial problems in agriculture, it is important to understand the broader dimensions of today's "farm problem." Clearly, farm incomes are lower than they were during a large part of the 1970s, but similar income levels were encountered in prior years without the severity of the financial pressures currently being felt. In fact, there are six additional characteristics of the current financial stress in agriculture, and some of them will be only indirectly impacted by price and income support programs.

In addition to lower incomes, farmers have a much higher debt-to-income ratio than in prior years. Based on USDA data, aggregate debt of the U.S. agricultural sector was approximately 90 percent of net farm income in 1950, resulting in a debt to income ratio of less than one. This ratio rose to two in 1960, to approximately three in 1970, and now stands in excess of ten to one [Economic Indicators of the Farm

Sector: Income and Balance Sheet Statistics, 1982].¹ Although non-farm income of farmers has increased in relative importance in recent years, this income is concentrated on smaller farms that have lower debt loads, so does not significantly improve the debt carrying capacity of those farmers with the majority of the debt [Melichar, November 1984]. Thus, farmers are attempting to carry a much larger debt load per dollar of debt servicing capacity (i.e., income) which adds to their financial pressure. In fact, to obtain a debt-to-income ratio representative of the mid-1970s would require incomes to more than triple, not a realistic possibility in the near future. Furthermore, the maturity structure on debt has shortened; farmers with lower incomes and higher debt loads are being required to repay that debt more rapidly. Institutional lenders such as banks and PCAs have shortened maturities to reduce their interest rate risk exposure. Although Federal Land Banks and other long-term institutional lenders have not adjusted terms significantly, land contracts, which comprise a substantial portion of farm real estate debt, have become shorter in maturity in recent years.

Another balance sheet adjustment which has occurred on many farms is that of reduced liquidity. In 1950 approximately 27 percent of the

¹Melichar has recalculated this ratio for 1983 by adjusting total income and debt by an estimate of the amount attributable to landlords [Melichar, November 1984]. The result is a lower debt to income ratio in 1983 than that obtained with unadjusted data. However, similar adjustments must be made in earlier years to obtain comparable data, suggesting that the trend of a significantly rising debt to income ratio over time still occurs.

asset base on the typical farm firm was liquid (i.e., financial assets or crop and livestock inventories); in 1980 only 11 percent was liquid [Economic Indicators of the Farm Sector: Income and Balance Sheet Statistics, 1982].² In the past, liquidity provided a safety valve for that farmer who did not generate sufficient income to meet the debt servicing requirement; he or she could sell part of the liquid asset base without sacrificing part of the productive plant--the land, machinery or breeding stock. Today, liquidity is gone--forcing some farmers to consider selling part of the fixed asset base to service their indebtedness.

In reality, farmers dramatically restructured their balance sheets during the 1970s, increasing the amount of fixed assets compared to inventories and other assets easily converted to cash in times of financial stress; and increasing the amount of current liabilities compared to longer term obligations, thus adding to the current debt servicing requirements. Improved farm incomes will help reduce the financial stress in agriculture, but will only eliminate this mismatching of assets and liabilities if farmers use the additional income to either pay down debt or increase liquidity rather than purchase fixed assets. Even if farmers use their improved incomes to restructure their balance

²Melichar has argued that the USDA Balance Sheet of Agriculture significantly understates financial assets in the agricultural sector, but even with his adjustments the proportion of total assets that were liquid (financial assets plus crop and livestock inventories) in 1980 is not altered substantially [Melichar, 1983].

sheets, the process will be slow--thus suggesting that financial stress will be a long-run problem for the agricultural sector.

An additional characteristic of the current financial stress in agriculture is the increased income and collateral risk faced by most farmers. A significant change in government policy in the 1980s resulted in a reduced safety net for agriculture and a movement to gradually transfer the responsibility for managing risk from the government to the individual farmer. This change in philosophy is reflected in the substitution of crop insurance for disaster programs, the changing role of the Farmers Home Administration, and the approach to government farm programs that provides incentives for participation but is not structured to necessarily benefit those who do not participate and pay the "insurance premium." Although the income risk in agriculture may not be significantly larger this decade than last, the responsibility for managing that risk is being transferred from the public to the private sector. Some farmers still have not accepted this concept.

In addition to income risk, farmers are now facing collateral risk as well. During the three decades from 1950 to 1980, even when farm incomes turned down, the lending community was willing to extend credit to the agricultural sector because collateral values (specifically land values) were stable or rising. A key reason lenders have turned conservative during the last four years is that in addition to income risk, they are facing reduced collateral values and deteriorating security positions. Legitimately so, the borrower who has financial los-

ses combined with declining collateral is perceived to be less credit-worthy than one who has financial losses but stable or rising collateral values.

A further consequence of declining collateral values is that the traditional safety valve of the 1970s for farmers who could not meet the cash flow--that of refinancing--is either no longer available, or is quite costly because of higher interest rates. In reality, the agricultural sector no longer has a financial safety valve; adjustments on the liability side of the balance sheet to reduce financial pressure by extending the terms on the debt are no longer possible for many operators, and liquidity is nonexistent in many cases. Thus, a significant number of farmers are having to consider asset liquidations as a means of reducing or eliminating the financial pressures they are facing.

A seventh characteristic of today's financial stress in agriculture is that of higher and more volatile interest rates [Melichar, January, 1984]. When queried as to what is the fundamental reason why they have encountered financial difficulties, many farmers respond that they did not anticipate the dramatic rise in interest rates that occurred from the mid-1970s to 1980. A shift from relatively low real and nominal interest rates to relatively high rates is particularly devastating for an industry like agriculture that has a large proportion of its total debt used to finance fixed assets on a variable rate. In other industries with a larger proportion of the debt used in inven-

tory financing, it is easier to adjust debt utilization to rising interest rates. Because of the dominance of fixed assets in the asset base of the agricultural sector, and the necessity to finance those fixed assets with longer term financial obligations, it has been much more difficult for the farm sector to adjust to rising rates than other sectors of our economy.

IMPACT OF PAST POLICIES

A fundamental question in evaluating the future direction of agricultural and economic policies is whether or not past policies have contributed to the financial stress of agriculture; if so one should be careful that such policies are not continued or repeated. The three areas of policy that merit evaluation in answering this question are price and income support policy, federal credit and interest rate policy, and tax policy.

Price and income support policy

In recent years, government support prices for agricultural commodities have been formally or informally indexed to the cost of production--as costs of production (variously defined) rose, support prices rose. In terms of financial stress, the issue is how have such indexed support prices affected price expectations of producers, resource values, and debt-carrying and debt-servicing capacity.

Analysis of the impact of government price and income support programs on asset values, particularly land, indicates that such programs

have put upward pressure on prices. Hedrick [1962] documented that peanut price support and allotment program benefits have been capitalized into land values. Similar analyses have been completed by Boxley and Gibson [1964] and Boxley and Anderson [1973] for peanuts and tobacco, respectively. A more recent study by Reynolds and Timmons [1969] confirms that government farm program payments have resulted in higher land values in the Midwest as well.

However, the cost-of-production approach to specifying support prices provides a much more direct linkage between government programs and land values than previous policies. Using an income capitalization model, Boehlje and Griffin [1979] indicate that cost of production indexed price supports not only increase the expected income, thus generating higher land values, but they also truncate the left tail of the price distribution, thus decreasing the price risk and the capitalization rate which results in further upward pressure on land values. Furthermore, the guaranteed cash flow of such a support price system increases the debt carrying capacity of the firm. These results strongly support the argument that government farm programs of the past decade have increased the guaranteed cash flow of the farm business and reduced the financial risk, resulting in increased bid prices for durable assets such as land, increased debt-carrying capacity and thus financial leverage, and a more rapid rate of growth of the farm. Thus, such programs have contributed to the financial stress in agriculture for those who entered the sector or expanded after the mid-seventies.

