

**Relationships Among Farm Capital,
Income, and Debt, 1950-1977**

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1978

Food and Agricultural Policy Issues

SPECIAL REPORT 71

Agricultural Extension Service — University of Minnesota

Relationships Among Farm Capital, Income, and Debt, 1950-1977

The relationship of farm assets to debt has commonly been presented as reassuring because it shows that farmers have a high net worth. However, other data indicate why the agricultural sector has been having financial difficulties.

Agriculture's debt/asset ratio is only 16 percent, which implies that there is room to increase debt. The problem comes in servicing the debt. Interest on additional debt is high relative to present earnings. Unless borrowed funds increase income rather than simply maintaining it, net income is decreased and cash flow becomes a problem.

Since 1950, the percentage of liquid assets held by farmers has significantly decreased. This change has been reflected in the higher loan/deposit ratios of rural banks. Banks also are now far less liquid and must rely on deposit growth in order to expand loans.

It is useful to compare debt increases with the amount of capital formation generated by the debt. There was a large rise in capital formation in 1971-73, followed by a leveling off. Debt increases rose sharply in 1976 and 1977, however. The ratio of debt financing to capital formation thus rose higher than at any time since 1915-19. However, comparison of debt increases with cash flow and net income shows that debt financing - income flow ratios are higher than they have ever been. Debt has increased relative to income, and future debt service burdens have increased.

Off-farm income has become a major factor in determining farm income. Off-farm income is not evenly distributed among farmers, however. Those farmers who have been the major land buyers for expansion have only a small percent of off-farm income. It would therefore seem to be a relatively minor factor in the decision to buy additional land. Off-farm income thus has been over-emphasized as a factor in land price increases.

Emanuel Melichar

In this presentation I hope not only to describe recent trends in total farm capital, income, and and debt, but also to provide perspective helpful in thinking about the current financial situation of agriculture.

Assets and debt

Chart 1 is a graph of farm assets and debt as most commonly presented. This chart has been very reassuring to those concerned about the

financial health of the farming sector, as it indicates that the equity of the farming sector--the difference between assets and debt--has recently increased greatly. Many farmers today have a net worth to which most nonfarmers cannot really aspire.

In spite of the huge increase in farm wealth, however, the sector has been experiencing financial problems. In addition, its financial prospects appear uncertain. One must turn to other data to appreciate these present and potential financial difficulties of the sector.

It is useful, first of all, to point out that farm debt actually grew about as fast as asset values during the recent boom in asset prices. Still, as the USDA noted in The Balance Sheet of the Farming Sector, 1977, agriculture's debt/asset ratio is only 16 percent whereas that in manufacturing, while not strictly comparable, is over 40 percent. The implication of this comparison is that agriculture has considerable room to increase debt as a way of easing current cash flow problems.

The problem with such action by the sector--or by the individual farmer that Mike Boehlje discussed earlier--relates to servicing the increased debt. The current interest rate on additional debt is high relative to present earnings on farm assets as a whole. Thus more borrowing reduces net income unless the funds borrowed are used in ways that increase income. If debt is increased simply to obtain funds to supplement current income in maintaining living levels, the high interest charge will reduce future income significantly.

This effect can be easily illustrated. The farming sector's return to equity last year was 2.5 percent, as the interest rate on debt averaged about 8 percent while the rate of return to total assets was only 3.5 percent. The total return to equity was \$11.3 billion. If debt were to be increased by \$141 billion at an interest rate of 8 percent, the annual interest charge would be equal to that \$11.3 billion. That increase in debt, which at current asset values would raise the debt/asset ratio to about 36 percent, would thus depress the sector's return to equity to zero. This exercise demonstrates that the potential for increasing farm debt for "unproductive" reasons is limited by the consequent reduction in farm income.

