Chapter Title: Data and Methods of Analysis

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CHAPTER 2

DATA AND METHODS OF ANALYSIS

SOURCES and technical details of the data of the study are provided in Appendix A, so that here the description of their character and of the plan of analysis can be aimed at a general understanding of the text. The principal indicators of the asset, product, and financial characteristics of farms that proved useful are discussed in the first two sections of this chapter. In the following section the 108-county sample, on which so much of the study rests, is treated in detail. Next, a description is given of the method used to take account of the fact that during the 1930's the financial experience of the agriculture in some of the counties differed greatly from that in others.

Indicators of the Economic Characteristics of Agriculture

From a fairly long list of available indicators, a few were selected to measure such factors as variations in farm size, in the economic nature of the assets used, in the kinds of farming operations conducted, and in the extent to which the farm and the farm family were involved in nonfarm economic activities. Of course no limited array of measures can reflect all of the many characteristics of agriculture that may be significantly related to the over-all pattern of its financial organization; often, in fact, some of the most significant economic characteristics of a particular sector of agriculture can be imputed to it only by combining a background knowledge of its agriculture with the objective measures chosen. In some connections, the indicators serve more to provide clues to significant differences in the economic nature of agriculture than to measure their precise extent.

FARM SIZE AND ASSET COMPOSITION

Average physical assets per farm has been selected as a measure of farm size. Among total agricultural assets the county estimates include the value of the farm dwelling, but exclude household and consumption goods for lack of adequate data. To make the concept of average farm size conform more closely to the aggregate of resources usually financed in a single business unit, cropper-operated farms in the South are excluded from the total number of farms in that area in the computation of average farm size.

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This adjustment is in the direction of defining a farm as an ownership, in contrast to an operation, unit. It is believed that an analysis of the influence of farm size on financing in the Mississippi Delta counties, for example, is more meaningful when the average farm unit is defined in this manner than when it is defined so as to treat the cropper-operated farm as a separate unit.[1]

In any event such estimates of average asset size of farms as can be employed serve more as measures of relative than of absolute size; that they are generally lower than average for commercial farms in the several counties is due to inclusion in that category of many "nominal" farms—part-time farms, retirement farms, and rural residential properties on which some farming is done. In a study of commercial farm financing, it would be essential, of course, to exclude all such units. For the purposes of this study, their presence in the available data is potentially useful in determining whether the over-all farm financial organization of the agriculture of counties in which such agriculture is important differs from that of counties where agriculture is almost entirely commercial. Accordingly, specific measures have been developed to indicate the relative importance of these noncommercial farms in the structure of agriculture.

The estimates that can be made of average farm asset size for 1940 do not permit direct comparison among counties, since relative asset values in that year probably are not representative of long-time relationships among the counties. Real estate values in 1940, and to some extent other farm asset values, were still affected by the differing impact of the depression of the 1930's in different localities. Hence intercounty comparisons of farm asset size must be confined to individual counties that had a roughly comparable financial experience, or to county groups with a roughly similar mix in that respect. The techniques applied are discussed later in the chapter.

Five indicators are employed to provide uniform breakdowns of agricultural assets in the sample counties. Two of them—the percentage of total physical assets in land (excluding buildings) and the percentage of total acreage in cropland—provide partial bases for comparisons of the importance of land, and of the kinds

[1] Even as adjusted, the census data may understate the average asset size for some of the southern cash-crop counties in comparison with cash-crop counties in the North. It is true that eliminating the cropper-operated farms entirely in computing the averages is an overcorrection for this one factor, but the inclusion of all tenant-operated farms probably more than compensates for it.

of land, in the asset structure of farms. Another—the percentage of total physical assets in buildings—also provides, in conjunction with other indicators, an indirect clue to type of farming. The percentage of total real estate value in farm dwellings is useful as a measure of the relative importance of "nonfarm" assets. Finally, the percentage of total physical assets represented by items other than real estate—livestock, equipment, and other working capital—provides a general indicator of the relative magnitude of farm working capital assets.

FARM PRODUCT CHARACTERISTICS

Since the type of operation in which the farm is engaged, as well as the extent and nature of the assets utilized, can reasonably be expected to influence farm financing, indexes are given which reflect differences in the types of products produced on the farms of the sample counties. Census figures on the gross value of products sold, traded, or consumed by the farm household in 1939, distributed by major categories, are presented to indicate the character of the "gross product throw-off." Gross value of product per farm could be used also as a measure of farm size, but less satisfactorily in some respects than average asset size, since it does not reflect differences in nonmonetary income, such as housing services, and may vary widely among counties owing to weather and product-price conditions.

Value of product represented by sales of crops will usually not be shown separately, because agriculture devoted mostly to crops fed on the farm to livestock for sale as meat animals is indistinguishable therein from range livestock agriculture. Instead, sales of crops are combined with sales of livestock exclusive of livestock products, and given as a percentage of total value of product. The percentage of total acreage in cropland is used to distinguish agriculture in which growing of crops is dominant from other kinds of agriculture. Dairy product sales are shown separately, and the remainder is broken between all other product sales (including sales of poultry and poultry products) and farm products consumed by the farm family. The value of farm housing services cannot be shown directly, but its comparative weight is indicated indirectly by the importance of residential property in total farm real estate in 1930. Likewise, though the value of farm family income from off-farm work cannot be measured directly, its relative importance in the various counties is indicated by the average number of days of off-farm work per farm operator.

