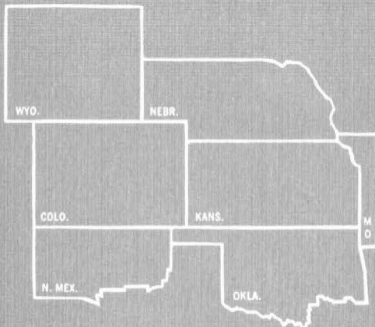


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OCTOBER 1968

Bank Credit Flows page 3

Farm Participation Loans in the
Tenth Federal Reserve District . . . page 14



FEDERAL RESERVE BANK OF KANSAS CITY

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Bank Credit Flows

By Raymond J. Doll and Gene L. Swackhamer

THE FLOW OF bank credit is a vital part of economic activity in a highly integrated economy. The research which will be discussed here suggests considerable immobility in the flow of such credit. Reasons for prevailing rigidities include variation in state laws pertaining to such items as usury and legal loan limits, managerial inertia of lenders, and perhaps the kinds of mechanisms used in making bank credit available. Because of such rigidities, monetary policy authorities are concerned both with making the proper amount available and with its distribution. To the extent that particular techniques can be varied to optimize bank credit flows, attempts can be made to use that combination of techniques that will do the most effective and impartial job.

In this article, an attempt is made to test for rigidities in bank credit flows and to evaluate their significance insofar as monetary policy authorities are concerned. To minimize rigidities caused by such factors as legislation and managerial inertia would require an intensive educational campaign and changes in legislation. All monetary policy authorities can do to alleviate immobility caused by factors such as these is to use that combination of mechanisms that will tend to minimize the differentials that arise. To do this effectively, policy authorities must be able to identify the differentials and understand the linkage between the various mechanisms used and credit flows.

The quantity of bank reserves is influenced directly by three kinds of activities—open market operations, discounting, and float. The proportions of total bank reserves made available in recent years by each activity are 95 per

cent through open market operations in which the Open Market Committee takes the initiative, 1 per cent through discounting in which the individual member bank takes the initiative, and 4 per cent by float. In addition to changing the quantity of bank reserves, the Board of Governors of the Federal Reserve System also can take action to change the level of reserve requirements. Such action does not itself affect the amount of total member bank reserve balances, but it does affect the amount of deposits and of loans and investments that member banks can legally maintain on the basis of a given amount of reserves.

If the economy were perfectly competitive, arguments would strongly favor exclusive use of the open market operation, since impersonal market forces, rather than personal judgment, would determine distribution of bank reserves. Under the rigorous assumptions underlying perfectly competitive markets, float would disappear and discount window administration would be unnecessary.¹ However, it should be pointed out that, even in open market operations, the judgment of the Open Market Committee must be relied upon for the decision as to the total volume of reserves to be made available.

Since the economy is not perfectly competitive, money markets do not function perfectly as impersonal allocators of resources—including bank credit. Many examples of imperfection could be cited in all sectors of the economy.

¹The assumptions underlying perfectly competitive markets include complete and instantaneous mobility of resources, perfect knowledge, and enough buyers and sellers so no buyer or seller can have a noticeable influence on the market.

Some evidences of imperfections relating directly to bank credit markets include variability among banks in: (1) their ability to use such devices as the Federal funds and certificate of deposit markets for obtaining and dispersing bank credit, (2) rates paid on time and savings deposits, (3) the ability to finance specific individuals and businesses, and (4) their knowledge of, and access to, financial and other market information. Other evidences of imperfections exist, but those just cited point out that a specific individual or business could have more difficulty in obtaining credit than another comparable individual or business because of such factors as location and structure and kind of business. To the extent that any prevailing variability can be measured and traced to imperfect markets, it behooves responsible authorities to review prevailing market techniques and suggest revisions or adaptations that will tend to compensate for some of the inequities. For example, discount administration at the Federal Reserve Banks could be revised in an effort to adjust for market inequities, including cushioning the strains of reserve adjustment for individual member banks.

This article tests how well bank credit has been distributed regionally to the agricultural industry in the United States. The agricultural sector is excellent for this type of analysis because the regional impact of market imperfections is likely to be most severe in an industry such as farming, which is composed of a large number of relatively small, widely dispersed firms that tend to be isolated. Furthermore, the Agricultural Loan Survey of mid-1966 makes data available for developing a methodology and testing for evidences of imperfections in the farm credit market.

In this study, it is hypothesized that regional variation in interest rates on agricultural loans exceeds differences attributable to variability in uncertainty and lending costs. Multiple linear regression is used to relate borrower, lending bank, loan, and market characteristics

to interest rates for similar type loans.² Alternative models are tested for feeder livestock and farm operating expense loans in order to identify those economic factors that best explain rate variability.

In a perfectly competitive economy, interest rates charged borrowers on comparable loans would be the same in all regions.³ Every seller and purchaser of bank credit would have equal and complete knowledge about, and access to, bank credit markets. Interest rates charged borrowers would differ primarily because of variability in risk and other costs of making loans. Such factors as lack of mobility in flow of funds, diversity in usury laws, and managerial inertia of lenders would not prevail, since, if rates on comparable loans tended to get out of line, with perfect knowledge and freedom of access to all markets, forces would be implemented instantaneously that would tend to reestablish equilibrium. Excess demand in areas of rapid growth would be only temporary.

Fixed interest rates charged all customers by a bank or other financial institution, regardless of variability in risk and other costs, also indicates that the financial institutions do not operate in a perfectly competitive environment. If all customers are charged the same rate, regardless of risk and other costs of making loans, some of the customers are paying more and others less than they would in a competitive market. Credit, under these conditions, would not be optimally allocated, since free market forces would not determine distribution of the credit. Instead, personal judgment of the allocators would determine how credit was distributed.

²The methodology used and technical data are included in the appendix at the end of this article.

³The term "interest rates," as used in this study, will refer to rates charged borrowers and will include the cost of risk-bearing and other costs, in addition to the payment for use of funds or "pure interest," as the term is frequently used by the economist.

In this study, rates charged farmers by commercial banks were compared by Federal Reserve districts for feeder livestock and other operating expense loans. A comparison also was made by states for other operating expense loans, since the size of sample, with the exception of a few states, was adequate for state analysis on this type of loan. A large number of factors—selected to measure the cost of lending, local loan demand, the supply of loanable funds, borrower risk, and market competition—were examined in preliminary tests to determine which had the greatest impact on rates charged farmers for the particular type of loan being evaluated. After these factors were determined, rates were analyzed for loans that were adjusted for comparability by Federal Reserve districts for feeder livestock loans and by Federal Reserve districts and states for other operating expense loans.

