

PRICE RISK IN FARM CREDIT

by

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PRICE RISK IN FARM CREDIT

CHAPTER I

INTRODUCTION

General Statement

The risk of declining prices constantly confronts the borrowers and lenders of agricultural credit. Prices of a single farm commodity may fall as much as 50 percent in one year resulting in a drop in gross income equally as great. Debt paying capacity can be no greater than the earning power of the farm and the farmer. Earning capacity of the farm depends to a great extent on price trends. Extended price declines may place even conservative loans in jeopardy.

As a group, farmers are in the debtor class. They hold title to land and commodities. When prices fall they lose much. Many good farmers are liquidated. When prices rise many reap a windfall. The windfall itself may be unhealthy in the long run if it distorts values, creates false booms, and causes overexpansion.

Agriculture is also beset with production risks such as drought, flood, frost, wind, hail, diseases, and insects. An individual farm or a whole region may have its production cut to zero by any such natural hazard.

Generally speaking, the farmer can do little to combat such hazards except in an indirect way through crop insurance, storage operations, better management, and capital investment for flood control, irrigation, etc. If, however, the natural hazards are lessened there yet remains the uncertainty of income caused by low prices or unfavorable price relationships.

A further risk encountered by lenders and borrowers and one that runs through all aspects of farm credit is what might be termed appraisal risk. It is impossible for human judgment to consider all of the changing elements of appraisal and arrive at an evaluation that is 100 percent correct. The economic elements of evaluation as enumerated by E. C. Young are: (1) Prices of farm products, (2) prices of products used in production, (3) technological changes resulting in changing unit costs, (4) taxes, (5) interest rates, (6) rate of capitalization.⁽¹⁾

The physical elements of appraisal are sometimes equally as difficult to evaluate. Overlapping soil types are often overlooked. Discrepancies in the actual acreage in cultivated land, orchard, brush and pasture

(1) Young, E. C., Use of the Normal Value Concept as a Stabilizing Influence in Agriculture. Jour. Farm Economics, 22:148, February 1940.

often appear in the evaluations of capable appraisers. There is also the tendency to appraise toward the regional average with the result that the good farms are appraised too low and the poor quality farms too high. Loan difficulties usually start on these same poor quality farms. Even with the best appraisal there remains the possibility of loss because of a depressed real estate market at the time sale of the property is desired.

Objective and Technique

It is the objective of this paper to study in a general way a few of the relationships that exist between price risk and farm credit. The study will be conducted by observing the past relationship of farm prices to net income to people on farms, the relationship of farm prices to prices of goods used in agricultural production, the secular movements of prices of farm commodities and farm real estate, the general effect of net income on debt paying capacity, and the variation in the purchasing power of different groups of farm commodities in respect to debt paying capacity. From these observations an analysis of the place of price risk in the plans of borrowers and lenders will be made.

The study is general in nature and indirect in approach. It is impossible because of ever-changing conditions and insufficient data to compile information which would indicate that for an individual farm in a certain region under given management conditions a certain debt could be supported and paid out in so many years. It is likewise impossible to say that for a given drop in the index of farm prices a certain percent of mortgaged farms will be foreclosed. General relationships and the normal margin of safety, however, can be discovered.

Source of Data

A multitude of regional and sectional studies have been made in the field of farm credit to determine the reason for farm credit failures. There is also an accumulation of information and statistics in the field of prices. This paper draws principally from the latter.

The following indexes have been used:

1. Index of prices received by farmers for all commodities. (August 1909-July 1914=100)
Source: Agricultural Statistics, U. S. Department of Agriculture, 1944, 1945, 1946.
2. Index of price paid by farmers for all commodities, bought for use in production, excluding interest and taxes and commodities used for family maintenance. (1910-1914=100) Source: Agricultural Statistics, U. S. Department of Agriculture, 1944, 1945, 1946.

3. Index of realized net income from agriculture to persons on farms, excluding government payments, computed from figures on realized net income in millions of dollars. (1910-1914=100) Source: The Farm Income Situation, U. S. Department of Agriculture, Bureau of Agricultural Economics, June 1946.
4. Index of agricultural commodities by groups. (August 1909-July 1914=100) Source: Agricultural Statistics, U. S. Department of Agriculture, 1944, 1945, 1946.
5. Index of farm real estate values. (1912-1914=100) Source: The Farm Real Estate Situation, Circular No. 754, United States Department of Agriculture, Bureau of Agricultural Economics, December 1946.
6. Index of wholesale prices of farm production, 1800-1946. (1910-1914=100) Source: 1800-1910, Warren, George F. and Pearson, Frank A. Gold and Prices, New York, J. Wiley and Sons, 1935. 1910-1946, Agricultural Statistics, U. S. Department of Agriculture, 1944, 1945, 1946.
7. Index of wholesale prices of nonagricultural products. (1910-1914=100) Source: 1800-1910, Warren, George F. and Pearson, Frank A. Gold and Prices, New York, J. Wiley and Sons, 1935. 1910-1946, Agricultural Statistics, U. S. Department of Agriculture, 1944, 1945, 1946.

Limitation of Data

Lending money to farmers is, in some respects, an individualized business. Each loan represents a different set of conditions. No two farms or farmers are exactly alike. The risk involved will vary accordingly. This

paper will treat price risk on a general basis and therefore will set forth only general principles which can be adapted to specific regions after the accumulation of the necessary data.

Considerable use will be made of total net income figures for the United States. Net income itself is an elusive figure. Economists and statisticians of the Bureau of Agricultural Economics who compile farm income reports admit that there is a wide margin of error in their estimates of income from garden, greenhouse, and forest crops.

The total farm income in the United States obscures the income fluctuations of regions and certainly of individual farms. Furthermore, reduced production or failure in some areas is partly balanced by increased prices to other producers so that national farm income figures tend to remain more constant than individual farm incomes.

The value of the index of prices paid by farmers for goods used in production is limited by the fact that different types of farming require expenditures in different proportions for different commodities. There is, however, the tendency for all commodities to follow the same trend.