To illustrate how the several economic indicators, considered as a group, reflect major differences in type of agriculture, estimates for five counties are shown in Table 2.[2] Physical assets

TABLE 2

Economic Characteristics of Agriculture, Five Selected Counties
(dollar figures in thousands)

| | TYPE OF AGRICULTURE | | | | |
| | *Large-Scale*[a] | | | *Small-Scale*[b] | |
	Wheat	*Range Live-stock*	*Dairy*	*Dairy*	*General*
Physical assets per farm	$39.1	$38.5	$17.2	$3.7	$3.9
Physical assets in:					
Land	74%	46%	30%	31%	53%
Buildings	8	8	47	31	24
Non-real-estate	18	46	22	38	23
Cropland/total acreage[c]	72	2	55	27	39
Dwellings/farm real estate, 1930	6	7	28	22	20
Farm product value, 1939:					
Crops and livestock	93	94	44	20	63
Dairy products	1	1	39	47	6
Poultry and prod. and misc.	3	....	10	4	11
Used by farm household	3	5	7	29	20
Off-farm work in days, 1939[d]	16	33	49	52	62
Change in phys. asset value, 1930-1940	–8%	–29%	–16%	–44%	–25%

[a] Large-scale counties are: wheat—Adams, Washington; range livestock—Elko, Nevada; and dairy—Chester, Pennsylvania.

[b] Small-scale counties are: dairy—Ashland, Wisconsin; and general—Pike, Indiana.

[c] Cropland excludes plowable pasture.

[d] Per farm operator.

Note: Data in this and all subsequent tables are for 1940 unless otherwise indicated.

per farm varied in these counties in 1940 from almost $40,000 to less than $4,000, and correspondingly wide variations will be noted in the composition of assets and the pattern of product throw-off. These and other indicators provide concrete bases for the grouping of counties according to common characteristics of their agriculture.

[2] The percentage decrease from 1930 to 1940 in the aggregate value of land, buildings, livestock, and implements and machinery is used as an index of the immediately previous financial experience of the different counties and groups of counties.

Indicators of the Financial Characteristics
of Agriculture

A general indication of county variations in the financial organization of agriculture, and indirectly of the kind of market from which capital is supplied to different types of agriculture, is provided by a distribution of the interests in farm physical assets in 1940 of operators, landlords, and creditors. For example, high operator interests may reflect a tendency for asset ownership and active management to be performed by the same individual, whereas high landlord interests are likely to reflect a greater separation of ownership from management. High creditor interests reflect the provision of capital by nonoperators on a nonownership basis under conditions of greater protection to the investor. Means of measuring this three-way distribution of interests in total physical assets were developed in the belief that in over-all comparisons among counties they would reveal significant adaptations of the financial organization of agriculture to the economic nature of the assets and operations involved.

Even for such general use, this three-way distribution of interests in assets has many limitations. For example, it does not disclose variations among counties in the underlying rental and credit arrangements; unfortunately, data are not available for studying the financial structure of agriculture according to the tenure of the farm operator. Furthermore, the economic functions performed by operators, landlords, and creditors are not the same in all counties. Finally, the analysis is not adapted to showing a typical distribution among these three interests for individual farms in the several counties. Accordingly, the three-way distribution of interests gains in significance when considered along with other indicators of variations in farm financial characteristics.

Financial indicators for county groups of farms are, of necessity, approximations based on data of varying quality. The interest of operators is defined to include equities in both real estate and non-real-estate assets, whether they are a part of the operator's own farm or not, but it excludes his creditor interests in other farms.[3] Creditor interests are defined to include all debts that can be regarded as claims against farm operators and farm businesses. Landlord interests are made up mainly of equities in farm

[3] No comprehensive data are available on the creditor interests of farmers in other farms, but they are not believed to be large.

real estate but also include the residual equity in non-real-estate assets after independent estimates have been made for operator and creditor interests.

To provide further financial indicators, census data on farm mortgage debt for owner-operated farms by county have been supplemented with special sample survey data to produce estimates of the percentage of all farms under mortgage, and of the ratios of mortgage debt to the value of mortgaged farms and of all farms. In addition, the distribution of farm mortgage debt among different lender groups has been estimated from various sources and an approximation made of the relationship of the non-real-estate loans of four major institutional lender groups to farm non-real-estate assets.

The fact that these specific indicators of differences in farm financial organization are most meaningful when employed as a group, and when used to differentiate between broad patterns of financial organization, is illustrated in Table 3, where they are applied to five counties selected for widely disparate financial patterns. The first county is one of those in which operator interests in physical assets were highest in 1940. Despite heavy asset deflation in the 1930's the creditor interest is no higher in this than in the second county, chosen from those in which landlord interest in physical assets was highest. Local lenders, such as banks and individuals, held a higher proportion of the farm mortgage debt in the first than in the second county, and the fact that a relatively high percentage of the mortgage debt in the first county was held by the federal land bank and the Federal Farm Mortgage Corporation probably reflects its worse-than-average financial experience in the 1930's. The general picture presented by the first county, therefore, is of a kind of agriculture drawing equity capital to finance real estate from rather restricted local sources, principally the farm operator's own funds, and debt capital from local lenders and governmental credit agencies. The second county appears to draw more of its capital from a broader, more impersonal, and more exclusively private capital market.

