Farm Capital and Credit Projections to 1980

EMANUEL MELICHAR

WITH the approach of a new decade, several projections of farm capital in 1980 have appeared. Conceptually, such long-run capital projections ought to be particularly useful to agencies that can influence the volume and terms of credit available to agriculture. For instance, availability of bank credit might be increased by developing secondary markets for farm loan paper, improving access of rural banks to discount facilities of the Federal Reserve Banks and Federal Intermediate Credit Banks, or promoting branch banking. Such efforts are more likely to be seriously pursued if greater future credit demands can be well documented.

Unfortunately, most capital studies have not served this purpose. Common shortcomings and omissions are discussed below, along with some thoughts that may help point the way to improved work. Throughout, one recently published projection is used simply to provide an empirical example of the considerations discussed, not because it is necessarily better or worse than other available projections.

Capital Stocks

The National Advisory Commission on Food and Fiber sponsored a study to "get the best possible estimate of the resources and farm structure needed to produce food and fiber in 1980" [1, p. iii]. From several projections of 1980 capital stocks made in that study, the Commission chose to present the "feed grain model" in which the 1980 stock of real estate, machinery, and livestock was projected at $275.6 billion "in 1965 dollars," up from $200.9 billion in 1965. This "suggests that the total value of capital employed in agriculture will increase by 35 to 40 percent in 1980" [2, p. 240].

As physical quantities of farm assets rose by only about 11 percent during the preceding 15 years of great agricultural change, this was an exciting projection. Thus, what a letdown to find that a unique concept of "1965 dollars" had been employed. The machinery and livestock projections did refer to physical quantities, but two-thirds of the projected gain in total capital reflected only the land price appreciation that would occur if projected increases in rents (in 1965 dollars) were capitalized into land prices at the 1965 capitalization rate. This partial estimate of land price

EMANUEL MELICHAR *is an economist in the Division of Research and Statistics at the Board of Governors of the Federal Reserve System, Washington, D.C.*

inflation was added to the projected real increases in machinery and livestock to get a total that represents—what?

If stability in physical real estate assets is projected—an expectation consistent with the relatively insignificant growth experienced since 1955—the adjusted 1980 projection for the three assets in 1965 prices totals $225.9 billion, an increase of only 12 percent during 1965–80 (Table 1, part B).

But a projection in truly real terms remains of limited value to those concerned with capital requirements and credit demands. In 1950, for example, how helpful would it have been to have had perfect foreknowl-

Table 1. Past and projected farm capital stocks (billions of dollars)

Type of asset	1950	1965	1980
A. Heady-Mayer "feed-grain model" projection for 1980			
Land and buildings			210.5
Machinery and equipment			43.3
Livestock inventories			21.7
			275.6
B. Actual values and adjusted Heady-Mayer projection (1965 dollars)			
Land and buildings	148.3	160.9	160.9
Machinery and equipment	18.4	25.5	43.3
Livestock inventories	12.2	14.5	21.7
	178.9	200.9	225.9
C. Actual values and adjusted Heady-Mayer projection (current dollars)			
Land and buildings	75.3	160.9	283.3
Machinery and equipment	12.2	25.5	62.7
Livestock inventories	12.9	14.5	21.7
	100.4	200.9	367.7

edge of the 11 percent real increase that was to take place by 1965—but not to have known that current-dollar stocks would double and aggregate credit demands triple?

The general price level has on average been rising by 2 percent annually since 1950, further increases are generally expected, and several studies have indicated a proportional response in land prices. This prospective contribution to land price inflation might be added to the rent capitalization effect already in the model. Also, farm machinery prices have exhibited an average annual increase of 2.5 percent since 1950, and a continuation of this rate might be projected. With these crude but plausible price adjustments, projected 1980 current-dollar stock becomes $367.7 billion, up 83 percent from 1965 (Table 1, part C).

Capital Flows

Capital flows, rather than changes in stocks, constitute the capital requirements that must be financed and can lead to credit demands. Flows can be much different from the changes in stocks, if any, that accompany them. Flows may be defined as capital required for (1) replacement of buildings, land improvements, and machines that wear out or become obsolete; (2) physical additions to the stock of land, land improvements, buildings, machinery, livestock, stored crops, and working capital; and (3) transfer of real estate by sale rather than inheritance [3, p. 134].

USDA estimates provide annual data on all past capital flows except

Table 2. Average annual farm capital flows (billions of dollars)

Type of capital requirement	Estimated actual				Projected—feed grain model		
	1950–54	1955–59	1960–64	1965–67	1965–69	1970–74	1975–79
Gross capital expenditures:							
Machinery	3.1	2.8	3.2	4.6	5.1	7.0	9.4
Buildings, etc	1.5	1.4	1.3	1.3	1.3	1.3	1.4
To increase:							
Livestock inventory	.5	.1	.3	0	.4	.5	.5
Stored crop inventory	.1	.2	0	.4	.1	.1	.1
Working capital	.1	−.1	0	.3	.1	.2	.2
Real estate purchases	2.5	3.0	3.5	4.4	4.5	5.4	6.5
Total	7.8	7.4	8.3	11.0	11.5	14.4	18.1

real estate transfers. But this data gap can be approximately filled by using new USDA data on the value of farms sold in 1965–67 plus some heroic assumptions, enabling complete capital flows to be estimated. Annual requirements fluctuated around $8 billion in the late 1950's and early 1960's but rose to $11 billion in 1965–67, as machine stocks were increased and land price inflation accelerated (Table 2).