CHAPTER II

NATURE AND EFFECT OF AGRICULTURAL PRICE CHANGES

General Statement

As indicated by Figure I on the following page, prices of agricultural products tend to follow the general price level but with fluctuations above and below the general level tending to be more pronounced. This is partially explained by the fact that several hundred commodities and manufactured products are included in a general price index. The general price index includes manufactured goods over which there is considerable production control. Agricultural production, on the other hand, is not easily controlled in response to short run supply and demand conditions.

Changes in the supply of farm products account for some price changes, especially for fluctuations around the general price level. Changes in supply tend to be offset by changes in price, so that for some commodities a small supply is more valuable than a large supply. The elasticity of demand is the determining factor. Changes in prices of farm products caused by changes in the price level are seldom offset by changes in supply except after a difficult period of adjustment.

WHOLESALE PRICES OF FARM AND NONAGRICULTURAL PRODUCTS,
UNITED STATES, 1800-1946

Index Numbers (1910-14=100)

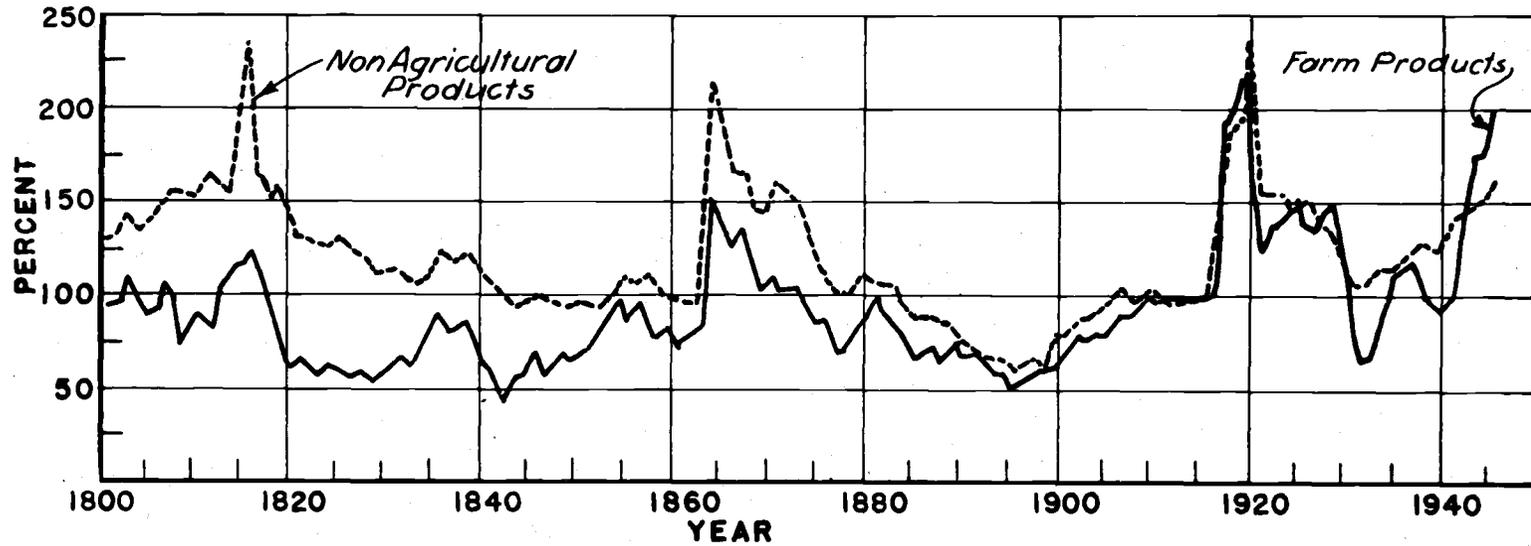


Figure I

When the price level changes, prices of raw materials move faster and farther than the average of all commodity prices. Agricultural products in many respects can be considered raw materials. Feeds and cereal grains are more basic in character than meat and dairy products. As might be expected, there seems to be less price fluctuation among the more finished products of agriculture.

A Changing Price Level and Unit Purchasing Power

An unfavorable economic situation for agriculture is often the result of disparities between the selling prices of farm products and the prices of goods and services used in production. The use of the term price disparity is based on the assumption that the activities of our economy should work together. In reality, the pricing mechanism functions in such a way that wide differences in price relationships often occur.

One concern of this paper is with certain aspects of the changes which occur between prices paid by farmers for the factors of production and prices received for farm commodities as they affect net income and purchasing power. Changes in market conditions and price relationships are constantly occurring with favorable and unfavorable consequences. A persistent disparity that continues beyond a reasonable time of readjustment

leads to uneasy long-term agricultural credit. On the other hand, a short-time disparity such as might occur in the price of perishables could have harmful consequences in the field of production credit.

To measure the condition of disparity it is best to compare the course of prices actually received at the farm with prices of goods bought by farmers for production. A retail index of goods used in production is more indicative of actual conditions. An index of this type is constructed by the Bureau of Agricultural Economics. It should be noted, however, that a comparison of prices received and prices paid does not show the entire relationship because it leaves out of consideration the possible changes in production efficiency and quality. Some loss of accuracy is unavoidable, but no other general measures are available.

The most obvious generalization that can be made in regard to farm prices is that they change more rapidly and go to greater extremes than commodities used in production. This fact is shown graphically in Figure II. Table I shows the extent of changes on a percentage basis for the two groups for selected periods.