By use of this procedure, it was possible to determine average rates for each Federal Reserve district on feeder livestock loans made to farmers with about the same gross dollar value of sales and net worth, on notes of the same size, made by banks of about the same size and loan-to-deposit ratios. Rates charged were then compared among Federal Reserve districts. Some Federal Reserve districts had very few feeder livestock loans on which necessary borrower information was available. Average rates on other operating expense loans—adjusted for gross dollar value of sales, net worth, size of note, size of bank making the loan, loan-to-deposit ratio of the bank making the loan, type of farming, and security—also were computed by Federal Reserve districts.

Greater interest rate variability among states than among Federal Reserve districts for other operating expense loans was expected for two reasons. First, most Federal Reserve districts contain all, or parts, of several states—resulting in the averaging out of much state variability. Second, there is substantial variability among states in factors that influence financial

markets—such as usury laws, legislation pertaining to bank structure, legal loan limits, and familiarity of bank management with agriculture.

Determining average interest rates by states, adjusted for comparability by holding the influence of other economic variables constant, is a huge task. Furthermore, such computations require a large computer and a large sample of loans to provide a high degree of significance for each state. Consequently, rates were computed on operating expense loans exclusive of feeder livestock loans adjusted only by net worth of borrower, since this was the most important variable influencing interest rates other than region. Since the comparisons were made on operating expense loans, which generally have short maturities and are adjusted for net worth of borrower, a high degree of comparability prevails.

REGIONAL VARIABILITY AS MEASURED BY INTEREST RATES

Analysis of interest rate variability suggests that impersonal market forces do not allocate bank credit optimally among regions in the prevailing economic environment. Regional variability prevailed consistently for both livestock and other operating expense loans by Federal Reserve districts and states. Regional differences were substantially more important than any other measurable factor in explaining interest rate variability.

Regional variation in interest rates on business and real estate loans has been identified also. For example, a study of new house mortgage rates in Standard Metropolitan Statistical Areas in 1963-64 revealed a range of 89 basis points between the northeast low of 5.28 and the West Coast high of 6.17.⁴

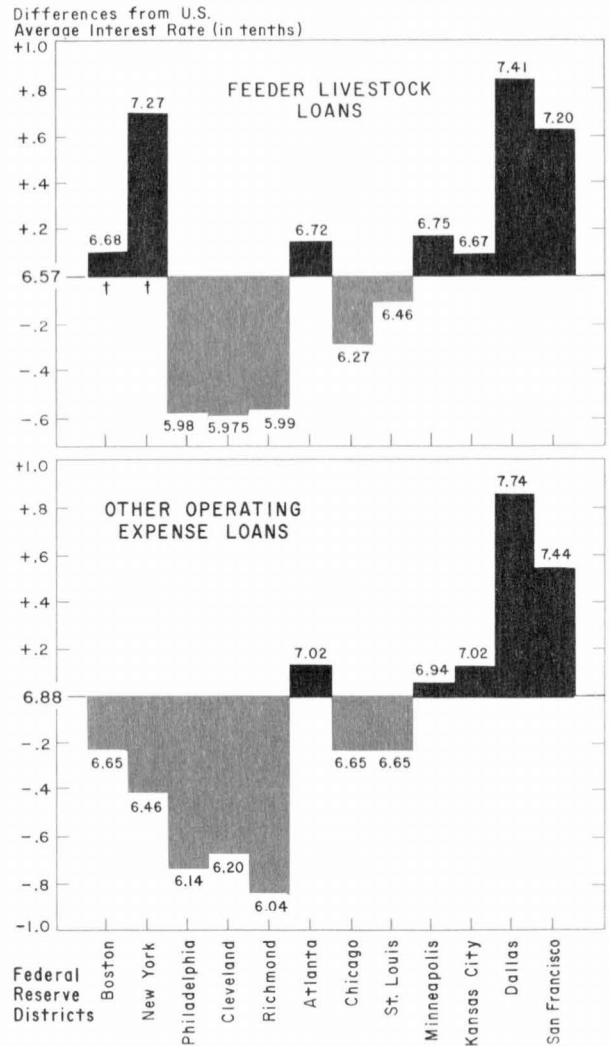
⁴A. H. Schaaf, "Regional Differences in Mortgage Financing Costs," *The Journal of Finance*, March 1966, pp. 85-94.

Federal Reserve Districts

A comparison of interest rates charged on feeder livestock loans, adjusted for the influence of other factors mentioned previously, reveals substantial variability on highly comparable loans among the different Federal Reserve districts. It is significant that region, as measured by Federal Reserve district, accounted for 12 per cent of the total variability in interest rates charged on such loans. As indicated in Chart 1, rates charged on these highly comparable loans varied from a low of 5.97 per cent in the Cleveland District to a high of 7.41 per cent in the Dallas District. Available evidence suggests that rates on feeder livestock loans for the Boston and New York Districts are not comparable. In the case of New York, 77 per cent of the survey loans was necessarily excluded from the study due to unreported information for several of the factors being examined. Thus, the entire figure for the New York District was expanded on the basis of 41 loans on which rates were substantially higher in relation to other farm loans in other Federal Reserve districts. Additionally, since Boston and New York, combined, accounted for less than 1 per cent of all feeder livestock loans in the Nation, a few high- or low-rate loans in these districts could easily distort district average rates. The general pattern was for rates to be relatively low in the districts located in the northeast and north-central regions and high in those districts located in the South and West. This pattern also prevailed in the Boston and New York Districts for other production expense loans where a much larger sample of loans was available.

Chart 1 indicates that livestock feeders located in the Dallas Federal Reserve District, on an average, paid a full 1.44 percentage points, or 24 per cent, more than livestock feeders in the Cleveland, Philadelphia, and Richmond Districts. The Chicago and St. Louis Districts also had relatively low rates. Rates in the San Francisco District, along with the Dal-

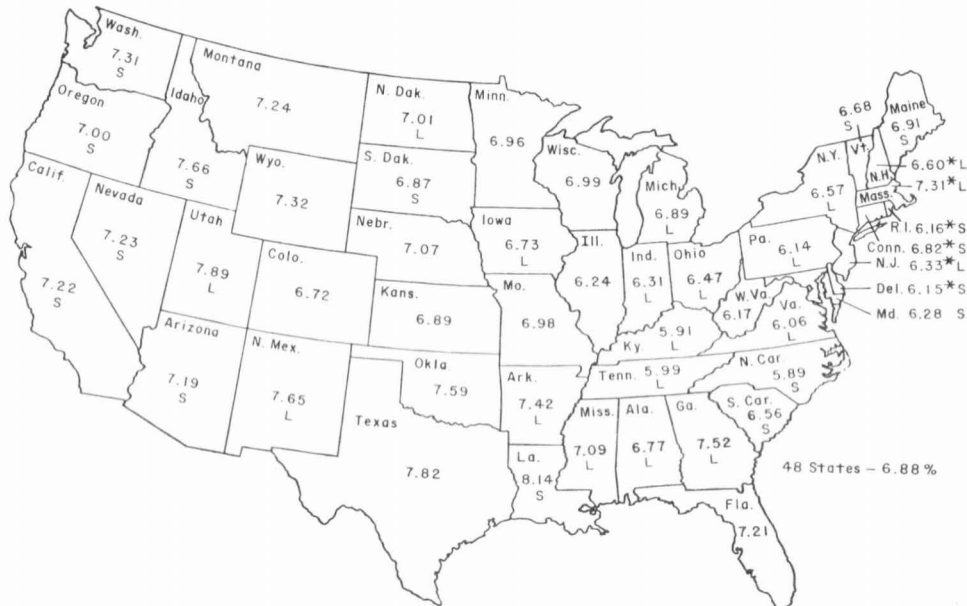
Chart 1
INTEREST RATES CHARGED BY COMMERCIAL BANKS BY FEDERAL RESERVE DISTRICT
June 30, 1966*



*Adjusted for factors indicated in introduction to article.
 †Comparability questionable because of factors discussed in article.

las District, were substantially higher than for the Nation. In the Atlanta, Kansas City, and Minneapolis Districts, they were moderately higher than for the Nation.

