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THE BALANCE SHEET OF AGRICULTURE—USES AND LIMITATIONS

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People interested in agriculture are concerned about the welfare of farmers and their financial condition. Farm income data indicate that farmers have not shared in the prosperity enjoyed by the rest of the economy in recent years. Total net farm income in the United States has declined from $16.3 billion in 1951 to $11.8 billion in 1959. Per capita net farm income has declined considerably less due to diminishing farm population.

The Balance Sheet of Agriculture, however, shows that the value of farm assets increased from $165.6 billion to $203.6 billion from January 1, 1952, to January 1, 1960. Proprietors' equities rose from $151 billion to $179.3 billion during the same period. These data are frequently cited to indicate a stronger economic position of farmers despite declines in farm income.

The purpose of this article is to discuss recent changes in the Balance Sheet of Agriculture and their significance.

The Balance Sheet is prepared by the United States Department of Agriculture. The data for 3 recent years are shown in table 1. The table lists, in terms of current prices, the value of physical assets used in farming such as land and buildings, livestock, machinery, and crop inventories. It also includes other assets of farmers such as household furnishings and financial items; the latter include deposits and currency, United States savings bonds, and investments in cooperatives. Subtracting total farm debts, or liabilities, from the total assets gives the proprietors' equities as a balancing item.

The Balance Sheet is not compiled by aggregating the financial statements of all farms in the United States. Rather, the value of farm assets and debts are estimated with the aid of statistical series of individual items.

Price Changes Important

The value of farm assets increased $38 billion from 1952 to 1960. A large part of the increase, however, was due to price increases in farm land.

The value of farm land increased from $90 to $129 billion. This was an increase of $33 billion, or 87 percent of the total increase of all assets.

Total farm debts rose by $9.7 billion; hence, proprietors' equities increased by $28.3 billion—a smaller increase than that of total assets.

Proprietors' equities in agriculture would have declined by $4.8 billion had the value of farm real estate remained constant from 1952 to 1960. Of course, if farm real estate values had remained constant, the farm real estate debt probably would not have increased as much as the $5.6 billion indicated. Assuming a constant farm real estate debt, proprietors' equities would have increased by only $800 million.

Since year-to-year changes in the Balance Sheet of Agriculture reflect changes in unit prices, increases shown can represent "paper" gains in the sense that they can be realized only if the assets are sold. It is for this reason that the U. S. Department of Agriculture warns that changes in farm assets and proprietors' equities must be used with caution as a measure of the general economic situation of farmers.

The quantity of farm assets did increase over this period. As shown in table 2, the quantity of real estate was increased by 5.8 percent, primarily by adding improvements. Other physical assets also increased with the total up by 9.4 percent.

Not Only Farm Operators Included

One of the most common errors made in using the Balance Sheet of Agriculture is to treat it as a balance sheet of farm operators. This is in error because it is a combined balance sheet of farm operators and non-operating owners. It is true that farm operators actually own most of the assets and owe most of the debts listed and the Balance Sheet reflects major changes that occur in the financial condition of farm operators. Yet the differences between a balance sheet for farm operators and the present Balance Sheet would be substantial.

Farm operators rent a substantial share of their capital from non-operating owners. This is particularly impor-

Table 1. Comparative Balance Sheet of United States Agriculture, as of January 1

	1952	1959	1960
	billion dollars		
Assets			
Physical			
Real estate	96.0	125.1	129.1
Non-real estate:			
Livestock	19.5	18.1	16.2
Machinery	15.2	17.7	18.4
Crops stored	8.8	9.3	8.0
Household	9.5	13.1	13.5
Financial	16.6	19.0	18.4
Total	165.6	202.3	203.6
Claims			
Liabilities			
Real estate debt	6.7	11.3	12.3
Non-real estate debt:			
CCC	.6	2.5	1.4
Other	7.3	9.5	10.6
Total liabilities	14.6	23.3	24.3
Proprietors' equities	151.0	179.0	179.3
Total	165.6	202.3	203.6

Table 2. Physical assets of United States agriculture valued at 1940 prices, January 1

	1952	1959	1960	Net change 1952-1960
				percent
Real estate	36.1	38.0	38.2	+ 5.8
Livestock	4.9	5.1	5.3	+ 8.2
Machinery	6.7	7.2	7.3	+ 9.0
Crops stored	3.0	4.4	3.8	+26.6
Household	5.8	7.1	7.2	+24.1
Total	56.5	61.8	61.8	+ 9.4

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tant in the case of real estate capital. As shown in table 1, the total value of farm real estate on January 1, 1959, was $125.1 billion. Farm operators owned and operated farm real estate valued at $79.5 billion or 64 percent of the total. The remaining $45.6 billion in real estate capital was rented from other farm operators and from nonoperating owners.