PRICES RECEIVED BY FARMERS FOR ALL COMMODITIES (AUG. 1909-July 1914=100)
PRICES PAID BY FARMERS FOR COMMODITIES USED IN PRODUCTION (1910-14=100)
NET INCOME REALIZED BY PERSONS ON FARMS (1910-14=100)

Index Numbers, United States, 1910-46

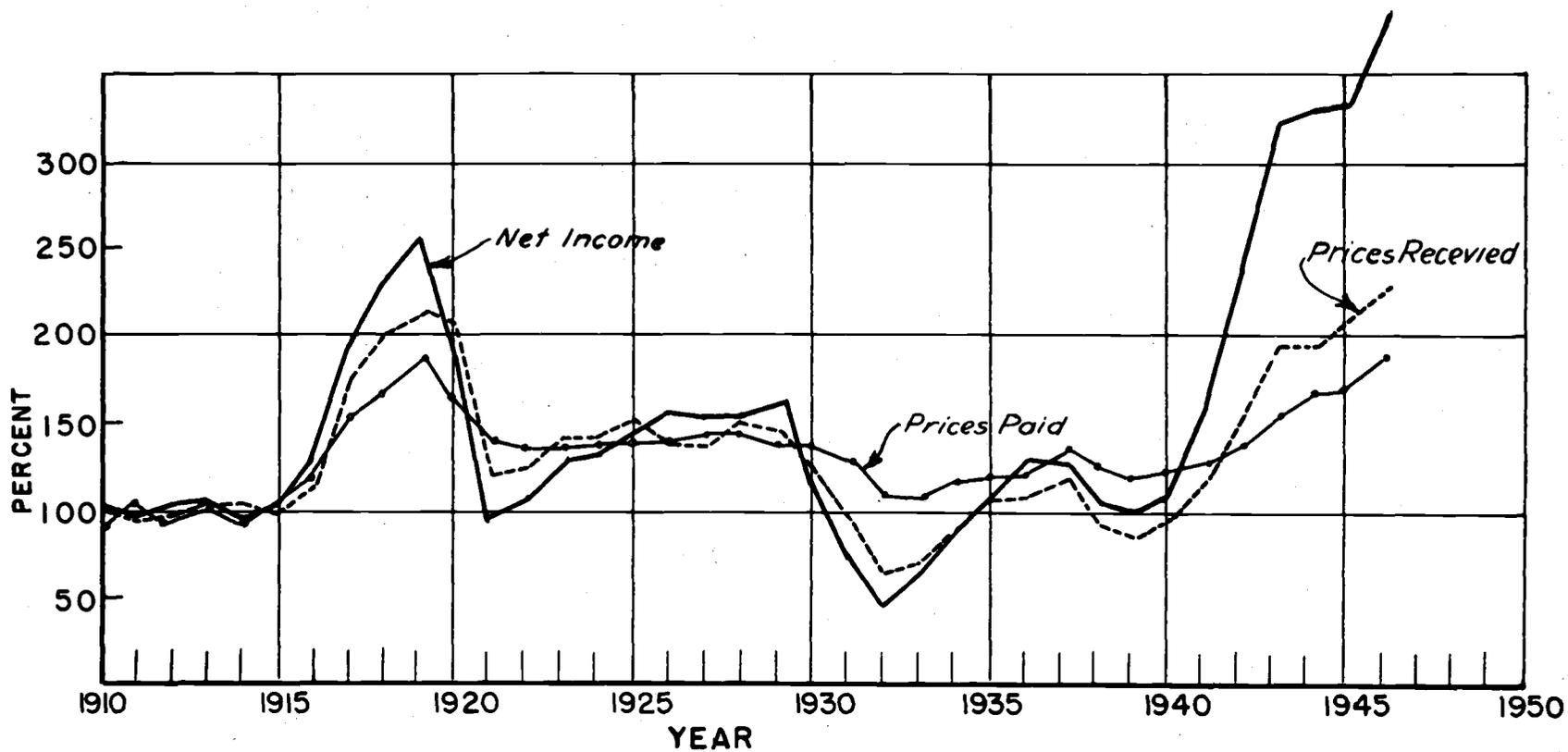


Figure II

Table I
 Percentage Change in Indexes of
 Prices Paid and Prices Received by Farmers

1910-1914 = 100

Period	Prices paid percent	Prices received percent
1910-1919	+93	+115
1920-1922	-28	-39
1923-1925	+6	+18
1926-1927	-2	-8
1928	+3	+6
1929-1932	-26	-59
1933-1937	+25	+79
1938-1939	-10	-22
1940-1945	+43	+113

The degree of loss in per unit purchasing power has varied considerably from group to group of farm commodities. The term unit purchasing power may be defined as the buying power of a farm commodity in terms of the cost of the goods used in its production. As shown in Table II, the purchasing power of grains in 1919 was 128 percent of the base period. In 1921 it had fallen to 92 percent and by 1929 to 79 percent. There were, of course, many changes in grain farming methods during this period so it cannot be said with any certainty that there was a corresponding change in the economic position of the grain farmer.

Table II

Average Unit Purchasing Power of Groups of
Farm Commodities for Selected Periods

1910-1914 = 100

Year	All farm commod- ities	Dairy products	Meat products	Food grains	Cotton	Wool
1919	112	105	108	128	126	145
1921	88	99	76	92	72	65
1929	101	111	109	79	98	116
1932	62	79	59	41	43	48
1937	90	96	96	88	66	122
1939	78	90	92	59	57	102
1945	116	113	121	100	100	132

Based on indexes of prices received for commodities and prices paid for commodities used in production.

Table III shows the degree of change in purchasing power that has occurred in the past among different groups of farm commodities. The purchasing power of dairy products has changed less than the average of all farm products. Grains, meats, and wool have changed considerably more.

Table III

Percentage Change in Unit Purchasing Power of
Different Groups of Farm Commodities

Period	All farm commod- ities percent	Dairy products percent	Food grains percent	Meat animals percent	Wool percent
1919-21	-21	-6	-28	-30	-55
1921-29	+15	+12	-14	+43	+78
1929-32	-39	-29	-48	-46	-59
1932-37	+45	+22	+115	+63	+154
1937-39	-13	-6	-33	-4	-16
1939-45	+49	+26	+41	+32	+30

Based on changes shown in Table II.

