PROCEEDINGS OF WORKSHOP ON FARM SECTOR FINANCIAL ACCOUNTS, APRIL 14-15, 1977

ANALYTICAL RATIOS BASED UPON A FARM SECTOR CASH FLOW STATEMENT: DISCUSSION

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U.S. Department of Agriculture
Economics, Statistics, and Cooperatives Service,

Agricultural Economic Report 412

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A table showing annual cash sources and uses of funds in the farming sector has been published in Agricultural Finance Outlook since 1973. The purpose of this note is to demonstrate that analytical ratios based on these data can provide insights into aggregate farm financial behavior beyond those presented thus far in that publication.

The account as published in the December 1976 issue of Agricultural Finance Outlook (3, pp. 16 and 19) is reproduced in parts A and B of table 1. The sources of funds, shown in part A, include cash farm income (net farm income and capital consumption allowances), off-farm income, and the net increase in farm debt. In part B, uses of funds are shown as consisting of several capital flows and of total nonfarm uses (personal consumption and other cash uses) which are derived residually (total sources less total capital flow). Total capital flow consists of capital formation (machinery purchases, real estate improvements, and other capital purchases) and purchases of real estate from discontinuing proprietors.

To set the stage for the computation of various analytical ratios, several additional series are derived from these data. The income flow (from part A) can be regarded as composed of capital consumption allowances2/ and net income, and this detail is shown in part C of table 1. Next, the total capital flow (from part B) can be regarded as financed either through borrowing (measured by the net increase in debt, from part A) or from internal sources. This partition is shown in part D, with internal financing being computed residually (total capital flow less the net increase in debt). Finally, the total or "gross" internal financing can be regarded as met first from the funds received as capital consumption allowances, leaving a residual, "net" internal financing (last line of part D, calculated as gross internal financing less capital consumption allowances), to be met from net income.

From the various series in parts A through D of table 1, one can calculate at least four sets of ratios with analytical utility. These ratios are presented on an annual basis in the lower panel of table 1. Several of them were used by Tostlebe in his study of farm finance during the first half of this century (2). Tostlebe showed how their levels varied greatly over periods encompassing farming booms and depressions. To facilitate similar comparisons, the years since 1960 have been grouped into five periods in table 2, and the average ratio over each period is shown. Both tables 1 and 2 also present the ratios that Agricultural Finance Outlook (3) implicitly estimated for 1976 and forecast for 1977.

1/ This material was presented by Emanuel Melichar in the open discussion period following the paper presented by Lins. Because of the length of the comment and the need to include tables he distributed at the meeting, it appears here as an added discussion.

2/ Capital consumption allowances are shown as published in Farm Income Statistics (4). These correspond to all items of capital formation shown in the Agricultural Finance Outlook account except "breeding livestock," which is an unpublished series estimated by the authors of the latter publication, and for which corresponding estimates of depreciation allowances are not available. Such depreciation is small relative to total depreciation, however, and thus the data and ratios presented here are not significantly affected.