Farm operators owned $17.3 billion or 38 percent of the latter amount but rented it to other farmers. Persons not living on farms provided $28.3 billion in real estate capital to farm operators. Thus, nonfarmers contributed about 23 percent of the total real estate capital used in agriculture.

These data are significant because they illustrate that not all farmers have shared in the rise in land values to the extent shown in the Balance Sheet. It should also be pointed out that some portion of the total farm real estate debt is also held by people other than farmers. Although data are not available, it is reasonable to assume that even though nonfarmers own much real estate, they are frequently less indebted for these properties than are farmers.

Changes 1959 to 1960

Farm assets reached a record value of $203.6 billion on January 1, 1960 (table 1). The increase of $1.3 billion in farm assets values during 1959, however, was small in comparison to increases of $16 billion in 1958, $10 billion in 1957, and $8 billion in 1956.

Real estate, the principal farm asset, rose about $4 billion in value in 1959. This gain in real estate values was only about half as large as in each of the 3 preceding years, reflecting a slowing down in the rate of increase in land values in 1959. Increases also occurred in the value of farm machinery and motor vehicles and household furnishings.

Although the number of livestock and poultry on farms increased to near record levels on January 1, 1960, the total value was down 10 percent from a year earlier due chiefly to price declines in cattle and hogs.

The value of crops stored by farmers was nearly 15 percent lower than a year earlier. This was due chiefly to a reduction in the quantity of crops stored off the farm under Commodity Credit Corporation loans.

The value of financial assets was also down due to lower deposits and currency held by farmers. This was the first time in 10 years that farmers' holdings of deposits and currency declined.

Farm debts increased by $1 billion during 1959 and proprietors' equities remained virtually unchanged at the record level of $179 billion.

One striking fact revealed by the Balance Sheet is the small size of farm debts relative to proprietors' equities. On January 1, 1960, farm debts totalled only 12 percent of the total value of farm assets. Proprietors' equities accounted for the remainder or 88 percent of total assets.

These data do not indicate that 88 percent of the farmers are free of debt. The Balance Sheet gives no indication as to the distribution of the debt among farmers or the number of farmers having debts. Some farmers, particularly those who began farming in the past decade, may have heavy debt burdens.

The low debt position relative to proprietors' equities indicates, however, that farmers and other owners of farm property as a whole still have considerable borrowing capacity.

Although the data contained in the Balance Sheet are sometimes misinterpreted, they nevertheless have many important uses.

It provides a good picture of trends in the market value and the physical volume of farm assets over time. Also, trends shown in the financial assets held by farmers give clues as how readily farmers might adopt new technology such as better farm machinery. Trends in the debt load and proprietors' equities give further indications of borrowing capacity and the possible willingness with which farmers would go ahead with major farm improvements. In addition, the debt position of agriculture is indicative of the claims on farm income for debt servicing.

Construction and Use of Farm Price Indexes

Elmer W. Learn

The use of several key index series directly affects the incomes of millions of Americans. For example, farm support prices are determined on the basis of the parity index. Some contracts for processing crops contain a pricing provision based on certain price indexes. Wages of many workers are tied to indexes. The so-called escalator clauses in wage contracts tie wage increases and decreases to changes in the consumer price (cost of living) index. Indexes also play an important role in the analysis and discussion of economic conditions. The farm price situation, cost of living, level of industrial production, and per capita food consumption are some of the important economic variables that are measured by indexes. Understanding of the nature, uses, and limitations of indexes is required for intelligent discussion of economic issues.

Persons concerned about Minnesota agriculture have special interest in Minnesota farm price indexes. This article is designed to increase understanding of index numbers generally and to describe Minnesota farm price indexes.

What Is an Index Number?

Simply defined an index number is a type of average. Index numbers are used most often to compare changes in prices, consumption, production, and other factors over periods of time. This article relates primarily to price indexes.

The methods and problems of calculating an index can be illustrated with a hypothetical farm situation where hogs and eggs are produced for sale. The sales for 2 years are:

	Hogs		Eggs	
	sales	price	sales	price
	cwt.	dollars per cwt.	doz.	cents per doz.
1959	400	16	80,000	30
1960	400	14	80,000	33

The farmer may wish to compare the prices received in these 2 years either to analyze his own operations or to explain changes to others. One way is to look at each commodity separately. In this case, the price of hogs dropped $2.00 or 12½ percent and the price of eggs rose 3¢ or 10 percent. This procedure becomes complex and confusing when many commodities are involved. Furthermore, the farmer may wish to know what the average price change was. In other words, what happened to his *general level* of prices?