Credit and interest rate policy

Public sector lending to farm firms has been a reality for many years, but with the recent economic and financial stress in agriculture, pressures have developed for larger public sector lending programs for farmers. However, some analysts have suggested that part of the current financial stress of some farmers can be attributed to subsidized public sector lending in the past, and that additional credit will do little to relieve the financial stress for those farmers who are already highly leveraged [Financial Stress, 1984; George Irwin's Senate testimony, 1985].

To most people, public credit in agriculture means the Farmers Home Administration (FmHA). The FmHA program has undergone dramatic changes in recent years. In 1960, FmHA administered eight programs of which farm operating loans accounted for 64 percent and farm ownership loans accounted for 14 percent of loan volume. By 1982, FmHA operated 23 grant and loan programs, with farm operating loans accounting for 15 percent and farm ownership loans accounting for eight percent of loan volume [Economic Research Service, U.S. Department of Agriculture, 1984].

Emergency disaster, economic emergency, individual housing, rural rental housing, water and waste loans and grants, and business and industrial development loans each accounted for larger shares of FmHA activity in recent years.

This does not necessarily mean that FmHA has neglected its traditional role. The absolute level (as opposed to percentage share) of

farm operating and farm ownership loans has been at a record high in recent years. What the current situation does indicate is that the FmHA has become a giant, many-faceted agency that perhaps has been absorbing programs and mandates (many unrequested) faster than it can maintain a clear sense of purpose and direction. More than \$8 billion in loan and grant obligations were made by FmHA in 1982, a decrease from the high of nearly \$14 billion in 1979 and 10 times the amount of 1962 [Lee, Gabriel, and Boehlje, 1980].

Who is served by FmHA's farmer oriented programs? By design, the agency is a lender of last resort; that is, its borrowers are supposed to be those unable to obtain funding elsewhere. A recent study of borrower characteristics suggests that in 1979 the farm operating and farm ownership loans were heavily directed to young farmers and those with small net worth and low incomes [Lee, Gabriel, and Boehlje, 1980].

Over 68 percent of the money loaned in the farm ownership program that year went to farmers with less than \$12,000 in net cash income and less than \$120,000 in net worth. Over 74 percent of farm operating loan money went to farmers in the same category. In the same year, 50 percent of the money loaned in each of these programs went to people under the age of 30.

However, the economic emergency loans were distributed a bit differently. The borrowers tended to have low income (presumably, that is what put them in an "emergency" situation), but over a third of the money loaned in 1979 went to farmers with more than half a million dol-

lars in assets. Farms with gross value of sales of over \$40,000 represented one-fifth of all farms, but received more than two-thirds of the money loaned under the Economic Emergency Program in 1979.

The FmHA share of total farm debt has grown rapidly in recent years with FmHA holding 15 percent of the nonreal estate farm debt in 1984. Regionally, the Southeastern states are much more dependent upon FmHA debt than other regions of the United States. This rapid growth in volume, combined with the current economic stress, has resulted in severe repayment problems on the part of FmHA farm borrowers. A total of 24.6 percent of all farm program borrowers were delinquent at fiscal year-end 1982; 31 percent of active farm program borrowers totaling approximately 84,000 clients had missed their scheduled payments as of July 31, 1983 [Farmer Home Administration, 1984]. These delinquency rates are clear cause for alarm as to the viability of FmHA farm lending programs. A fundamental issue is whether such high delinquency rates are a function of inadequate procedures in loan extension and supervision, or whether such performance is "normal" in times of economic stress. Irrespective of the answer, extension of significant amounts of credit (much of it at subsidized rates) by FmHA has contributed to the high debt load in agriculture.

Providing public credit through FmHA or other agencies to preserve the normally healthy, moderate-size farm temporarily caught in adverse conditions could be consistent with the long-term goals of agricultural policy. Present trends suggest that about two-thirds of the land sold

each year is bought by farmers and consolidated into existing farm units. This is the primary source of increasing concentration in the farm sector. If the normally-healthy-but-temporarily-in-trouble farms are allowed to go out of business, it is reasonable to assume that some portion of them will be consolidated into other existing units. Thus, assuring that such farms obtain the funds needed to stay viable would be consistent with the goals of efficiency, preserving a pluralistic agriculture for resiliency and future flexibility, providing economic opportunity for more people, and ultimately assuring food security. But there are some risks to the public sector. This problem can be minimized by reducing the subsidy as much as possible, thus reducing the attractiveness of the emergency credit.

If, instead of a moderate-size family farm, the farm in temporary trouble is very large, it is not clear that the same arguments for public credit assistance hold. If the farm was much larger than necessary to achieve efficiency, and if the odds favored some or all of the land being sold in smaller tracts to new farmers or moderate-sized existing farmers, there would be no particular public interest in saving the larger farm.

There would appear to be no direct economic reason for offering subsidized public credit to preserve those farms that are submarginal even under normal economic conditions and for whom that does not appear to be a temporary phenomenon. Both the subsidy in the credit program and the inefficient use of resources implied by the farm being submar-

ginal are social costs. However, perhaps one more question should be asked: Is the social cost ultimately greater if the farmer goes out of business? This is not likely if there is alternative gainful employment. But if the displaced farmers or workers end up as a public liability anyway, social costs may be minimized by extension of public credit to keep them in business, at least until better opportunities are available.

The same general comments apply to the farmers in trouble because of natural disasters. That is, it would be consistent with goals of efficiency, competitiveness, and future flexibility to provide public credit assistance to efficient-size family farms. For larger farms the question is how far the public should go in sharing the risks and protecting the interests of the wealthy.

For a third group, those who need specialized help or terms, the appropriateness of public credit assistance depends on the likelihood that the operator will successfully graduate to private credit and eventually repay the public investment through taxes; on efficient use of resources; and on contribution to pluralism in the farm sector. It is in these programs, more than any other, that social objectives and economic objectives of credit policy come face to face.

Little need be said about the impact of interest rate policy on agriculture. Stimulative fiscal policy and tight monetary policy combined with deregulation of interest rates and implementation of monetary policy by controlling the money supply rather than pegging inter-

est rates has resulted in higher and more volatile costs of money for farmers. We have moved from an extended period of low and predictable real rates of interest to high and volatile rates, and because of the fixed asset based in agriculture and the long-term financing needs, farmers have not been able to adjust borrowing levels to the higher rates. In fact, some have argued that government fiscal and monetary policy as it impacts interest rates is the major contributor to financial stress in agriculture, and that policies that will lower interest rates are more important to the long run financial health of agricultural than credit or price and income support policy [Ag Policy, 1984]. This argument will be evaluated further later in this discussion.

Tax policy

Numerous studies have shown that taxes and tax management play a significant role in the choice among various production, marketing, and financial strategies by farmers. These studies also indicate that tax policy has influenced purchasing patterns for capital assets and exerted upward pressure on farm asset prices, particularly farmland [Davenport, et al. 1982]. This pressure comes about because land provides an ideal tax shelter. The return obtained from appreciation or increases in land value is not taxed until the property is sold. And if the land is held until death, this return is exempted. Carrying costs in the form of interest are fully deductible and may offset income from other sources. In essence, income taxed at low rates, or

perhaps even exempt from tax, is combined with fully deductible costs-- the classic tax shelter. Furthermore, farmland under the Tax Reform Act of 1976 has become an estate tax shelter as well as an income tax shelter.