Given a projection of farm capital stocks that shows its real and price inflation components, together with projected depreciation and real estate transfer rates, the implied capital flows can be derived. Capital flows under the adjusted feed grain model are estimated to rise to an annual average of $18.1 billion in 1975–79, up 118 percent from the average level 15 years earlier (Table 2).

Credit Demands

Projection of capital flows is but a first step toward estimation of credit demands, that is, of net changes in farm debt. Minimum further needs are

Table 3. Sources of capital (annual average billions of dollars)

	Estimated actual				Projected—feed grain model		
	1950–54	1955–59	1960–64	1965–67	1965–69	1970–74	1975–79
Cash flow							
(A) Depreciation allowances	3.2	3.9	4.4	5.3	5.6	7.5	9.4
(B) Net farm income	14.8	12.7	13.7	16.2	15.7	17.2	18.8
(C) Farm cash flow	18.0	16.6	18.1	21.5	21.3	24.7	28.2
(D) Nonfarm income	6.4	6.6	8.1	10.4	10.7	13.7	17.5
(E) Total cash flow	24.4	23.2	26.2	31.9	32.0	38.4	45.7
Sources—Model I							
(F) From farm cash flow	6.8	6.0	5.7	6.7	6.6	7.7	8.7
(G) Increase in debt	1.0	1.4	2.6	4.3	4.9	6.7	9.4
(H) Capital requirements	7.8	7.4	8.3	11.0	11.5	14.4	18.1
(F) as percent of (C)	38	36	31	31	31	31	31
Sources—Model II							
(I) From total cash flow	6.8	6.0	5.7	6.7	6.7	8.1	9.6
(J) Increase in debt	1.0	1.4	2.6	4.3	4.8	6.3	8.5
(H) Capital requirements	7.8	7.4	8.3	11.0	11.5	14.4	18.1
(I) as percent of (E)	27	26⅓	22	21	21	21	21

projections of farm income and of the relative distribution of capital financing among income, depreciation allowances, and debt—all consistent with the capital projection. Ideally, all projections would be the output of a model in which the capital, income, and savings equations are jointly developed. Here, a crude procedure will be used to illustrate the considerations involved and perhaps inspire more sophisticated future efforts.

First, depreciation allowances consistent with projected machinery and building stocks are calculated. In the adjusted feed grain model, allowances rise rapidly because of the large buildup in the real machine stock. Second, to project net farm income, we might assume that in the long run countervailing political forces will keep growth in real per farm income roughly parallel to growth in national real per capita income, which the National Planning Association has projected at 3.25 percent annually for 1965–80. If in addition the general price level rises by 2 percent and farm numbers decline by 3.3 percent annually, aggregate net farm income would advance by 1.84 percent yearly. Annual farm cash flow—the sum of depreciation allowances and net farm operator and landlord income—would then average $28.2 billion in 1975–79, compared with $21.5 billion in 1965–67 (Table 3, line C).

Next, how have capital flows been financed in recent years? We know the past increase in debt; by subtracting it from the estimated total capital outlays, we obtain a sum that we can regard as financed from farm

Table 4. Farm debt

	Estimated actual				Projected—feed grain model		
	1950–54	1955–59	1960–64	1965–69	1965–69	1970–74	1975–79
Average annual increase in debt (billions of dollars)							
USDA estimate	1.0	1.4	2.6	4.5			
Projected—feed grain Model I					4.9	6.7	9.4
Projected—feed grain Model II					4.8	6.3	8.5
Outstanding debt at end of period (billions of dollars)							
USDA estimate	17.6	24.8	37.6	61.1			
Projected—feed grain Model I					62.2	95.8	139.5
Projected—feed grain Model II					61.5	93.2	135.7
Average annual growth rate of outstanding debt (per cent)							
USDA estimate	7.3	7.1	8.7	10.2			
Projected—feed grain Model I					10.6	9.0	7.8
Projected—feed grain Model II					10.4	8.6	7.8

cash flow. On an average annual basis, capital flow requirements in 1965–67 were $11.0 billion and the increase in debt was $4.3 billion; thus $6.7 billion was financed from cash flow. This amount was 31 percent of farm cash flow of $21.5 billion.

Suppose that this rate of internal savings continues. Then in 1975–79, for example, 31 percent of farm cash flow, or $8.7 billion annually, would be applied toward total annual capital outlays of $18.1 billion. Therefore, the remaining annual outlays of $9.4 billion must be financed by increase in debt (Table 3, Model I).

Alternatively, perhaps farmers' nonfarm income should be included in cash flow (Table 3, line E). Similar calculations show that farmers have recently been applying about 21 percent of total cash flow toward capital requirements. If this savings rate is projected, and nonfarm income continues to rise at the 1957–67 annual average of 5 percent, slightly lower estimates of future growth in debt are obtained. Annual increases would average $8.5 billion in 1975–79 (Table 3, Model II).

These models project farm debt outstanding in 1980 at $140 and $136 billion, respectively. They indicate a slowing in the rate of increase of outstanding debt from recent annual rates of 10 percent to around 8 percent a decade later (Table 4).

Observe that many steps beyond the capital projection were required to obtain the projection of credit demands desired by policymakers. Suppose that additional work enabled monetary authorities to project annual de-

posit growth averaging 5 percent at rural banks. Given the above credit demand projections, the authorities would be concerned about the ability of rural banks to maintain their relative share of the farm credit market.

But the prevalence of assumptions in the above projections indicates their insecure foundation. More analytical work is sorely needed, and it should include the often neglected considerations discussed herein. Hopefully, it will be possible to build structural models in which these interdependent financial variables are jointly determined.

References

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