A Changing Price Level and Income

The purchasing power of gross farm income has been more stable than the per unit selling prices of farm products. Between 1929 and 1932 selling prices fell some 58 percent on the average. Buying prices were falling at the same time, however, and production was being maintained, with the result that the net loss of total purchasing power amounted to 39 percent (table III). This was severe but much less so than prices alone would indicate. There would, therefore, seem to be danger of drawing erroneous conclusions concerning the effects of price change if attention is confined to the price of farm commodities alone.

Relative changes in the economic status of agriculture are, therefore, better measured by net income than by price changes or gross income. Net income figures measure in some degree the disparity between prices paid and prices received.

Equal changes in gross income resulting from unequal price and production changes may represent quite different movements of net income. When gross income is sustained through the maintenance of a high volume of output, as was true of agricultural income from 1929 to 1932, correspondingly high production expenses may force net income to a very low figure. Fixed charges in the form of taxes, interest, etc. take a far greater proportionate part of the reduced gross income of farmers in depression than of the larger gross income of prosperity. The income available for debt retirement is correspondingly reduced. For instance, from 1929 to 1932 the gross income of farmers declined some 53 percent--13,824 million dollars to 6,406 million dollars. The cash available to farmers after payment of production expenses was reduced 70 percent--6,044 million dollars to 1,832 million dollars. Percentage changes in net and gross income for other periods are listed in Table IV.

Table IV
 Percentage Change in Gross and Net Income
 1910-1914 = 100

Period	Net percent	Gross percent
1910-1919	+155	+142
1919-1921	-61	-41
1921-1929	+68	+31
1929-1932	-70	-53
1932-1937	+166	+70
1937-1939	-22	-11
1939-1945	+235	+140

Based on gross and net income. Appendix, page 40.

Prices received for farm commodities are the greatest single factor affecting the variation in both gross and net agricultural income. This relationship is explained by the fact that agricultural production is relatively constant, that about one half of all farm costs are non-cash costs, and that costs for goods and labor used in production tend to move with prices received. The simple coefficient of determination between prices received for all farm commodities and realized net income of farm operators is 0.88 (appendix, page 40). The regression coefficient between prices received and realized net income is 1.14, indicating that net farm income changes about 1.14 percent for each one percent

change in prices received. The net income curve in Figure II demonstrates this relationship.

A Changing Price Level and Fixed Expenses

In 1929 the total farm debt amounted to over 12 billion dollars (Table V). Interest payments came to approximately 700 million dollars. This represented slightly over six percent of the total cash income to farmers. Farm mortgage debt, the most important item in the total farm debt, amounted to about 9,250 million dollars in 1929, with interest payments of about 550 million dollars. The total farm debt in 1919 was much smaller, about 4,445 million dollars.

The average long-term Federal Land Bank farm mortgage is amortized over a period of 30 to 40 years. Reduction of the total income naturally tends to require a higher percentage of the net income to meet the fixed charges incurred in a long-term debt. In 1932 the total farm debt amounted to 10,728 million dollars. Interest charges alone amounted to 590 million, or about 13 percent of the total cash income. Taxes levied against agriculture in 1932 amounted to 504 million dollars, or 10.6 percent of total cash income as compared with 5.6 percent in 1929. Taxes and interest required around 13 percent of the total cash income in 1929 and around 23

percent in 1932. Fixed charges become increasingly important as prices decline.

The situation constitutes the crux of the long-term farm credit problem. Heavy fixed obligations incurred at a definite time under conditions prevailing at the moment must later be met when an entirely new set of prices and value relationships exist. The amount of the loan and the interest rate are fixed. The purchasing power of the farmer's dollar changes. The farmer may have to pay his debts with expensive money.

Farm debts are contracted under diverse conditions. Loans are being made all the time. Some are made at the high point of a price cycle, some at the low point and others in between. If a certain number of loans go bad during a period of deflation, a return to a high price level would not necessarily correct all the mistakes because many factors other than prices determine the success of a loan. A favorable ratio between prices paid and prices received could also exist without total income being sufficient to correct the inequalities. The farmer's debt is fixed but everything else may be changing.

Table V gives the interest expense on the total farm debt as a percentage of cash income for the whole of agriculture. All farmers, however, are not in debt

to the same degree. Others are completely free of debt. The significance of interest and taxes to the cash income of persons in debt is, in reality, more pronounced than is indicated by Table V.

A Changing Price Level and Land Values

The generally accepted theory regarding land value is that value depends upon capitalized current income and capitalized anticipated income. The market value of farm land inevitably follows the current and anticipated income of the land with past income history tempering the market value somewhat. L. H. Bean measured the relationship between farm prices and land values for the years 1912 to 1936 and found that about 52 percent of land values are associated with prices in the current year, 25 percent with prices in the previous crop year, and 8 percent, 6 percent, 5 percent, 3 percent, and 1 percent with prices in the respective previous years.⁽²⁾ Bean's study indicated that actual values corresponded closely with estimated values except for the depression years of 1930 to 1933 and the immediate recovery years during which actual values fell below estimated values. On the

(2) Bean, Louis H., Inflation and Price of Land, Journal of Farm Economics, 20:315, February 1938.

Table V

Interest Expense on Total Farm Debt as a Percentage of
Cash Receipts for Selected Years

	1920	1929	1932	1937	1945
	(In millions of dollars)				
Total farm debt*	12,321	12,362	10,728	8,407	7,007
Interest	739.26	679.91	590	420.35	350.35
Cash income*	12,608	11,303	4,747	9,217	21,552
Interest as a percent of cash income	6.1	6.0	13.0	4.5	1.6

Arbitrary interest rates used: 1920 = 6.0%
 1929 = 5.5%
 1932 = 5.5%
 1937 = 5.0%
 1945 = 5.0%

* Figures from Statistical Abstract, U. S. Bureau of Commerce, Bureau of
 Census, 1946, pp. 626-627.

basis of Bean's analysis estimated values have continued to be above actual values since 1931. This can largely be accounted for by the memory in the minds of most farmers of the depression of 1932.