The third county resembles the second in the importance of operator as against landlord equities, but has a much higher creditor interest, 43 per cent as compared with 18 per cent. This high creditor interest is at least partly a result of the very sharp reduction in asset values in the 1930's, brought on by several

TABLE 3

Financial Characteristics of Agriculture, Five Selected Counties

	COUNTY CHARACTERIZED BY:				
	High Operator Interests in Physical Assets (Ashland, Wis.)	High Landlord Interests in Physical Assets (Douglas, Ill.)	High Creditor Interests in Physical Assets (Logan, Kan.)	High % of Real Estate Loans Held by Banks (Kent, Del.)	High % of Real Estate Loans Held by Insurance Companies (Coahoma, Miss.)
Interest in physical assets of:					
Operators	76%	31%	23%	51%	23%
Landlords	6	51	34	32	47
Creditors	18	18	43	16	30
Mtgd. farms/all farms	45	45	52	39	65
Mtg. debt/value of mtgd. farms	49	38	59	41	37
Mtg. debt/value of all farms	19	17	24	17	28
Farm mtg. debt held by:					
FLB's and FFMC	58	41	79	18	21
Ins. and mtg. investment companies	5	47	....	....	50
Commercial and savings banks	16	....	4	47	4
Individuals and miscellaneous	21	12	17	35	25
Non-real-estate loans, as % of total non-real estate farm assets, of:					
Banks and PCA's	2	15	31	6	25
FSA and ECFL Division of FCA	3	1	31	3	1
Change in phys. asset value, 1930-1940	-44%	-11%	-57%	-27%	-9%

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years of drought, which also helps to explain the extensive use of credit from federally sponsored agencies.

The fourth and fifth counties make an interesting contrast. As of 1940, about half of the farm mortgage debt in the fourth county was held by banks, whereas about half of that in the fifth county was held by insurance and mortgage investment companies. Farm financial organization in the county in which banks were prominent real estate lenders resembles, more closely than in others, that of the county with high operator interests, though the one is in Delaware and the other in northern Wisconsin. And the fifth county has a number of financial characteristics in common with the second—both appearing to draw heavily on outside capital, i.e. on capital in addition to that of farm operators— although one is in East Central Illinois and the other in the Mississippi Delta.

The principal deficiencies of the data available for the description of farm financial organization relate to the use of cross-sectional data in exploring the sources of farm capital, a problem of interpretation inherent in any attempt to study capital sources by means of balance sheet data. Clearly, the fact that landlords had a high percentage interest in the agricultural assets of a county as of a particular date does not tell what percentage of investment there over any definite period of time was made by landlords. On the other hand, it is presumptive evidence of a tendency for farms to be financed extensively by nonoperating owners, as is confirmed by an analysis which showed that there is a correlation between the averages, for the 108 counties of the sample, of the percentage of farms operated by tenants in the six census years 1920, 1925, 1930, 1935, 1940, and 1945 (an indirect indication of the importance of landlord investment) and their ratios of landlord interests for 1940.

The most serious distortion in the 1940 cross-sectional data has already been referred to, namely the influence of differential financial experience during the depression years of the 1930's. The assumption made in this study is that even though underlying patterns of financial structure in agriculture are modified by changing economic conditions, important continuing differences among counties are likely to be found if allowance can be made for the shorter-run influences stemming from general economic conditions. It is assumed further that the major short-run influence to be considered in the use of data for 1940 is the wide divergence

among counties in financial experience in the 1930's, and a method has been devised to take account of its effect.

Characteristics of the 108-County Sample as a Whole

The 108 sample counties, whose location is shown in Chart 1, were selected from a list of 250 for which survey data on mortgage credit and related financial information were obtained on a sample basis for 1940 with the object of representing as many different kinds of agricultural situations as possible.

First consideration in selecting counties had to be given to the quality of the available data, and a large number of the 250 were eliminated on this basis alone. Other were eliminated because they were so mixed as to type of farm that averages would have little meaning, or in order to retain a better balance by areas and kinds of agriculture. In the final selection an attempt was made to include counties within broad type-of-farming regions representing diverse subtypes of agriculture, as well as counties representing the major type of farming of the region, and thus to emphasize diversity of representation rather than homogeneity.

This method of selection may actually overemphasize the element of dissimilarity: thus, when measured by the several indicators described earlier, differences between the highest and the lowest 36 counties of the 108-county sample tend to be in sharper contrast than those that would be observed between the highest and lowest one third of all agricultural counties in the United States. But to the extent that this happens, the basis for selection facilitates the analysis by accentuating those differences in farm economic and financial characteristics on which the investigation focuses.

While the sample was not intended to typify the entire agriculture of the United States, the comparisons shown in Table 4 indicate that it is not altogether ill fitted for this purpose. In fact, a fair measure of agreement is found when the indicators for the combined 108 counties are compared with corresponding indicators for the United States.[4] Since the sample data have not been used to develop national estimates, the main significance of this agreement lies in the assurance that extreme counties are fairly well balanced in the sample.[5]

[4] If a closer approximation of the sample to the United States figures had been considered desirable, it could have been accomplished by including more general farming counties in the North and omitting some of the larger-scale cotton counties of the South.