At the same time, the provisions of both the income and estate tax law contain features that tend to restrict the supply of land offered for sale. In the case of the income tax, the exemption from tax of gains on property that passes at death encourages the holding of land until death. In regard to estate tax, the ownership requirements that must be met to qualify for the estate tax preferences discourage sales both before and after death. The greater demand for land and the restriction of its supply have operated to keep upward pressure on prices of farmland.

Tax laws appear to have also encouraged the growth of individual farm firms. The use of cash accounting allows farming to be a tax sheltered industry. So long as there is other income that would be subject to tax except for the tax shelter, taxpayers in a higher tax bracket have more funds for growth and expansion than they would if the tax sheltered asset did not exist. Furthermore, however great is the advantage of cash accounting, it is augmented if some of the income produced through deductions can be reported as capital gain which is taxed at lower, preferential rates. Investment tax credit provisions, accelerated depreciation, and the tax deductibility of interest have also encouraged firm expansion and the substitution of capital for

labor. By encouraging growth of the firm, increased use of debt, the substitution of capital for labor, and higher land prices, tax policy has contributed to the current financial stress in agriculture.

POLICY OPTIONS

Given the financial stress faced by the agricultural sector, a relevant question is what should be the appropriate policy response? The agricultural sector is facing a new financial and economic environment, and adjusting to that environment may require government assistance to make sure that the process of adjustment is not too costly in terms of financial and human losses. However, most analysts believe that in the intermediate-term agriculture must also adjust to excess production capacity and lower values for some agricultural resources, particularly land [Financial Stress, 1984; Ag Policy, 1985]. If this is the case, then a public policy that impedes that adjustment will not only be very costly, but may result in long-term dependence on government assistance as well as continued government interference. What kind of policy response is targeted to the problems of financial stress, is politically acceptable in an environment of fiscal restraint, and does not impede the long-term adjustments that are necessary to maintain a productive, efficient, and financially healthy agriculture?

Much of the past debate concerning the public response to assist farmers in financial stress has focused on the traditional approach to

agricultural policy--various forms of price and income supports. Such a policy response may not only be an extremely high cost alternative, but if improperly implemented might result in disincentives to adjust the resource use in agriculture to the slower growth in demand for its products. Higher incomes would contribute to a healthy agricultural sector, but the current financial stress problem in agriculture is much more complex. In fact, an income policy focusing on surpluses and supply control may not only miss the target from a prospective of the problem, but because most of the support will go to larger farms, whereas farms of all sizes are exhibiting financial stress, such a program may miss the target audience as well. Other means for enhancing the income of agriculture through subsidizing and promoting exports, devaluing the dollar, expanding domestic consumption including bio-mass production and fuel use, and converting grainland to grassland also have similar problems--they only focus on one dimension of today's financial crisis in agriculture. A broader set of policies and a broader perspective of the problem is likely required to develop an adequate solution to today's "farm problem."

Public policy currently does encumbrance a set of rules to resolve severe financial stress problems--the bankruptcy rules. Although bankruptcy may involve immediate liquidation of the assets and a discharge of the indebtedness of the farm [Chap. 7 of the Bankruptcy Act of 1978, Public Law No. 95-593, 92 Stat. 2549, 1978], it can also involve restructuring and rehabilitating the business under Chapter 11 or 13 of

the bankruptcy law. Farmers can not be forced into an involuntary bankruptcy. A farmer who chooses Chapter 11 (or possibly Chapter 13) bankruptcy proceedings becomes a "debtor in possession"--generally the farmer continues to manage and operate the farm, possibly under the surveillance of a creditor's committee [Looney, 1980]. A trustee to manage the property is appointed only in rare cases, so the farmer can continue to operate the farm as long as he develops an acceptable debt reduction plan.

The bankruptcy rules specify how the private sector will share financial losses in case of a default by a creditor, but two fundamental issues remain. First, should the private sector--the creditor, the debtor, and others who have or are doing business with the debtor absorb the full loss, or should the public sector share in part of this loss through some type of government transfer payment program? And second, and probably most important, is the question concerning who in the private sector under the current provisions will typically be required to absorb the majority of the loss? Because of the extensive use of merchant and dealer credit in agriculture provided by input supply firms who are usually unsecured creditors, the bankruptcy rules will likely transfer the major losses from the production sector and the lending institutions to the input supply firms. In many cases the financial losses will be transferred from those who have been directly involved in the financial management and debt utilization decisions (i.e., the producer and his lending institution) to those who have only

been peripherally involved in those decisions (i.e., the input supply firm and other unsecured creditors including many landlords). A fundamental question can be raised as to the equitability of this sharing of the financial losses due to debtor default.

A second rather blunt policy instrument that might be used to respond to the current financial stress in agriculture is a debt moratorium. This alternative would deny the use of foreclosure procedures against farmers who cannot make their principal and interest payments, cancel or defer interest and principal payments for a time specific, write down a portion or all of the indebtedness, deny deficiency judgments for those who cannot make their payments, or various combinations of the above. The purpose of such a policy response would be to enable the financially pressed producer to temporarily be relieved of the financial obligations associated with excessive debt. Most debt moratorium proposals include a temporary, time limited period where debt obligations need not be met, but they do not eliminate the eventual and definite commitment to repay indebtedness. Consequently, a key to the success of such proposals is the assumption that the financial condition of the firm and the industry will improve sufficiently in the intervening period so that the obligations can be repaid. Debt moratoriums have been used with limited success in previous periods of financial stress, specifically the 1930s, to relieve the financial pressure faced by farmers.

The major direct cost of a debt moratorium is the income foregone by the lenders during the moratorium period. But in addition to this cost, there is serious concern about the implications of such programs on the long-run performance of the financial markets. The implementation of a debt moratorium would likely result in the lending institutions concluding that such a prospect has a higher probability in future periods of financial stress. Consequently, lenders who feel their earnings flow may be interrupted by future moratoria will likely judge that there is more financial risk in credit extension and would expect to be compensated for that risk through higher rates of interest. Furthermore, some borrowers would no longer be able to obtain credit even if they have adequate collateral because a debt moratorium has negated the value of collateral in the credit extension decision. In essence, the use of this particular alternative would likely result in chaotic conditions in the financial markets, higher interest rates for the agricultural sector, and the definite prospect that many firms would no longer be able to obtain credit.

Another possible public policy response is the provision of loan guarantees from a federal or state agency to indemnify the lending institution from potential default on the part of a borrower. The provision of a government loan guarantee would reduce the risk faced by the lender, thus encouraging forbearance and loan restructuring. A loan guarantee might be conditional upon an approved plan of liquidation or other more permanent solutions. Such a program is currently

available from the Farmer's Home Administration; additional funding could be made available for this program which would eliminate the need for unique legislation.

To be a permanent and effective solution, a loan guarantee program must be combined with other alternatives such as systematic asset or liability restructuring to reduce the debt obligation or increase the cash flow of the business. Properly structured, a loan guarantee program may provide the time necessary to implement other more permanent solutions and protect the resource markets from collapsing in the process. Without such a long-term solution, a loan guarantee program might be perceived as simply a "lender bailout." A variation of the loan guarantee program is to offer the lender a federal or state bond in exchange for the loan; such a program transfers the responsibility for collection as well as the debt obligation to the government and quite likely would result in higher cost than the traditional Farmer's Home Administration, SBA, or other government guarantee.