Of course, even at an average sector return of zero, many farmers would be earning significant positive returns to their own equities. For example, Bruce Hottel and Robert Reinsel found that the return to equity on large farms (sales of \$100,000 or more) in 1970 averaged 6.9 percent, while the average return on small farms (sales below \$5,000) was negative and the overall average was only 2.1 percent (Returns to Equity Capital by Economic Class of Farm, Agricultural Economic Report No. 347, USDA, August 1976). Thus even if average returns were to be further depressed, many farms would likely remain profitable enough to handle increased debt.

Another trend involving farm assets and debt warrants mention here, though it is peripheral to the main thrust of this paper. Farmers' holdings of liquid financial assets--cash and bank deposits--have declined from 7 percent of total assets in 1950 to the present level of 2 percent. The greater liquidity of farmers as they entered the adjustment period of the 1950's was reflected in the position of rural banks at that time. Most banks had very low loan/deposit ratios and were heavily invested in government bonds that could be liquidated to meet increasing farm loan demands. Now, both farmers and rural banks are far less liquid, and the future rate of loan expansion at most rural banks will be more closely tied to their deposit growth.

Capital formation and debt

Instead of borrowing used to ride out a period of low income, both farmers and lenders like to see borrowing that promises to increase future income. To help in assessing the nature of the borrowing by farmers as a whole in any given period, it is therefore useful to compare increases in debt to the amount of capital formation and the value of land transfers. Table 711.1, reproduced from the flow-of-funds section of the Agricultural Finance Databook--Annual Series, shows the types and amounts of expenditures that comprise capital formation. Total capital formation is plotted in the upper panel of Chart 2. Note that capital formation rose only gradually during the two preceding decades and showed little growth over several multi-year periods such as 1966-70. The latter plateau was followed by a large rise in 1971-73. Since 1973, however, capital formation has not shown much overall growth (visualize a trend line passing through the large recent annual variation caused mainly by fluctuations in the additions to crop inventories).

Annual increases in debt are also shown in the upper panel of Chart 2. The big increases in debt that occurred in the first half of this decade were in large part explained by the increased capital spending. Improved farm income and income prospects were driving both capital formation and borrowing upward--a situation that borrowers, lenders, and proponents of economic growth all like.

In 1976 and 1977, however, increases in debt rose sharply even though capital formation remained near the level first reached in 1973. As shown in the lower panel of Chart 2, the ratio of debt financing to capital formation thus rose far above levels experienced in other years since 1950. It is particularly interesting to see that there was much less use of debt relative to capital expenditures in the early 1950's, at the culmination of the boom that had started during World War II. At that time, attitudes toward future economic prospects and appropriate use of credit were much different. Because many persons were anticipating another postwar depression, they avoided going heavily into debt. Agricultural finance textbooks published at the time contained numerous warnings about the dangers of debt as they had been

vividly demonstrated during the 1920's and 1930's. But soon, in the new economic environment resulting from government policies and programs to stabilize both the general economy and the agricultural sector, farmers and professors alike saw the advantages of greater use of debt. Before the advent of the recent boom, attitudes toward debt had been reversed; the new textbooks, for instance, contained few warnings as they showed how to maximize financial leverage through borrowing.

Recent ratios of debt financing to capital formation represent historically high levels. In his study of the first half of this century, Alvin Tostlebe found a comparably high ratio only in 1915-19, when debt financing averaged 76 per cent of farm capital formation (Capital in Agriculture: Its Formation and Financing Since 1870, Princeton University Press, 1957). In retrospect, the boom of that period has been commonly described as an unfortunate speculative and debt-financed episode.

Farm income and debt

As I noted earlier, if income prospects are improving, increased debt financing often aids in achieving the income gains. But if debt is being increased mainly to alleviate current financial problems, a part of the present problem is simply being transferred to the future as the current borrowing increases the future debt service and repayment burden.