Chart 2
INTEREST RATES CHARGED BY COMMERCIAL BANKS
ON OTHER OPERATING EXPENSE LOANS, BY STATES
June 30, 1966



S—Statewide branch banking.
 L—Limited branch banking.

*Results need to be interpreted with care because of paucity of farm loans.

Regional variability on operating expense loans followed the same general pattern as for feeder livestock loans. Geographic region, as measured by Federal Reserve district, accounted for 14 per cent of total variability in interest rates charged on other operating expense loans. Rates charged varied from a high of 7.7 per cent in the Dallas District to a low of 6 per cent in the Richmond District. Thus, farmers in the Dallas District paid a full 1.7 percentage points, or 28 per cent, more for other operating credit than farmers in the Richmond District. Rates in the Boston and New York Districts were below the national average, as they were for all other Federal Reserve districts located in the northeast part of the Nation.

Chart 1 reveals a high degree of comparability in the direction and magnitude of variability

in rates charged for feeder livestock and operating expense loans among the Federal Reserve districts. When one considers that the rates being compared have been adjusted for variability in such factors as net worth of borrower, gross dollar value of sales, size of note, type of farming, security, size of bank, and loan-deposit ratio of bank, it is obvious that wide regional variability prevails in rates charged on quite similar loans.

Average rates charged farmers for operating expense loans (other than for purchase of feeder livestock), adjusted for variability in net worth of borrower, are shown by states in Chart 2. For the reasons mentioned previously, variability in rates was greater among states than among Federal Reserve districts. Region, as measured by states, accounted for 23.8 per

cent of total variability in interest rates charged on operating expense loans in the Nation. Farmers with the same net worth in Louisiana, a high-rate state, paid a full 2.25 percentage points, or a 38 per cent higher rate, than farmers in North Carolina, a low-rate state.

Although there is substantial variability in rates charged in adjoining states in a few instances, generally rates by states again tend to be low in the northeast and northcentral regions and high in the Western and Southern States. It is difficult to find either statistical data or empirical evidence of any kind that suggest that agriculture becomes more risky or that farm loans are more costly to make as one moves from the northeast and northcentral regions into the Southern, Rocky Mountain, or Pacific States. In fact, the evidence, as measured by income per farm, would tend to suggest the reverse. Arizona, California, and Florida—the three highest ranking states in income per farm in 1966 and most other recent years—are all high-interest rate states. North Carolina—the state with the lowest interest rates—is substantially below the national average in income per farm. Furthermore, year-to-year variability in farm income does not appear to be the explanation for rate variability from state to state.

REGIONAL VARIABILITY

The general pattern of rates on comparable loans suggests considerable immobility in the flow of bank credit. It is difficult to explain why a farmer with about the same dollar volume of business, net worth, kind of farming operation, and security, pays a substantially higher interest rate for financing a loan for the same purpose if he lives in the western or southern parts of the United States than if he lives in the northeast or northcentral regions. Banking structure obviously is not the explanation, since branch banking prevails in both high- and low-rate areas. Furthermore, there are both high- and low-rate areas in unit banking regions. Usury laws appear to have a sub-

stantial influence in some states; however, to the extent they are effective in holding rates below average, it may be that low rates are achieved at the expense of inability to obtain adequate credit. The indications of lack of mobility suggest that a relatively large proportion of funds remains in states with low usury rates, despite the fact that higher rates could be attained outside the state.

It has been contended that rates are high in the South and West because of rapid growth and strong demand for credit. Even if this were the case, in a highly competitive economy funds would flow freely enough between two states to prevent a 38 per cent difference in the price of money for highly comparable loans. Furthermore, when considering the extreme low- and high-rate states—North Carolina and Louisiana—it is doubtful that much difference in growth rates prevails between these states. High-rate states frequently are not the rapidly growing states, and low-rate states frequently are not those with stagnant economies. It also should be pointed out that regions with stagnant economies usually are higher risk areas and, therefore, would be inclined to have higher interest rates.

Several potential explanations are available for the immobility that apparently prevails in the flow of funds. Rural banks in the South and West are more likely to be isolated from money centers than those in the northeast and northcentral regions. Frequently, there are fewer competing financial institutions and they tend to have less easy access to market information and funds from financial centers. Many of the mechanisms currently being used by money center banks for increasing the mobility in the flow of funds are not available on a practical basis to such rural banks. Furthermore, small rural banks are not large enough to compete for, and retain, the best management and cannot have specialists for the numerous diversified services that banks are expected to perform. Consequently, managerial

inertia is more likely to prevail in small rural banks than in large banks in financial centers. Also, legal limitations such as loan limits are likely to force many large customers to larger banks. The farther the customer is removed from his bank, the less well known he is and the more difficult it is to properly serve his needs. Thus, in areas such as the South and West, where customers are farther removed from larger banks, they may pay higher rates for the same service.

Finally, the fact that a large proportion of bank reserves is made available through open market operations, which are dependent on the functioning of a highly developed system of financial markets, may have an impact on regional variability. All open market operations are conducted in New York City with dealers who have nationwide contacts. This method probably works satisfactorily for money center banks and for large national firms who can shop around for funds. The previous analysis raises doubts as to whether the system works perfectly for rural areas.

If impersonal market forces allocated funds optimally in the current economic environment, interest rates should not vary by as much as 28 per cent between Federal Reserve districts, and 38 per cent between states on similar kinds of farm loans. Individuals and firms that use smaller amounts of capital cannot be as sophisticated in either investing or shopping for funds as those who deal in large quantities. They cannot afford to invest the necessary resources to keep as well informed on financial markets, nor spend the necessary money to shop in all the Nation's financial markets in order to get the best price. Even if they did such shopping, they likely would not receive as attractive rate offers from distant financial markets because of geography and the fact that they would not be well known in such markets. Thus, consideration might be given to implementing devices which would improve regional distribution of bank reserves.