[5] It does not follow that equally good results would be obtained for a

CHART 1

Location of 108-County Sample
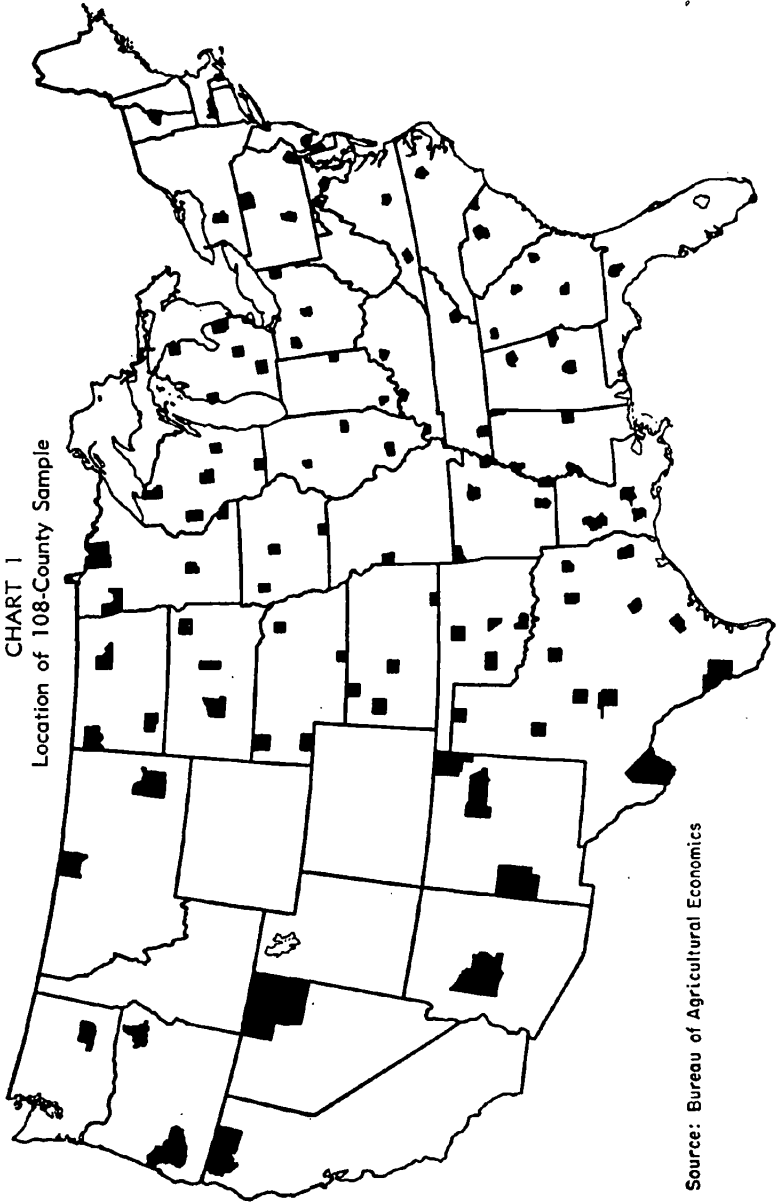
Source: Bureau of Agricultural Economics

TABLE 4

ECONOMIC AND FINANCIAL CHARACTERISTICS:

Averages for 108-County Sample and for the United States

(dollar figures in thousands)

	108-County Sample[a]	United States[b]
Economic Characteristics		
Physical assets per farm	$8.3	$8.0
Physical assets in:		
Land	52%	52%
Buildings	23	24
Non-real-estate	25	24
Cropland/total acreage[c]	40	38
Dwellings/farm real estate, 1930	16	15
Farm product value, 1939:		
Livestock	25	23
Crops	38	40
Dairy products	13	14
Poultry and prod. and misc.	6	9
Used by farm household	18	14
Financial Characteristics		
Interest in physical assets of:		
Operators	48%	} 77%[d]
Landlords	29	
Creditors	23	23
Farms with operator interest in real estate/all farms	63	67
Farms with landlord interest in real estate/all farms	50	44
Mtgd. farms/all farms	43	40
Mtg. debt/value of mtgd. farms	40	42
Mtg. debt/value of all farms	19	20
Farm mtg. debt held by:		
FLB's and FFMC	47	41
Ins. and mtg. investment companies	12	15
Commercial and savings banks	10	8
Individuals and miscellaneous	31	36
Non-real-estate loans, as % of total non-real-estate farm assets, of:		
Banks and PCA's	13	13
FSA and ECFL Division of FCA	8	5

[a] Counties are given equal weight in the averages except in physical assets per farm, where the average is weighted by the number of farms. In all averages involving number of farms, the number excludes cropper farms in the South.

[b] Compiled from the Census of Agriculture and records of the Department of Agriculture.

[c] Cropland excludes plowable pasture.

[d] Comparable breakdowns of owner equities are not available for the United States.

Although an attempt was made to select counties from most of the major type-of-farming regions, it was not possible to develop a sample that would permit valid comparisons among and within different farming regions. At an early stage of the study it was hoped that the available data would permit such comparisons, but preliminary analyses on this basis encountered a number of difficulties. The counties for which data were available often were not representative of an entire farming region. Furthermore, variations in financial and economic characteristics of the agriculture among counties within a region often were as great as variations among county groups when classified by region. Likewise, counties in widely different farming regions were often found to be much alike as regards certain basic financial and economic characteristics of their agriculture. These results raised considerable doubt as to the significance of comparisons among farming regions for this study, even if the data had sufficed. For these reasons the characteristics of agriculture and of its financial structure that can be compared without direct reference to farming regions have been made the primary basis of the classification of counties for analytical purposes. Very few of the comparisons based on regional and intraregional classifications of counties are presented.

It would have been desirable, however, to supplement the analysis with detailed comparisons of counties within farming regions, and attempts at such an analysis were made, even with the inadequate data that were available. Although the results were often suggestive of possible refinements in the conclusions reached, they have not been presented because of their voluminous nature and of what, in many cases, is a dubious statistical validity. Their main significance lies in the finding that the discernible relationships within regions resembled those that are revealed when regional groupings are ignored and comparisons are made within the entire 108-county sample. The intraregional phase of the analysis is an area that must await development of better basic data.

