

V. The Farm Sector

Excerpt from

THE IMPACT OF HIGH INTEREST RATES ON THE HOUSING, AUTOMOBILE,
AGRICULTURE, AND SMALL BUSINESS SECTORS

A Study by the Staff of the Board of Governors
of the Federal Reserve System

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Appendices A and B were added to this excerpt to provide additional detail of farm sector estimates made in this study.

V. The Farm Sector

The farm sector is now experiencing its seventh consecutive quarter of relatively low profitability (see table on page 29). Although this slump has occurred during a period when interest rates have risen to historically high levels, a glance at the data on farm income for the past decade would suggest a need for caution in drawing conclusions about causal linkages. For instance, the last period of relatively weak farm profitability, 1976-77, occurred during a period of lower interest rates. Farm income then rose rapidly in 1978-79 even though interest rates had started to climb. And earlier, in 1973, the highest farm income in history was recorded while market interest rates were rising sharply.

As these historical references indicate, the farm sector has experienced relatively severe income cycles over the past ten years. First came the extraordinarily profitable years of 1972-73, then an income slide that by 1976 had carried the real earnings on farm assets below their longer-term trend of annual increases averaging 4 percent since the mid-1950s. This longer-term profit growth had been accompanied by an equivalent average annual increase in the real price of farm real estate; furthermore, the relatively high price/earnings ratio placed on farm assets--averaging about 25--reflected expectations that such real growth in asset earnings would be sustained. The income recovery of 1978-79 returned farm profitability to approximately the longer-term trend to which farm real estate values were evidently related. The swift return to lower earnings that ensued seemingly was an unexpected shock.

Higher interest rates could have cut into net farm income in four ways: (1) by increasing production expenses directly, through higher interest

Table 1. Farm income and expenses (quarterly, seasonally adjusted annual rate, billions of dollars)

Quarter	Gross farm income	Farm production expenses	Net farm income of farm operators
1978-Q1	120.4	97.7	22.7
Q2	124.1	99.1	25.0
Q3	126.9	100.4	26.5
Q4	138.9	107.2	31.7
1979-Q1	148.2	114.8	33.4
Q2	152.8	116.9	35.9
Q3	152.5	120.2	32.3
Q4	154.1	124.9	29.2
1980-Q1	149.3	126.0	23.4
Q2	146.0	129.0	16.9
Q3	151.9	132.2	19.7
Q4	155.1	135.6	19.5
1981-Q1	157.7	139.4	18.3
Q2	165.2	142.2	23.0

Source: U.S. Department of Agriculture.

charges on debt owed by the farm sector; (2) by increasing production expenses indirectly, as higher interest charges paid by nonfarm manufacturers and suppliers of goods and services to the farm sector are passed along in the form of higher prices of these farm inputs; (3) by reducing gross income through adverse effects on the demand for farm output; and (4) by changing the time-path of gross income if higher rates cause producers to alter their marketing patterns.

Data available permit rough empirical estimates of the first two of these effects. To establish a perspective for such estimates, it is first useful to quantify the extent to which farm income has fallen below its 1979 level. As such income is to be compared with interest expense, it must include the net rent of farm landlords as well as the net income of farm operators, because landlords owe part of the farm debt and thus pay part of the interest included in farm production expenses. The table on page 31 shows that the combined net farm income of operators and landlords, labeled "net income of farm sector," totaled \$38.1 billion in 1979. Between 1979 and the first half of 1981 (1981-H1), the price deflator for personal consumption expenditures rose 17.1 percent; thus, to provide the same purchasing power, such income would have had to total \$44.6 billion (annual rate) in the latter period. As also shown in the table, actual sector net income totaled \$26.5 billion (annual rate). Thus the reduction in annual net income, in terms of current purchasing power, was approximately \$18 billion as of the first half of 1981.

The rise in interest rates on outstanding farm sector debt is estimated to have accounted for \$2.4 billion, or 13 percent, of this drop in real net income. Thus, so far, for the farm sector as a whole, the direct

Table 2. Farm income and expenses (annual, billions of dollars)

Year	Gross farm income	Farm production expenses	Net farm income of farm operators	Net farm income of farm sector	Farm cash flow of farm sector	Farm cash flow of farm sector plus farm operators' off-farm income
1977	108.7	90.3	18.4	22.4	37.8	63.1
1978	127.5	101.1	26.5	31.4	48.7	76.8
1979	151.9	119.2	32.7	38.1	57.8	91.0
1980	150.5	130.7	19.9	25.7	47.4	83.4
1981-H1 ^a	161.4	140.8	20.6	26.5 ^e	49.0 ^e	87.0 ^e

a - Annual rate.

e - Estimated for this report.