A comparison of the index numbers of farm prices and farm real estate values since 1912 shows less inflation for the 1946 period than for the 1920 period. The index of farm prices in 1919 stood at 215 percent and in 1945 at 202 percent while the index of farm real estate in 1920 was 170 percent and 142 percent in 1946. The farm price index in 1946 was 233 percent. If the customary time lag occurs the real estate index should be higher in 1947 than in 1946.

Farm real estate values tend to follow farm income but do not show the same pronounced fluctuations. Figure III shows that there have been only three general movements in real estate values since 1912 - two upward movements and one downward movement. From 1912 to 1920 real estate values rose 75 percent, dropped 57 percent between 1920 and 1933, and rose again 96 percent between 1933 and 1946. The length of the farm real estate cycle has made it very difficult for a borrower or lender to ride it out from one period to a like position on another cycle.

FARM REAL ESTATE, UNITED STATES, 1912-46

Index numbers of estimated value per acre (1912-14 = 100)

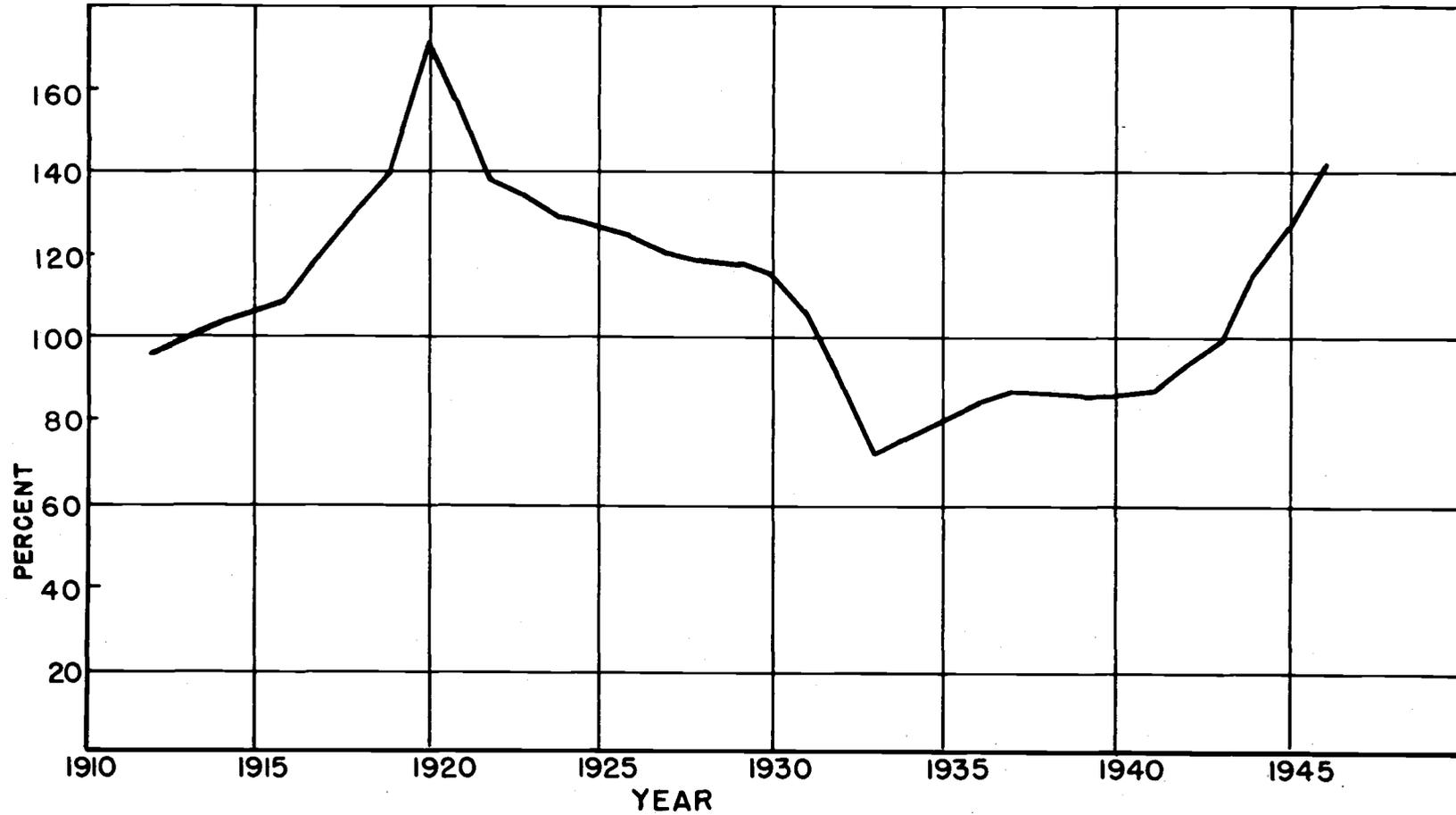


Figure III

CHAPTER III

SUMMARY AND RECOMMENDATIONS

Significance of Price Risk to Loan Policy

Rising prices and increased agricultural income increase the incentive to expand and therefore the need to borrow. Prospective income looms higher and the value of the security is expected to increase. The situation is ideal for a time. When the drop in prices comes, liquidation of loans is often required and a general tightening of available credit occurs.

The obvious answer to this situation is the adoption of a strict credit policy during good times and a more liberal one during bad times, always keeping in mind the probable earning capacity of the farm for the next few years. However, it is not always possible to follow the obvious course. Competition for loans is severe, especially in the better farming areas. Lending agencies sometimes find it necessary to make high ratio loans to keep up their volume during periods when borrowers and lenders alike are filled with the exuberance of good times. Farmers are quick to take advantage of easy credit conditions. From the lender's standpoint it is primarily a matter of company policy as determined by conditions within the company and the nature of the

competition. From the borrower's standpoint it is a matter of judgment on how to avoid the unfortunate.

