

# Economic Review



FEDERAL RESERVE BANK OF KANSAS CITY

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Farm Credit Problems: The Policy Choices

Lasting Effects of Deregulation  
on Monetary Policy

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## Farm Credit Problems: The Policy Choices 3

*By Mark Drabentstott and Marvin Duncan*

Although U.S. agriculture is undergoing a painful adjustment, the need to compete in a global market will constrain the public policy response. A number of policy choices are available, and if financial stress persists in the next few years, new public sector mechanisms to ease the adjustment might be necessary.

## Lasting Effects of Deregulation on Monetary Policy 17

*By Howard Roth*

Financial deregulation has affected the behavior of the monetary aggregates. M1 has become more responsive to changes in interest rates, while M2 has become less responsive. With the current degree of responsiveness, close short-run control of either aggregate would increase interest rate volatility.



# Farm Credit Problems: The Policy Choices

*By Mark Drabenstott and Marvin Duncan*

American agriculture is under its greatest financial stress since the Great Depression. Heavily leveraged farmers are having great trouble servicing their debts. Capital losses in the sector promise to be large as farm asset values decline. And farm financial problems are resulting in substantial loan losses to agricultural lenders. The roots of the problems are to be found in events of the 1970s—rapidly growing export markets and escalating price inflation—and farmers' aggressive use of debt in response to those events. The problems also are rooted in the growing need to compete for capital and product sales in an international marketplace. These adjustments are proving traumatic for farmers and their lenders. To

ease the sector's necessary adjustment, several proposals for public assistance have surfaced.

Although financial stress may persist for a noticeable subset of American farmers, the need to compete in a global market will constrain the public policy response. This paper outlines the origins and dimensions of the farm sector's financial stress. The likely duration of financial stress is then discussed and a number of public sector initiatives to ease the stress are identified and evaluated.

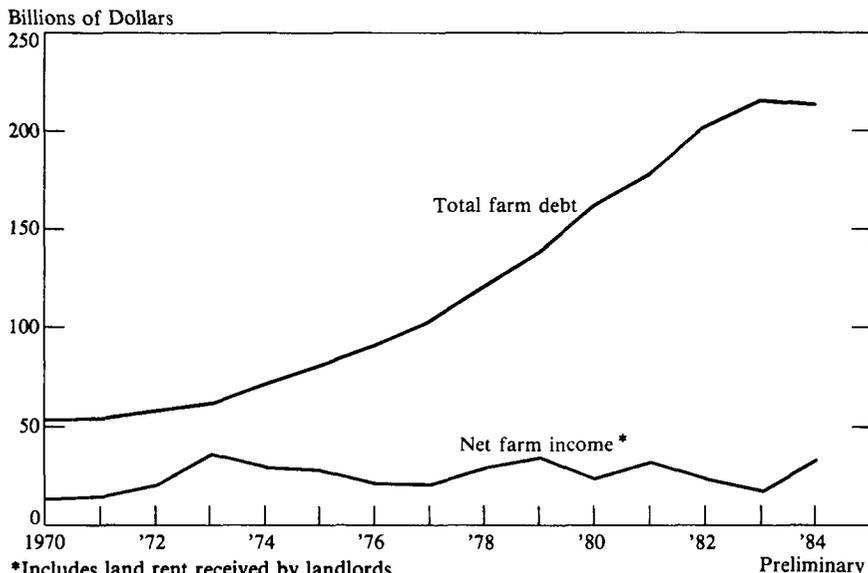
## **Dimensions of financial stress**

Leverage separates farmers doing reasonably well from those having serious troubles. Misled by rising income expectations and price signals distorted by rising inflation, farmers used debt aggressively in the 1970s to finance expansions and to paper over short-term debt service problems. Farm debt at the beginning of the 1970s was about three times annual farm income (Chart 1). By 1983 and 1984, farm sector debt was about eight times annual farm income.

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**CHART 1**  
**Farm income and farm debt**



\*Includes land rent received by landlords.

Source: U.S. Department of Agriculture

Poor prospects for farm income have combined with high real interest rates to exact a toll on farm real estate values (Chart 2). In the Tenth Federal Reserve District, land values have dropped a third from the market highs reached in early 1981—and land values were falling more rapidly as 1984 ended. Barring a decline in real interest rates or a rise in farm product prices, district farmland values seem destined to fall to about 50 percent of their previous market highs in the next year or two.

Farm financial stress appears concentrated among commercial-scale family farms. There are 2.4 million farms in the nation. Of these, 1.7 million are part-time farms with annual farm sales less than \$40,000. These farms receive most of their income off the farm and, as a result, remain financially sound. An additional 25,000 farms are very large commercial farms, with annual farm sales above \$500,000. These farms tend to be highly leveraged, but in general have the cash flow to

support their debt.<sup>1</sup> That leaves 675,000, or about a fourth, of all farms with annual sales between \$40,000 and \$500,000.

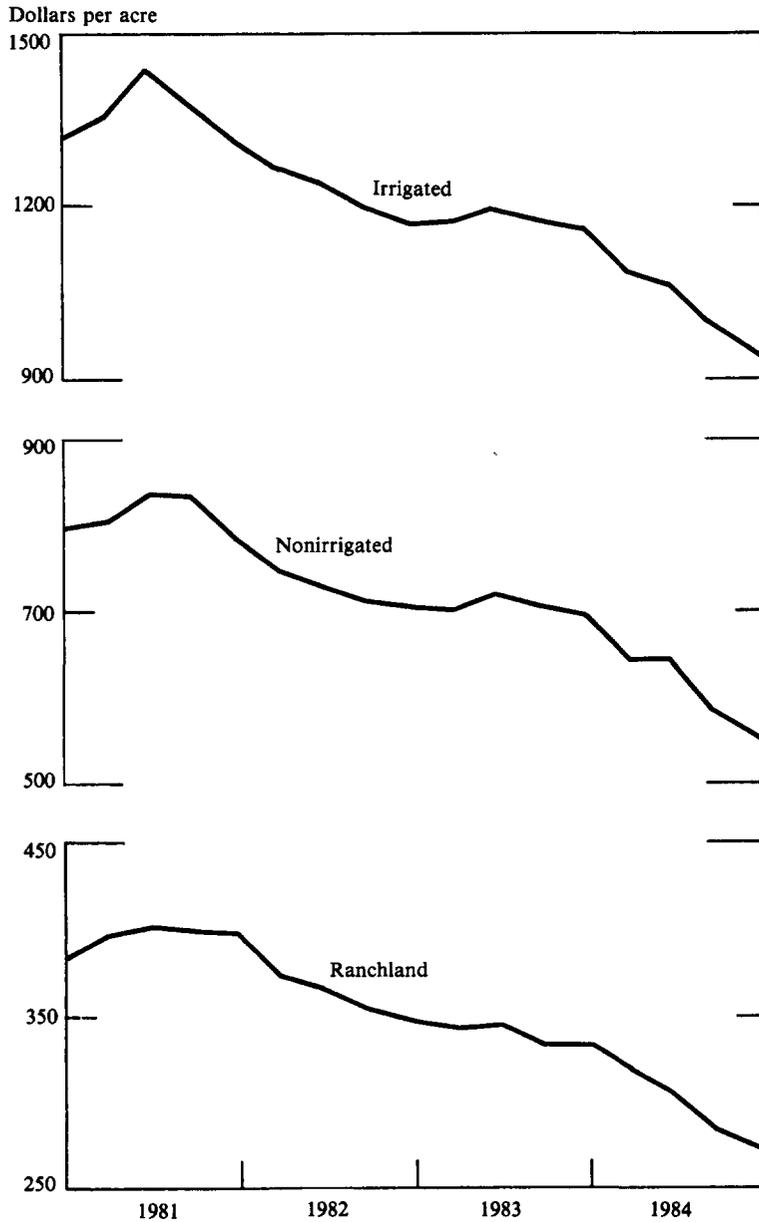
Farm financial stress is greatest on heavily leveraged farms in this sales class of between \$40,000 and \$500,000 (Chart 3). A 40 percent debt-asset ratio seems to be the dividing line between moderate and serious financial stress. About 210,000 of these farms have debt-asset ratios of more than 40 percent. These highly leveraged farmers hold 39 percent of farm operator debts and own about 14 percent of farm operator assets. Their assets total \$107 billion, and they owe \$73 billion.<sup>2</sup>

The outlook is particularly grim for farmers with leverage ratios more than 70 percent.

<sup>1</sup> Farms with annual sales of \$500,000 or more seem to be very profitable, as a group, despite high leverage. In the Tenth District, for example, most cattle feedlots and large confinement hog operations continue to generate sufficient cash flow to service debt.