In Chart 3, the upper panel shows annual increases in farm debt and also each year's farm cash flow and net income. The lower panel shows the ratio of debt financing to net income and to cash flow. It is interesting to see how low, by present standards, the relative amount of debt financing was at the height of the Korean War boom. In contrast, the current post-boom period is being entered at much higher levels of indebtedness and of ongoing debt financing. The ratios of debt financing to income flows shown in the lower panel of Chart 3 have risen into unknown territory, as Tostlebe's study shows no precedent for current levels earlier in this century. During 1915-19, when debt financing was high relative to capital formation, annual debt financing actually averaged only 16 percent of net farm income. Over the next three decades, debt financing averaged only 2.2 percent of net income. Thus current and past levels of relative credit use are far apart.

On the other hand, there was a significant rise in the ratio of debt financing to income during the two decades preceding 1920 as farmers moved to more leveraged financial positions. Then, as now, a rise in the ratio indicated that debt was being incurred at an accelerated rate relative to income flows--and it is the income flows from which debt must be serviced.

There are other ways of presenting this relationship, but all tell pretty much the same story. For instance, I could have charted the ratio of outstanding debt to net income. Or, as some analysts have done, I could have inverted that ratio to indicate the number of

years of income it would take to repay all of the debt outstanding as of a given date. In 1960, outstanding debt equalled 1.8 years of net farm income; in 1970, 3.3 years; and in 1977, 4.4 years. Debt has increased relative to income, entailing greater future debt service burdens.

Off-farm income and debt

Before closing, it may be useful to point out that the distribution of debt among farmers differs greatly from the distribution of farmers' off-farm or nonfarm income. Off-farm income now enters into most discussions of farm financial conditions, because such income for the sector as a whole has been steadily rising. Since 1967 off-farm income of farm operator families has exceeded total net farm income (including landlords' net rent) except during the farm boom years 1972-75.

The overall level and trend of off-farm income have drawn considerable attention and analytical comment. One analyst recently concluded that the consistent increase in off-farm earnings was a major factor permitting farmers to bid up land values steadily since the mid-1950's. Other analysts have included off-farm income in the denominator of the debt-to-income ratio for the farming sector. At a recent meeting in North Dakota, the Secretary of Agriculture told farmers that their off-farm income exceeds their farm income.

These uses of the data on off-farm income are highly questionable because of the way in which off-farm income is distributed among farmers. Using data on the distribution of income, assets, and debt by value-of-sales classes, published in the USDA's Farm Income Statistics (July 1978) and Balance Sheet of the Farming Sector, 1978, a string of comparisons can be cited to support this point.

To begin with, 46 percent of off-farm income in 1977 was on farms with annual sales under \$2,500. These farms owed only 5 percent of the total farm debt. Conversely, the farms with sales of \$40,000 or more in 1977 owed 71 percent of the debt but had only 12 percent of the off-farm income.

The 162,000 farms with sales of \$100,000 or more owed 48 percent of the total debt but had only 5 percent of the off-farm income. Operators' average net farm income on these farms in 1977 was \$38,300, while the off-farm income averaged \$9,600. Debt on these farms (including landlords' debt) averaged \$312,500. At current interest rates, the off-farm income covers perhaps two-fifths of the annual interest charge on the debt, and it would hardly be a major factor in debt repayment. Assets of these farms averaged \$1,155,000, and so it seems that the off-farm income would, on average, be a relatively minor consideration when additional land purchases are being contemplated. Yet these and other large farms have been major buyers of land for farm enlargement.

It appears that the role of off-farm income as a base for debt service and as a factor in land price increases has been overemphasized by many

financial analysts and other commentators on the farm scene. Very likely, these persons have simply been unaware of the distribution of off-farm income relative to that of assets and debt.

The USDA data cited in this paper have been revised since the seminar to reflect updates and revisions made by the USDA through September 1978.