SUMMARY AND CONCLUSIONS

A careful evaluation of interest rates charged farmers by commercial banks indicates substantial regional variability in the flow of bank credit to rural areas in the United States. Rates on similar agricultural loans vary by as much as 28 per cent among Federal Reserve districts, with a general pattern of being relatively low in the northeast and northcentral parts of the Nation and relatively high in the southern and western parts of the Nation. Studies made on interest rates on housing mortgages in different metropolitan areas suggest comparable, but less wide, variability prevails on such notes. Rates on prime business loans show less variability.

Although there are several explanations for regional variability, the fact remains that bank credit apparently is less available to many borrowers in certain sectors of the economy in some regions than for comparable borrowers in other regions. To the extent that such variability prevails, bank credit is not distributed optimally. Thus, monetary policy authorities need to be concerned with methods for identifying and minimizing such variability. The preceding research identifies regional variability insofar as farm credit is concerned, and suggests that mechanisms need to be developed for improving financial markets as they are applicable to rural communities. Improved financial markets will enable impersonal marketing mechanisms to more nearly distribute bank credit optimally in such communities.

It appears that branch banking has not provided a satisfactory solution as many contend, since wider variability prevails among states with branch banking than among unit banking states. A satisfactory solution will require managerial personnel that are familiar with rural economies and agricultural finance, regardless of bank structure. It also is likely to become increasingly necessary for banks to make other provisions for the credit needs of rural cus-

tomers if they are unable to finance such customers completely because of loan limits.

APPENDIX

Multiple linear regression with dummy (zero-one) variables was used to analyze borrower, lender, loan, and market characteristics. Average effective interest rate—the dependent variable—was regressed on alternative independent explanatory factors in order to explain variations in interest rates for agricultural loans. The use of micro-economic cross-sectional data from the June 30, 1966, Agricultural Loan Survey permitted an intensive examination of those factors believed to most influence interest rates. The use of dummy variables to represent subclassifications of explanatory factors, such as for each net worth grouping, Federal Reserve district, etc., permitted the inclusion of qualitative attributes, simplified multivariate analysis, and provided for alternative functional forms. Several models of the form

$$Y = a + b_1 X_1 + b_2 X_2 + \dots + b_n X_n + e$$

were estimated for different loan types and (n) factor-variable combinations.

The technical procedure for this study is documented in an article on "Least-Squares Analysis," by Emanuel O. Melichar.¹ Each response in the survey was coded as a 1 in the class of its membership, all other subclasses for the same factor were given a value of 0; thus, the derivation of the term "dummy variable." Since, under this approach, there are more coefficients than there are independent normal equations based on the least-squares methodology, each multiple regression model was constrained by setting one coefficient in each factor-variable group at zero. The computed regression coefficients were then adjusted so that each could be interpreted as the net difference

from the national average loan rate associated with loan membership in any given variable classification. Thus, a coefficient for the Tenth Federal Reserve District indicates the amount loans in the District differ from the national average rate.

The terms "gross" and "net" used in Appendix Tables 1, 2, and 3, relate to the particular regression models being tested. Gross coefficients are obtained for the classes of a factor when only the variables representing that factor were used in the regression equation. In these models, the influence of all other factors may interact with the factor under investigation. Net coefficients are from equations of several factors where the influence of each other factor is held constant while determining the regression solution. These coefficients then have been adjusted for the influence of the other explanatory factors included in the model.

Extensive preliminary tests of the methodology and other explanatory factors were made using Tenth District survey data.² Numerous data cross-classifications were examined for evidence of interaction. Although some interaction was identifiable, it was not deemed serious enough to warrant the addition of interaction terms. Likewise, the omission of notes with blank observations was not considered troublesome, since, with few exceptions, a high proportion of the sample was usable and the blank responses seemed random. Because of the large sample size and the numbers of variables used, statistical significance of correlation coefficients using the standard F-ratio was virtually assured.

The analysis of factors used in computing interest rates on feeder livestock loans by Federal Reserve districts (Table 1) and other operating expense loans by both Federal Reserve district (Table 2) and states (Table 3) conclude the appendix.

¹For an excellent detailed discussion of the methodology used, see Emanuel O. Melichar, "Least-Squares Analysis of Economic Survey Data," *1965 Proceedings of the Business and Economic Statistics Section*, American Statistical Association.

²G. L. Swackhamer and R. J. Doll, "Interest Rate Variability—Feeder Livestock Loans," *Monthly Review*, Federal Reserve Bank of Kansas City, March 1968.

Table 1
ANALYSIS OF FACTORS INFLUENCING INTEREST RATES
ON FEEDER LIVESTOCK LOANS IN THE NATION

Explanatory Factors and Subclassifications (Independent variables)	No. of Sample Loans	Total No. of Loans Expanded from Sample	Gross Variation in Rates Explained by Each Factor (In per cent)	Gross Differences from National Average Rate Associated with Membership in Subclass	Net Explanatory Contribution of Factor	
					When Combined with All Other Factors (In per cent)	Differences from National Average Rate Associated with Membership in Subclass
Totals and Averages	7,405	221,678		6.571	26.91	6.571
Gross Dollar Sales						
Less than \$5,000	497	29,985		.805		.401
\$ 5,000 to 9,999	637	33,943		.283		.115
\$10,000 to 19,999	1,209	69,190	12.24	-.065	1.97	-.049
\$20,000 to 39,999	1,033	50,508		-.281		-.108
\$40,000 and over	4,029	38,053		-.397		-.186
Net Worth						
Less than \$5,000	212	10,987		1.062		.578
\$ 5,000 to 9,999	256	16,633		.655		.405
\$ 10,000 to 24,999	872	50,106	12.14	.227	3.09	.126
\$ 25,000 to 99,999	2,202	97,935		-.154		-.079
\$100,000 and over	3,863	46,019		-.409		-.254
Bank Size by Deposits						
Less than \$3 M	542	48,067		.228		.159
\$ 3 M to 4.9 M	704	59,142		-.046		-.057
\$ 5 M to 14.9 M	1,832	74,549	1.26	-.065	0.80	-.027
\$15 M to 24.9 M	645	13,708		-.123		-.015
\$25 M to 49.9 M	672	6,325		-.155		.113
\$50 M and up	3,010	19,887		-.038		.140
Federal Reserve District						
Boston*	69	964*		.221*		.109*
New York*	41	680*		.785*		.695*
Philadelphia	132	2,621		-.516		-.587
Cleveland	224	7,967		-.427		-.595
Richmond	182	5,168		-.382		-.581
Atlanta	234	7,503	12.65	.236	11.70	.147
Chicago	1,233	68,076		-.405		-.298
St. Louis	470	18,558		-.033		-.103
Minneapolis	499	28,081		.136		.178
Kansas City	2,394	56,903		.157		.102
Dallas	713	14,963		.967		.835
San Francisco	1,214	10,193		.508		.632
Loan/Deposit Ratio						
0 - 39%	215	18,410		-.119		-.268
40 - 49	589	38,676		-.087		-.121
50 - 59	1,952	63,275	1.02	-.067	1.18	.022
60 - 69	3,301	67,043		.029		.065
70% and up	1,348	34,274		.229		.115
Loan Size (FL & RE)						
Less than \$5,000	2,600	139,111		.173		.055
\$ 5,000 to 9,999	1,132	42,019		-.283		-.093
\$ 10,000 to 24,999	1,493	28,821	4.24	-.313	0.46	-.080
\$ 25,000 to 49,999	740	7,360		-.218		-.049
\$ 50,000 to 99,999	490	2,920		-.368		-.225
\$100,000 and up	950	1,447		-.303		-.258

*If information on any variable was omitted, such notes were dropped from the analysis. In these districts, the sample was small for feeder livestock loans, and a large proportion of the notes was dropped because of failure to report information on one or more of the variables. Careful perusal of all data indicate the results may not be typical.