Adjustment of Sample Data for County Differences in Financial Experience, 1930-1940

Differences in previous financial experience complicate the problem of determining at a given point in time whether there is

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regional comparison, since no attempt was made to provide a balanced sample for each region.

any tendency for counties with similar patterns of agriculture to have similar patterns of farm financial organization. For example, one would not expect a North Dakota wheat county affected by severe drought and low wheat prices during the 1930's to exhibit a farm financial organization in 1940 similar to that of an Oklahoma wheat county that largely escaped those difficulties. In the first county, operator interests would have been largely lost through forced sales and the shrinkage of asset values; on the other hand, creditor interests, as well as landlord interests in foreclosed farms, would be relatively high. An index of the degree of financial distress experienced in the 1930's is needed, therefore, to classify the counties observed as of 1940 into groups representing different degrees of farm financial distress.

If annual data on farm income had been available by counties, it would have been possible to compare county income levels in the 1930's with those of some previous period; alternatively, financial statistics on distress farm transfers, or debt defaults, might have been used. No usable county data of these types are available, however, and the index of variation in financial experience which was adopted—partly because of the availability of comparable data for the two dates—is the percentage change from 1930 to 1940 in the value of farm real estate, livestock, and equipment. This is referred to as the index of farm asset deflation.

An assumption implicit in the choice is that changes in farm asset values from 1930 to 1940 resulting from increases or decreases in physical inventory would not seriously distort the index for its intended purpose. It is possible, however, that the 1930 and 1940 figures do, to some degree, reflect changes in physical inventory and for this reason tend to exaggerate intercounty differences in financial experience. For example, some of the Great Plains counties doubtless had less land in use in 1940 than in 1930, and their inventories of livestock and equipment may not have been rebuilt by that time. At the other extreme, in some counties land values fell very little and real investment in agriculture rose even during the 1930's, partly as a result of a more favorable economic climate. In effect, however, since the index is not used to make detailed comparisons among individual counties, but rather to classify counties into a few groups according to their financial experience, its deficiency is mainly that it provides a less sharp demarcation than might be desired at the borderlines of major groups of counties.

For almost any date that might be selected, the financial experience of different counties during the preceding ten years would be expected to vary widely. The following distribution of the 108 counties by percentage change in value of physical assets of farms between 1930 and 1940 gives an idea of the extent of variation for the period in question. It should be noted that dif-

| PERCENTAGE CHANGE IN VALUE OF PHYSICAL ASSETS, 1930-1940	COUNTIES	
	Number	*Per Cent*
45.0% and more decrease	13	12%
30.0 - 44.9	20	19
15.0 - 29.9	35	32
5.0 - 14.9	24	22
Less than 5.0 decrease and increase	16	15
	108	100%

ferent indicators of the economic and financial characteristics of agriculture may vary widely in the extent to which they are distorted by variations among counties in previous financial experience. Indicators based on numbers of farms, for example, are less influenced by this factor than those based on values. Thus, one would expect to find less distortion of the percentages of farms under mortgage than of the ratios of mortgage debt to the value of mortgaged farms. Evidence corroborating this assumption is furnished by Chart 2, in which the counties are distributed by mortgage frequency, and next by the mortgage debt-to-value ratio, with the 1940 figure to be read on the vertical axis and the average for 1920 and 1930 on the other.

Further corroborative evidence that these two financial indicators are likely to be affected differently by extremes of financial experience in the 1930's lies in certain comparisons of the counties when they are classified according to change in value of farm physical assets during the 1930's. The percentage of the counties in which mortgage debt frequency for owner-operated farms was higher in 1940 than the average for 1920 and 1930 is shown on page 38 by three "asset-deflation" groups of counties.

In the middle group of 59 counties, in terms of extent of asset deflation in the 1930's, higher debt frequency ratios are found in 1940 than in the earlier period in 68 per cent of the counties as compared with 57 and 58 per cent of the two extreme groups. But this difference is not particularly striking, in view of the widely different financial experience of the county groups in the

CHART 2

Percentage of Owner-Operated Farms Mortgaged, and Ratio of Mortgage
Debt to Value of Mortgaged Full-Owner Farms, 1940, Compared
with Average for 1920 and 1930 in 108 Sample Counties