A simple average of the price changes is meaningless. An average of percentage changes is a possibility. But, in addition to mathematical problems that plague averages of percentages, this fails to account for the relatively greater importance of eggs in this farm situation. For example, the average of the percentage changes is −1.25 percent. Notice that sales are the same in each year. Thus, any change in income is due to price. Income for this farmer rose 5.26 percent between 1959 and

1960. The average percentage price change (−1.25 percent) does not even reflect the correct direction of change in this case.

The solution to these problems is found in the concept of a weighted index number. Each commodity in the index is assigned a "weight" that reflects the relative importance of that commodity. In price indexes average sales or purchases during some given period generally are used as "weights." Assume that average sales for this farmer are 420 cwt. of hogs and 85,000 dozen of eggs. The price index for 1960 is computed as follows:

1959 $420 \times \$16 + 85{,}000 \times .30 = 32{,}220$
1960 $420 \times \$14 + 85{,}000 \times .33 = 33{,}930$

$$\text{Index (1960)} = \frac{33{,}930}{32{,}220} \times 100 = 105.31$$

This says that average prices for this farmer were 5.31 percent higher in 1960 than in 1959. The slight difference between this percentage and the percentage change in income is due to the difference in the relative sales of eggs and hogs in 1959 and 1960 from the average.

The "weights" must stay the same in all years for which the index is to be computed. Otherwise, the index will reflect quantity changes as well as price changes. If relative sales change during the period to which the index refers, the relative importance of the commodities in the index is in error. Unfortunately, there is no completely satisfactory way to take this into account. However, for the state or the nation relative sales of commodities do not change greatly from year to year.

State and national farm price indexes are computed on the same basis as illustrated above. Of course, the number of commodities included is much greater and "weights" used are average sales for the state or nation.

The Index of Prices Received by Minnesota Farmers

Prior to 1959 an index of prices received by Minnesota farmers was computed in the Department of Agricultural Economics and published in *this publication.* In January 1959 this responsibility was transferred to the State-Federal Crop and Livestock Reporting Service. The index has been published since that time in the monthly *Minnesota Farm Price Report.* A revised index also was introduced. This revision was designed to more accurately reflect the current relative importance of commodities to Minnesota farmers and to make the computation of the state index comparable with the procedures employed by the U. S. Department of Agriculture in computing national farm price indexes.

Over a period of time there are trends in the relative importance of farm commodities in the state. Since the weights in the price index must be the same for all years, the index becomes less accurate as a measure of average price change for years farthest removed from the time when the weights are determined. Thus, periodic revision of index series is required to bring them up to date. The recent revision in the Minnesota index of prices received by farmers was prompted, in part, by the fact that the weight period previously employed was for the years 1935-39. The recent revisions currently employ the same weight period as the U. S. Department of Agriculture indexes—1953-57.[1]

In an index series that covers a large number of years, several weight periods may be employed. The corresponding series are spliced together to form a continuous series. In the revised prices received index three series are employed. From January 1920 through August 1932 the weights employed are average sales during 1924-29; from September 1932 through December 1946, sales during 1937-41 are used as weights; and sales during 1953-57 are used as weights for the period since January 1947. Some of the more dramatic changes in relative importance of the commodities and commodity groups included in the index are shown in table 1.

The current index of prices received by farmers is published for all farm products and for four subgroups—crops, livestock, dairy products, and poultry and eggs. In all cases the indexes are expressed as a percent of the average 1947-49 level.

A revised series of the prices received index by months since 1920 may be found in *Minnesota Agriculture, 1858-1959—Prices,* published by the Crop and Livestock Reporting Service.

In early 1961 indexes of prices paid by Minnesota farmers will be published for the first time. The development of these indexes and the revision of the prices received index have been a joint project of the Department of Agricultural Economics and the State-Federal Crop and Livestock Reporting Service.

[1] Another change that was made was to use constant weights for all months of the year. The "old" index used varying weights among months to reflect seasonality of sales.

Table 1. Relative importance of selected commodities in the Minnesota Index of Prices received by farmers during three weight periods

Commodity	1924-29	1937-41	1953-57
		percent	
Wheat	5.99	5.20	1.95
Corn	2.99	5.74	10.59
Soybeans	*	.12	8.02
Hogs	27.59	23.30	18.89
Cattle	14.46	15.38	16.64
Butterfat	18.92	17.57	4.10
Whole milk	2.58	4.09	14.55
Turkeys	*	1.52	3.26
Eggs	4.74	5.52	8.81

* Not included in 1924-29.

Use of Index Numbers

Index numbers, by their very nature, represent a short cut. They are an attempt to condense a mass of information into a simple series—e.g., to portray the general movement of a large number of different price series over a period of time. One cannot gain as much detailed information from an index number series as he could from careful study of each individual price series. Indexes, therefore, are useful when one wants a general description of price movements. They show clearly and simply what happens over time.