Table 2
ANALYSIS OF FACTORS INFLUENCING INTEREST RATES
ON OTHER OPERATING EXPENSE LOANS IN THE NATION

Explanatory Factors and Subclassifications (Independent variables)	No. of Sample Loans	Total No. of Loans Expanded from Sample	Gross Variation in Rates Explained by Each Factor (In per cent)	Gross Differences from National Average Rate Associated with Membership in Subclass	Net Explanatory Contribution of Factor	
					When Combined with All Other Factors (In per cent)	Differences from National Average Rate Associated with Membership in Subclass
Totals and Averages	28,634	1,109,604		6.885	23.00	6.885
Gross Dollar Sales						
Less than \$5,000	3,518	179,323		.307		.247
\$ 5,000 to 9,999	5,470	287,676		.097		.044
\$10,000 to 19,999	6,964	346,479	2.47	-.072	0.89	-.069
\$20,000 to 39,999	4,749	187,561		-.115		-.056
\$40,000 and over	7,933	108,565		-.336		-.209
Net Worth						
Less than \$5,000	1,816	79,384		.319		.169
\$ 5,000 to 9,999	2,179	108,108		.312		.169
\$ 10,000 to 24,999	5,738	285,602	3.26	.129	0.93	.082
\$ 25,000 to 99,999	10,266	470,653		-.077		-.017
\$100,000 and over	8,635	165,857		-.361		-.283
Bank Size by Deposits						
Less than \$3 M	2,791	200,915		.204		.154
\$ 3 M to 4.9 M	3,325	227,420		-.048		-.024
\$ 5 M to 14.9 M	9,592	433,642	0.90	-.010	0.61	-.009
\$15 M to 24.9 M	2,767	87,098		.005		.007
\$25 M to 49.9 M	1,583	25,790		-.209		.090
\$50 M and up	8,576	134,740		-.153		-.182
Federal Reserve District						
Boston	481	4,421		-.022		-.240
New York	833	14,987		-.333		-.423
Philadelphia	393	7,916		-.696		-.748
Cleveland	855	36,052		-.571		-.686
Richmond	2,957	87,083		-.704		-.841
Atlanta	2,318	92,264	14.44	.275	14.24	.138
Chicago	2,622	233,112		-.343		-.237
St. Louis	1,983	115,698		-.201		-.232
Minneapolis	2,426	148,106		.083		.058
Kansas City	3,705	166,045		.146		.130
Dallas	4,156	122,383		.906		.856
San Francisco	5,905	81,583		.284		.559
Farm Type						
Meat Animal	5,508	189,029		.006		.010
Cash Grain	3,912	206,192		-.160		-.104
Specialty Crop	7,653	200,634	0.60	.028	0.86	.020
Poultry	365	10,867		-.002		.184
Dairy	2,458	83,400		.193		.309
General	8,738	419,482		.024		-.029
Security						
Unsecured	12,471	587,975		-.191		-.071
Collateral Mortgage	12,871	399,580	4.96	.341	0.78	.133
Other Securities	3,292	122,048		-.196		-.094
Loan/Deposit Ratio						
0 - 39%	1,306	93,359		-.307		-.311
40 - 49	3,072	179,282		.043		-.056
50 - 59	6,969	335,923	0.74	-.014	1.10	-.016
60 - 69	11,515	331,341		.032		.067
70% and up	5,772	169,999		.088		.132
Loan Size						
Less than \$1,000	9,783	512,489		.126		.077
\$ 1,000 to 2,499	7,453	331,938		-.066		-.025
\$ 2,500 to 4,999	3,576	129,772	1.16	-.135	0.46	-.078
\$ 5,000 to 9,999	2,794	75,531		-.154		-.111
\$10,000 and up	5,028	59,874		-.227		-.216

Table 3
ANALYSIS OF FACTORS INFLUENCING INTEREST RATES
ON OTHER OPERATING EXPENSE LOANS IN THE NATION

Explanatory Factors and Subclassifications (Independent variables)	No. of Sample Loans	Total No. of Loans Expanded from Sample	Gross Variation in Rates Explained by Each Factor (In per cent)	Gross Differences from National Average Rate Associated with Membership in Subclass	Net Explanatory Contribution of Factor	
					When Combined with All Other Factors (In per cent)	Differences from National Average Rate Associated with Membership in Subclass
Totals and Averages	28,634	1,109,604		6.885	26.38	6.885
Net Worth						
Less than \$5,000	1,816	79,384		.319		.459
\$ 5,000 to 9,999	2,179	108,108		.312		.344
\$ 10,000 to 24,999	5,738	285,602	3.26	.129	6.44	.161
\$ 25,000 to 99,999	10,266	470,653		-.077		-.072
\$100,000 and over	8,635	165,857		-.361		-.516
State						
Alabama	652	27,463		.049		-.120
Arkansas	375	1,439		-.068		.302
Arizona	481	19,011		.491		.533
California	2,684	25,162		.049		.335
Colorado	471	16,953		-.275		-.161
Connecticut*	22	170*		-.108*		-.069*
Delaware*	59	744*		-.727*		-.735*
Florida	345	7,941		.375		.324
Georgia	615	27,045		.695		.633
Idaho	1,115	21,364		.719		.775
Illinois	814	73,992		-.693		-.650
Indiana	474	42,894		-.604		-.571
Iowa	1,088	96,153		-.185		-.154
Kansas	840	54,439		-.021		.008
Kentucky	524	30,554		-.815		-.976
Louisiana	170	6,821		1.384		1.254
Maine	157	952		.044		.028
Maryland	92	2,977		-.616		-.606
Massachusetts*	71	789*		.518*		.426*
Michigan	444	28,068		.039		.009
Minnesota	902	73,488		.083		.074
Mississippi	411	17,745		.251		.206
Missouri	836	48,559		.107		.092
Montana	377	12,090		.160		.360
Nebraska	1,565	56,994	21.31	.185	23.82	.181
Nevada	154	549		.053		.349
New Hampshire*	62	562*		-.238*		-.285*
New Jersey*	66	1,435*		-.831*		-.558*
New Mexico	470	6,530		.627		.761
New York	794	14,212		-.306		-.311
North Carolina	1,651	47,381		-.809		-.992
North Dakota	398	29,927		.082		.121
Ohio	554	19,103		-.419		-.413
Oklahoma	252	22,397		.760		.708
Oregon	437	10,332		-.176		.118
Pennsylvania	335	8,456		-.659		-.743
Rhode Island*	1	43*		-1.245*		-.728*
South Carolina	351	12,146		-.207		-.327
South Dakota	663	28,606		-.003		-.012
Tennessee	536	25,382		-.746		-.893
Texas	3,649	111,719		.927		.939
Utah	136	3,455		.871		1.003
Vermont	168	1,905		-.179		-.203
Virginia	769	21,852		-.765		-.826
Washington	655	16,514		.283		.428
West Virginia	94	2,727		-.696		-.714
Wisconsin	227	22,196		.106		.101
Wyoming	235	5,585		.330		.438
Other	393	2,786		.257		.167