Ratio of Mortgage Debt to Value
of Mortgaged Full-Owner Farms

Percentage of Owner-Operated Farms
under Mortgage
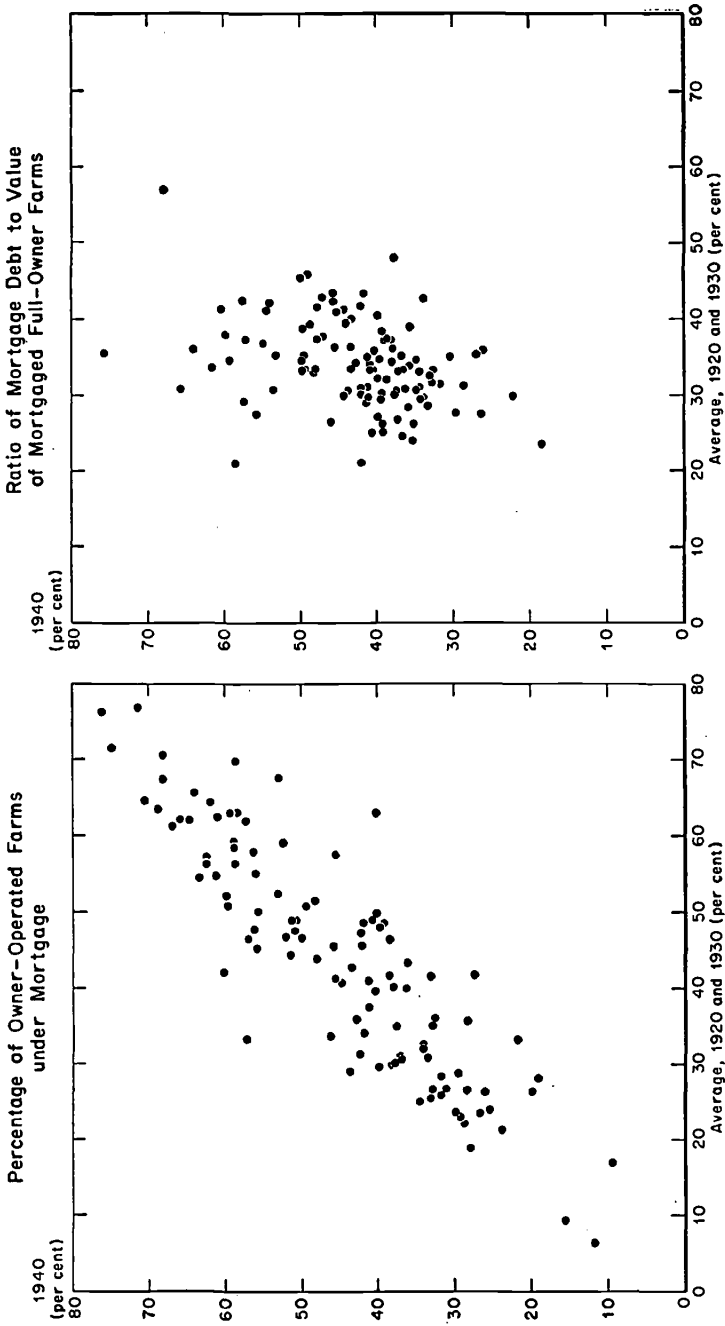
Source: 1920, 1930 and 1940 Census of Agriculture (Bureau of the Census).

1930's. These data suggest that direct 1940 comparisons of mort-
gage debt frequency among groups of counties differing substan-
tially in their previous financial experience could be made with a
fair degree of confidence that financial experience in the 1930's is
not the major factor affecting the relative levels of debt frequency
in 1940.

PERCENTAGE CHANGE IN VALUE OF PHYSICAL ASSETS, 1930-1940	NUMBER OF COUNTIES	PER CENT OF COUNTIES WITH HIGHER MTG. DEBT FREQUENCY IN 1940 THAN FOR AVG. 1920 AND 1930	DEBT-TO-VALUE RATIO	
			Avg. *1920-1930*	*1940*
30.0% and more decrease	33	58%	33%	50%
5.0-29.9	59	68	35	41
Less than 5.0 decrease and increase	16	57	34	35
	108	62%		

But similar confidence is not warranted in direct 1940 com-
parisons of counties as to the ratio of mortgage debt to the value
of mortgaged full-owner farms. To illustrate this point, average
debt-to-value ratios for 1940 and for 1920 and 1930 combined are
given above for the counties grouped into asset-deflation classes.
It is apparent that the ratio of debt to value in 1940 tends to vary
directly with the extent of asset deflation in the 1930's.

When 1940 comparisons were made between pairs of counties
differing widely with respect to their previous financial experience
but little in terms of the nature of their agriculture, it became
evident that differences in certain aspects of farm financial organ-
ization are fairly consistently related to differences in the severity
of financial conditions in the 1930's. Since the presentation of
these numerous paired comparisons would be cumbersome, and
would invite bias in the selection of counties to be compared, a
simple summary form of tabulation had to be devised. The method
used was to select groups of counties for comparison that are
roughly comparable—as groups—with respect to the farm asset
deflation which they experienced in the 1930's.

In the early stages of the analysis, the 108 counties were classi-
fied into four equal groups of 27 counties each, based on the per-
centage change in the value of their farm assets from 1930 to 1940,
and these asset-deflation quartiles were then studied separately.
An example of this analysis is given in the tabulation below, in

which the counties are classified first by degree of asset deflation
and then according to average farm asset size—high, middle, and
low. Within each asset-deflation quartile, the nine counties with
highest average farm asset size are compared with the nine
having the middle and the lowest average farm asset size.

FARM ASSET DE-FLATION GROUP (PER CENT)	CLASSIFICATION BY ASSET SIZE OF FARM WITHIN ASSET-DEFLATION GROUPS			
	Largest	Middle	Smallest	TOTAL
Under 10.0 and increase	9	9	9	27
10.0-22.2	9	9	9	27
22.3-34.1	9	9	9	27
34.2 and over	9	9	9	27
Total counties	36	36	36	108

The county grouping in asset-deflation quartiles was well suited
to the conduct of exploratory analyses, but in presentation would
involve an unwarranted amount of detail. A summarizing method
was found which revealed most of the relationships between the
economic characteristics of agriculture and its financial organiza-
tion shown by the quartile procedure and at the same time greatly
simplified the presentation. With the counties arranged as above—
each asset-deflation quartile divided into "high," "middle," and
"low" groups of nine each according to some economic or financial
characteristic—the final step is to combine the four "high"
groups, the four "middle," and the four "low." The effect is to
produce three groups of counties, of 36 each, similarly stratified
as regards farm asset deflation. In a sense the procedure may be
described as an adaptation of partial correlation to the special
needs of this study, in that it tends to keep average asset deflation
relatively constant while other factors vary.