A proposal which has received wide-spread attention recently is that of federally assisted debt restructuring. In fact most of the current legislative proposals are variations of the debt restructuring theme. The premise of this approach is that providing additional time to repay the principal would reduce annual obligations, thus enabling some farmers to cover these lower principal and interest payments. And for those who still cannot meet their debt obligations, restructuring would give them some additional time to rearrange the financial struc-

ture of their business including possibly the sale of assets. Most restructuring proposals involve the potential of a write-down of the debt obligation as a condition to obtain a federal or state guarantee [Harl, May, 1984]. The key concept is to provide a government incentive for the private sector to implement workout plans and to "buy time" so that these plans can be implemented rather than forcing the sale of assets and collapsing the resource markets. For many producers who are facing financial stress, such a program again may not be a permanent solution, but the first step in a longer-run plan to adjust the asset and liability structure of the business so that the firm can survive.

As noted earlier, one of the severe problems faced by agriculture has been higher interest rates. Consequently, various proposed policy responses include interest rate buy-downs or subsidies which are focused at reducing this component of the cost structure for farmers. Interest rate buy-downs can be implemented in many ways including a direct government subsidy of interest rates for farmers, an increased tax write-off for farm interest payments, a public guarantee to reduce the risk faced by the lender and therefore allow him (her) to charge a lower interest rate to the borrower, and the use of tax exempt revenue bonds to obtain lower cost funds for agriculture. Temporary interest rate reductions would benefit farmers in the short-run, because interest has become a major component of the cost of production, particularly for those who are highly leveraged. However, a preferred alternative to interest rate buy-downs for agriculture would be a fiscal

policy that reduces the size of the government deficit and the demands of the federal government on the capital markets. Such policy would result in lower market rates of interest throughout the U.S. economy, which would have similar benefits to farmers as an interest rate buy-down plan in terms of reducing their cost of production. Furthermore, lower interest rates in general would have a significant impact on the demand for agricultural commodities by making U.S. investments less attractive to foreign investors, thus reducing the demand for the dollar which would result in lower exchange rates and increased export demand for agricultural commodities. The consequences of interest rate buy-down alternatives will be quantitatively assessed in a later section.

As suggested earlier, debt restructuring may not be adequate for some producers and asset restructuring including liquidation may be required to improve the chances of survivability of the firm. Much of the current asset restructuring involves liquidation of real estate and other capital items for cash, but there is only so much liquidity in rural communities, and cash liquidations frequently result in substantial liquidation losses. Other means of liquidation must be investigated and could be facilitated by public policy. For example, lending institutions might be encouraged to take the title of real property in lieu of debt obligations, and then lease this property back to the original debtor. Such an arrangement would keep the property off the market and thus reduce the chance of resource markets being depressed further. In addition, by leasing the property back to the original

operator, other resources such as machinery and equipment could be efficiently utilized rather than also being in excess. The lender through this process can convert a nonperforming asset into one that generates at least some rate of return in the form of rental payments. To reduce the possibility that the lender must tie up its liquidity in such assets, a government program of providing funds to the lender in the amount of the assets taken back in lieu of debt could be implemented. In fact, government funds could be provided to the institution at a cost which would typically be lower than the cost of funds from the private sector, which would thus partly off-set the lower yield being earned by the asset. Such a program might require the lender to remove the assets from its portfolio over a two or three-year period with the original debtor having a first option to buy. A similar program might be implemented by a state agency or a newly formed private sector firm funded through state or federal revenue bonds.

Again, one of the purposes of such a program is to stabilize resource values. A critical issue today is whether the public sector should play a role in asset liquidations in the form of regulating, monitoring or facilitating the process. Legitimate concerns have been expressed about the attitudes of some lenders who are encouraging cash sales of assets without recognition of the implications for the producer or the asset markets. Collateral values are declining in part because of forced sales of assets for cash into a market where there is limited buying power. We need to be much more innovative in the liqui-

dation process, and we need to evaluate whether there is something that should be done in the public policy arena to assist in this financial stress environment.

A final alternative that might involve public policy is that of recapitalization. In many cases, the financial structure of the business could be significantly improved through an infusion of equity from outside the firm, either by a debt holder exchanging his obligation for an equity position in the firm, or an outside investor providing additional funds which are used to reduce indebtedness. An equity infusion may at first glance appear to be difficult to orchestrate. Who would want to put equity into a financially troubled firm? In some cases family members may be willing to provide such an infusion to protect the integrity of a family business. An expected future inheritance of nonbusiness assets could be converted into current cash through sale to other family members. A nonfamily investor might be willing to contribute capital for a larger-than-proportionate share of the ownership of the firm. Some investors may be attracted by the tax shelter available from operating losses; under certain conditions, an operating loss is, in reality, an asset for a high tax bracket investor. And unused tax credits may be available to make the equity infusion more attractive for the investor.

The third source of an equity infusion is the lender. In some cases, the financial condition of the firm is such that the lender will incur a significant loss if the note is called, foreclosure occurs, or

the operator takes advantage of the bankruptcy procedures. If the firm has current cash flow problems because of high leverage and aggressive growth, but strong management and the potential for reasonable future earnings, the lender may minimize losses or increase the chances for recovery by converting debt obligations into equity. This conversion reduces the current cash flow burden of excessive debt servicing and releases resources (both funds and management) to use in more productive activities that will enhance current and future income.

The role of public policy in this area of outside equity infusions or recapitalization may be one of reassessing current legislation which discourages such arrangements. Many states have passed laws that restrict or prohibit outside equity investments in agriculture. Such prohibitions or restrictions should be reassessed in the current financial stress environment. Alternatively, a government financed venture capital entity might be formed to make the necessary equity capital infusion into agriculture under terms that are more acceptable to both farmer and investor. Such an arrangement could be financed with state revenue bonds or federal funding. An institution not all that dissimilar from Agricultural Development Banks used in many Third World countries which involves a combination of public and private sector funding might be a viable institutional innovation in the U.S. capital markets at the present time.

A final role of public policy in the current environment would be one of providing information to facilitate the adjustment process.

Programs to facilitate the merger of business firms, to retrain and relocate people, and to disseminate the best information on adjustment strategies and resource availability might make the adjustments less painful for those involved. However, it is not clear that such programs would be an adequate response to the current financial stress problem in agriculture.

ANALYSIS OF POLICY OPTIONS

The purpose of this section will be to evaluate the aggregate and firm level impacts of selected policy options. The focus of this analysis will be on interest rate buy-downs, refinancing and extending repayment terms, and sale leasebacks and asset liquidations. The aggregate implications of interest rate buy-downs and extending repayment terms as well as a "stronger economy" will be discussed first; then the micro implications of these options along with the asset liquidation alternative will be reviewed.

Aggregate analysis

The aggregate analyses were completed using an econometric simulation model developed by the Center for Agricultural and Rural Development which projects the future production and financial characteristics of the agricultural sector. The model (crop, livestock, and finance sectors) was estimated block recursively with data from the 1960 to 1980 period. The crop and the livestock sectors were solved simultaneously and the results were fed to the finance sector recur-

sively. Previous studies documenting the model and its historical performance indicate that it has a high degree of reliability and should have good predictive power [Thamodaran, et al. and Thamodaran, et al., both forthcoming].

In this analysis, the model was first used to develop a base scenario to the year 1995 of the expected financial condition of U.S. agriculture. Then, alternative financial stress policies were imposed and the results under these policy options are compared to the base results. The first policy option, that of interest rate buy-downs, assumes that interest rates are reduced on real estate debt by three percentage points for the years 1985-1988, and rates on non-real estate debt are reduced by four percentage points for the same time period. After this four-year period of rate buy-downs, interest rates are assumed to return to the rates used in the base run. During the four-year period, the majority (80 percent) of the increased farm income resulting from the interest rate buy-down is allocated to repay principal on the nonreal estate debt. Thus, most of the interest cost savings must be used for debt reduction, not for capital expenditures or family living. For the policy option of extending loan terms, the extension is accomplished by reducing the annual repayment rate on both real estate and non-real estate debt by 25 percent. In essence, this approach means that farmers are required to only pay 75 percent of their scheduled principal payments with the remainder being deferred. This program is again assumed to be available for a four-year period

from 1985-1988 with a return to the base scenario repayment rate for the years 1989 and thereafter.