Chart 1
Assets compared with debt

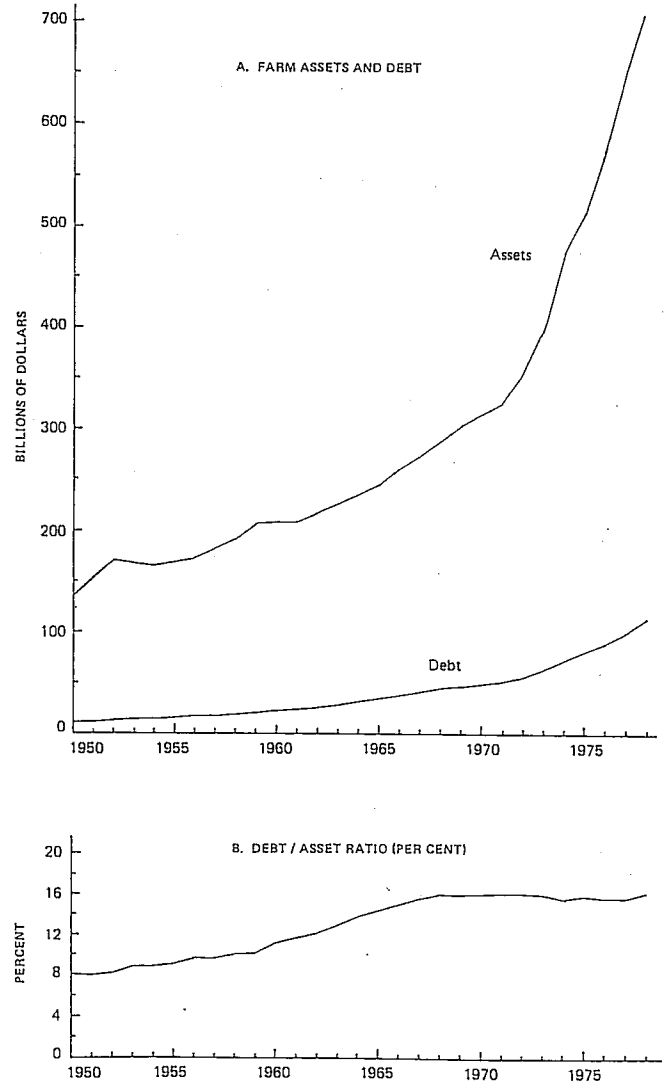


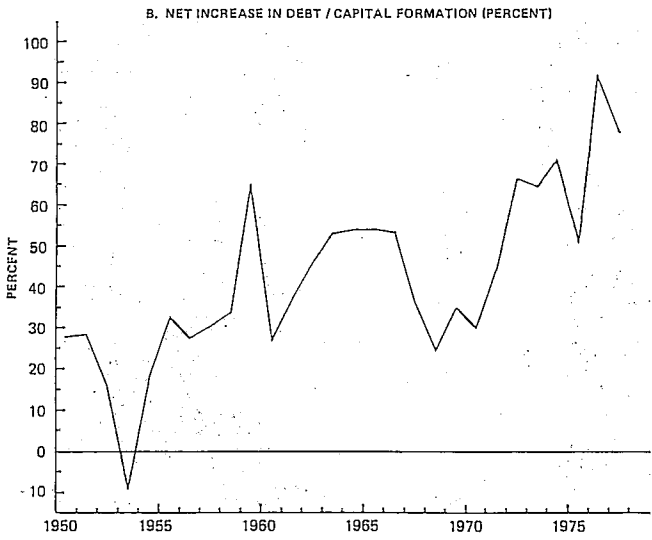
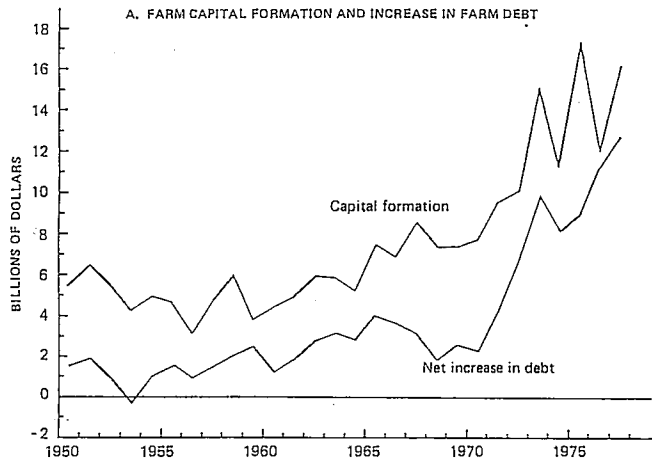
TABLE 711-1