This method of handling the asset-deflation factor is illustrated
in the two tables that follow. The object of the first is to discover
any relationship that may exist between the extent of operator
interest in physical assets and two economic characteristics of the
farm enterprise—the percentage of physical assets in land and the
percentage of acreage in cropland; of the second, to discover any
relationship that may exist between the ratio of real estate debt
to the value of all farm real estate and two economic charac-
teristics—the percentage of physical assets in land and the per-
centage of total product obtained from crops and livestock.

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In the first table an inverse relationship is evident in each asset-deflation quartile between the degree of operator interest in physical assets and both the land component of physical assets and the acreage component of cropland; but the second table reveals no consistent pattern of relationship between the ratio of real estate debt to the value of farm real estate and the farm economic characteristics examined. The significant point for present purposes is that these two results—the inverse relationship of the first, and the lack of consistent relationship in the second, are consistent with what is found when the counties are combined, as in the "total" group at the bottom of each table, so as to eliminate the effect of differential prior financial experience.

FARM ASSET DEFLATION GROUP AND INDICATOR	CLASSIFICATION OF COUNTIES BY OPERATOR INTEREST IN PHYSICAL ASSETS			
	High	Middle	Low	Average
Under 10 Per cent and Increase				
Per cent of operator interest	67	49	32	49
Per cent of physical assets in land	47	57	63	55
Per cent of acreage in cropland[a]	34	40	37	37
10.0-22.2				
Per cent of operator interest	66	54	38	53
Per cent of physical assets in land	33	47	64	48
Per cent of acreage in cropland[a]	44	44	51	46
22.3-34.1				
Per cent of operator interest	64	51	42	52
Per cent of physical assets in land	44	49	57	50
Per cent of acreage in cropland[a]	32	34	40	35
34.2 and Over				
Per cent of operator interest	56	36	29	40
Per cent of physical assets in land	47	59	59	55
Per cent of acreage in cropland[a]	33	39	57	43
Total, All Counties				
Per cent of operator interest	63	47	35	48
Per cent of physical assets in land	43	53	61	52
Per cent of acreage in cropland[a]	36	39	46	40

[a] Acreage in cropland excludes plowable pasture.

Partial correlation might have been used if a more precise description of relationships had been necessary, and if the data had been adequate. This would have avoided certain minor defects of the method actually used which may result from giving equal weight to each of the four asset-deflation quartiles when the range of asset deflation is wider in the two extreme quartiles than in the two middle ones. For the possible undesirable effect of giving equal weight to each of the four quartiles, the ratio of real estate debt to the value of mortgaged farms provides the best illustration. Tabulations not reproduced here show that when counties are classified according to debt-to-value ratios in 1940, they tend also to be grouped according to asset deflation

FARM ASSET DEFLATION GROUP AND INDICATOR	CLASSIFICATION OF COUNTIES BY REAL ESTATE DEBT AS A PERCENTAGE OF VALUE OF ALL FARM REAL ESTATE			
	High	Middle	Low	Average
Under 10 Per cent and Increase				
Mtg. debt/value of all farms	20	15	11	15
Per cent of physical assets in land	56	55	55	55
Per cent of product from crops and livestock, 1939	76	63	60	66
10.0-22.2				
Mtg. debt/value of all farms	21	17	13	17
Per cent of physical assets in land	50	43	51	48
Per cent of product from crops and livestock, 1939	62	56	56	58
22.3-34.1				
Mtg. debt/value of all farms	26	17	14	19
Per cent of physical assets in land	43	51	57	50
Per cent of product from crops and livestock, 1939	56	58	68	61
34.2 and Over				
Mtg. debt/value of all farms	28	23	17	23
Per cent of physical assets in land	56	56	54	55
Per cent of product from crops and livestock, 1939	71	66	65	67
Total, All Counties				
Mtg. debt/value of all farms	24	18	14	19
Per cent of physical assets in land	51	51	55	52
Per cent of product from crops and livestock, 1939	66	60	63	63

in the 1930's, with the result that the "high" and "low" counties—on the basis of a debt-to-value ratio—in the first and fourth quartiles are likely to differ more with respect to asset deflation than the "high" and "low" counties in the two "middle" quartiles. Perhaps the weight given the first and fourth quartiles in the 36-county averages should be less than that given the two middle quartiles, but this refinement would be of minor importance in the present study, particularly in view of the imprecise nature of much of the basic data. Alternatively, the weighting bias presumably might have been avoided in good part if the counties had been grouped into asset-deflation brackets of equal range; but this would have introduced certain mechanical hindrances to classifying each asset-deflation group according to the various economic and financial criteria. The decision to use equal numbers of counties as the basis for subclassification was based primarily on the need for a simple device that would permit easy and numerous manipulations of the basic data.

It should be noted, further, that the effectiveness of the stratification technique varies with the degree of correlation between asset deflation in the 1930's and the particular criterion used to classify the counties. This point may be illustrated by two examples. The ratio of mortgage debt to the value of mortgaged farms in 1940, we have seen, is directly related to asset deflation in the 1930's. Thus when the 108 counties, unstratified as to asset deflation, are grouped into high, middle, and low counties according to their average debt-to-value ratios, the asset deflation indexes vary correspondingly.