A more logical extension of this policy for the debtor and creditor is to liquidate rather rapidly when prices are high so that the debt ratio will be within a safe margin by the time the trend changes. When prices are low the lender should not lose sight of the "normal" concept of prices and values.

This policy implies the use of sound price forecasting. It may be argued, of course, that no one is always accurate in price forecasting. However, short time price movements are not of particular interest in long-term farm credit if the debt ratio is at all reasonable. Abnormal difficulties are brought on by extended periods of depressed prices and poor timing of credit operations so that loans are made at the top of the cycle.

A price history of the United States since 1800 shows four peak periods. The first three peaks - 1812, 1865, 1919 - were about 50 years apart with generally falling prices for 25 years and generally rising prices for 25 years (figure I). The shorter period from 1919 to 1947 was characterized by more violent fluctuations.

Borrowers and lenders of long-term credit must base their operations on the probability of violent price changes. They cannot, however, forecast the time and

extent of price changes with any degree of certainty. Neither will they be able in all cases to recognize the high and low points of the cycle. They must, therefore, use an arbitrary percentage of the security value or an arbitrary percentage of the earning power of the farm as a safeguard.

Significance of Price Risk to Debt Ratio

Lending agencies commonly follow the practice of lending 40 to 50 percent of the appraised value of the security. This margin is made to cover not only probable declines in the market price and earning power of the security, but also errors in appraisal, foreclosure costs in the event foreclosure is necessary, loss of interest during delinquency, depletion of the soil, depreciation of the buildings, etc.

Furthermore, the established margin must be applied to all loans to give protection against the inevitable foreclosures. The lender does not know at the time a loan is made whether it will be successful. He cannot rely on the average of all loans to compensate for the loss from delinquencies and foreclosures since he can collect only his interest and principal from even the best loans. The margin must therefore be extended to include loans which may prove to be far below average. The

experience of the Federal land banks is indicative of the high cost of foreclosure.

The Federal land banks have lost approximately 25 percent of their investment of farms foreclosed or deeded to them.⁽³⁾ To ascertain the significance of this loss it is necessary to have data on the book value of the acquisitions. Estimates of this amount were not encountered in the course of this study. However, by using the average number of forced sales per 1,000 mortgaged farms for a somewhat normal period, an estimation can be made. During the five years, 1934-38, the average number of forced sales per 1,000 of all farms mortgaged to the Federal land banks was 22.2 per year.⁽⁴⁾ Assuming the farms foreclosed represented a like percentage of the total value of the loan investment, a loss of .555 percent (0.0222×0.25) per year was experienced. A foreclosure rate of eight percent would wipe out all possible gains derived from interest charges.

A few of the costs involved in foreclosure should be mentioned. Farm mortgages will ordinarily be

(3) Farm Credit Administration. The Profitable Use of Farm Credit. Cir. No. E-4, Washington, D.C., p. 42, October 1939.

(4) Horton, Donald C., et al. Farm Mortgage Credit Facilities in the United States, Miscellaneous Publication No. 478, U.S.D.A., Washington, D.C., p. 37, 1942.

delinquent one or two years before foreclosure action is taken. If court action is necessary for the lender to obtain title to the security, more time will elapse. The time necessary for court foreclosure or foreclosure under power of sale varies with different state laws. Doane's Agricultural Service estimates the average time required in Oregon for a lender to acquire title, free of all rights of redemption, as 15 months, 10 days, and the average court cost as 130.37 dollars on an average loan of 2,990 dollars.(5)

Unpaid interest at four percent for two years and foreclosure costs of 4.3 percent per loan account for 12.3 percent of the loan investment. In such a case it would be necessary for the lender to recover 123 percent of his loan investment to cover the expense of foreclosure and unpaid interest. Recovery of this percentage is unlikely because of the close correlation between the number of foreclosures and depressed real estate values.

Rights of redemption are of major importance to lenders in some states. Alabama, the extreme case in this matter, has set two years as the time limit for redemption by the borrower. Soil depletion and depreciation

(5) Doane Agricultural Service, Agricultural Digest, St. Louis, Missouri, p. 1064-1092, November 1938.

of the buildings will proceed at a more rapid rate during delinquency. After a lender acquires title, he often finds it necessary to make repairs to bring the farm back into saleable condition.

There are, then, many factors directly associated with price risk which the lender must consider in establishing a reasonable debt ratio. At the same time the borrower is interested in having sufficient equity to avoid delinquency during periods of low income. The debtor as an individual is not protected by the average condition of all debtors. The farmer who is foreclosed probably loses everything. He is, moreover, most vulnerable to delinquency and foreclosure during periods of depressed income. The loan margin and expected earning power, therefore, must be sufficient to cover the possibility of periods of low income.

Many factors are involved in determining whether a loan is safe. Such factors as soil, size of farm unit, type of farming, etc. are interrelated and important to the eventual success of a farm loan. While not overlooking these factors the scope of this study is confined to the place of price risk in the plans of borrowers and lenders. What, then, has been the history of farm real estate values and how can that history be related to present conditions?

Farm real estate values have tended to follow farm income. Income fluctuations, however, have been more erratic and have moved to greater extremes than real estate values. The most severe drop since 1912 occurred between 1929 and 1933 when the United States index of real estate values fell 40 percent. The situation was, of course, more acute in certain areas than in others. Such a precipitous drop, while likely to occur only after several years of depressed prices, must, nevertheless, be considered as a possibility.

A study of changes in the farm real estate index from year to year between 1922 to 1931 reveals that real estate values fell, on the average, less than two percent per year (figure III). During this period agriculture enjoyed what has since become regarded as a very favorable position although it may not have been considered so at the time. From the standpoint of price risk only, a loan of 75 percent of market value in 1922 would have, in view of subsequent events, proven satisfactory. The characteristic which distinguished the 1922-1930 period was the comparative stability of agricultural income. This situation permitted amortization to proceed at a steady rate so that by 1931 the debt ratio could have been within the bounds of safety. The success of a 75 percent loan in 1922 would probably have

been the result of fortuitous circumstances rather than sound loan policy.