The Minnesota index should not be used to indicate price changes for any given commodity or for any particular farm or farming area. The index is representative for the state as a whole. Both the prices received and the relative importance of the individual commodities vary greatly among farmers and among areas of the state.

A common misuse of price indexes is in discussions relating to income. Care should be exercised in using them this way. Income is a product of price × quantity. Price indexes alone do not indicate changes in income.

Price indexes are valuable tools. They provide a useful way to describe, in simple terms, a complex of changing forces. So long as they are used and interpreted as intended, they are a valuable addition to our knowledge of changing economic conditions.

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THE OUTLOOK CORNER

Farm Real Estate Debt in Minnesota

The farm real estate debt in Minnesota has nearly doubled during the past decade. Farm income, on the other hand, has declined. Hence, the farm real estate debt per dollar of income has also increased. Claims on income for debt servicing are greater today than in 1950.

The principal factor contributing to the increase in the farm mortgage debt has been the transfer of farms at higher prices. The average value of farm land in Minnesota increased from $85 per acre in 1950 to $157 in 1959, an increase of 85 percent. Some refinancing of non-real estate debts into real estate debt has also been a factor in the increase.

As shown in the table, the farm real estate loans of all of the principal lenders increased but not at equal rates. The loans of commercial banks and the Farmers Home Administration showed the smallest increase—about 50 percent from January 1, 1950 to January 1, 1959.

Life insurance companies, the Federal Land Bank, and individuals more than doubled their loans in the past decade.

The farm real estate loans of individuals increased the most. Individuals now hold nearly half of the total farm real estate debt in Minnesota. The largest group of individuals are sellers of farms who retain a mortgage or a contract for part of the purchase price.

Individual sellers of farms are the major source of credit to finance farm transfers. In the year ending March 1, 1960, they financed 42 percent of all credit financed farm transfers in the U. S. This is in sharp contrast to life insurance companies and Federal Land Banks which financed 16 percent and 11 percent of the transfers, respectively.

A sizeable share of the farm transfers financed by sellers is on land contracts. The proportion of all farm transfers financed by land contracts in the United States has doubled in the last 10 years, and in 1959-60 contracts were used in a fourth of all transfers. They are even more important in Minnesota. A study of 1,257 farm sales in the state during the 6 months ending June 30, 1960, showed land contracts were used to finance 44 percent of the sales.

Several factors account for the increased usage of land contracts by individual sellers. Many sellers are faced with substantial capital gains taxes when they sell unless they sell on a low equity basis such as a contract. Down-payments on farm purchases financed by land contracts averaged 27 percent nationally in 1959. This is near the 30 percent maximum permissible for special treatments of capital gains under present Federal income tax regulations.

Appraised values of lending institutions, that is, values based on the long run earning capacity of the farm, have also been considerably less than market values of farms as land prices have climbed. Hence, a buyer needs a substantial amount of funds to qualify for institutional mortgage credit today. In 1959-60, loans obtained from insurance companies and Federal Land Banks averaged 55 percent of the purchase price of farms. Individual sellers of farms have accepted high debt-ratio contracts and mortgages in order to facilitate transfers.

The average repayment period for land contracts is somewhat shorter than for mortgages. This suggests that contracts are often used as a means of building up the buyer's equity to the level required for mortgage financing. About half of the loan funds advanced by the Federal Land Banks in recent years has been used for refinancing.

The trend toward the increased use of contracts in farm real estate financing will probably continue unless lending institutions loan a higher proportion of value.

Contract buyers should exercise caution in the months ahead because heavy debt commitments might be difficult to meet if farm income continues its downward trend. Furthermore, indications are that farm land values have begun to level off and even decline in some areas of the state. This may make it difficult for contract buyers with small equities to obtain refinancing if the need arises.

The farm real estate debt will probably continue to increase but at a slower rate if land prices level off. The trend toward farm enlargement and improvement will continue. Voluntary farm transfers, however, declined in 1959. This ended a rising trend in the transfer of farms by voluntary sales since 1953.

Farm real estate debt, total outstanding and amounts held by principal lenders, Minnesota, January 1

	Life ins. co.'s	Fed. land bank	Com. banks	FHA	Individuals	Total
	(millions dollars)					
1950	63	52	43	6	113	277
1951	69	53	50	7	127	306
1952	77	55	52	7	145	336
1953	83	60	53	7	159	362
1954	88	65	53	8	169	383
1955	94	70	56	8	182	410
1956	107	79	60	7	200	453
1957	117	89	60	8	216	490
1958	124	96	62	8	229	519
1959	129	106	63	9	242	549
% 1950-59 Change	+105	+101	+47	+50	+115	+ 98

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