*Results need to be interpreted with care because of paucity of farm loans.

Farm Participation Loans in the Tenth Federal Reserve District

By Blaine W. Bickel

CAPITAL AND credit requirements of agriculture have increased rapidly in recent years both in the aggregate and on a per farm basis, and present trends indicate that credit needs will accelerate in the future. Yet, even now farmers are seeking lines of credit which exceed their banks' legal lending limits. This is especially true in the Tenth Federal Reserve District¹ due to the disparity between bank size and farm size and the predominant banking system.

Tenth District banking is predominantly unit banking, with New Mexico the only District state with provisions for limited branch banking. Many District banks in rural communities are relatively small; their capitalization and deposit growth rates have not kept pace with the dynamic credit requirements of agriculture. Total deposits at commercial banks in the District increased 67 per cent between 1956 and 1966. In contrast, the total outstanding dollar amount of agricultural loans increased 176 per cent during the same period.

District states have more larger-than-average farms, and investment in production assets per farm is quite high. An indication of the increase in investment and the subsequent increase in credit needs is reflected by figures

from the Federal Reserve System's agricultural loan surveys. During the 10-year period ended June 30, 1966, the number of borrowers increased 13 per cent, while the number of outstanding loans increased 23 per cent, and the number of loans in excess of \$25,000 increased 287 per cent. These increases appear even larger considering the fact that the number of farms decreased by 20 per cent during that period.

Many banks, however, cannot legally make a loan of \$25,000. The National Banking Act limits the size of loan a national bank can make to 10 per cent of the bank's net unimpaired capital and surplus, unless the loan is secured by livestock; in which case the limit is 25 per cent. Therefore, a \$25,000 loan requires that the lending bank have \$100,000 or \$250,000 in capital and surplus, depending on the purpose of the loan. At the time of the survey, one out of every nine banks in the District had less than \$100,000 and one third had less than \$200,000 in capital and surplus. Most states also set limits on the size of loan a state bank can make. These limits vary from state to state.

Customer requests for credit which exceed the legal lending limit of the bank are commonly referred to as overline requests. In the 1966 survey, District banks reported being

¹Colorado, Kansas, Nebraska, Wyoming, and parts of Missouri, New Mexico, and Oklahoma.

unable to grant 3,204 otherwise acceptable farm loans from their own resources during the previous year because requests exceeded legal limits. These requests amounted to more than \$131 million, or an average of \$41,000 per loan.

When a bank receives an overline request, there are alternative solutions such as suggesting a smaller loan, referring the customer to a larger bank or to some other financial institution, or arranging a participation loan with a second bank. The latter procedure is frequently preferred by the banker, since the alternatives may mean complete loss of the account.

SIGNIFICANCE OF PARTICIPATION LOANS

Several comparisons can be made to illustrate the relative importance of farm participation loans. In relation to all agricultural loans in the Tenth District, participation loans accounted for 12.6 per cent of the total dollar amount outstanding (Table 1), while the average ratio of participation loans to total loans in the United States was less than 5 per cent. The \$1.9 billion of all farm loans outstanding in the Tenth District represented only 16 per cent of total agricultural loan volume in the United States; but, when participation loans were isolated, the District had 45 per cent of the outstanding amount of these loans. Chart

Chart 1
DISTRIBUTION OF OUTSTANDING DOLLAR AMOUNT OF FARM PARTICIPATION LOANS BY FEDERAL RESERVE DISTRICT

June 30, 1966

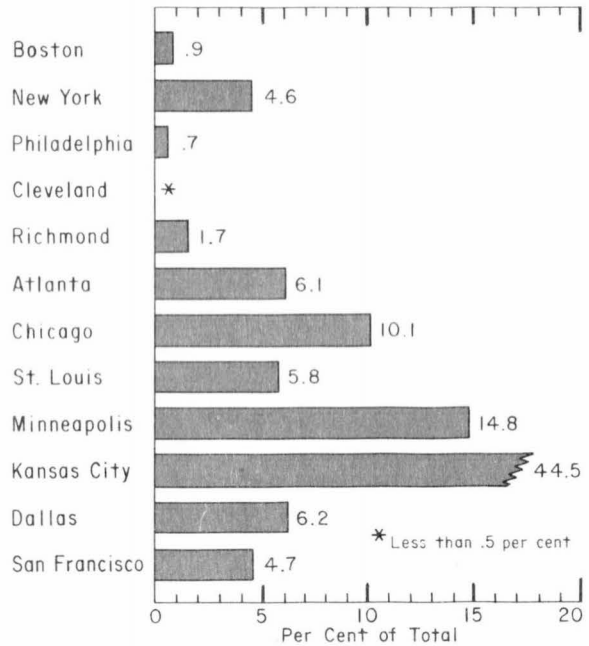


Table 1

OUTSTANDING AGRICULTURAL LOANS
June 30, 1966

	Tenth District	United States
All Loans		
Total Outstanding Amount (thousands)	\$1,913,076	\$11,711,129
Average Outstanding Amount	\$ 3,985	\$ 3,355
Participation Loans		
Total Outstanding Amount (thousands)	\$ 241,731	\$ 543,471
Average Outstanding Amount	\$ 80,678	\$ 69,090

NOTE: Participation loans refers only to those loans originated by banks reporting on the June 30, 1966, survey. Amount outstanding represents the amount held by the reporting bank plus the correspondent's share.

1 shows how the \$543 million in outstanding participation loans was distributed among the 12 Federal Reserve districts.

To provide a better understanding of the role of participation loans in agricultural finance in the Tenth District, this article will describe the characteristics of those banks which originated participation loans, the characteristics of farmers to whom these loans were made, and the characteristics of the loans. The relationships and trends presented hereinafter, while concentrating on the Tenth District, are representative of participation lending throughout the United States unless otherwise stated.