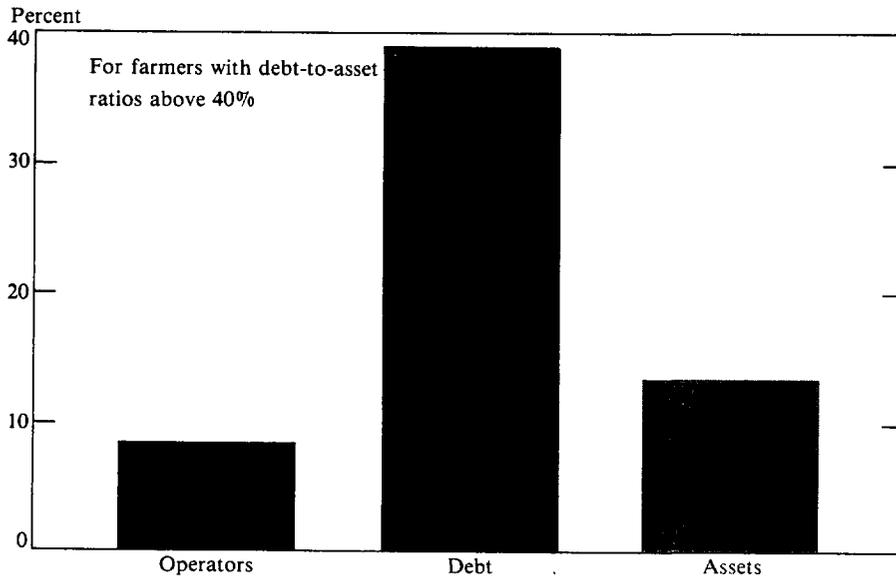
<sup>2</sup> Source: Board of Governors of the Federal Reserve System.

**CHART 2**  
**Farm real estate values**



Source: U.S. Department of Agriculture

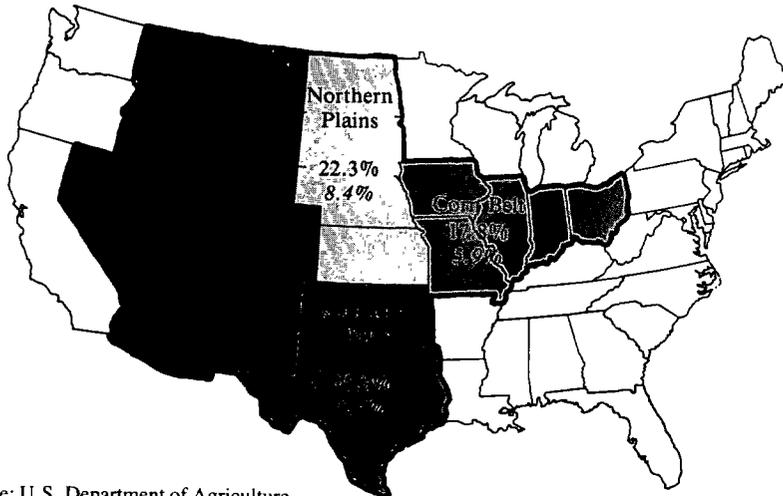
**CHART 3**  
**Farm debt and assets**  
**for selected sales classes**



Source: U.S. Department of Agriculture

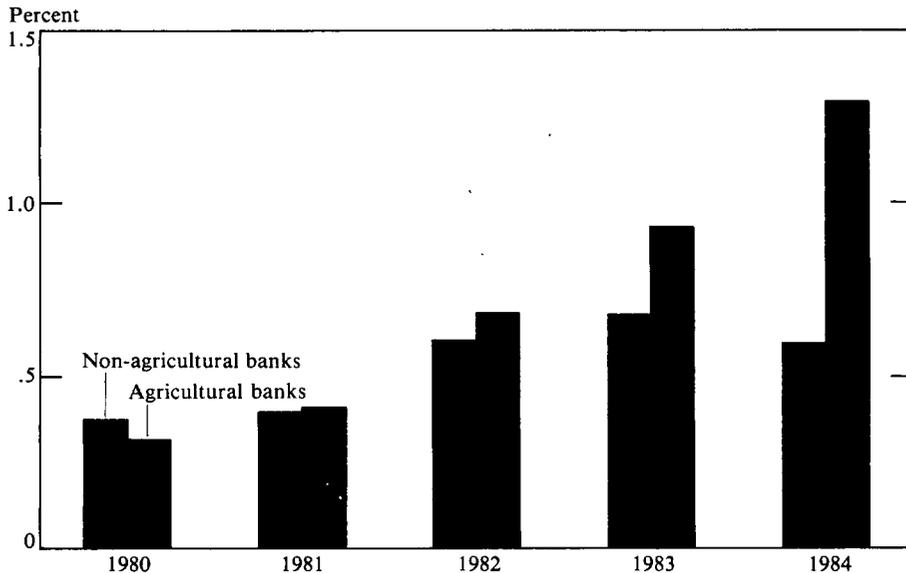
**CHART 4**  
**Highly leveraged farm operators**

- Operators with debt-to-asset ratios above 40%
- Operators with debt-to-asset ratios above 70%



Source: U.S. Department of Agriculture

**CHART 5**  
**Total net chargeoffs as a percentage of total loans**



Source: Board of Governors of the Federal Reserve Bank.

About 4 percent of the nation's farmers are in this situation. These farmers—nearly 100,000—hold about 5 percent of the assets owned by farm operators and account for about a fifth of the debt. Most farmers in this group seem destined to sell at least a substantial part of their assets over the next year or two or face actions by lenders to force them to settle their debts.

Although the stress currently may be worst in the western Midwest and northern Plains states, the problem appears national. The proportion of farmers with debt-asset ratios of 40 to 70 percent exceeds the national proportion in the Northeast, the Lakes states, the Cornbelt, and the northern Plains (Chart 4). The proportion with debt-asset ratios of more than 70 percent exceeds the national proportion in the Lakes states, the northern Plains, the Appalachians, the Southeast, the Delta states, the southern Plains, and the Rocky Mountain states.<sup>3</sup>

Farm financial stress has affected the performance of the nation's agricultural banks, banks with more than a fourth of their loans in agriculture. Loan losses at these banks at the end of 1984 were four times more than in 1980, moving agricultural banks well ahead of nonagricultural banks (Chart 5). Substantially higher loan losses are in prospect for 1985. So far, provisions for loan losses have kept up with the losses written off, but measured by returns to equity, agricultural bank profits have fallen sharply. Despite the reduction in earnings, capital ratios have been maintained at most agricultural banks.

Until recently, failures among agricultural banks were less than failures of other commercial banks of comparable size. The rate of agricultural bank failures climbed relative to nonagricultural banks in 1984. Of 79 bank

<sup>3</sup> Source: U.S. Department of Agriculture.

failures nationwide in 1984, 25 were agricultural banks.

Growing financial problems in agriculture, as indicated by the growth of total net charge-offs as a proportion of total loans outstanding at agricultural banks, are of increasing concern to lenders. Agricultural bank performance has changed over the past few years from showing fewer loan losses than nonagricultural banks to showing substantially more loan losses than nonagricultural banks.

Losses also have mounted for the farmer-owned Farm Credit System (FCS). Production Credit Association (PCA) losses for 1984 totaled \$285 million, compared with only \$109 million for the entire decade of the 1970s.<sup>4</sup> Together, PCA losses in 1983 and 1984 exceeded the combined losses of the previous 50 years. Five PCA's failed in 1984 and four have failed so far in 1985. Losses could be large at several Federal Intermediate Credit Banks (FICB's).

Federal Land Banks (FLB's), which have had relatively few loan losses so far, are bracing for what could be a marked increase in loan delinquencies and maybe loan losses later. The increase is expected because commercial banks and PCA's are increasingly reluctant to extend credit to farmers to finance land payments. While FLB's are well capitalized and loan losses are not expected to impair their stability, the losses could be large, especially in regions where financial stress appears greatest and land prices have declined the most.

Although banks serving agriculture and the FCS are both likely to have more loan delinquency and loan loss problems in 1985, it is important to keep the situation in perspective. Both groups of lenders have a high degree of resilience. Both the rural banking system and

the FCS should weather the current stress in relatively good shape.

### **Factors conditioning the policy response**

Dimensions of the current stress in agriculture suggest the need to ease the adjustment underway, but three factors condition the scale and appropriateness of that response. One is the expected duration of farm credit problems. Another is the international dimension of the transition in U.S. agriculture. A final factor is the expected decline in farm asset values. So before proposed policy solutions are examined, the medium-term outlook for U.S. agriculture, the international constraints to domestic policy options, and adjustment in farm real estate values must be considered.

### *Financial outlook for agriculture*

The expected duration of today's farm loan problems is important to the consideration of policies to ease the problems. There are two possible financial courses for agriculture over the next five years. One is pessimistic, and the other is more optimistic. Both have implications for the scale of public sector intervention needed to ease agriculture's adjustment.