CAPITAL FLOW AND ITS FINANCING
AMOUNTS IN MILLIONS OF DOLLARS

YEAR	CAPITAL FLOW								FINANCING OF CAPITAL FLOW			ADDENDUM: FARM CASH FLOW	
	TOTAL	REAL ESTATE PURCHASES FROM DISCONTINUING PROPRIETORS	CAPITAL FORMATION					STORED CROPS	FINANCIAL ASSETS	TOTAL	INTERNAL FUNDS		INCREASE IN DEBT
			TOTAL	BUILDINGS AND LAND IMPROVEMENTS	MACHINERY	LIVESTOCK							
1950	7762	2304	5458	1522	3152	607	205	-28	7762	6256	1506	17546	
1951	8915	2451	6464	1599	3321	1017	360	107	8915	7098	1817	20449	
1952	7842	2401	5441	1614	2966	579	342	-61	7842	6982	860	19708	
1953	6366	2171	4195	1527	3201	-81	-542	90	6366	6730	-372	17648	
1954	7188	2296	4892	1425	2739	260	231	237	7188	6290	898	17113	
1955	7199	2589	4610	1385	2760	18	197	250	7199	5718	1481	16062	
1956	5773	2655	3118	1392	2406	-345	-111	-224	5773	4914	859	16086	
1957	7584	2861	4723	1411	2512	-211	829	182	7584	6169	1415	16427	
1958	8956	3081	5875	1355	3150	576	248	545	8956	6976	1980	18340	
1959	6930	3165	3765	1654	3414	418	-404	-1317	6930	4496	2434	16041	
1960	7468	3067	4401	1686	2802	89	308	-484	7468	6289	1179	16979	
1961	8144	3264	4880	1748	2866	372	-36	-70	8144	6333	1810	17691	
1962	9309	3354	5955	1832	3190	585	35	313	9309	6577	2732	18081	
1963	9539	3635	5904	1866	3525	396	233	-136	9539	6410	3128	18089	
1964	9064	3862	5202	1918	3770	-38	-779	331	9064	6264	2800	17056	
1965	11723	4311	7412	1926	4179	-175	1217	265	11723	7734	3989	19696	
1966	11462	4666	6796	2077	4611	221	-304	191	11462	7821	3641	21367	
1967	12498	4449	8049	2314	5132	82	575	446	12498	9893	3105	20602	
1968	11677	4308	7369	2146	4550	218	-94	549	11677	9868	1808	20521	
1969	11685	4326	7359	2340	4525	222	-123	395	11685	9120	2566	22928	
1970	11820	4136	7684	2367	4918	665	-659	391	11820	9563	2257	23043	
1971	15404	5845	9559	2484	4873	460	937	805	15404	11060	4244	24424	
1972	18643	8549	10094	2350	5695	445	416	1186	18643	11943	6700	30043	
1973	20612	11469	15143	3062	7647	1818	1588	1028	20612	16777	9835	47973	
1974	20865	9598	11327	4395	6195	454	-2065	348	20865	12758	6127	41793	
1975	27261	9963	17378	4684	8653	-1044	4444	641	27261	18301	8960	41661	
1976	24367	12274	12093	4956	9199	-682	-1683	303	24367	13221	11146	36842	
1977	26084	11896	16188	5933	9432	-1216	1631	410	26084	15421	12663	39691	