Table 1.-- Cash sources and uses of funds for the U.S. farm sector, 1961-77

	Item	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976 1/	1977 5/
		Billion dollars																
A.	Cash sources of funds 2/																	
	Cash income from farm and off-farm sources 3/	23.8	24.7	25.8	26.7	28.9	32.6	31.1	33.1	36.5	37.5	38.7	46.8	64.9	64.8	62.6	66.0	66.2
	Net flow of real estate loans	1.0	1.3	1.7	2.1	2.3	1.9	2.0	2.3	1.8	1.1	1.9	3.6	5.5	5.0	4.6	5.8	7.0
	Net flow of nonreal estate loans	.8	1.4	1.5	.6	1.8	1.7	1.1	-0.5	.7	1.1	2.4	3.2	4.3	3.1	4.2	5.0	4.0
	Cash sources of funds	25.6	27.4	29.0	29.4	33.0	36.2	34.2	34.9	39.0	39.7	43.0	53.6	74.7	72.9	71.4	76.8	77.2
B.	Cash uses of funds																	
	Purchases of machinery and motor vehicles	2.9	3.2	3.5	3.8	4.1	4.6	5.1	4.6	4.5	4.9	4.8	5.7	7.7	8.4	8.9	9.5	10.0
	Capital improvements to real estate assets	1.7	1.8	1.9	1.9	1.9	2.1	2.3	2.1	2.3	2.4	2.5	2.4	3.0	4.1	3.8	3.8	4.3
	Other capital purchases 4/	1.0	.9	.6	.6	1.0	.8	1.6	1.6	1.2	1.5	2.5	3.1	2.4	0.9	1.3	1.7	1.9
	Annual capital formation	5.6	5.9	6.0	6.3	7.0	7.5	9.0	8.3	8.0	8.8	9.8	11.2	13.1	13.4	14.0	15.1	16.2
	Purchases of real estate from discontinuing proprietors 6/	3.2	3.3	3.5	3.9	4.3	4.6	4.4	4.3	4.3	4.1	5.8	8.5	11.4	9.5	9.8	11.2	12.5
	Total cash flow of capital 6/	8.8	9.2	9.5	10.2	11.3	12.1	13.4	12.6	12.3	12.9	15.6	19.7	24.5	22.9	23.8	26.3	28.7
	Personal consumption and other cash uses	16.8	18.2	19.5	19.2	21.7	24.1	20.8	22.3	26.7	26.8	27.4	33.9	50.2	50.0	47.6	50.5	48.5
	Cash uses of funds	25.6	27.4	29.0	29.4	33.0	36.2	34.2	34.9	39.0	39.7	43.0	53.6	74.7	72.9	71.4	76.8	77.2
C.	Income flow	23.8	24.7	25.8	26.7	28.9	32.6	31.1	33.1	36.5	37.5	38.7	46.8	64.9	64.8	62.6	66.0	66.2
	Capital consumption allowances	4.4	4.5	4.7	4.9	5.1	5.4	5.8	6.2	6.6	6.8	7.4	7.9	8.9	10.6	12.5	7/14.0	7/15.2
	Net income	19.4	20.2	21.1	21.8	23.8	27.2	25.3	26.9	29.9	30.7	31.3	38.9	56.0	54.2	50.1	7/52.0	7/51.0
D.	Capital flow	8.8	9.2	9.5	10.2	11.3	12.1	13.4	12.6	12.3	12.9	15.6	19.7	24.5	22.9	23.8	26.3	28.7
	Debt-financed	1.8	2.7	3.2	2.7	4.1	3.6	3.1	1.8	2.5	2.2	4.3	6.8	9.8	8.1	8.8	10.8	11.0
	Internally financed--gross	7.0	6.5	6.3	7.5	7.2	8.5	10.3	10.8	9.8	10.7	11.3	12.9	14.7	14.8	15.0	15.5	17.7
	--net	2.6	2.0	1.6	2.6	2.1	3.1	4.5	4.6	3.2	3.9	3.9	5.0	5.8	4.2	2.5	7/ 1.5	7/2.5
	Analytical ratios	Percent																
	Relative burden of capital flows																	
	Capital flow/income flow	37	37	37	38	39	37	43	38	34	34	40	42	38	35	38	40	43
	Real estate purchases/income flow	13	13	14	15	15	14	14	13	12	11	15	18	18	15	16	17	19
	Capital formation/income flow	24	24	23	24	24	23	29	25	22	23	25	24	20	21	22	23	24
	Allocations to internal financing																	
	Gross internal financing/income flow	29	26	24	28	25	26	33	33	27	29	29	28	23	23	24	23	27
	Net internal financing/net income	13	10	8	12	9	11	18	17	11	13	12	13	10	8	5	3	5
	Prospective burden of debt financing																	
	Debt financing/income flow	8	11	12	10	14	11	10	5	7	6	11	15	15	12	14	16	17
	Debt financing/net income	9	13	15	12	17	13	12	7	8	7	14	17	18	15	18	21	22
	Relative role of debt financing																	
	Debt financing/capital flow	20	29	34	26	36	30	23	14	20	17	28	35	40	35	37	41	38
	Debt financing/capital formation	32	46	53	43	59	48	34	22	31	25	44	61	75	60	63	72	68

1/ Preliminary. 2/ Cash sources of funds from sale of real estate to the nonfarm sector are not included due to the lack of data. 3/ Gross cash farm operating expenses have been deducted from gross cash farm income in the account. 4/ Includes net additions to household furnishings, commercial bank deposits and currency, and purchases of breeding livestock. 5/ Forecast by the AIW simulator. 6/ Data published in AFO-17 are corrected for 1969-77. 7/ Based on author's projection of capital consumption allowances.