Unfortunately the majority of loans are not made at the time which history indicates as the most favorable. More credit is available and hopes are higher during prosperity. Young farmers and tenants find it easier to become owners when agricultural income is high. During good times there is also a faster turnover in farm real estate, largely because of the desire of older farmers to retire.

The common practice of lending 50 percent of appraised value can be examined in the light of past events. The safety of a 50 percent loan at current value depends to a great extent on timing. If the loan is made at the high point of the cycle and the following decline in farm income continues downward without a break, as occurred in 1931, difficulties are sure to develop. Foreclosure may result. The lending agency may have the alternative of foreclosing and selling at a loss or operating the farm at a loss until values return to a satisfactory level. Lending agencies generally are not in the business of managing farms unless forced to do so.

Lenders wish to avoid having an outstanding debt greater than the market value of the security but under

the pressure of competition for loans many mistakes have been made. The following table illustrates how the downward trend in farm real estate values from 1920 to 1933 reduced the debt margin of a loan of 50 percent of market value made in 1920, assuming no amortization.

Table VI

50 Percent Loan Made in 1920 as a Percentage
of Index Value in Later Years

Year	Percent	Year	Percent
1920	50	1934	112
1921	54	1935	108
1922	61	1936	104
1923	63	1937	100
1924	65	1938	100
1925	67	1939	100
1926	68	1940	100
1927	71	1941	100
1928	72	1942	93
1929	72	1943	86
1930	74	1944	75
1931	80	1945	68
1932	95	1946	60
1933	116		

Based on index numbers of estimated value of farm real estate, 1912-46. (1921-14=100). Appendix, page 40.

Solely on the basis of index value, a loan of 43 percent in 1920 was equal to the value of the property thirteen years later. On the other hand, a 50 percent loan based on index value in 1933 was equal to only 26 percent of the 1946 index value.

If, for the purpose of illustration, it is assumed that a 20 percent margin was sufficient to cover the probable errors in appraisal, foreclosure costs, loss of interest, and physical deterioration of the security, Table VI indicates that a loan of 50 percent of market value in 1920 was not sufficient to cover the drop in security value during the depression years. The lender was further handicapped by the slow recovery of real estate values.

A 50 percent loan made during a more normal period, 1926 for instance, would have been comparatively safe. The loan investment would have equaled 84 percent of the security value in 1933. If fluctuations in the future are no more severe than those in the past, a 50 percent margin during normal periods should provide sufficient protection.

From the borrower's standpoint, however, there is another aspect to be considered. Land values have fallen in response to a like though more severe downward movement in agricultural income. If a loan made in a normal period were not based on a farm budget that showed net income at normal prices at least twice as great as the amortization payment, difficulties would have developed.

The borrower must be especially conservative in his long-term credit operations because of the probability

of terrific declines in net income. The fact that credit is available and the value of the security sufficient to protect the lender does not mean that the debt will be any less burdensome to the debtor.

Significance of Price Risk to Payment Plan

Instability of income is the condition which causes many farm credit failures. The fluctuations in prices received have been noted. The fact that net income fluctuates more than prices received has also been mentioned. The farmer's debt and the annual payment, however, remain fixed. As net income goes down fixed debt expenses take a higher percentage of the total. The most logical answer to this situation is a flexible payment plan.

Flexible payment plans came under consideration in a theoretical way after the unprecedented number of debt failures in 1932 to 1933. Many of these failures were not due to overestimation of the long-time earning power of the farm but to low farm prices and an unsatisfactory payment plan which did not apply the increased earnings of good times against the outstanding debt.

The primary purpose of a flexible payment plan is to build up a reserve to carry through the bad years and if the reserve is insufficient, to give the debtor

more time before being declared delinquent. As pointed out by F. F. Hill, the chief disadvantage of such a plan is the difficulty in measuring changes in the farmer's debt-paying ability.⁽⁶⁾

Net income on the individual farm is an exceedingly variable figure. It is doubtful if a lending agency could be found to agree to a contractual arrangement whereby payment on the outstanding debt is dependent on net income. Gross income is a more stable figure but is subject to the same bookkeeping difficulties as net income.

The problem is to find an index of debt paying capacity that is understood by both parties to a loan and can be incorporated in a loan contract. There are several possibilities. A contract involving the payment of a given share of the crop is sometimes used. Payments varying with the price of the principal crop have been used to some extent.

The index of the wholesale prices of agricultural products as compiled by the Bureau of Labor Statistics is perhaps the best indicator of agricultural income for the purpose of a flexible payment plan. In the first place, any index that established some flexibility in

(6) Hill, F. F. Flexible Payment Plans for Farm Mortgage Loans. Jour. Farm Economics, 20:269, February 1938.

payments would be an improvement for the debtor. The wholesale price index is generally understood. Its fluctuations are not as pronounced as those of certain single farm products. The amount of the annual payment could be determined by the percentage change above or below the period selected as normal in the wholesale price index.

There is also the question of whether the interest payment on the outstanding debt should also fluctuate. Again there is the question of getting a lender to agree to such an arrangement. The income from interest is the only gain the lender receives. The first part of the reserve should perhaps be set aside to take care of interest charges in the years when they cannot be met from income. This policy could be extended to allow interest to accumulate to a predetermined amount before the debtor would be declared delinquent. As an alternative to this plan the entire amortization payment could fluctuate with the index chosen. The excess above interest could then be applied against the principal.

Significance of Price Risk to Production Credit

Production credit in agriculture is ordinarily considered short-term credit. The length of the production cycle determines the term of the loan. Production

loans are made for a term of 12 months or less with the tacit understanding that renewals will be made if the situation warrants. Such extensions are often made with the result that short-term credit becomes intermediate credit. Complete refinancing in the form of long-term real estate loan may be necessary eventually to retire all old short-term debts.