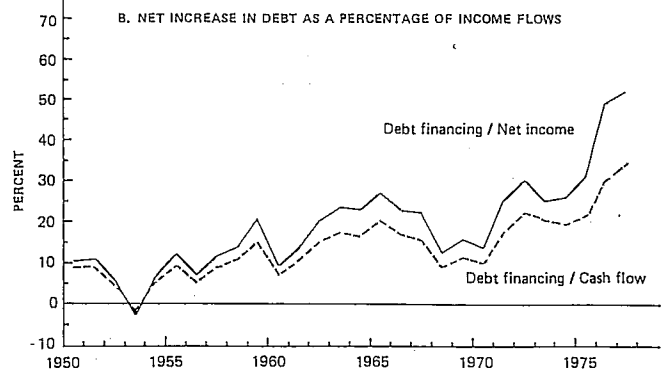
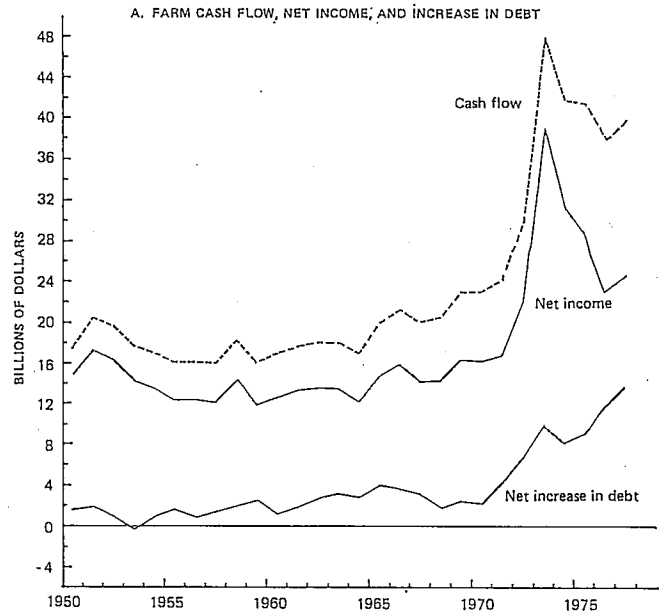
"REAL ESTATE PURCHASES" IS AN ESTIMATED PROPORTION OF REAL ESTATE TRANSFERS (TABLE 632.11). BEFORE 1965 TRANSFERS ARE ESTIMATED FROM REAL ESTATE ASSETS (TABLE 511.1) AND TRANSFER RATES (TABLE 631.1). CAPITAL FORMATION CONSISTS OF BUILDING AND MACHINERY EXPENDITURES (TABLE 110.1), NET ADDITIONS TO LIVESTOCK AND STORED-CROP INVENTORIES (TABLE 921.1), AND NET CHANGES IN CURRENCY, BANK DEPOSITS, AND U.S. SAVINGS BONDS (TABLE 521.2). "INCREASE IN DEBT" EXCLUDES CCC LOANS (TABLE 111.2). FINANCING FROM "INTERNAL FUNDS" IS TOTAL CAPITAL FLOW LESS THIS DEBT FINANCING. "FARM CASH FLOW," WHICH INCLUDES UNREALIZED AND NONMONEY INCOME, IS DEFINED IN TABLE 941.1.

Chart 2
Debt financing compared with capital formation



Note: Capital formation consists of expenditures for machinery, buildings, and land improvements plus the net change in financial assets and in livestock and crop inventories.

Chart 3
Debt financing compared with income flows



Note: Cash flow is net farm income plus capital consumption allowances at replacement cost.

Discussion

QUESTION: You noted that the average farm debt/asset ratio is less than 20 percent--but do you realize that the way USDA values assets and the way they would be valued on a business balance sheet are considerably different? USDA uses current market values, whereas on business balance sheets assets are valued at actual cost at the time they were purchased. I think that if you would put farm assets on a cost basis also you'd probably find little difference in farm and business debt/asset ratios. In fact, the farm ratio might even be higher. My point in bringing this up is that you don't want to get a false sense of security from the USDA debt-to-asset ratio.