The pessimistic course rests on the assumption that no progress is made to reduce the federal budget deficit. Huge federal deficits of about \$200 billion persist. Monetary policy is assumed to remain directed at keeping inflation under control by achieving monetary growth targets. This economic policy mix means that pressures on U.S. capital markets remain high, keeping real interest rates high and lending strength to the dollar. Under these assumptions, general economic growth would probably be sluggish over the next five years, maybe less than the economy's long-run potential of about 3 percent. Economic growth

<sup>4</sup> Source: Farm Credit Administration.

also would be unbalanced, with industries producing defense and consumer goods doing well while industries producing capital goods, exports, and import-competing goods suffered.

Under this scenario, many troubled farm loans would likely end in liquidation. Most producers with debt-asset ratios much above 40 percent—except those in profitable dairy and specialty crop enterprises—would probably have substantial financial problems. Assets sold by troubled farmers would be acquired by well-capitalized producers and off-farm investors.

A more optimistic course for agriculture depends on the budget deficit problem being promptly addressed. In this case, it is assumed that in five years annual budget deficits are running no more than \$100 billion and are on a downward trend. In response to this change in fiscal policy, real interest rates would decline, even though restraining inflation

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***Policy that eases farm credit problems in the near term must be constructed so that it does not impair the competitiveness of U.S. farm exports in years to come.***

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would remain a primary objective of monetary policy. The dollar would weaken somewhat in response to the lower real interest rates and the large U.S. trade deficit. The general economy grows more vigorously than under the previous assumptions as lower real interest rates spur business fixed investment. Annual growth in real GNP is somewhat higher than the approximately 3 percent long-term potential rate of growth for the five-year period.

Farm loan problems are less severe under this scenario because farmland values stabilize earlier and farm income is higher. Although

substantial asset and debt restructuring is required, more producers that now have 40 to 70 percent debt-asset ratios will survive. Those with ratios of more than 70 percent are still likely to be forced out of business. The need for infusion of nonfarm equity would be less under this scenario, but the need would still be higher than in the past few decades.

In summary, if large federal budget deficits continue, real interest rates remain high, and the dollar stays strong, current farm loan problems will become more serious. In that event, there will be more need for public assistance to ease credit problems. If deficits are reduced, leading to lower real interest rates and a weaker dollar, the stress will ease, though the need for public assistance will remain for near-term problems.

### *The international dimension*

The dimensions of the current financial stress and the prospects for continued stress may argue for substantial public sector assistance. The policy response, however, cannot overlook the international dimension of the current adjustment. American agriculture must compete in a world market for food and fiber, supplying products that are price competitive. Policy that eases farm credit problems in the near term, therefore, must be carefully constructed so that it does not impair the competitiveness of U.S. farm exports in years to come.

Agriculture has become more dependent on trade, along with the rest of the economy. Total U.S. trade (exports plus imports) is now more than a sixth of GNP, more than twice as important as it was in 1965. The opening of the U.S. economy to international trade carries with it two noteworthy implications for agriculture. One is that U.S. macroeconomic policy has become much more important to agri-

culture. The consequences of U.S. economic policy now spread far beyond our shores, with many food-importing countries feeling the effects of U.S. policy. Agriculture in this country suffers when economic policies raise real interest rates, and slow economic growth in developing countries.

The other implication for agriculture is the competitiveness that a more open economy brings. With many countries vying for world markets, U.S. firms must increase productivity and cut costs to keep a competitive edge in both their domestic and export markets—a conclusion that applies to agriculture as well as such industries as steel and automobiles. With many countries having made large capital investments in food production over the

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*Under various assumptions, farmland values could fall to a half to a fourth of their previous market highs.*

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last decade, U.S. agriculture competes in the world marketplace against an array of growing export competition. And greater competition keeps pressure on all segments of U.S. agriculture to trim costs. For producers, this has meant a secular decline in farm real estate values, an important part of crop production cost. For agribusinesses, it has meant consolidations of firms to eliminate excess capacity and reduce costs as well as limited opportunity to maintain profitable price margins.

A more open economy means agriculture cannot ignore international competitive pressures or implement agricultural policy that impairs its competitive position in a global food market. Moreover, agriculture has a great stake in U.S. economic and international policies that foster economic growth here and abroad.

### *Asset value adjustment*

It seems clear that U.S. agriculture is in the midst of a major adjustment to both the market realities it currently faces and those that are in prospect. That adjustment will be more traumatic than any since the Great Depression. Moreover, it is agricultural asset values that appear likely to adjust most dramatically. Because farm real estate accounts for about three-fourths of all farm assets, and thus is a major determinant of the cost structure of U.S. agriculture, it is not surprising that farmland values have fallen sharply.

Under optimistic assumptions, it now appears that farmland values will settle at about half their previous market high.<sup>5</sup> That loss will seriously affect the borrowing capacity of farmers carrying moderate amounts of leverage. Heavily leveraged farmers will experience greater financial stress that will probably require substantial asset restructuring.

Under the most pessimistic assumptions, the decline in land values could be more protracted—and much deeper. Asset values could decline for at least the next few years. Land values could fall to the range of 25 percent of market high before support was found.<sup>6</sup> That pessimistic outlook would occur as the result of continued high interest rates, substantially weaker farm commodity prices than are now in prospect for 1985, and continued sluggish world economic growth. Such precipitous

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<sup>5</sup> That conclusion is based on the following assumptions. Investors were assumed to pay a value for Tenth District farmland determined solely by the net cash returns from a 50/50 crop share lease. In this case, 1985 USDA crop price forecasts were assumed and long-term interest rates were assumed to have declined to 8 percent as a result of a significant reduction in the federal budget deficit.

<sup>6</sup> In this case, crop prices were assumed to fall to the levels estimated recently by Secretary of Agriculture Block if a market oriented farm program were enacted. Long-term interest rates of 12 percent, approximately current levels, were also assumed.

decline in land values would have far reaching impacts on farmers; even those who currently carry relatively light debt loads would find their borrowing capacity sharply reduced. Moderately and heavily leveraged farmers would experience severe financial stress. Lenders and agribusinesses also would share in the agricultural sector's severe financial stress.

### **Policy solutions**

A rather sober view of farm financial conditions—and expectations of additional adjustment over time—have prompted calls for public assistance for financially troubled farmers. Such assistance, of course, would also help their lenders.

To grant more assistance than currently available would cut across current policy efforts to pare most categories of discretionary public spending. Moreover, most agricultural economists, and many policymakers, see the current adjustment as necessary if agriculture is to get its cost structure in line with the competitive demands of a world marketplace. Policymakers also fear—with good reason—the prospect of another large increase in farm borrowers dependent on subsidized government credit and unable to survive over a longer time horizon without continued infusions of soft credit.

There appear to be only limited bases for increased public intervention in easing agriculture's adjustment problems. One reason for public intervention would be to prevent the collapse of the rural banking system. Another would be to ease the adjustment while allowing it to continue but not so rapidly as to create chaotic conditions in farm asset markets. A third reason would be to help avoid a substantial undershooting of farm asset values below those that would be supported by market fun-

damentals. A sharp undershooting of asset values could bring a larger group of farmers into financial trouble than otherwise.

Data suggest that concern over collapse of the rural banking system is overstated. The performance of agricultural banks has deteriorated in recent years. By some measures, it now falls noticeably behind nonagricultural bank performance for similarly sized banks. Some banks will have serious problems because of this trend. But there is not compelling evidence that the commercial banking system is in jeopardy. Nor is the farmer-owned FCS in jeopardy. To the contrary, evidence suggests that most agricultural lenders have enough resilience to ride out the current stressful period.

Justification for public intervention, then, appears to be twofold: to moderate the adjustment in agriculture and to help avoid substantial declines in asset values below equilibrium values. Most proposals have these goals as their focus.

A number of proposals that have been suggested to ease farm financial stress are now evaluated.

### *Interest rate buydown*

Proponents of an interest rate buydown suggest that lowering interest rates by two to three percentage points would go a long way in curing farmers' financial ills. The proposal typically calls for a buydown for farmers with federal funding or a preferential interest rate for agricultural lending instituted by the Federal Reserve System. This proposal seems fairly easy to dismiss as unworkable. First, an interest rate buydown would be a direct cost to the Treasury of at least a few billion dollars a year. In an era of fiscal austerity—and such a program benefitting only a small proportion of the population—an interest rate buydown may

not be feasible. Second, preferential interest rates granted by the Federal Reserve to a single sector of the economy or group of persons would entail credit allocation by the central bank. Neither Congress nor the Federal Reserve seems willing to pursue such a policy. Credit allocation programs have not worked well. There is likely no basis for policies favoring farmers over other groups, such as homebuilders, for example.