BANK CHARACTERISTICS

The 1966 survey showed that more than half of the District's banks reported working

with outside financing sources to obtain additional financing for their farm customers during the year preceding the survey, compared with one third of all banks nationally. A small percentage of these banks obtained funds from insurance companies or agricultural credit corporations, but the majority worked with correspondent banks. Nationally, it is estimated that the number of banks originating participation loans increased 213 per cent between 1956 and 1966, while the number of banks participating in loans originated by others increased 180 per cent.

Capital and Surplus

Banks with capital and surplus under \$200,000 originated 47 per cent of the number of outstanding participation loans in the Tenth District, while banks with capital and surplus greater than \$1 million originated only 6 per cent. Conversely, and somewhat contrary to the general concept of participation lending, 25 per cent of the outstanding dollar volume of participation loans originated from banks with capital and surplus of \$1 million or more; whereas, 21 per cent was originated by banks with capital and surplus under \$200,000 (Table 2). This was a result of the extreme variation in average loan size between those two capital and surplus categories.

The number of overline requests was closely associated with bank size. The distribution of the number of overline requests by size of capital and surplus was as follows: Less than \$100,000, 9 per cent; \$100-\$199,000, 26 per cent; \$200-\$299,000, 34 per cent; \$300-\$499,000, 27 per cent; \$500-\$999,000, 3 per cent; and over \$1 million, 1 per cent.

Banks reporting overline requests originated 38 per cent of the outstanding participation loan volume and only 30 per cent of total agricultural loan volume, which indicates that an appreciable number of financing difficulties were resolved through participation lending.

Table 2
FARM PARTICIPATION LOANS
BY BANK CHARACTERISTICS
TENTH FEDERAL RESERVE DISTRICT
June 30, 1966

	Amount Outstanding	
	Total (In thousands of dollars)	Average Per Loan
Capital and Surplus (In thousands of dollars)		
Less than \$100	\$ 7,273	\$ 20,478
\$100-\$199	43,948	42,177
\$200-\$299	55,813	96,624
\$300-\$499	49,935	86,158
\$500-\$999	23,312	89,194
\$1,000-\$1,999	34,871	267,745
\$2,000 and over	26,577	528,573
Loan-Deposit Ratio (Per cent)		
Less than 40	\$ — —	\$ — —
40-49	33,554	70,431
50-59	31,198	63,973
60-69	76,041	108,371
70 and over	100,940	75,865
Difficulty in Financing Farm Customers, Compared with Other Years		
Smaller	\$ — —	\$ — —
Same	24,421	82,424
Greater	43,026	50,149
No difficulty	174,285	94,616
Total	\$241,731	\$ 80,678

NOTE: Details may not add to totals due to independent rounding.

Overlines, however, were not the sole reason for originating participation loans.

Loan-Deposit Ratio

Since larger banks are usually located in money centers, they generally have higher loan-deposit ratios than smaller banks. A cross classification of capital and surplus with loan-deposit ratio showed that banks with over \$500,000 capital and surplus had loan-deposit ratios of at least 50 per cent, while a loan-deposit ratio of at least 60 per cent was observed at all banks with capital and surplus of more than \$2 million. No sample banks with loan-deposit ratios below 40 per cent originated participation loans, but almost three

fourths of the dollar volume was originated at banks with loan-deposit ratios of at least 60 per cent.

The survey revealed that the frequency of overline requests also was related to the loan-deposit ratio. In the Tenth District, 516 banks with loan-deposit ratios less than 50 per cent received 355 overline requests from farm customers; whereas, 378 banks with loan-deposit ratios of 70 per cent and over received 940 such requests during the year prior to the survey.

Difficulty in Financing Farm Customers Compared with Other Years

Each bank was asked to indicate the degree of difficulty, if any, encountered in meeting its financial requests, as compared with past years. The fact that none of the sampled banks originating participation loans reported less difficulty was of special interest. If any difficulty was present, it was at least the same as, or greater than, in past years.

Seventy-two per cent of the participation loan volume in the Tenth District originated from banks which reported no difficulty. However, the survey showed that some banks with overline requests did not report farm financing difficulties, which points out the difference of opinion among banks as to what constitutes difficulty in financing. For some banks, any loan request exceeding the bank's legal loan limit or resource capability represented financing difficulty, while other banks considered a similar situation normal business.

BORROWER CHARACTERISTICS

As of June 30, 1966, 2,755 farmers, or 1.1 per cent of all farm borrowers in the Tenth District, had 2,996 outstanding participation loans. The characteristics of these borrowers varied substantially, but examination of several measurable traits identifies those farmers most likely to have participation loans.

Net Worth of Borrower

In 1956, only 4 per cent of all farm borrowers in the Tenth District had net worth in excess of \$100,000, but data from this period do not indicate how many of these borrowers had participation loans. By 1966, 11 per cent of all borrowers attained this net worth level, with 1,569 having participation loans. This represents 57 per cent of all participation borrowers, who, in turn, accounted for 76 per cent of the outstanding dollar volume of participation loans.

With the exception of the lowest net worth category, average loan size increased as net worth increased (Table 3). The one exception can be explained by the fact that a few large borrowers had low or negative net worth; hence, a distorted relationship appears in this category.

Annual Gross Sales

Average loan size remained fairly constant for the three groups of borrowers having annual gross sales of less than \$40,000—although the number of loans and, consequently, the total amount outstanding, increased as annual gross sales increased. For those borrowers with gross sales reported at more than \$40,000 per year, the average loan was \$133,359—nearly five times as large as for the other groups.

Over 54 per cent of the District participation loan users had annual gross sales of at least \$40,000, compared with only 6 per cent for all farm borrowers. Nationally, half of the participation borrowers and 5 per cent of all farm borrowers produced at least \$40,000 of farm products each year.

Tenure

The survey revealed that full owners in the Tenth District held 48 per cent of the number of participation loans, while part owners held an additional 34 per cent, tenants 17 per cent,

Table 3
FARM PARTICIPATION LOANS
BY BORROWER CHARACTERISTICS
TENTH FEDERAL RESERVE DISTRICT

June 30, 1966

	Amount Outstanding	
	Total (In thousands of dollars)	Average Per Loan
Net Worth of Borrower		
Less than \$5,000	\$ 860	\$ 85,437
\$5,000-\$9,999	—	—
\$10,000-\$24,999	5,555	17,710
\$25,000-\$49,999	12,386	30,135
\$50,000-\$99,999	36,643	54,473
\$100,000-\$199,999	52,637	63,322
\$200,000 and over	131,103	176,232
Not reported	2,548	186,500
Annual Gross Sales		
Less than \$10,000	\$ 250	\$ 21,542
\$10,000-\$19,999	11,414	27,931
\$20,000-\$39,999	29,300	27,369
\$40,000 and over	200,768	133,359
Tenure		
Full-owner	\$158,972	\$109,521
Part-owner	53,781	53,096
Tenant	27,220	54,329
Landlord	1,759	57,063
Individuals by Age Groups, Corporations, and Partnerships		
Under 35	\$ 6,588	\$ 41,373
35-54	115,151	65,148
55 and over	42,233	80,292
Corporations	46,116	245,915
Partnerships	28,586	82,920
Not reported	3,057	272,000
Type of Farm		
Meat-animal	\$201,769	\$121,501
General	37,941	31,936
Cash-grain	1,632	12,000
Dairy	390	33,583
Total	\$241,731	\$ 80,678

NOTE: Details may not add to totals due to independent rounding.

and landlords 1 per cent. These figures compare closely with the actual distribution of farm tenure in the District, as found in the 1964 *Census of Agriculture* (full owner, 50 per cent; part owner, 31 per cent; tenant, 18 per cent; and landlord, 1 per cent). The \$109,521 outstanding per full owner probably was abnormal, since full owner farms are frequently small and likely to be debt-free.