Source: U.S. Department of Agriculture.

Notes: Data for the first half of 1981 (1981-H1) are shown at annual rates.

Gross farm income includes cash receipts from farm marketings, government payments, net change in inventory of livestock and stored crops, home consumption of farm output, and the rental value of operators' dwellings. Share rents and government payments received by landlords are also included.

Farm production expenses are as reported by the USDA. They include landlords' farm production expenses as well as net rent paid to farm landlords.

Net farm income of farm operators is gross farm income less farm production expenses.

Net farm income of farm sector is net farm income of farm operators plus net rental income of farm landlords.

Farm cash flow of farm sector is net farm income of farm sector plus the capital consumption allowances that were included in farm production expenses.

Table 3. Outstanding farm debt, interest paid, and interest rates

Year	Average outstanding debt (billions of dollars)	Annual interest paid (billions of dollars)	Implicit average interest rate (percent)	Addendum: Average interest rate on loans made (percent)		
				Commercial banks	Production credit associations	Federal land banks
<u>Non-real-estate debt</u>						
1976	43.1	3.2	7.39	n.a.	8.4	--
1977	51.2	4.0	7.76	8.8	8.1	--
1978	60.3	4.9	8.13	9.6	9.0	--
1979	70.4	6.6	9.34	11.8	10.9	--
1980	80.1	8.5	10.62	15.1	13.0	--
1981-H1	86.5e	9.9a,e	11.50e	17.9	14.3	--
<u>Real estate debt</u>						
1976	53.7	3.9	7.18	--	--	8.6
1977	60.3	4.4	7.24	--	--	8.3
1978	67.4	5.1	7.60	--	--	8.4
1979	77.3	6.1	7.96	--	--	9.2
1980	88.2	7.3	8.29	--	--	10.4
1981-H1	95.0e	8.1a,e	8.55e	--	--	11.0
<u>Total debt</u>						
1976	96.8	7.0	7.27			
1977	111.5	8.3	7.48			
1978	127.7	10.0	7.85			
1979	147.7	12.7	8.62			
1980	168.3	15.8	9.40			
1981-H1	181.5e	18.1a,e	9.96e			

a - Annual rate.

e - Estimated for this report.

Table 3. (continued)

Source: Debt and annual interest paid, U.S. Department of Agriculture; interest rate on loans made by commercial banks, Federal Reserve survey of terms of bank lending to farmers (dollar-weighted average of effective rates on non-real-estate farm loans of \$1,000 or more made in the first full business week of the second month of each quarter); interest rate on loans made by production credit associations and Federal land banks, computed for this report as the unweighted average of quoted rates on the first day of each quarter, as compiled by the Farm Credit Administration (stock purchases and loan fees required of borrowers from these cooperatives are not taken into account in the average rates shown).

Note: Average outstanding debt was computed for this report as follows, in order that the seasonal pattern of debt outstanding be reflected in the annual average: (1) quarterly average institutional debt (compiled in Federal Reserve Board Statistical Release E.15, "Agricultural Finance Databook--Quarterly Series") was estimated by averaging amounts outstanding at the beginning and end of each quarter; (2) annual average of institutional debt was estimated by averaging the quarterly averages computed in step 1; (3) annual average institutional debt was alternatively estimated by averaging amounts outstanding at the beginning and end of each year; (4) annual average total debt was first approximated by averaging amounts outstanding at the beginning and end of each year (USDA estimates of noninstitutional debt are made only as of January 1); and (5) the amount obtained in step 4 was adjusted by multiplying by the ratio of the amount obtained in step 2 to the amount obtained in step 3. These computations were performed separately for non-real-estate and real estate debt, and the results were summed to obtain average total debt.

cost impact of higher interest rates has been small. The key factor is that a relatively large amount of outstanding intermediate- and long-term farm debt was incurred in earlier years at lower fixed rates; also, a significant amount of recent new debt consisted of drought-related Farmers Home Administration disaster loans bearing an interest rate of 5 percent. Consequently, the average rate on all outstanding debt rose relatively slowly toward the new higher level of rates on most other new loans. As shown in the table on page 32, the average rate paid on all outstanding farm debt in the first half of 1981 is estimated to have been 9.96 percent, up from 8.62 percent in 1979. Total interest paid rose from \$12.7 billion to an estimated \$18.1 billion (annual rate). But much of this increase resulted from a sizable growth in the amount of outstanding debt, from \$147.7 billion to \$181.5 billion. Thus even if the average interest rate had remained at its 1979 level, interest paid would have risen to \$15.6 billion. Only the remaining \$2.4 billion of the total increase is attributable to the higher rate.