Some farm belt states are considering bond issues to provide low-cost loans to farmers. While such programs would ease the debt service burden of financially stressed producers, they have drawbacks. The programs would offset bond authority that might be used for economic development or capital investment. They would favor one sector of the economy over others. And they would generally provide benefits to all producers, when a targeting of benefits according to management skills and other criteria is probably more appropriate. States may find relocation and retraining grants to displaced farm operators a more cost effective use of funds.

#### *The administration's debt assistance program*

The administration's debt assistance program provides an opportunity for debt and asset restructuring with losses being shared by borrowers, lenders, and the federal government. For its borrowers, the Farmers Home Administration (FmHA) will provide a five-year debt set-aside on up to 25 percent of the borrowers' debt, for a maximum of \$200,000, with no interest on the amount set aside. For loans held by other lenders, the FmHA may guarantee up to 90 percent of a restructured loan, with a \$400,000 limit for operating loans and a \$300,000 limit for real estate loans, after the lender has taken at least a 10

percent writedown on the loan principal. In either case, the restructured loan must generate a breakeven cash flow.

The program appears to be quite successful with FmHA borrowers at this point. About 30 percent of the FmHA's 273,000 borrowers have asked for interviews to determine their eligibility. Apparently far less popular with nonFmHA borrowers and their lenders is the 90 percent loan-guarantee program, which until recently had only limited use.

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#### *A corporation to purchase farmland could be an attractive policy choice, but it has shortcomings.*

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The lack of participation by nonFmHA borrowers is a matter of substantial concern. With capital losses shared by borrower, lender, and government, the program appropriately does not stop the necessary adjustment in farm asset values and in farm structure. Instead, it moderates the speed of adjustment to a rate that is politically and socially acceptable. If the program does not work well, however, more drastic action by Congress is almost certain.

To improve the program's acceptance, the administration has made several improvements. First, FmHA has streamlined the certifying of approved lenders. This broadened the authority of lenders to act on debt-restructuring and loan-guarantee agreements—within prescribed guidelines—greatly speeding guarantee approvals.

Second, lenders participating in the debt restructuring and loan guarantee program are now allowed to take their required writedown in the form of a reduction in loan interest rates instead of an immediate writedown against loan principal. The change allows lenders to take their losses out of earnings over time instead of taking them out of loan loss reserves and capital.

Third, the program's initial requirement that the restructured loan generate 110 percent of cash flow requirements has been relaxed to 100 percent. If agriculture's prospects are to improve over the next two to three years, it may be enough to require that the loan generate only 100 percent of cash flow requirements.

Fourth, the funding authorization cap for loan guarantees is no longer a limitation. Greater guarantee authority will be available if needed.

These improvements may increase the number of borrowers and private lenders using the FmHA loan restructuring and guarantee program. That would mean more risk to the FmHA, and the possibility of agriculture becoming more dependent on public lending. To offset that risk, the FmHA could offer loan guarantees that decline over a fixed number of years. For example, a 90 percent loan guarantee could be in effect for the first three to five years of a restructured loan with the guarantee declining by ten percentage points a year thereafter. The private lender could then exercise credit discipline if the loan did not perform, and the FmHA loan guarantee portfolio would dwindle over time as private lenders assumed the risk associated with the credit.

### *A new federal lending agency*

A new federal lending program has been proposed to provide needy farmers a new source of capital. While such a program might have merit in theory, it has many problems. With the current emphasis on reducing federal budget deficits, it seems unlikely that such an agency would be authorized and adequately capitalized. But even more relevant is how such an agency could be kept from becoming still another large and generous source of soft credit to borrowers that are no longer credit-

worthy and how the lending of such an agency could be limited to agriculture and not extended to include other troubled sectors.

Policymakers have discussed using the FCS as a vehicle for providing soft credit to agriculture to ease financial stress. In addition to other credit management problems that could result, the FCS would likely jeopardize its private sector status. If financial markets became concerned about the future quality of FCS bonds, borrowing costs to farmers through FCS outlets would rise, affecting both short and long-term loans. Consequently, this seems to be an unwise alternative.

A federally chartered private corporation has been proposed for acquiring agricultural land from financially troubled farmers. The corporation would raise funds in national capital markets to buy land and hold the land for a few years before offering it for sale to farmers. Farmers that had sold the corporation their land would have the right of first refusal. Land would be leased back to farmers by the corporation during the holding period.

A federally chartered corporation has some appeal. It might be a way around state laws limiting corporate ownership of land. Its federal charter likely would enable it to raise large amounts of capital through the sale of bonds. Its presence in land markets would promote more optimism about the future of farm asset values. And the corporate approach represents a private sector, rather than government, solution to a knotty public policy problem.

But the proposal is not without problems. To stabilize land markets effectively, the corporation would need to become operational in a relatively short period of time. Political pressures might cause the corporation to support farmland values higher than market fundamentals dictate. Since capital losses in farmland are likely to continue for another few

years, the corporation would need enough capitalization to withstand portfolio losses on a mark-to-market basis during that time. And finally, since agriculture is not alone in facing capital losses, political pressures would be strong to authorize lending by the corporation to other troubled sectors, such as energy and heavy manufacturing.

On balance, the corporation may be an attractive policy choice if land values decline substantially over a period of years. It could ease the financial problems of farmers and lenders that would accompany such a decline. Nevertheless, the corporation would need to be carefully crafted to avoid some potentially large shortcomings.

### *Helping lenders hold assets*

Lenders are expected to take possession of large amounts of farm real estate over the next two to three years as a result of foreclosures and other actions to settle problem loans. In the past, lenders usually have put such property on the market promptly. But that option does not seem reasonable in the current adjustment. With land values falling and much more property for sale than usual, to place more land on an already crowded market would be to depress prices even faster and maybe even further than market fundamentals would require.

As a result, many lenders are now holding land in their portfolios and they may need to continue holding land for a few more years. Federal banking regulations seem flexible enough to allow property to be held up to ten years, but if property values decline from those determined when the property was acquired, banks must establish reserve accounts at least equal to the excess of book value over fair market value or writedown the value of the assets directly. In short, banks

must mark to market the real estate. Some state banking laws are more stringent, requiring annual writedowns on the property until it is written off the bank's balance sheet.

Despite their good intentions to hold land off the market, then, few lenders will be able to hold large amounts of land for several years. To do that when the land market was declining would be to impair the banks' capital. As a result of this problem, agricultural banks would be aided by forbearance, where appropriate, on the part of national and state bank regulators regarding holding of real estate by lenders.

### *Federal Reserve discount window*

Because of the problems in agriculture, a significant number of agricultural banks may approach the Federal Reserve discount window. Assistance could be provided under two Federal Reserve extended credit programs. Under the seasonal borrowing privilege, banks that can show a clear problem of seasonal liquidity needs may qualify for advances of credit for up to nine months. For small rural banks, that need typically is the result of "regular and recurring deposit and loan flows associated with a crop production cycle."<sup>7</sup> The Federal Reserve can also provide extended credit where exceptional circumstances or practices adversely affect an institution's ability to obtain funds elsewhere. These special circumstances include sustained deposit drains, impaired access to money market funds, or sudden deterioration in loan repayment performance.<sup>8</sup> Under either of these pro-

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<sup>7</sup> *Operation of the Federal Reserve Discount Window under the Monetary Control Act of 1980*, Federal Reserve Bank of Kansas City, p. 6.

<sup>8</sup> *Extensions of Credit by Federal Reserve Banks*, Regulation A, Board of Governors of the Federal Reserve System, September, 1980.

grams, the primary consideration in extending credit is the liquidity strains of the particular institutions.

On March 8, the Federal Reserve Board announced modifications in its seasonal borrowing program. The changes were designed to further assure that small and medium-sized agricultural banks can meet their temporary liquidity needs arising from providing credit to farm borrowers during the current production cycle. The changes were twofold: a revision of the regular seasonal credit program and addition of an alternative simplified program. These changes are summarized in the accompanying box.

Under some circumstances, institutions in the FCS also might find it helpful to use the discount window. FICB's, lenders to agriculture for production purposes, have statutory access to the discount window. Requests from these institutions could be honored if special circumstances, as noted above, created substantial liquidity needs.

#### *Attracting new investors*

While much debt restructuring remains to be done by farmers and their lenders, restructuring alone will not solve the problems. Much farm property will need to change hands

### **Modifications in Federal Reserve Seasonal Borrowing Program**

#### *Modification of regular program*

The regular seasonal borrowing privilege has been modified to increase the amount of seasonal funds available. In the past, the program has required banks to fund a portion of the seasonal swing in its net need for funds from its own resources before it can borrow from the Federal Reserve. Equivalent in concept to a deductible, that amount has been reduced from 4 to 2 percent for the first \$100 million in deposits, from 7 to 6 percent for the second \$100 million in deposits, and remains at 10 percent for deposits over \$200 million. In addition, discount window officials will take a more flexible approach in administering the seasonal program, taking into account special factors in the farm economy that might modify historical seasonal patterns.