MELICHAR: If you have to compare debt/asset ratios for the farm and nonfarm business sectors, given the present data, the best procedure may actually be to use the current value of farm assets, but the book value of the nonfarm assets. Before I explain this, note that for farm assets both book value and current market value have been estimated by the USDA, but that for the business sector only the book value is available. Now, should you take the book value that you have for business assets and compare it with book value rather than current market value of the farm assets? Well, if you look at the composition of manufacturing assets, about one-fourth of the total is accounts receivable. Another one-fourth or so is inventories and other current assets. In addition, a comparison of capital expenditures with the book value of the remaining assets indicates that much of the manufacturing plant has been purchased within the last few years. Machinery is apparently a big part of these assets. In contrast, a major part of farming assets consists of farm land that was bought long ago. The book value of this land is way below market, whereas in manufacturing most of the assets are either current assets or have been purchased fairly recently. Thus I have concluded that comparing farm book value with manufacturing book value may actually be misleading, and that it may be analytically better to compare book values for manufacturing with current values for farming.

COMMENT: Business use of fast depreciation schedules has been increasing. I know specific instances--where businesses have been sold--in which plant values were 3 or 4 times their book values, if one had to replace them at current prices. The difference between current and book values has also been widened by the recent high rates of inflation.

MELICHAR: You have a valid point insofar as business plant and equipment is concerned. But the fact remains that the proportion of assets in accounts receivable, inventories, and cash is much higher in manufacturing than in farm-

ing, while the proportion consisting of real estate is much lower than the 75 percent share found in agriculture.

QUESTION: Yesterday you presented data showing that the percentage of farms with debt had increased, and that the percentage of debt had increased on these farms. I'm having trouble relating the high percentages you presented yesterday to the much lower debt/asset ratio in agriculture that you cited today.

MELICHAR: You are undoubtedly referring to the first two columns of Table 641.1 used yesterday, which showed the percentage of farms on which debt was incurred at the time they were transferred and also the amount of such debt as a percentage of the purchase price. Thus those data referred only to the 4 to 5 percent of all farms that are transferred in any given year. In contrast, the debt/asset ratio cited today is the average for all farms. This gets us into an important point, however, which is that debt/asset ratios differ greatly among farms. Those farmers who have recently purchased land undoubtedly have the higher debt/asset ratios and the higher interest payments to cope with now.

QUESTION: You commented earlier on the reduction in the liquidity of banks, particularly country banks. I'm wondering if there has been some work done that might demonstrate that there is a deliberate attempt on the part of the country bank to maintain earnings in the face of a changing deposit mix that raises the interest cost of obtaining funds to lend, as opposed to the thesis that says farmers have needed more debt and that the banks have responded to their requests. My own view is that many banks have made a deliberate effort to capture more of the agricultural debt market in response to a need for more earnings. Would you want to comment on that at all?

MELICHAR: I don't think that this explains the recent sharp rise in loan/deposit ratios, although it may have been a factor in the longer-term uptrend. At the smaller banks in rural areas that are heavily involved in farm lending--specifically, the 5,000 or so banks at which more than one-fourth of loans are farm loans--the average loan/deposit ratio rose from the early 1950's until 1967. For the next seven years it stayed on a plateau around 55 percent. But then between the end of 1975 and September 1977 it made a phenomenally rapid rise to to 64 percent. This was a period of lower farm income during which growth in total deposits at these banks was cut back to an annual rate of 10 percent, or maybe even a little less than that; with demand deposits rising very little and time deposits growing at a rate of perhaps 15 percent. Farm loans in-

creased faster than deposits, in part because loan repayments slowed and demand for renewals increased. Thus the farm income situation was responsible for the large and rapid reduction in the liquidity of rural banks.