In production credit the loan budget is of great importance. Borrowers and lenders are interested in avoiding renewal of short-term debts. The expected income of the debtor, therefore, must be great enough to cover production and living expense and leave sufficient money to pay the debt. The lending agency cannot rely on the value of the security for complete protection. Commercial banks especially are hard hit when a good deal of their outstanding loans must be renewed.

The bank may not be in a position to renew loans because of demands by depositors. Farmers may lose heavily because of forced sales. The lender will lose the good will of his clients. A more common case, however, is for the bank or other lender to renew the loan and to keep closer account of the financial condition of the borrower through the loan budget.

The element of price risk enters into the estimation of the budget. The expenses connected with the

production of crops and livestock will not vary appreciably in the short run. Feed prices, however, may show considerable fluctuation and the need for careful estimation of this item is, therefore, greater.

In the estimation of income the borrower and lender must be especially careful. For the purposes of estimating income for production credit normal prices cannot ordinarily be used. The current price can be used only for a harvest loan or when economic conditions are fairly stable. A certain amount of price forecasting is inevitable.

Prices of grains, cotton, wool, and meat animals declined 50 percent or more in 1920. The decline in 1932 was even more severe. Net income to persons on farms declined 61 percent from 1919 to 1921, 70 percent from 1929 to 1932, and 22 percent from 1937 to 1939 (table IV). Declines of 60 or 70 percent of net income are calamitous in short-term credit operations. When a heavy real estate loan is also being carried there is sometimes little chance for the debtor to consolidate his debt into a long-term, low-interest rate loan.

Production Credit Associations have followed the policy of lending 50 to 75 percent on hogs, 65 to 85 percent on the appraised value of livestock on range and pasture, and 50 to 60 percent on the value of the primary

security on general purpose loans.⁽⁷⁾ The renewal option is permitted for one to three years if the security is sufficient and other conditions are favorable.

Losses of the associations from 1933 to 1943 were exceedingly low. Only 0.16 percent of the total cash advanced (excluding renewals) by the associations was lost through nonpayment.⁽⁸⁾ This would seem to indicate that the ratios established were sound for periods of generally rising prices. Lower ratios will undoubtedly be followed when supply and demand conditions indicate the possibility of a sharp decline in prices.

A situation frequently found in production credit operations is the use of chattels as security for capital loans. This is especially true in livestock loans where a good part of the borrower's net worth is tied up in breeding stock. The same economic conditions that make it easy for stockmen to pay their debts are also responsible for the availability of easy credit. Lenders generally are looking for places to put their money. Stockmen feel that they are perfectly good for capital loans

(7) Farm Credit Administration, Rules and Regulations for Production Credit Associations Organized Under the Farm Credit Act of 1933, Washington, D. C., U. S. Government Printing Office, pp. 10-15, March 1934.

(8) Butz, Earl L. The Production Credit System for Farmers, Washington, D. C., The Brookings Institution, p. 22, 1944.

on the basis of the market value and earning power of their security. Lenders are more or less forced by the nature of the situation to grant capital loans. It is generally agreed that this is not a desirable policy, however, because of the danger of extreme changes in the value of the security. For this reason the lender cannot lend to the same extent on chattels as he can on real estate.

APPENDIX

Year	Gross income 1/	Net income 2/	Index net income 3/	Index farm real estate 4/
(Millions of dollars)				
1910	7352	3753	103	
1911	7081	3435	95	
1912	7561	3671	101	97
1913	7821	3786	104	100
1914	7638	3518	97	103
1915	7968	3745	103	103
1916	9532	4687	129	108
1917	13147	7011	193	117
1918	16232	8674	239	129
1919	17710	9249	255	140
1920	15908	6778	187	170
1921	10478	3603	99	157
1922	10883	4057	111	139
1923	11967	4842	133	135
1924	12623	5128	141	130
1925	13567	6103	168	129
1926	13204	5699	157	124
1927	13251	5706	157	119
1928	13550	5695	157	117
1929	13824	6044	166	116
1930	11388	4329	119	115
1931	8378	2744	76	106
1932	6406	1832	50	89
1933	6924	2569	71	73
1934	8040	3362	93	76
1935	9022	3986	110	79
1936	10356	4812	132	82
1937	10898	4825	133	85
1938	9589	3915	108	85
1939	9740	3754	103	84

Year	Gross income <u>1/</u>	Net income <u>2/</u>	Index net income <u>3/</u>	Index farm real estate <u>4/</u>
(Millions of dollars)				
1940	10199	4015	111	84
1941	13214	5940	163	85
1942	17702	8744	240	91
1943	22113	11716	322	99
1944	23089	12260	337	114
1945	23813	12542	345	126
1946	27300	14000	385	142

1. Gross farm income to farm operators including cash receipts from farm marketings, the value of farm-produced food and fuel consumed on farms, and the rental value of farm dwellings, but excluding government payments.
Source: The Farm Income Situation, U. S. Department of Agriculture, Bureau of Agric. Economics, p. 21, June 1946.
2. Realized net income to persons on farms. Represents gross farm income less production expenses.
Source: The Farm Income Situation, U. S. Department of Agriculture, Bureau of Agric. Economics, p. 21, June 1946.
3. Realized net income to persons on farms. Index numbers computed from realized net income (1910-14=100).
4. Farm real estate: Index numbers of estimated value per acre, United States, 1912-46. (1912-14=100)
Source: Regan, M. M. and Johnson, A. R. The Farm Real Estate Situation, 1945-46, Washington, D.C., U. S. Government Printing Office, pp.6-7, 1947.

Correlation Analysis

X = Index numbers of prices received by farmers

Y = Index numbers of net income to persons on farms,
1910-1941

$$r = \frac{\sum XY - (\sum X)MY}{\sqrt{\sum X^2 - (\sum X)MX} \sqrt{\sum Y^2 - (\sum Y)MY}}$$

$$r = \frac{570508 - (4005)130.12}{\sqrt{544497 - (4005)125.16} \sqrt{605596 - (4164)130.12}}$$

$$r = .9399$$

$$r^2 = .8834$$