#### *Temporary simplified program*

Available through September 1985 as an

alternative to the regular program, the simplified program makes discount window credit available to fund half of a bank's total loan growth in excess of 2 percent from a base level—either the average for February or for the two weeks just prior to application. The total amount of credit extended under the program may not exceed 5 percent of a bank's deposits. The credit extended is expected to be used for agricultural or agriculturally related loans. The interest rate on credit advanced in the program will be fixed for the time credit is outstanding. The rate was initially set at 8.5 percent, and borrowings must be repaid by February 1986.

To qualify for the temporary simplified program, banks generally would have less than \$200 million in deposits and would have a ratio of agricultural loans to total loans greater than 17 percent, the average farm loan ratio for the banking system. In addition, banks must have loan-deposit ratios above 60 percent to be eligible.

over the next few years. For example, most of the property in which the current owner has no more than 30 percent equity will likely need to move into stronger hands.

Thus, over a longer period, it could be desirable to increase the number of potential investors in farmland, including farmers and nonfarm investors. But many states have restrictions on farmland ownerships by aliens and corporations. Because insurance companies, pension plans, and other corporate entities could be an important source of demand for farmland, it seems appropriate for states to reconsider their restrictions on ownership. To ease farmer concern over nonfarmer control of agricultural assets, the length of time such assets could be held by aliens or corporations might be limited, say, to between ten and 15 years, with family farmers given the right of first refusal when the corporations sell.

### **Summary**

American agriculture is in the midst of a difficult but necessary adjustment. Much of the current financial stress in agriculture comes from the inflationary excesses of the 1970s. The current and prospective financial

problems resulting from adjustment to slower world economic growth, increased international competition, and greater price stability are putting farmers and their lenders under great stress. The stress could become more intense before it eases.

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*Unusual cooperation is needed among borrowers, lenders, regulators, and the government.*

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It is important that the adjustment be completed without rupturing the social and political fabric of the nation's rural economy. To avoid such a rupture, unusual cooperation is needed among borrowers, lenders, regulators, and the government. Large capital losses will be realized in agriculture and may need to be broadly shared. If farm asset values continue to decline over the next few years, a strong pressure will build for new public sector mechanisms to ease agriculture's transition to new market forces. The challenge for all involved is to use both private and public sector mechanisms to their fullest in addressing the current and emerging farm financial stress problems.

# Effects of Financial Deregulation on Monetary Policy

*By Howard Roth*

Deregulation of deposit ceiling rates has complicated monetary policy in recent years. Introduction of new, higher yielding accounts and the gradual phaseout of ceiling rates on existing accounts led to large shifts of funds that temporarily distorted monetary growth rates. To cope with the effects of these distortions on monetary policy implementation, the Federal Reserve redefined the monetary aggregates and changed the emphasis placed on various aggregates as policy guides. The worst of the policy problems resulting from the initial transition to deregulated deposit rates are now over, since deposit ceilings have already been phased out on all but a few accounts.

However, there may be more lasting effects of deposit rate deregulation that might affect the future conduct of monetary policy. For example, deregulation may have altered the short-run response of monetary growth to changes in market interest rates. If so, the

degree of interest rate volatility associated with close, short-run monetary control may also have changed.

There is reason to suspect that the interest sensitivities of both M1 and M2 have been affected by deposit rate deregulation. In the last three years the patterns of monetary growth following changes in interest rates have differed from the pattern that was typical before deregulation. For example, the increase in interest rates that began in the spring of 1984 was followed by several months of very sluggish M1 growth. Growth of M2, on the other hand, seemed to be less affected. This would have been an unusual development before deposit rate deregulation. Then, interest rate increases reduced M2 growth much more than M1 growth. These experiences suggest that deregulation may have reversed the relative interest sensitivities of M1 and M2.

This article examines the implications for monetary policy of changes in the interest sensitivities of the monetary aggregates resulting from financial deregulation. The first section documents the changes in the composition of

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M1 and M2 in recent years and explains how these changes could have increased the interest sensitivity of M1 and reduced the interest sensitivity of M2. The second section provides empirical estimates confirming that M1 has become more sensitive to interest rate changes and that M2 has become less sensitive. These changes have improved the prospects for achieving close, short-run control of M1, while reducing the prospects for close, short-run control of M2. To shed light on the implications of these results for monetary control, the third section assesses the degree of interest rate volatility that would accompany monthly control of either M1 or M2. The conclusion from this assessment is that monthly control of either M1 or M2 is inadvisable because it would lead to considerable interest rate volatility.

### **Effects on the interest sensitivities of M1 and M2**

Deregulation has changed the composition of the monetary aggregates.<sup>1</sup> In contrast to the situation a few years ago, most nontransactions accounts now pay a market-related rate of interest, and a substantial fraction of transactions deposits pay interest. The rates paid on transactions deposits do not closely follow market rates, however. As a result, M2 has likely become less sensitive to changes in market interest rates while M1 has likely become more sensitive.

#### *Effects on M1*

Two developments have accounted for most of the transformation of M1 to date. One was

<sup>1</sup> Deregulation is defined broadly in this article to encompass deregulation of deposit rate ceilings, the authorization of new deposit accounts by Congress, and the development of new accounts, like money market mutual funds, by nondepository institutions.

the authorization of nationwide NOW accounts in 1981, and the other was the introduction of ceiling-free Super NOW accounts in 1983. Both new accounts have grown rapidly. As a result, the proportion of M1 in interest-earning checking accounts has climbed from less than 7 percent in 1980 to more than 25 percent today.

The increasing importance of NOW's and Super NOW's may have affected the interest sensitivity of demand for M1. The interest sensitivity of demand for a monetary aggregate is an average of the interest sensitivities of demand for the various assets in that aggregate. The interest sensitivities of these assets depend, in turn, on how their own rates respond to changes in market interest rates. If an asset's own rate does not move closely with market interest rates, a change in market rates will affect the opportunity cost of holding the asset, which can be measured by the difference between market rates and the asset's own rate. This change in opportunity cost affects demand for the asset. The size of the effect depends on how much the opportunity cost of holding the asset changes when market interest rates change, as well as how responsive demand for the asset is to changes in its opportunity cost. Thus, if the opportunity costs of NOW's and Super NOW's respond proportionally more or less to changes in market interest rates than does the opportunity cost of currency and demand deposits, and the sensitivities of these assets to changes in opportunity cost are comparable, then the rapid growth of NOW's and Super NOW's has likely changed the interest sensitivity of demand for M1.<sup>2</sup>

<sup>2</sup> For one commonly used model, a change in the opportunity cost of holding an asset affects demand for the asset such that the percentage change in demand is proportional to the percentage change in the opportunity cost. Two assets with this behavior that are equally sensitive to changes in their opportunity cost will respond differently to changes in market rates if the opportunity

Demand for NOW accounts should be more sensitive to market interest rates than is demand for currency and demand deposits. Whereas currency and demand deposits do not earn explicit interest, most NOW accounts earn 5 1/4 percent, the ceiling rate. Therefore, a change in market rates has a greater proportional impact on the opportunity cost of holding NOW's than on the opportunity cost of holding demand deposits or currency. For example, assume market rates increase from 10 1/4 percent to 11 1/4 percent. Before the increase, the opportunity cost of holding demand deposits and currency is 10 1/4 percentage points and the opportunity cost of holding NOW accounts is 5 percentage points. The increase in market rates would raise the opportunity cost of demand deposits and currency by about 10 percent to 11 1/4 percentage points, and would raise the opportunity cost of NOW accounts by 20 percent to 6 percentage points. Because the opportunity cost is lower for NOW accounts than for currency and demand deposits, a given change in market rates has a larger proportional impact on the opportunity cost of NOW accounts.<sup>3</sup> As a

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cost of one asset is proportionally more affected by changes in market rates than is the opportunity cost of the other asset.

For another model of asset demand, the percentage change in demand for the asset in response to a given percentage change in its opportunity cost is not constant. Rather it is a function of the level of the opportunity cost. See Flint Brayton, Helen T. Farr, and Richard Porter, "Alternative Money Demand Specifications and Recent Growth in M1," Board of Governors of the Federal Reserve System, May 23, 1983.

<sup>3</sup> Moreover, the extent to which the change in the opportunity cost of NOW's exceeds that of currency and demand deposits is even higher at lower market rates and can become very large as market rates fall toward 5 1/4 percent. For example, when market rates equal 6 percent, a one percentage point increase in market rates—almost a 17 percent increase—increases the opportunity cost of NOW's 133 percent. That is, the elasticity of NOW's to changes in market rates is 6. An explanation given for the extraordinary fall in M1 velocity in 1982 was a rapid buildup in regular NOW account balances as market rates fell toward the 5 1/4 percent fixed rate of regular NOW's. See Howard Roth,

result, demand for NOW accounts is probably more sensitive to changes in market rates than is demand for currency and demand deposits.