Some individual farm operators, of course, have experienced a much greater relative increase in their average interest rate--in particular, those highly leveraged operators who have employed significant short-term financing. Because short-term borrowing often tends to minimize immediate interest expense while maximizing financial flexibility, persons seeking rapid financial progress may choose such financing in spite of the obvious risk of greater susceptibility to cash-flow problems should interest rates subsequently rise. In effect, some individuals chose to take above-average risks in the hope of above-average short-term gains, and their timing proved, in retrospect, unfortunate. Data on the number of these or other cases of individual farm financial distress are limited, however. Foreclosures, which

would tend to be a lagging indicator of severe problems, in 1980 accounted for 0.13 percent of farm transfers, about the same as the average proportion over the past two decades.

Average interest rates being paid by nonfarm businesses also have lagged behind advances in rates on new loans, thus holding down the size of the indirect impact of higher rates on farm expenses for nonfarm inputs. If firms supplying farm inputs had credit experience similar to that of nonfinancial corporate business in general, a full pass-through of their own cost increases attributable to higher interest rates paid since 1979--which may not have been possible, given demand conditions--would have raised the price of their final sales by about 1.0 percent. Annual farm sector purchases of such inputs have recently totaled about \$60 billion; thus, at most only about \$0.6 billion, or 3 percent, of the reduction in real net farm income resulted from this indirect impact of higher rates.

The third avenue through which, as was noted above, higher interest rates might have reduced net farm income was by reducing demand for farm commodities. Stagnant gross farm income has been the proximate cause of the decline in net income. After rising above \$150 billion in the second quarter of 1979, gross farm income failed to advance significantly further until the second quarter of this year (table on page 29). In an environment of general price inflation approaching 10 percent annually, two years of stalled growth in gross income had a devastating effect on net income.

High interest rates undoubtedly have had some effect on the growth path of gross farm income. However, these effects have worked mainly through indirect channels and are thus hard to disentangle from other causal factors--such as the impact of languishing labor productivity on real consumer income--that have probably been more important in limiting farm income growth. More than

likely, the direct effect of high interest rates in limiting the demand for farm output has been quite small since, by and large, final consumer purchases of farm output are neither credit-financed nor highly postponable. Thus an increase in rates should have relatively little influence on either the level or timing of consumer food purchases.

While the direct effects are probably small, many observers have argued that high interest rates have restricted farm income growth indirectly through exchange rate effects that limit farm export demand. According to this argument, high U.S. interest rates contribute to the strength of the dollar in exchange markets and thereby make U.S. goods more costly relative to those of other countries. Conceptually, there is merit to this argument; however, the magnitude of the exchange rate effect on recent farm income developments could easily be exaggerated. Although exports of the major U.S. crops in the 1980-81 marketing year will apparently fall short of earlier expectations, these exports are still at very high levels by historical standards. Moreover, the cash receipts of farmers producing our major export crops have in general held up better than the incomes of livestock producers, who--in the short run--should not be much affected by exchange rate developments.

Yet another way in which interest rates might affect farm prices and farm incomes is through their effect on the pattern of crop and livestock marketings. Rising interest rates make it more costly to finance inventories and thus encourage increased near-term marketings at the expense of long-run supplies. This argument has been cited especially often in the popular press as a factor explaining the weakness in livestock prices in recent quarters. However, as with exchange rate factors, it is easy to exaggerate this effect.

For example, while cattle marketings so far in 1981 have run somewhat above earlier expectations, there has not been a massive selloff of breeding animals that would severely limit future supplies; indeed, the nation's cattle inventory as of July 1 was 2 percent above its year-earlier level, and the pool of animals targeted for entry into the breeding herd was up considerably from a year earlier. In contrast, the pork industry is cutting back from recent output levels, but these cutbacks appear to be part of the normal cyclical process that has characterized that industry for several decades. The marketing decisions of crop farmers may also be influenced to some extent by high interest rates that raise carrying costs. However, for these storable commodities, increased marketings and lower prices in the near term would, with all else constant, be offset by reduced marketings and higher prices later in the marketing year.

Thus, although interest rates are affecting gross farm income in various ways, these effects do not represent the dominant factor limiting income growth. Among other factors, it is notable that real per capita incomes have grown little over the past year and a half, and that at least temporarily the pattern of consumer spending appears to have shifted away from red meats, particularly beef--a factor which helps explain the adverse income developments of livestock producers. In addition, drought and other special forces have adversely affected the incomes of farmers in certain regions.