	High	Middle	Low
Ratio of debt to value of mortgaged farms	50%	39%	31%
Farm asset deflation, 1930-1940	37	20	9

If the stratification technique were completely effective, each of the three groups of counties arrived at by this method should show an average asset deflation of 22 per cent. The actual results are as follows:

	High	Middle	Low
Ratio of debt to value of mortgaged farms	48%	40%	32%
Farm asset deflation, 1930-1940	26	21	19

The difference between the high and the low group with respect to asset deflation is greatly reduced by the stratification procedure,

without greatly altering the difference between the high and the low group with respect to the ratio of debt to value of mortgaged farms; but the high and the low group are still not entirely comparable with respect to asset deflation. Even so, comparisons can be made among the three groups with respect to debt-value ratios on the assumption that the differences shown are not greatly influenced by differential financial experience in the 1930's.[6] For readers who may want to know to what extent the results obtained when counties are grouped without regard for asset deflation are altered by the stratification method used in this study, information is given in a footnote to each major table.

As can be seen from the foregoing discussion, the object of the method selected is not to place individual counties on a comparable basis in 1940; rather, it is to obtain groups of counties that are reasonably comparable with respect to their average prior financial experience. Because the index of differential financial experience employed is the change in the value of physical assets, the method is most effective in making allowances for the effect of extreme declines in the value of physical assets on estimates of farm asset size and on ratios based on asset values. It also enables the analyst to take account of the frequent close relation between the use of federal and federally sponsored lending facilities and the extent of the financial distress experienced by different counties in the 1930's. The effects where other indica-

[6] The failure of the stratification method to produce three groups of counties with precisely the same average asset deflation in the 1930's results in part from restricting the number of initial asset-deflation subgroups to four consisting of 27 counties each. When the 108 counties are classified according to asset deflation into 36 groups of 3 counties each, and then each 3-county group is divided into the high, middle, and low county, the three 36-county groups obtained when all high, middle, and low counties, respectively, are combined, compare closely as regards average asset deflation in the 1930's with the average for the unstratified array. The results of such a tabulation are shown below:

	High	Middle	Low
Ratio of debt to value of mortgaged farms	46%	40%	34%
Farm asset deflation, 1930-1940	21	23	22

It will be noted, also, that the spread between debt-value ratios for the high and the low groups is reduced from 19 points in the case of the unstratified array to 12 points in the above tabulation. Although the difference between the two tabulations *reflects* the correlation between debt-to-value ratios and asset deflation in the 1930's, it does not purport to *measure* the extent to which the ratios in the unstratified array are influenced by differential asset deflation. Other possible influences are not neutral in the two tabulations.

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tors are involved are not always so clear, partly because extremes of financial experience may set in motion counteracting influences with respect to particular financial indicators. Thus, landlords with mortgage debts who retained their farms in a period of financial distress would show reduced equities as a result of declining values, but many owner-operated farms were foreclosed and became landlord-owned, in many cases largely free of debt. At the opposite extreme, if economic conditions are favorable many farms may be bought by owner operators, thus reducing the landlord interest in total farm assets at a time when other landlords, continuing their ownership, may be increasing their interest by repaying debt. Since the net effect of differential financial experience on some of the indicators used in the study cannot be separately evaluated, it was believed preferable to allow for these influences by making comparisons among groups of counties that had approximately equal financial experience during the 1930's. In this way, whatever influence the financial experience of the depression decade had on the several indicators would be similar in each of the stratified thirds of the sample.

One further aspect of the method should be made explicit. The method may be described as the use of a dual basis of classification which holds average asset deflation in the 1930's relatively constant by groups of counties. It follows that in the stratified array the 36 counties that are "high" according to a particular criterion (e.g. the percentage of farms under mortgage) may include some that would not be in the "high" group in an unstratified array. The three stratified groups, however, include counties that are predominantly "high," "middle," and "low" in an unstratified array, and when considered as groups, without reference to the individual counties of which they are composed, show distinct differences with respect to the particular criterion which they are intended to reflect. As the averages shown for stratified groups are not used to measure the absolute amount of variation among counties in respect to particular financial or economic characteristics, any distortion of the single classification arrays by the use of dual bases of classification does not impair the usefulness of the data for their intended purpose.

To avoid any possible distortion of results arising from this feature of the summarizing technique, the four 27-county groups (quartiles) representing different levels of asset deflation in the 1930's were first studied independently. These detailed analyses often suggested alternative tabulations that promised results bet-

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ter suited to the analysis. Although these more detailed tabulations could not be presented in each case, a comparative examination of selected farm economic and financial characteristics by asset-deflation quartiles is included for some of the analyses.

Because of the nature of the available data, comparisons of individual counties and groups of counties were first made under tentative hypotheses regarding possible relationships between specific economic characteristics of agriculture, taken separately, and specific aspects of its financial organization. It was soon evident, however, that no single characteristic of a business as complex as farming could provide an adequate explanation of variations in financial organization. Rather, it was necessary to look for significant clusters of economic characteristics that, viewed collectively, are related to significant clusters of financial characteristics of farms.[7] The material presented in the following chapters represents a selection and grouping of such of these comparisons as lend themselves to meaningful economic interpretation.

[7] For many kinds of analysis a geographical grouping of counties based on the concept of "type of farming" has been found to produce significant clusters of economic characteristics of agriculture. This concept, however, does not result in classifications of counties that can be compared advantageously with respect to the financial characteristics of agriculture.