In contrast, the change you bring up--the increasing proportion of time deposits in banks' total deposits--has been a more gradual and long-term development. That trend and any resulting pressure on earnings was present during that period from 1967 to 1975 when the average loan/deposit ratio at rural banks stayed at around 55 percent--a level well below that at which large city banks were then operating. At the time, I felt that the rural bankers operating at a lower level were recognizing that there was greater risk in lending to the small, undiversified areas they serve, and that they were behaving prudently in maintaining a greater liquidity cushion.

Now it appears that the cushion of liquidity that was being maintained by rural banks has been used up. Of course, if you're never going to use a cushion, you may as well not keep it. So the purpose in keeping a liquidity cushion was for it to be there to use when the time came, which it apparently did. Where will these banks go from here? Since last fall, several factors--more CCC loans, the wheat deficiency payments, Federal disaster loans, and the improvement in crop and livestock prices--have helped to improve deposit growth and bank loan repayments. The average loan/deposit ratio at rural banks has dropped by about 2 to 3 percentage points since last September.

QUESTION: But if you study the earnings of these banks over that period of years when the loan/deposit ratio did not go beyond 55 percent, do you find that earnings were coming down? Or were they flat? Or what?

MELICHAR: I have not studied the earnings.

COMMENT: Well, my contention remains that these banks finally realized that the need for more earnings was forcing them to look into whether or not they need that large a liquidity buffer from here forward.

MELICHAR: That seems unrealistic. The pressure for earnings would have existed over the whole period. For seven years they didn't respond to it, and then suddenly in the spring of 1976 they realized the pressure on their earnings and so zoomed up their loan/deposit ratios to the new high level? It seems more realistic to explain the recent rise in terms of what we know happened to farm income, deposit growth, and loan repayment rates. I agree, however, that the changing deposit mix is one of the factors underlying the longer-term upward movement of loan/deposit ratios.

QUESTION: One of the concerns that we have is financing the highly leveraged position of agriculture. Many of the banks today do not have the liquidity they had, say, 15 or 20 years ago. We have more intermediate-term credit today than we had 20 or 25 years ago, and it is not 3-year credit. We are looking

at 5 to 8-year credit to finance some of these Steiger tractors. I don't think we anticipate the kind of deposit growth in banking that we had during this period from 1950 to 1970, for example, or that we had in 1973. This concerns us, because we see the need for additional debt financing in agriculture through our system of banks and PCA's. Malcolm Harding (then Governor of the Farm Credit Administration) gave us some projections that were rather astounding as to the future need for financing farm capital formation.

MELICHAR: Well, I share your concern, but I don't necessarily agree that financing agriculture will be a great problem. For one thing, I have published a criticism of Malcolm Harding's projections. He took the trend of capital formation during the recent boom and drew it out for another 10 years. If you do that, you are saying that we will continue to have a boom in capital expenditures--machinery buying--equal to the one we have had since 1972, and that it will keep going for 10 more years. That's completely unrealistic. But given that assumption, you can't quarrel with his projection that a large amount of financing would be needed.

But would the financing of a continued boom be a problem? Farmers would be doing that kind of buying only if times were very good. If that came to pass, there would be no financing problem. With farming a profitable, growing industry, people would be happy to lend to farmers. Rural bank deposits would be growing apace. In other words, if you project a capital formation boom, to be consistent you must also project the great income that is responsible for such booms, and that means that the financing will be available.

The current situation is different. Capital formation is essentially flat, but debt is rising rapidly. The added debt is not being used to increase capital spending. It is being used for something else--perhaps to make up for the drop in farm income. Well, that gets you into trouble, because you are not adding to income, but you have higher interest charges. So I am more worried about handling the current debt than about where more debt is going to come from.

QUESTION: You are not particularly concerned then about the deposit growth in banks, for example, or the lack of deposit growth as compared to increases in farm debt?

MELICHAR: That continues to be a concern, but my point is that the problem it poses for farmers is not as great as sometimes painted. The current problem for farmers is that of servicing the debt already taken on.