Finally, past periods of high interest rates were often associated with reduced credit availability at institutions engaged in farm lending, particularly at the larger commercial banks. At present, with interest-rate ceilings on major types of deposits removed or tied to market rates at banks

of all sizes, the potential for credit-availability problems has been greatly reduced; however, interest rates on bank loans necessarily have become more responsive to movements in market rates that change banks' cost of loanable funds. With farm credit readily available, farm sector debt outstanding increased by 10.6 percent in 1980 even though amounts of expenditures that are often credit-financed rose more slowly or, in the case of machinery purchases and real estate transfers, actually declined. The rise in borrowings has continued in 1981; during the first half of this year, farm loans outstanding at major lending institutions are estimated to have risen by about \$10 billion, or 7.7 percent.

Appendix A

Estimate of Impact on Interest Paid

The amount of increase in annual interest paid by the farm sector in the half of 1981 as a result of increases since 1979 in interest rates paid was estimated by the procedure illustrated in Table 3. Estimates were made separately for non-real-estate debt and real estate debt and then combined. In 1979, the farm sector owed average non-real-estate debt of \$70.4 billion, on which interest of \$6.6 billion was paid, an average rate of 9.34 percent. By the first half of 1981, such debt had risen to about \$86.5 billion, an estimate based on quarterly reports from the institutional lender groups and the assumption that noninstitutional debt had risen at the same pace as institutional debt since the beginning of the year. To estimate the average rate of interest paid in 1981-H1, the rate of 10.62 percent for 1980 was updated by reference to the Addendum (Table 3) showing average rates on loans made by the two most important institutional lender groups. The estimated average rate of 11.50 percent for 1981-H1 was then multiplied by the average outstanding non-real-estate debt of \$86.5 billion to obtain estimated interest paid of \$9.9 billion (annual rate).

A similar procedure was followed in making estimates for debt secured by real estate. In 1981-H1, an estimated \$8.1 billion (annual rate) was paid in interest on debt averaging \$95.0 billion, compared with \$6.1 billion in interest paid on \$77.3 billion of such debt in 1979. The average rate was estimated to have risen from 7.96 percent in 1979 to 8.55 percent in 1981-H1.

Thus the farm sector is estimated to have owed an average of \$181.5 billion in 1981-H1, on which interest of \$18.1 billion (annual rate) was paid. The implicit average rate for 1981-H1 was therefore 9.96 percent. If the average interest rate had remained at the 1979 level of 8.62 percent, interest paid on the 1981-H1 level of debt would have been \$15.6 billion (annual rate) rather than \$18.1 billion. Thus the rise in rates caused interest paid by the farm sector to increase by \$2.4 billion (annual rate).

Appendix B

Estimate of Impact on Cost of Farm Production Inputs

An estimate of the impact of higher interest rates on the price of farm inputs produced by the nonfarm sector was obtained by examining the impact on all nonfinancial corporate business and then assuming that industries selling to the farm sector had roughly the same experience. In 1979, all nonfinancial corporate business paid \$93.2 billion in interest on average outstanding debt (excluding trade credit) of about \$903 billion, an average rate of 10.3 percent. By the first half of 1981, their debt had risen to about \$1,078 billion, and their interest costs had increased by about 38 percent (an estimate based on the change in net interest paid, as data for gross interest paid were not available beyond 1979). Thus their interest costs in 1981-H1 were about \$17.6 billion (annual rate) higher than if they had still been paying the 1979 average interest rate $[(\$93.2 \text{ billion} \times 1.38) - (\$1,078 \text{ billion} \times 0.103)]$. As gross domestic product of this sector was about \$1,700 billion, this higher cost would have raised the price of its final output by about 1.0 percent if it were completely passed on to purchasers.

In 1980 the farm sector purchased about \$60 billion of goods and services from nonfarm sectors--\$40 billion of current operating inputs such as fertilizer, pesticides, fuel, and machinery parts and repairs, and \$20 billion in capital expenditures for motor vehicles, machinery, buildings, and land improvements. Thus if, as noted above, the prices of these inputs had been increased by an average of 1.0 percent as a result of the increase in interest rates between 1979 and the first half of 1981, farm expenses would have been increased by only \$0.6 billion (annual rate).

This estimate may somewhat overstate the actual impact because it does not take into account the increased monetary interest that nonfinancial corporate business received on funds invested, usually temporarily, in interest-earning accounts and securities. This offset was not included because available data on the funds and earnings involved did not appear to be consistent.