One should note that these two programs as analyzed in the aggregate framework are drastic and nondiscriminatory. The methodology does not allow for targeting--selective application of the policy alternatives to only a specific group of farmers. The purpose of this aggregate analysis is to evaluate the implications of broad sweeping nontargeted approaches such as making debt restructuring or interest rate buy-down arrangements available for all farmers. The actual implementation of such programs would preferably be on a targeted basis. The aggregate results presented here suggest the direction of the impacts of a targeted vs. nondiscriminatory program if not the magnitude of those impacts.

The third option assumes reduced interest rates and a stronger demand for farm products. Although this is not a policy focusing uniquely on farm financial stress, government macro policy will directly influence the farm economy. In simple terms, this "stronger economy" scenario assumes lower interest rates and higher crop exports. Real estate and nonreal estate interest rates are lowered by three percentage points from the base run values for the entire 10-year period (1985-1995), and farm exports are assumed to be 10 percent higher than the base run levels. The changes in critical assumptions and the financial results of the simulations are summarized in Tables 4-7.

The short-run and long-run financial implications of these three policy options can best be appreciated by comparing the results for each policy option to the base results for the years 1988 and 1995, respectively (Table 4). With an interest rate buy-down option, the short-run (1988) result is higher net farm income and cash flow compared to the base analysis (Table 5). This higher income and cash flow is used to repay part of the nonreal estate debt, resulting in lower liabilities and higher equity with similar total asset values. In the short-run, the financial condition of the sector as measured by the equity-to-asset ratio is improved with the interest rate buy-down compared to the base results.

The long-run (1995) implications of an interest rate buy-down are slightly higher incomes and cash flows, in large part because of the reduced liabilities. As to long-run financial structure, the assets, equities, and equity-to-asset ratio are slightly higher for the interest rate buy-down option compared to the base analysis. Thus, the interest rate buy-down option appears to have a beneficial short-run and long-run impact on the agricultural sector, assuming the interest cost savings are used to reduce outstanding debt. Other analyses indicate that if the interest cost savings are used instead for improved family living and capital expenditures, the debt load is not reduced and in the long run the financial condition of the sector as measured by annual flows of income and cash deteriorates from the base analysis.

Lengthening repayment schedules (reducing the repayment rate) has

different short-run and long-run implications for the agricultural sector (Table 6). In the short-run (1988), this policy option will result in lower incomes but higher cash flow. The lower income will occur because liabilities are being repaid at a slower rate, thus resulting in higher total interest cost. Furthermore, lower income results in a lower rate of growth in assets since purchases of capital items are significantly related to net farm income. Equity is lower under the reduced repayment rate option as is the equity-to-asset ratio. In the long-run (1995) income is slightly lower with this option compared to the base run, and cash flow is reduced because principal obligations that were delayed in earlier years must now be repaid. The financial condition of the industry as measured by assets, liabilities, and equity is significantly improved in 1995 compared to 1988.

The "stronger economy" scenario provides a much brighter outlook for farm financial conditions (Table 7). In the short-run (1988) incomes and cash flows are significantly higher than the base-run values. The higher incomes and lower interest costs translate into higher valued assets in agriculture. The financial condition as reflected in equity and the equity-to-asset ratio is significantly improved compared to the base-run. Furthermore, the brighter outlook for agriculture with a stronger economy is sustained and improved in the long-run (1995).

In essence, the aggregate results suggest that the interest rate buy-down option will reduce the short-run income and cash flow pres-

sure and stabilize income and cash flow in the long-run compared to the base; the financial condition of the sector as measured by stocks will improve in the short-run and remain about the same as the base in the long-run under this option. A lengthening of repayment terms will result in reduced income and higher cash flow in the short-run, but similar incomes and lower cash flow in the long-run compared to the base; the financial condition of the sector as measured by stocks will deteriorate slightly compared to the base under this option. A stronger economy as reflected in reduced interest rates and higher exports will not only solve the short-run income and cash flow problems but also alleviate the long-run problems; the financial condition of the sector as measured by financial stocks and the equity-to-asset ratio will improve significantly in the long-run compared to the base under this assumption.

Firm Level Analyses

The consequences of interest rate buy-downs and lengthening repayment terms along with asset restructuring on individual firms will be illustrated using a representative cash-grain farm and a representative hog farm. The cash-grain farm is comprised of 435 acres of row crop land and total assets valued at \$925,000; the hog farm is a farrow-to-finish operation consisting of 425 acres of land and total assets valued at \$965,000. Different financial structures for both farms are reflected through debt-to-asset ratios of 33, 50, and 67 percent. Addi-

tional key assumptions used in the analyses are summarized in Table 8. The financial consequences of various policy options were simulated over a 10-year period using the Iowa State University financial planning model. This firm level simulation model was econometrically estimated using farm record data from the Iowa Farm Business Association for the years 1964-1982. Numerous previous studies have been completed using the model providing various tests of its validity [Reinders, 1983; Wickham, 1984; Doye and Boehlje, 1984].

The various policy options were simulated by exogenous changes in parameters in the model. To simulate interest rate buy-downs, rates on long-term loans were reduced by three percentage points for the first four years of the ten-year planning horizon, and rates on short-term loans were reduced by four percentage points for the first year of the planning horizon only (short-term interest rates could be reduced for only the first year because of the structure of the model). Lengthening of loan repayment schedules was implemented by reducing the annual principal payments on long-term loans by 25 percent for the first four years and then increasing the repayment schedule for the remaining six years to compensate for the earlier reduction. Repayment rates on short-term loans were not adjusted since the model essentially uses short-term borrowing to cover cash flow shortfalls and uses excess cash to reduce short-term obligations. Asset restructuring options were incorporated in the model by assuming that the indebted portion of the real estate base was sold at a value equal to that used in the balance

sheet for determining collateral value, and then those assets were leased back under conventional lease terms. One strategy for accomplishing this objective would be for the lender to take title to the asset in lieu of debt (assuming the asset value exceeded secured indebtedness) and then lease it back to the original owner. A special agricultural credit corporation or development bank with a combination of public or private sector funding might also be the holder of such assets [Harl, November, 1984]. Or the property might be sold to a non-farm investor and then leased back.

The simulation model was run in a Monte Carlo mode with 50 observations of stochastic cash rates of return on assets to simulate the risk exposure faced by the typical firm. The primary indicators of financial stress employed in these analyses are the debt-service-coverage ratio (DSCR) and its three-year moving average (ADSCR). The DSCR is defined as the firm's income net of family living expenditures, income taxes, and production expenses other than interest and rental payments on leased land divided by the firm's annual debt service obligation including interest on all loans and principal payments on intermediate and long-term loans plus land rent. A DSCR of less than 1.0 in any year indicates that the firm has insufficient net income after taxes and family living expenses to meet its annual debt service obligation. An ADSCR of less than 1.0 indicates that the firm's payments problem is more persistent and less likely to be the result of a single "bad" year.

The results of the analyses for the cash grain farm are summarized in Table 9. Note that with only 33 percent of the firm's assets indebted, the probability of the ADSCR falling below a value of 1.0 at least once in the 10-year model period is 54 percent. This probability drops to 28 percent and the firm's average terminal equity increases modestly with the interest rate buy-down scheme. The reduced repayment rate strategy is less effective in reducing the odds of a cash flow crisis (48 percent probability of ADSCR less than 1.0). If the firm elects to restructure its assets through the sale-leaseback of indebted land, however, the firm's risk of a payments problem is essentially eliminated and a 12.5 percent increase in average terminal equity is realized.