The relative sensitivity of Super NOW accounts is less clear. Because there is no regulatory ceiling on Super NOW rates, they can follow market interest rates. Indeed, it had been assumed before their introduction that Super NOW's would pay a rate proportional to market rates. Instead, rates on Super NOW's have displayed considerable inertia, responding only partially and with a considerable lag to changes in market rates. For example, the national average rate on Super NOW's varied only between 7 1/4 percent and 8 3/4 percent in 1984 despite considerable variability in market interest rates.<sup>4</sup> As a result of the relative constancy of rates on Super NOW's, changes in market rates have a similar impact on the opportunity cost of holding Super NOW's as on the opportunity cost of holding NOW's. Thus, demand for Super NOW's may also be more responsive to changes in market rates than is demand for currency and demand deposits.

Because the opportunity costs of NOW's and Super NOW's are relatively sensitive to changes in market interest rates, the growing importance of these accounts may have increased the sensitivity of M1 to changes in market rates.<sup>5</sup> Moreover, the actual behavior of Super NOW rates so far suggests that removal of ceiling rates on NOW accounts in March of next year is unlikely to affect the

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"Recent Experiences with M1 as a Policy Guide," *Economic Review*, Federal Reserve Bank of Kansas City, March 1984, pp. 17-29.

<sup>4</sup> *Bank Rate Monitor*, Advertising News Service, Inc., Miami Beach, Florida.

<sup>5</sup> Empirical estimates in a later section confirm this expectation. A more comprehensive empirical study arriving at the same conclusion is the Brayton, Farr, and Porter study referenced in footnote 2.

interest sensitivity of M1 appreciably. As a result, a lasting effect of deposit rate deregulation may be higher interest sensitivity of M1.

### *Effects on M2*

Since M1 assets are also included in M2, introduction of NOW's and Super NOW's has affected M2. More important, though, have been the changes in the nontransactions portion of M2.

The nontransactions portion of M2 includes one of the most significant financial innovations in recent years, money market mutual funds ( MMMF's). Although introduced in 1974, MMMF's did not grow rapidly until much later. They increased from less than \$7 billion in December 1978 to \$185 billion by December 1982. MMMF's offered investors

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### *A lasting effect of deposit rate deregulation may be higher interest sensitivity of M1.*

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market-related rates, high liquidity, and lower minimum balance requirements—a combination not available at depository institutions. Perhaps more than anything else, the inability of banks and thrifts to compete with MMMF's spurred the deposit rate deregulation of the early 1980s.

The Depository Institutions Deregulation and Monetary Control Act of 1980 (DIDMCA) and the Garn-St Germain bill of 1982 provided the means for banks and thrifts to compete with MMMF's. The DIDMCA called for the complete deregulation of rates paid by banks and thrifts within six years. The Garn-St Germain bill accelerated this deregulation by authorizing banks and thrifts to begin offering money market deposit accounts (MMDA's) in December 1982. MMDA's were enthusiastically received because they

are liquid, pay a ceiling-free rate, and offer transactions capabilities. Within four months, funds in MMDA's surpassed those in MMMF's. Meanwhile, under DIDMCA, ceiling rates on small time deposits were being removed. Currently, only passbook savings deposits, regular NOW accounts, and time deposits of less than \$1,000 with maturities of seven to 31 days still have interest rate ceilings. Even these ceilings will be removed by March 1986.

Because of deregulation, the proportion of the nontransactions part of M2 paying a market rate is much higher now than it was only a few years ago. Accounts not subject to interest rate ceilings accounted for only about 10 percent of the nontransactions portion of M2 in December 1978. By December 1984, 84 percent of the nontransactions portion of M2 was in accounts with no regulatory ceiling rates.

Despite the phaseout of ceiling rates and the introduction of unregulated accounts, not all the assets in the nontransactions portion of M2 pay a rate that mirrors market rates. Whereas the yields on money market certificates (MMC's) and other deregulated time deposits closely track market interest rates, the yields on nontransactions accounts without a specific maturity vary less than market rates. The average yields on MMMF's and MMDA's, for example, lag behind market rates and are less volatile. Nevertheless, yields on most nontransactions accounts are closer to market rates than are yields on transactions accounts. For ease of exposition, therefore, analysis of the effects of financial deregulation is based on the assumption that ceiling-free nontransactions accounts in M2 pay a market rate.

Deposit rate deregulation has likely reduced the interest sensitivity of demand for the nontransactions component of M2. Since as much can be earned on accounts that pay a market rate as on market instruments themselves,

there is no opportunity cost of holding these accounts. Therefore, changes in market interest rates should not affect demand for the ceiling-free accounts in the nontransactions portion of M2. Only the few deposits still subject to regulatory ceiling interest rates are sensitive to changes in market interest rates. And since these ceilings will be removed next year, the entire nontransactions component of M2 will have rates that move to some extent with market rates. As a result, M2 will likely become even less sensitive to market interest rates, another lasting effect of deposit rate deregulation.

The overall effect of financial innovation and deregulation on the interest sensitivity of M2 is not clear. While demand for the M1 portion of M2 has likely become more interest sensitive, demand for the nontransactions portion has likely become less interest sensitive. Since the nontransactions component is much larger than the M1 component, the probable overall effect is a reduction in the interest sensitivity of M2. These effects can be determined precisely, however, only through empirical estimation of the interest sensitivities of the demands for M1 and for the nontransactions component of M2.

### **Empirical estimates of the effects**

To estimate the interest sensitivities of M1 and M2, demand functions for M1 and the nontransactions portion of M2 were specified and estimated. The effects of deposit rate deregulation on the interest sensitivities of M1 and M2 were determined by estimating these

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<sup>6</sup> See Helen T. Farr, "Derivation of the Fitzgerald Time Deposit Rate Used in the Monthly Money Market Model," Board of Governors of the Federal Reserve System, December 1982 (Revised).

The motivation for the M1 equation used in this article was a similar equation used by the staff at the Board of Governors. See the reference in footnote 2.

demand functions over two periods—one ending before financial change had a major influence and the other including more recent data.

### ***Specification of equations***

Specification of the M1 equation reflects the assumption that the demand for M1 depends mainly on real income, the price level, and market interest rates. Assets in M1 are held primarily to make transactions. The amount of transactions depends on the level of real income. Therefore, real personal income was included in the M1 equation as a proxy for the real volume of transactions financed by payments from transactions deposits. To the extent that there are economies of scale in managing transactions balances, a change in real income may lead to a less than proportional change in demand for M1.

Demand for transactions assets also depends on the level of prices. Because transactions assets are held as a store of real purchasing power, a change in the overall price level should result in a proportional change in demand for M1 in the long run. However, because transactions balances may not be adjusted immediately to price level changes, the current and lagged inflation rates were included in the M1 equation to allow for lagged adjustment to price level changes.

As argued above, the opportunity cost of holding funds in M1 assets is related to the interest rate on alternative assets. Commercial paper and other money market instruments are one alternative to transactions balances; time deposits are another. Therefore, the rate on 3-month commercial paper and a rate representing the return on small denomination time deposits, the Fitzgerald rate, were included in the M1 demand equation.<sup>6</sup>

The demand for M1 has also been affected in recent years by shifts resulting from finan-

**Demand Functions for M1  
and Nontransactions Portion of M2**

$$(1) \ln(M1) = a_0 + b_0(L)\ln(Y/P) + \ln(P) + c_0(L)\ln(RCP) + d_0(L)\ln(RFITZ) + f_0P + g_0P_{-1} + h_0TIME + j_0D + u_0$$

$$(2) M2-M1 = a_1 + b_1(L)\ln(Y) + c_1(L)(\ln RCP - \ln RFITZ) + g_1DMMDA + u_1$$

Definitions:

M1 = M1, seasonally adjusted

M2-M1 = Nontransactions portion of M2, seasonally adjusted

Y = Personal income, seasonally adjusted

P = Personal consumption expenditure deflator, seasonally adjusted

RCP = Yield on 3-month commercial paper

RFITZ = Yield on time deposits as measured by the Fitzgerald rate (see footnote 6)

$\dot{P}$  = Percentage change in personal consumption expenditure deflator, seasonally adjusted

TIME = Linear time trend

D = Vector of dummy variables measuring effects of:

1974-76 shift in money demand (= DSHIFT)

1980 credit controls (= DCRED)

1981 introduction of nationwide NOW accounts (= DNOW)

and 1982-83 introduction of money market deposit accounts (= DMMDA)

(L) = Polynomial lag operator L

$j_0$  = Vector of coefficients on dummy variables

$u_0, u_1$  = Zero mean, finite variance error terms

cial innovation and deregulation and by other special circumstances. Dummy variables were included in the M1 demand equation to account for the downward shift in M1 demand in the mid-1970s, the imposition of credit controls in 1980, the authorization of nationwide NOW accounts in 1981, and the introduction of MMDA's and Super NOW's in late 1982 and early 1983. A time trend was also included to allow for gradual improvement of technology in cash management. A more

detailed explanation of the specification of the M1 equation is given in the accompanying box.