The first set of ratios reflects the relative burden that capital flows place on the income flow. The first ratio is simply the total capital flow as a percentage of the total income flow. In the next two ratios, each of the primary components of capital flow--capital formation and real estate purchases--are separately shown as a percentage of total income flow. The most interesting finding is that the relative capital burden did not increase during the farm investment and land price boom of 1973-75, as a small decrease in the relative burden of capital formation offset a small increase in the relative burden of real estate purchases. However, the capital flows forecast for 1976 and 1977 would constitute a sharp rise in the relative burden. One may be wary in using these forecasts because similar annual forecasts of capital flows made by USDA since 1973 have consistently overestimated actual flows; however, the relative size of the overestimates has been decreasing as estimating procedures have been re-examined and improved. With this caveat, it appears that the relative burden of real estate purchases may be moving sharply above its recent historical relationship to income flow and net income.

Table 2.--Analytical ratios for selected time periods, 1961-77

Item	61-64	65-69	70-71	72	73-75	76	77
Relative burden of capital flows:							
Capital flow/income flow	37	38	38	42	36	40	43
Real estate purchases/income flow	14	14	13	18	15	17	19
Capital formation/income flow	24	25	24	24	21	23	24
Internal financing:							
Gross internal financing/income flow	27	29	29	28	22	23	27
Net internal financing/net income	11	14	13	13	7	3	5
Debt financing:							
Prospective burden:							
Debt financing/income flow	10	9	8	15	14	16	17
Debt financing/net income	13	11	10	17	17	21	22
Relative role:							
Debt financing/capital flow	27	24	22	40	38	41	38
Debt financing/capital formation	43	38	34	75	66	72	68

The second set of ratios examines the proportion of their income flow that farmers are allocating to the internal financing of capital flow. Surprisingly, in spite of the extraordinary farm income of 1973, farmers as a whole reduced the proportion of their income flow (or of their net income) allocated to internal financing. It appears that they used most of their additional income to increase greatly their personal consumption and/or nonfarm investment, rather than to finance farm capital flows or to repay outstanding farm debt.

The third set of ratios may indicate the prospective burden of ongoing debt financing. They are a rough indicator only, as they relate current debt financing to current income flow or net income. Preferable indicators would relate the future stream of debt service commitments to future income flow or net income. Nevertheless, the recent increases in the ratios shown indicate that income flows must rise in the future to avoid an increase in the relative burden posed by outstanding farm debt. Given current income trends, the legacy of the recent period of high farm income may be one of increased rather than reduced relative debt repayment burden.

Ratios in the last set simply compare the net increase in debt to capital flow and capital formation, respectively. These measures supplement the one set of ratios regularly published in Agricultural Finance Outlook (which relate the net increase in debt to the total cash sources of funds) in indicating the relative role of debt financing. One advantage of the additional ratios is that they are roughly comparable with those computed in earlier studies by Tostlebe (2) for 1900-1950 and by Melichar (1) for 1950-1969. It may be significant, for instance, that the only prior period in which the ratio of debt financing to capital formation resembled the level of 1972-77 is, as estimated by Tostlebe, 1915-19. The latter period has been generally described as a speculative, debt-financed farm boom based on euphoric long-term income projections that later failed to materialize.

It appears that these analytical ratios offer fruitful insights into relationships that are difficult to discern from examination of the flow series only.3/ I therefore suggest that such ratios be regularly presented and discussed in Agricultural Finance Outlook.

3/ Additional proof for this proposition surfaced during the preparation of this note. Investigation of a suspicious drop in the originally computed ratio of real estate purchases to income flow led to the discovery that real estate purchases had been incorrectly published in AFO-17 (3) for years after 1968. The unusual financial behavior, in this case traced to a data-recording error, was far more prominent in the ratio series than in the original flow series.

REFERENCES

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(4) ________. Farm Income Statistics. Econ. Res. Serv., Stat. Bul. 557, July 1976.