The ability of the 50 percent debt cash grain farm to meet all of its financial obligations in a timely manner is at much greater risk than that of the 33 percent debt farm, regardless of the financial policy considered. The ADSCR fell below a value of 1.0 at least once in the 10-year model period in all 50 trials of the base, interest-rate buy down, and reduced repayment rate scenarios. The interest-rate buy down policy was slightly more effective in reducing the firm's financial stress than the reduced repayment rate policy in that fewer overall occurrences of an ADSCR less than 1.0 (86 percent) were observed with this approach than for the base and reduced repayment rate scenarios (98 percent). For this firm of intermediate leverage, the only truly effective option to reduce the probability of a cash flow crisis

is the sale-leaseback of indebted land provided in the asset restructuring scenario. Again, this financial strategy effectively eliminates the probability of observing an ADSCR less than 1.0 at any time during the planning horizon and provides for the highest average terminal equity as well.

The DSCR, and thus the ADSCR, is less than 1.0 in every year of all model runs for the 67 percent debt firm under the base, interest-rate buy down, and reduced repayment rate scenarios. This highly leveraged firm has no choice but the sale-leaseback of indebted land if it is to significantly improve its chances of maintaining a positive cash flow. Indeed, the firm's initial equity of \$308,000 deteriorates to an average value of approximately \$90,000 under the base and reduced repayment rate schemes and to \$220,000 under the interest rate buy-down scenario. Under the asset restructuring scenario, the firm significantly reduces the probability of a cash flow crisis and eliminates the risk of insolvency while realizing a positive increment to equity in all 50 model runs.

The results of the hog farm analyses presented in Table 10 parallel those of the cash grain farm analyses discussed above. The major distinction between the results of the cash grain farm analyses and the hog farm analyses is the generally lower probability of cash flow problems for the hog farm relative to the cash grain farm, regardless of initial debt position or financial scenario considered.

The 33 percent debt hog farm is essentially free of difficulty in meeting debt service requirements as shown by an ADSCR which never falls below 1.0 in 50 runs of each of the four scenarios. For the 50 percent debt hog farm, the rate buy-down policy reduces the probability of observing an ADSCR less than 1.0 from 36 percent in the base scenario to 18 percent. Again, the reduced repayment rate policy is less effective than the rate buy-down policy in lowering the probability of an ADSCR less than 1.0--the probability is reduced from 36 percent in the base to only 28 percent with the repayment adjustment policy. In no instance under the asset restructuring policy, however, did the ADSCR fall below a value of 1.0, and the average terminal equity under this policy is larger than for the other options.

As was the case for cash grain farms with higher initial levels of leverage, the only method among the four analyzed for the 67 percent debt hog farm to reduce the probability of a cash flow crisis from relatively high levels (80-92 percent) is the asset restructuring plan. Asset restructuring is also the only one of the four scenarios which provides for an increase in the firm's initial \$322,000 equity in all 50 model simulations.

In summary, these micro results indicate that the risk of illiquidity is generally greater for the representative cash grain farm than for the hog farm for all initial leverage positions or financial policies considered. For the more highly leveraged cash grain farm (50 or 67 percent debt) and the highly leveraged hog farm (67 percent debt),

the probability of failure as measured by the ADSCR is very high--exceeding 90 percent in the base run. The interest rate buy down policy is marginally effective in reducing the probability of failure for the 67 percent leveraged hog farm, but a large reduction in the probability of failure of this highly leveraged hog farm and the 67 and 50 percent leveraged cash grain farms is attained only with the asset restructuring plan.

For the representative farms of lower leverage, the 33 percent debt cash grain farm and the 50 percent debt hog farm, the probability of failure in the base run is much lower than for comparable firms of higher leverage. For these firms the interest rate buy-down policy reduces the probability of failure by one-half relative to the base run, the asset restructuring policy completely eliminates the probability of failure, and the reduced repayment rate policy is of intermediate effectiveness in reducing the probability of failure. Finally, the 33 percent debt hog farm is well insulated from the financial stress affecting the firms of higher leverage categories; this low leverage hog farm is free of the risk of failure as defined by the ADSCR in the base scenario and all of the policy scenarios.

The impact of the policy scenarios on average terminal net worth is consistent for both representative farm types across all initial debt levels. The reduced repayment rate policy results in essentially no change in average terminal net worth relative to the base scenario, the interest rate buy-down policy causes a moderate increase in termi-

nal net worth, and the asset restructuring policy results in the greatest gain in equity over the 10-year period.

CONCLUSIONS

Data from Iowa and other states along with that from the U.S. Department of Agriculture indicate that a significant number of farmers are suffering financial stress. This stress is a result of the many changes in the financial environment for agriculture, and is not simply a result of lower incomes. Other factors that contribute to the financial stress problem of the U.S. agricultural sector are a higher debt load, shorter maturities on debt, reduced liquidity, higher and more volatile interest rates, increased income and collateral risk, limited availability of refinancing alternatives, and asset liquidations. Government policies of the past have contributed to today's financial stress by encouraging higher land values, more debt utilization, growth in farm size, and higher interest rates.

Given the complex nature of the financial stress problem, a public policy approach that focuses only on one characteristic of that problem will probably be ineffective. Specifically, price and income support programs which have been the major component of agricultural policy in the past may be quite ineffective in solving the current financial stress problem--such programs do not focus on some of the major dimensions of the stress problem (i.e. loan maturities, liquidity, collateral risk, etc.), and furthermore quite likely will not be targeted to

those individuals who have financial stress. Such programs may in fact compound and contribute to the longer run financial problems in agriculture.

Various policy options that are more targeted to the financial stress problem have been identified including interest rate buy-downs, debt moratoriums, debt restructuring, bankruptcy, asset restructuring, recapitalization, etc. While spiraling farm debt suggests that debt restructuring is the answer to the current financial stress, a restructuring of agricultural assets remains the key to a long-term solution. The results of both the firm level and the aggregate analyses indicate that asset restructuring through sale-leasebacks is a preferred option to interest rate buy-downs or liability restructuring in reducing financial stress for individual farm firms and the industry. The rearranging of liabilities is not a permanent solution to the current financial stress, because even with more time to repay, many farmers will not be able to service their debt with current or expected interest rates, productivity, and input and commodity prices. However, debt restructuring is an important mechanism for buying time to implement more permanent solutions. Asset restructuring, including liquidation, debt reductions, and equity infusions will be required to improve the chances of long-term survivability of many farm businesses. The aggregate analyses indicate that a general reduction in interest rates and more rapid growth in exports would significantly reduce the financial stress that the agricultural sector is facing.

One of the key objectives of any public policy to alleviate financial stress should be to protect the resource markets from collapsing-- stabilizing resource values is critical to maintaining the stability of the agricultural production sector and rural communities. If resource values decline precipitously because of excessive supplies being offered to a market that has no liquidity to absorb them, many farmers who were a "good credit risk" will no longer be so because of declining collateral values. But using government intervention to stabilize resource values at levels that are not supportable in the long-run by market prices can result in very high government costs, inefficient resource allocation, and higher consumer prices for food products. Such a result is also clearly not desirable.