Individuals by Age Groups, Corporations, and Partnerships

Average size of participation loans increased as the age of sole proprietors increased. Operators 55 years of age and over held an average of \$80,292 in outstanding participation loans, which was very close to the overall average for the District. Individuals held 67.8 per cent of the total outstanding volume, with over 70 per cent of that amount held by borrowers in the 35 to 54 age group.

Corporate farms were responsible for less than one fifth of the total outstanding participation volume, but each loan was approximately three times as large as the District average. Participation loans held by partnerships were slightly larger than the overall average and represented 12 per cent of the dollar volume. Corporations and partnerships accounted for a combined total of 10 per cent of all farm loans in the District.

Type of Farm

About 60 per cent of the participation borrowers were those whose farms were classified as "meat animal." These borrowers accounted for 83 per cent of the outstanding dollar volume of participation loans, and also held by far the largest average size of loan. It also was observed that a high proportion of operators of meat-animal farms had gross sales in excess of \$40,000 and fell into the over \$100,000 net worth group. Operators of general farms—those farms on which no single product or group of products amounted to 50 per cent or more of the value of all products sold—were next in total dollar volume, followed by cash-grain and dairy farms.

LOAN CHARACTERISTICS

The most striking characteristic of participation loans was their size. The total outstanding amount of participations held by bor-

Table 4
FARM PARTICIPATION LOANS
BY LOAN CHARACTERISTICS
TENTH FEDERAL RESERVE DISTRICT
June 30, 1966

	Amount Outstanding	
	Total (In thousands of dollars)	Average Per Loan
Purpose of Loan		
Buy feeder livestock	\$114,830	\$112,283
Buy other livestock	89,248	91,974
Other current expenses	19,571	55,902
Equipment	2,730	11,006
Consolidate or pay debts	2,966	15,635
Farm real estate	6,644	43,333
Improve land and buildings	5,534	90,709
Other	208	207,800
Maturity		
Demand	\$ 3,965	\$ 76,085
6 months or less	199,023	85,688
7-12 months	31,681	71,589
1-3 years	—	—
4-5 years	120	120,000
Over 5 years	6,943	39,015
Security		
Unsecured	\$ 30,332	\$113,355
Chattel mortgage	195,463	78,152
Farm real estate	7,882	50,066
Other	8,055	114,757
Method of Repayment and Interest Charge		
Single-payment	\$234,668	\$ 83,295
Instalment-outstanding balance	7,063	39,467
Instalment-add on	—	—
Instalment-discount	—	—
Total	\$241,731	\$ 80,678

NOTE: Details may not add to totals due to independent rounding.

rowers in the Tenth District, as shown in Table 1, was nearly \$242 million, and the average size of these loans was \$80,678. Participation loans also differed from other farm loans with respect to purpose, maturity, security, and method of repayment and interest charge.

Purpose

More than four fifths of the participation loan volume was used to purchase livestock, with feeder livestock alone accounting for 48 per cent and other livestock 37 per cent of

total participations (Table 4). In contrast, less than half of total farm loan volume was used to purchase livestock. It should be pointed out that loans to purchase feeder livestock were probably near their seasonal low at the time of year the survey was taken.

Other current expenses ranked next among the major purposes in terms of total amount outstanding, but comprised a smaller proportion of participation volume than among all farm loans. Participation lending appeared to be highly oriented toward short-term loans—only 5 per cent of the total was used to purchase farm real estate and improve land and buildings.

Maturity

As indicated above, participation loans were predominantly short-term notes—84 per cent having maturity dates of six months or less and an additional 13 per cent maturing within a year. In comparison, the survey showed that 63 per cent of all farm loans matured in six months or less and an added 25 per cent matured within a year.

All feeder livestock, other current expenses, and consolidation of debt participations picked up in the sample matured in one year or less and were single-payment notes. It was somewhat surprising to find that most farm real estate loans had maturities of six months or less, while loans for improving land and buildings generally fell into the “over 5 years” group. An explanation may be that banks frequently write a participation loan for the purchase of farm real estate on an interim basis with the understanding that some other financial institution will assume the loan after a given period of time.

Overdue participation loans represented 1 per cent of the outstanding volume, while 2 per cent of all farm loans were overdue. The sample showed that no participation loans in the Tenth District were more than three months overdue.

Security

No participation loans in the sample were co-maker or Government-guaranteed participations. Only 3 per cent of all farm loans was secured by these methods.

More than \$109 million of feeder livestock participations was secured by chattel mortgage, with the average loan size in this classification being \$113,352. All sample participation loans for equipment and consolidation of debts were backed by chattel mortgages, and a large proportion of other livestock and other current expense loans also was secured in this manner.

Method of Repayment and Interest Charge

The survey revealed that 97 per cent of all participations were single-payment loans, and that all sample loans for feeder livestock, other current expenses, and debt consolidation fell into this category. The remaining \$7 million outstanding was repaid in instalments with interest charged on the outstanding balance. No participation loans and only 2.5 per cent of all farm loans in the sample were made under the add-on or discount method of interest computation.

The average effective interest rate of all participation loans in the Tenth District was 6.3 per cent, compared with 6.7 per cent for all farm loans. These rates were identical to the national averages. The distribution of participation loan volume by interest rate in the Tenth District was as follows: 13.2 per cent at 5.0-5.9; 80.2 per cent at 6.0-6.9; 6.3 per cent at 7.0-7.9; and .3 per cent at 8.0 and higher.

CONCLUSION

Highlights of the participation phase of the Federal Reserve System's June 30, 1966, Agricultural Loan Survey have been presented to illustrate the magnitude of modern agricultural capital and credit requirements. The sevenfold increase in dollar amount of participation loans outstanding over the preceding decade can be viewed as an attempt by banks to adjust to, and keep pace with, the increasing financial requirements of agriculture.

The question still remains, however, as to whether the financial needs of tomorrow's sophisticated agricultural borrowers can be met adequately without developing other techniques for solving loan limit problems and for pulling outside funds into many agricultural areas.