Specification of the equation for the non-transactions component of M2 was similar in most respects to the specification of the M1 equation. Demand for nontransactions assets, as for M1 assets, depends on real income and on the price level. But, whereas some theories predict that real income and prices may affect demand for transactions balances differently,

**TABLE 1**  
**Estimated demand functions**

Variable	Coefficient Estimates*			
	M1		Nontransactions	
	1972-77	1972-83	1972-77	1972-83
Y/P	1.11†	1.02†	—	—
P	1.00‡	1.00‡	—	—
Y	—	—	0.81†	0.98†
RCP	-0.06†	-0.04†	-0.14†	-0.18†
RFITZ	-0.02	-0.07†	0.14†	0.18†
P <sub>1</sub>	-0.57†	-0.31†	—	—
P <sub>2</sub>	-0.26	-0.09	—	—
DSHIFT	-0.03†	-0.00	—	—
DCRED	—	0.01	—	—
DNOW	—	0.05	—	—
DMDA	—	0.07	—	0.12†
TIME	-0.02	-0.02†	—	—

\* Sums of lag coefficients for all variables for which a polynomial lag was estimated.  
† Statistically significant at the .05 level.  
‡ Constrained to equal unity.

there is little reason to expect that the same would be the case for nontransactions balances. For this reason, nominal income, rather than real income and prices individually, was included in the demand equation for the nontransactions portion of M2.

A large proportion of nontransactions assets earn explicit interest. As a consequence, the opportunity cost of holding nontransactions assets depends not only on market interest rates but also on the own rates of the nontransactions accounts. For this reason, the difference between market rates and the Fitzgerald rate was included as a proxy for the opportunity cost of holding nontransactions accounts.

Finally, deregulation has caused fewer shifts of funds for nontransactions accounts than for M1 assets. Only the introduction of MMDA's appreciably affected the demand for nontransactions accounts in M2. Therefore, a dummy variable representing the transition to MMDA's in 1983 was included in the nontransactions equation.<sup>7</sup>

### *Empirical estimates*

The M1 and nontransactions deposits equations were estimated over two periods to determine the effects of financial deregulation. The first set of equations was estimated from 1972 through 1977. Because deregulation had not yet had appreciable effects, these equations serve as standards for comparison in evaluating the effects of financial change. An additional set of equations was estimated from 1972 through 1983 to determine the effects of deregulation in recent years on demands for M1 and nontransactions accounts.<sup>8</sup>

<sup>7</sup> This nontransactions equation was motivated by an equation developed by the staff of the Federal Reserve Bank of San Francisco. See John P. Judd, "A Monthly Model of the Money and Bank Loan Markets," Federal Reserve Bank of San Francisco, Working Paper No. 83-01, May 1983.

<sup>8</sup> These equations were estimated only through 1983 so that simulations of money behavior in 1984 would not be affected by inclusion of 1984 data in the estimation period. Extending the estimation period to include 1984 does not change the estimation results appreciably.

**TABLE 2**  
**Changes in interest rate sensitivities**

	Consolidated Measure of Interest Rate Sensitivity*	
	1972-77	1972-83
M1	-0.06	-0.09
M2-M1	-0.15	-0.03
M2	-0.12	-0.04

\* This measure takes into account how the rate on small denomination time deposits respond to changes in the 3-month commercial paper rate. The relationship between the Fitzgerald rate, which was used in the estimated money demand functions, and the 3-month commercial paper rate was estimated through a regression of the form:

$$RFITZ = a2 + b2(L)RCP$$

where b2(L) is a fifth degree polynomial. This estimated relationship was then used for computing the composite interest sensitivities in this table and for the simulations in the following section.

The estimated coefficients are shown in Table 1. Most of the empirical estimates are in line with values implied by economic theory, suggesting that the specifications are accurate enough to provide reliable estimates of the interest sensitivities. The primary difference between the equations estimated through 1977 and those estimated through 1983 is in the interest rate coefficients. Interpretation of the change in coefficient values on interest rate variables is not straightforward, though, because more than one variable is included in each equation to represent opportunity costs. The opportunity cost terms had to be consolidated into a single measure to determine the total effect of deregulation on the interest rate sensitivities of M1 and the nontransactions portion of M2. These consolidated measures are given in Table 2.

The consolidated measures of interest rate sensitivities confirm that deposit rate deregulation has increased the interest sensitivity of M1 demand. As shown in Table 2, the interest sensitivity of M1 demand increased from -0.06 before deregulation to -0.09 after deregulation. This increase in the interest sensitivity of M1 is consistent with the theory that introduction of NOW's and Super NOW's

increased the responsiveness of demand for transactions deposits to changes in market interest rates. The empirical estimates may even understate the magnitude of the change because the estimates for the period ending in 1983 include data from the period before financial deregulation began having an appreciable effect. With allowance for this bias, the current interest sensitivity of M1 may be even larger than implied by the estimates in Table 2.

The empirical estimates also confirm that financial deregulation has substantially reduced the interest sensitivity of M2. The consolidated measure of the interest sensitivity of the nontransactions component of M2, also shown in Table 2, is estimated to have declined from -0.15 for the period ending in 1977 to only -0.03 for the period ending in 1983. Despite the increased sensitivity of M1 demand, this decline in the interest sensitivity of the nontransactions component of M2 has led to a fall in the interest sensitivity of M2 from -0.12 to -0.04.<sup>9</sup> As for M1, the empirical

<sup>9</sup> This is a more extreme decline than that found by M. A. Akhtar in "Financial Innovations and Their Implications for Monetary Policy: An International Perspective," *BIS Economic Papers*, No. 9, December 1983.

estimates probably understate the change in the interest sensitivity of M2 because data from the period before deregulation are included in the sample period.

In summary, deposit rate deregulation appears to have reversed the relative interest sensitivities of the monetary aggregates. Whereas M2 was more sensitive to interest rate changes than M1 before the recent financial changes, M1 now appears to be more interest sensitive than M2. Further deregulation may alter somewhat the interest responsiveness of the two aggregates. However, the interest responsiveness of M2 will likely remain below that of M1.

### **Implications for monetary control**

The reversal in the relative interest sensitivities of M1 and M2 calls for a reevaluation of these aggregates' roles in monetary policy implementation. Efforts to achieve precise, short-run target growth rates for a monetary aggregate that is insensitive to interest rate movements could result in extreme interest rate volatility, which could adversely affect the economy. As a consequence, adhering closely to monthly targets for M2, for example, is inadvisable. Adhering closely to monthly targets for M1 is also inadvisable. Although deregulation has reduced the interest rate volatility that would be associated with close, short-run control of M1, this volatility would still be considerable.

#### *Relation between monetary control and interest rate volatility*

The Federal Reserve relies on a long-run relationship between money and income to achieve its monetary policy objectives. Since income is a major determinant of the public's demand for money, income growth and money

growth are closely related in the long run. As a consequence, the Federal Reserve uses annual growth targets for monetary aggregates to achieve income growth consistent with monetary policy goals.

Some contend that achieving long-run money growth objectives is not enough. They argue that the Federal Reserve should also prevent short-run variability of money growth because such variability causes uncertainty that impairs economic efficiency.

The interest rate volatility that might result from close, short-run control of monetary growth could be costly, too. Despite the long-run relationship between money and income, interest rate changes are the primary means by which monetary policy actions affect money growth in the short run. Changes in the discount rate and open market operations affect interest rates quickly, but affect inflation and real income growth with a long lag. As a result, keeping money growing at a constant rate would require interest rate changes large enough to keep the public's demand for money growing at the target rate. If these interest rate changes are large and frequent, they could increase the risk involved in saving and investment. A higher risk might retard capital spending, thus reducing economic growth and impairing economic welfare.<sup>10</sup>

The degree of interest rate volatility necessary to achieve close, short-run monetary control depends on several factors. One important factor is the underlying variability in money growth. Variability in inflation or real income growth, for example, would cause variability in money demand that must be offset by interest rate changes to keep money growth constant. Since income and inflation affect M1

<sup>10</sup> See Paul Evans, "The Effects on Output of Money Growth and Interest Rate Volatility in the United States," *Journal of Political Economy*, April 1984, pp. 204-222.

and M2 similarly, however, underlying variability from this source probably has little effect in comparing the relative degree of interest rate volatility for M1 control and M2 control.