The agricultural sector has suffered significant wealth losses during the recent years. An important public policy concern is how those losses will be shared among the various firms in the private sector (farmers, lenders, input supply firms, landlords, etc.) and between the public sector and the private sector. A related concern is how to keep the losses from becoming more severe than they need be. What may be needed is a public sector contingency plan that can provide a safety net in case the farm economy continues to be stagnant and/or the resource markets began to collapse. A strategy of doing nothing today could, if the financial condition of agriculture continues to deteriorate, very easily result in irresistible political and economic pressures to implement drastic options later such as a general and extended

debt moratorium or significant increases in commodity support prices. But inappropriate action now may interfere with the longer-run adjustments in resource values and utilization that must occur to retain an efficient and financially sound agricultural sector.

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Table 1. U.S. Farms: Debts and Assets by Leverage

	Debt to Asset Ratio (percent)				Total (%)
	0-10	11-40	41-70	71+	
Operators (%)	58	24	11	8	100
Debt (%)	5	32	32	31	100
Assets (%)	47	32	14	8	100

Source: Melichar Jan. 84 Federal Reserve Bulletin.

Table 2. Estimated Percentage Distributions of Sample Farm Operators, Their Assets and Liabilities by Relative Debt Levels*

	Debt-to-Asset Ratios			
	0-10	11-40	41-70	71+
Percent operators	36	35	18	10
Percent Assets	30	40	21	9
Percent Liabilities	3	32	40	25

Source: Farm Finance Survey, March 1984, Iowa Department of Agriculture.

*Totals may not equal 100 due to rounding errors.

Table 3. Estimated Percentage Distributions of Iowa Farm Operators, Their Debt and Assets by Farm Size and Debt Level Categories*

Farm Size **		Debt-to-Asset Ratio (%)			
		0-10	11-40	41-70	#71
Very small	Number in Sample	13	7	7	5
	% Operators	41	22	22	16
	% Assets	39	25	25	11
	% Debt	0	25	41	34
Small	Number in Sample	61	45	25	17
	% Operators	41	30	17	11
	% Assets	41	31	18	11
	% Debt	3	25	33	38
Medium	Number in Sample	211	199	95	58
	% Operators	37	35	17	10
	% Assets	34	37	18	11
	% Debt	3	31	35	31
Large	Number in Sample	29	55	33	6
	% Operators	24	45	27	5
	% Assets	24	45	26	5
	% Debt	4	35	47	14
All	Number in Sample	314	306	160	86
	% Operators	36	35	18	10
	% Assets	30	40	21	9
	% Debt	3	32	40	25

Source: Farm Finance Survey, March 1984, Iowa Department of Agriculture.

*Totals may not equal 100 due to rounding errors

**Size Category	Assets
Very Small	Under \$50,000
Small	\$50,000 - \$199,999
Medium	\$200,000 - \$999,999
Large	\$1,000,000 and over

Table 4. Farm Financial Indicators - Base Run

Years	Real estate repayment rate	Non real estate re-payment rate	Interest rate on real estate debt	Interest rate on non-real estate debt	Net farm income (1977 dollars)	Net cash flow (nominal dollars)	Assets	Liabilities	Equity	Equity/Asset Ratio	Debt/asset ratio
	-----percent-----				-----millions-----						
1981	10.2	18.4	0.081	0.137	33,326.3	---	808,008.4	159,378.5	648,629.8	0.803	0.197
1982	10.4	18.7	0.081	0.130	35,011.7	37,781.1	825,560.7	163,480.6	662,080.0	0.802	0.198
1983	10.6	19.1	0.082	0.128	38,667.6	41,742.3	816,613.4	167,161.8	649,451.6	0.795	0.205
1984	10.8	19.5	0.083	0.128	38,145.6	46,672.6	1,062,083.0	177,315.8	884,767.2	0.833	0.167
1985	11.0	19.9	0.084	0.129	37,162.8	46,679.0	1,136,924.6	188,930.1	947,994.5	0.834	0.166
1986	11.3	20.3	0.085	0.131	37,075.3	47,319.0	1,184,135.2	201,521.9	982,613.3	0.830	0.170
1987	11.5	20.7	0.086	0.134	36,060.3	46,590.6	1,235,006.2	214,682.9	1,020,323.3	0.826	0.174
1988	11.7	21.1	0.087	0.136	34,324.6	44,505.8	1,276,684.6	227,951.4	1,048,733.2	0.821	0.179
1989	12.0	21.5	0.089	0.139	33,209.8	42,953.4	1,303,153.4	241,221.7	1,061,931.6	0.815	0.185
1990	12.2	21.9	0.090	0.142	33,405.4	43,184.0	1,327,689.0	254,463.0	1,073,226.1	0.808	0.192
1995	13.5	24.2	0.097	0.156	24,734.3	28,089.6	1,444,217.2	320,314.5	1,123,902.6	0.778	0.222

Table 5. Farm Financial Indicators - Interest Rate Buy-Down (including forced repayment of nonreal estate debt)

Years	Real estate repayment rate	Non real estate re-payment rate	Interest rate on real estate debt	Interest rate on non-real estate debt	Net farm income (1977 dollars)	Net cash flow (nominal dollars)	Assets	Liabilities	Equity	Equity/Asset Ratio	Debt/asset ratio
	-----percent-----				-----millions-----						
1981	10.2	18.4	0.081	0.137	33,326.5	-	808,008.4	159,378.6	648,629.8	0.803	0.197
1982	10.4	18.7	0.081	0.130	35,011.7	37,781.1	825,560.7	163,480.6	662,080.1	0.802	0.198
1983	10.6	19.1	0.082	0.128	38,667.6	41,742.3	816,613.4	167,161.8	649,451.6	0.795	0.205
1984	10.8	19.5	0.083	0.128	38,145.6	46,672.6	1,062,083.0	177,315.8	884,767.2	0.833	0.167
1985	11.0	19.9	0.054	0.089	37,112.8	47,113.4	1,136,924.6	184,764.5	952,160.1	0.837	0.163
1986	11.3	20.3	0.055	0.091	41,902.7	50,398.9	1,185,974.6	194,096.0	991,878.6	0.836	0.164
1987	11.5	20.7	0.056	0.094	41,325.1	51,045.9	1,236,299.4	204,630.2	1,026,669.3	0.834	0.166
1988	11.7	21.1	0.057	0.096	39,914.4	50,153.1	1,277,479.8	215,721.4	1,052,758.4	0.830	0.170
1989	12.0	21.5	0.089	0.139	34,539.4	49,190.4	1,310,464.7	231,583.9	1,078,880.9	0.823	0.177
1990	12.2	21.9	0.090	0.142	33,850.6	47,419.6	1,379,226.3	248,683.6	1,130,542.7	0.820	0.180
1995	13.5	24.2	0.097	0.156	24,778.8	28,599.7	1,445,085.4	319,875.7	1,125,209.8	0.779	0.221

Table 6. Farm Financial Indicators - Lengthening Repayment Terms (Reduce Repayment Rate)

Years	Real estate repayment rate	Non real estate repayment rate	Interest rate on real estate debt	Interest rate on non-real estate debt	Net farm Income (1977 dollars)	Net cash flow (nominal dollars)	Assets	Liabilities	Equity	Equity/Asset Ratio	Debt/asset ratio
	-----per cent-----				-----millions-----						
1981	10.2	18.4	0.081	0.137	33,326.3	---	808,008.4	159,378.6	648,629.8	0.803	0.197
1982	10.4	18.7	0.081	0.130	35,011.7	37,781.1	825,560.7	163,480.6	662,080.1	0.802	0.198
1983	10.6	19.1	0.082	0.128	38,667.6	41,742.3	816,613.4	167,161.8	649,451.6	0.795	0.205
1984	10.8	19.5	0.083	0.128	38,145.6	46,672.6	1,062,083.0	177,315.8	884,767.2	0.833	0.167
1985	8.3	14.9	0.084	0.129	37,079.6	53,151.7	1,137,644.9	195,741.0	941,902.8	0.828	0.172
1986	8.4	15.2	0.085	0.131	36,368.1	52,668.7	1,185,443.6	214,752.1	970,690.5	0.819	0.181
1987	8.6	15.5	0.086	0.134	34,832.7	50,888.6	1,232,466.4	233,913.6	998,552.8	0.810	0.190
1988	8.9	15.8	0.087	0.136	32,677.5	47,788.4	1,266,024.3	252,687.6	1,013,336.7	0.800	0.200
1989	12.0	21.5	0.089	0.139	31,204.7	35,779.8	1,284,712.4	261,481.1	1,023,231.2	0.796	0.204
1990	12.2	21.9	0.090	0.142	31,830.7	37,068.3	1,301,736.0	270,675.3	1,031,060.8	0.792	0.208
1995	13.5	24.2	0.097	0.156	23,976.0	26,020.0	1,433,360.4	325,170.4	1,108,190.0	0.773	0.227

Table 7. Farm Financial Indicators - (Stronger Economy)

Years	Real estate repayment rate	Non real estate repayment rate	Interest rate on real estate debt	Interest rate on non-real estate debt	Net farm Income (1977 dollars)	Net cash flow (nominal dollars)	Assets	Liabilities	Equity	Equity/Asset Ratio	Debt/asset ratio
	-----percent-----				-----millions-----						
1981	10.2	18.4	0.081	0.137	36,479.5	---	808,655.1	159,396.7	649,258.4	0.803	0.197
1982	10.4	18.7	0.081	0.130	39,003.5	42,874.6	826,326.2	163,574.2	662,752.0	0.802	0.198
1983	10.6	19.1	0.082	0.128	42,886.8	47,231.7	817,611.2	167,415.9	650,195.4	0.795	0.205
1984	10.8	19.5	0.083	0.128	42,173.1	53,586.9	1,130,927.7	179,620.4	951,307.3	0.841	0.159
1985	11.0	19.9	0.054	0.099	40,683.7	53,410.5	1,215,099.8	193,869.9	1,021,230.0	0.840	0.160
1986	11.3	20.3	0.055	0.101	44,288.9	58,767.9	1,268,703.6	208,745.3	1,059,958.3	0.835	0.165
1987	11.5	20.7	0.056	0.104	42,731.4	58,316.2	1,352,541.5	225,066.0	1,127,475.5	0.836	0.164
1988	11.7	21.9	0.057	0.106	40,736.0	56,855.6	1,428,146.8	242,293.6	1,185,853.1	0.830	0.170
1989	12.0	21.5	0.059	0.109	39,275.9	54,769.5	1,458,310.1	259,054.7	1,199,255.4	0.822	0.178
1990	12.2	21.9	0.060	0.112	38,881.8	54,122.6	1,486,500.9	275,402.6	1,211,098.3	0.815	0.185
1995	13.5	24.2	0.067	0.126	30,655.1	40,761.8	1,615,732.7	353,542.0	1,262,190.7	0.781	0.219

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Table 8. Parameter values for the representative farm analyses

Model	Asset Value Increase			Loan Terms		
	Current Assets	Intermediate Assets	Fixed Assets	Current	Intermediate	Long-Term
	----- (Percent) -----					
Base	0	0	1.9	1 yr. @ 14%	1 yr. @ 14%	25 yr. @ 12%
Interest Rate Buy-Down	0	0	1.9	Interest rate on current and intermediate debt reduced to 10% in initial year of planning horizon, 14% thereafter; rate on long-term debt 9% for first 4 years, 12% thereafter		
Reduced Repayment Rate	0	0	1.9	Principal payments on long-term (real estate) debt reduced by 25% for first 4 years; payments in later years correspondingly higher		
Asset Restructuring	0	0	1.9	1 yr. @ 14%	1 yr. @ 14%	Leased

Table 9. Results of representative cash grain farm analyses

Model	Probability of Debt Service Coverage Ratio Less Than 1.0		Probability of 3-yr. Ave. Debt Service Coverage Ratio Less Than 1.0		Terminal Equity		
	In Any Annual Observation ¹	In Any Model Period ²	In Any Annual Observation ³	In Any Model Period ⁴	Average	Range	
	----- (percent) -----				----- (dollars) -----		
<u>33 Percent Debt</u>							
Base	29	82	17	54	799,882	694,205 -	870,590
Interest Rate Buy-Down	20	74	8	28	829,710	737,406 -	899,907
Reduced Repayment Rate	25	80	15	48	799,884	695,353 -	870,089
Asset Restructuring	1	14	0	0	899,926	795,843 -	1,003,493
<u>50 Percent Debt</u>							
Base	92	100	98	100	492,140	303,645 -	601,114
Interest Rate Buy-Down	73	100	86	100	555,656	399,273 -	644,419
Reduced Repayment Rate	89	100	98	100	494,277	306,523 -	602,366
Asset Restructuring	8	26	0	0	668,697	565,691 -	770,827
<u>67 Percent Debt</u>							
Base	100	100	100	100	86,230	(174,998)-	245,512
Interest Rate Buy-Down	100	100	100	100	221,428	22,062 -	347,560
Reduced Repayment Rate	100	100	100	100	90,083	(171,144)-	249,365
Asset Restructuring	37	68	10	34	423,182	320,195 -	515,061

¹The proportion of 500 observations (10 years x 50 runs) of the DSCR with a value of less than 1.0.

²The proportion of 50 model runs in which the value of the DSCR fell below 1.0 at least once in the 10-year model period.

³The proportion of 400 observations (8 years x 50 runs) of the ADSCR with a value of less than 1.0.

⁴The proportion of 50 model runs in which the value of the ADSCR fell below 1.0 at least once in the 10-year model period.

Table 10. Results of representative hog farm analyses

Model	Probability of Debt Service Coverage Ratio Less Than 1.0		Probability of 3-yr. Ave. Debt Service Coverage Ratio Less Than 1.0		Terminal Equity	
	In Any Annual Observation ¹	In Any Model Period ²	In Any Annual Observation ³	In Any Model Period ⁴	Average	Range
----- (percent) -----				----- (dollars) -----		
<u>33 Percent Debt</u>						
Base	6	20	0	0	1,111,006	867,765 - 1,370,145
Interest Rate Buy-Down	4	14	0	0	1,146,494	907,841 - 1,405,283
Reduced Repayment Rate	5	22	0	0	1,112,778	868,737 - 1,373,140
Asset Restructuring	1	1	0	0	1,360,227	975,307 - 1,788,137
<u>50 Percent Debt</u>						
Base	20	68	10	36	777,407	524,976 - 1,000,256
Interest Rate Buy-Down	15	56	5	18	837,039	595,862 - 1,069,931
Reduced Repayment Rate	19	66	8	28	779,718	526,846 - 1,004,210
Asset Restructuring	3	20	0	0	1,119,841	756,990 - 1,607,309
<u>67 Percent Debt</u>						
Base	49	96	55	92	440,866	127,390 - 653,342
Interest Rate Buy-Down	39	88	36	80	524,589	252,516 - 732,026
Reduced Repayment Rate	48	94	52	90	443,196	130,835 - 656,769
Asset Restructuring	6	12	0	0	849,383	485,483 - 1,430,565

¹The proportion of 500 observations (10 years x 50 runs) of the DSCR with a value of less than 1.0.

²The proportion of 50 model runs in which the value of the DSCR fell below 1.0 at least once in the 10-year model period.

³The proportion of 400 observations (8 years x 50 runs) of the ADSCR with a value of less than 1.0.

⁴The proportion of 50 model runs in which the value of the ADSCR fell below 1.0 at least once in the 10-year model period.