Nevertheless, the underlying variability of M1 is greater than that of M2. There are a number of possible explanations for the higher variability in M1. One involves imperfect adjustment of money data for seasonal elements. Demand for transactions balances is more influenced by seasonal elements than is demand for nontransactions balances. For example, demand for transactions balances is very high during the Christmas shopping season because individuals must hold more in currency and checking accounts to finance higher spending. Although the Federal Reserve uses a variety of statistical procedures to seasonally adjust M1 growth, these procedures are imperfect. As a result, month-to-month growth in M1 may vary substantially because of seasonal influences. Because nontransactions accounts are not so closely related to spending, M2 is less affected by inadequate seasonal adjustment procedures. With the underlying variability of M1 growth larger than that of M2 growth, the interest rate volatility necessary to smooth M1 growth would likely exceed the volatility to smooth M2 growth even though demand for M1 is more sensitive to interest rate changes than is demand for M2.

The interest sensitivity of money demand is nonetheless an important factor affecting the interest rate volatility accompanying short-run monetary control. Interest sensitivity is particularly important to the extent that achieving short-run money growth targets requires discretionary policy actions to change the average rate of monetary growth. For example, suppose that money is predicted to grow more rapidly than desired and the Federal Reserve

deems it necessary to raise the discount rate or lower nonborrowed reserve growth to slow money growth. If money demand is highly interest sensitive, a modest increase in market interest rates would be sufficient to slow money growth. Accordingly, the Federal Reserve could achieve its short-run money growth objectives by a small increase in the discount rate or a small reduction in the growth rate of nonborrowed reserves. In contrast, a large increase in the discount rate or a substantial reduction in the growth rate of nonborrowed reserves would be required to boost market rates enough to accomplish the desired slowdown if money demand is very unresponsive to interest rates. For discretionary policy changes, therefore, the reduced

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***Close monthly control of either M1 or M2 would result in much more interest rate volatility.***

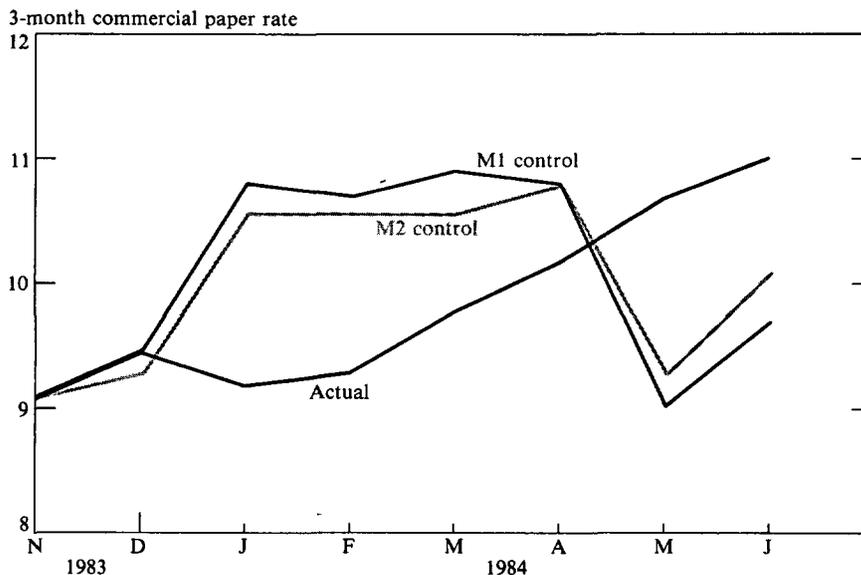
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interest sensitivity of M2 demand has increased the interest rate changes necessary for short-run monetary control.

#### ***Short-run monetary control***

The estimated money demand equations for the period ending in 1983 were simulated to determine the interest rate volatility that might result from close, short-run monetary control. Two sets of simulation were conducted. In the first, the underlying variabilities of M1 and M2 growth were smoothed by setting their monthly growth rates equal to the average growth rates actually experienced over the simulation period. In the second, the average M1 and M2 growth rates were lowered by one percentage point in addition to smoothing the underlying variability. Both sets of simula-

**CHART 1**  
**Interest rate behavior required**  
**to smooth monetary growth**



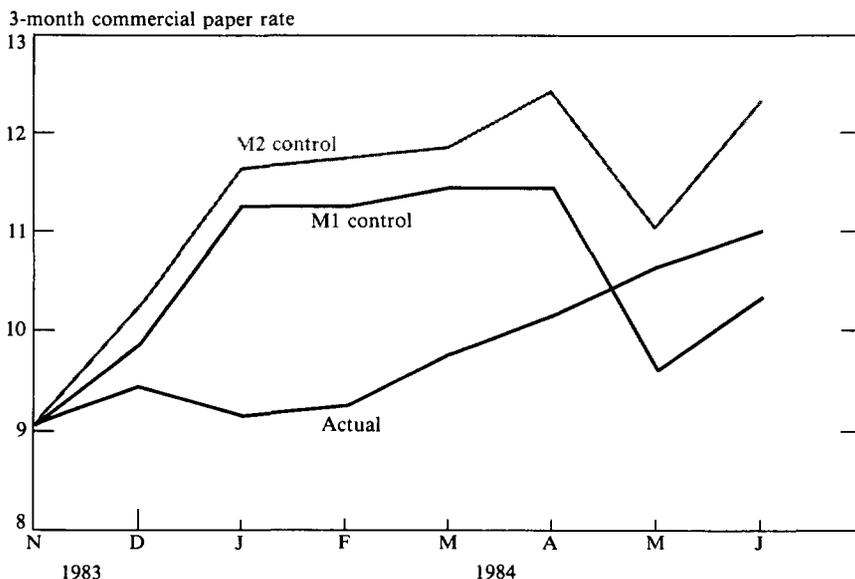
tions were for the period from December 1983 to June 1984. Because monetary policy affects real income and inflation with a long lag, actual historical values of these variables were used in the simulations. Only interest rates were allowed to vary to keep money growth at a constant rate each month of the simulation period.

The results of the first set of simulations are shown in Chart 1. The results confirm that underlying interest rate variability would be greater for M1 than for M2. Despite the lower interest rate sensitivity of M2, smoothing M2 growth would require less interest rate volatility than smoothing M1 growth. However, close monthly control of either M1 or M2 would result in much more interest rate volatility than actually occurred over the simulation period even though the average growth rates for the period as a whole were unchanged.<sup>11</sup>

The results of changing the average growth rates of M1 and M2 are shown in Chart 2. As expected, lowering money growth by one percentage point would have led to considerably higher interest rates than were actually experienced. Moreover, the increase in interest rates necessary to reduce M2 growth is much larger than the increase to reduce M1 growth the same amount. According to the estimated equations, the interest sensitivity of M2 has been lowered so much by financial deregulation that policy actions to reduce M2 growth one percentage point would have boosted market interest rates two to three percentage points throughout most of the first half of 1984.

<sup>11</sup> Of course, control over a longer run period, say, on a quarterly basis, could likely be accomplished with less interest rate volatility and, in this sense, would be more feasible. Only monthly control is considered in the current study, however.

**CHART 2**  
**Interest rate behavior required**  
**to lower monetary growth**



In summary, the simulations show that close monthly monetary control would likely result in larger interest rate volatility. Despite the increased interest sensitivity of M1 demand, smoothing the underlying variability of M1 growth would require much greater changes in interest rates. While the underlying variability in M2 demand is less and could be smoothed more easily, the reduced interest sensitivity of M2 caused by deposit rate deregulation has made it difficult to change the short-run M2 growth rate through monetary policy actions. Lowering M2 growth by as little as one percentage point would now require a prolonged period of much higher interest rates. To the extent that large changes in market interest rates have adverse effects on the economy, close, short-run control of either M1 or M2 may be inadvisable.

## Conclusions

Although the portfolio shifts during the transition phase of deposit rate deregulation are nearly complete, deregulation will have a lasting impact on monetary policy implementation. The empirical findings in this article suggest that the patterns of monetary growth in 1984 were not an aberration: Deregulation has resulted in M1 growth being more responsive to interest rate changes than is M2 growth. This lasting effect of deregulation on the interest sensitivities of monetary aggregates may have far-reaching implications for the conduct of monetary policy.

The implication explored in this article is whether close, short-run control of M1 or M2 is possible without inducing excessive interest rate volatility. At what point interest rate vola-

tility becomes "excessive" is to some extent subjective. However, simulation results suggest that close monthly control of either M1 or M2 would require considerably larger fluctuation in market interest rates than was actually experienced in 1984. To the extent that the

Federal Reserve can achieve its longer run policy objectives without forcing one of the monetary aggregates to grow at a constant rate each month, the costs of interest rate volatility imply that short-run monetary control is neither necessary nor desirable.

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