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INFORMATION TECHNOLOGY AND CREDIT SCORING AT AGRICULTURAL BANKS IN THE NORTHEAST AND EASTERN CORN BELT

By

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Advances in information technology and data processing are rapidly changing the methods of communication and transaction processing procedures used by commercial banks. Banks that are able to make use of this technology should be able to provide better service to customers and/or provide the same services at lower cost. It may also allow banks to change how they do business in ways that will be beneficial to both their customers and their stockholders. Agricultural businesses will be well served by banks only if rural banks adopt and make appropriate and effective use of these new technologies.

One of the handicaps of lending in rural areas, and particularly in lending to farmers, is the geographical separation of businesses. Farms are often located considerable distance from a bank's offices. This distance hampers person to person communication and makes transfer of documents slow and costly. Information technology provides opportunities to speed and reduce the cost of such communications. Thus, technology offers the opportunity to improve efficiency and reduce costs.

However, rural areas also often have lower quality phone service and generally no cable service. Also, many farm operators do not have state of the art computer systems. This implies that the short run value of modern information technology in dealing with agricultural portfolios may be more limited than a straightforward assessment of the theoretical possibilities would suggest. In addition, the cost of adopting new technology is high and tends to be a similar over a wide range in bank size. Smaller rural banks may find not have enough offices or business over which to spread the development costs.

Within this environment, bankers must decide whether to delay adoption of new technology in light of the possibly limited short run benefits or move ahead aggressively in the hopes of gaining a competitive advantage over rival lenders. Or, they may be forced to move ahead to just stay even with the competition. If information technology is viewed as a new distribution channel for traditional banking products and services, rather than new products[2], a bank's decision is one of the optimal timing for, and speed of, adoption of technology, rather than a decision of whether to adopt or not.

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[2] DeYoung, Robert, "The Internet's Place in the Banking Industry", Chicago Fed Letter, Number 163, The Federal Reserve Bank of Chicago. , March 2001.

The objective of this research is to identify the extent of adoption of information and processing technologies by Northeast & Corn Belt Region banks that lend to rural and agricultural businesses. First, we describe the survey procedures used to collect the data. This is followed by: (1) a description of the characteristics of the surveyed and responding banks, (2) a discussion of the level of use of various new technologies by rural banks, (3) a detailed description of design and use of credit-scoring models by banks, and (4) some conclusions.

The Survey

The survey region for this study was the 15 state area bounded on the west and south by Michigan, Ohio, West Virginia, Virginia and included all states northeast of those states.[3] Banks were included in the study if they had either at least $5 million of agricultural real estate loans or at least $2.5 million of agricultural production loans as indicated in September 30, 1999 CALL reports (Report of Condition and Income for Commercial Banks and Selected Other Financial Institutions, Board of Governors of the Federal Reserve System).

Agricultural loan officers in the study area were asked to complete a mail survey in late 1999. The survey was mailed to an agricultural officer, or if one was not identified, then the survey went to a senior loan officer or chief operating officer of the selected bank. Survey instruments sent to banks in Pennsylvania, Michigan, Ohio, Virginia and West Virginia were mailed from The Pennsylvania State University. All others were mailed from Cornell University. Banks that did not reply to the first request were sent follow-up notices. All returned survey instruments were number coded to assure confidentiality of individual banks.

The questionnaire requested information on current and expected agricultural banking technology. In particular the survey examined the use of the internet, including e-mail and customer data transactions, use of ATMs and the use of credit-scoring models. Information on the computerized tools that would be useful to rural banks and the effect of internet delivery on the level of use was also obtained.

Of the 169 agricultural banks in the study area, 52 responded with usable surveys. Two returned the questionnaire and indicated that they did not make agricultural loans. The agricultural loan volumes listed on those two CALL reports were purchased guaranteed portions of FSA guaranteed loans. Responding banks included 17 from Ohio, 10 from New York, 9 from Pennsylvania, 8 from Maryland, 5 from Michigan, 2 from Vermont and 1 from West Virginia. No banks responded from some of the New England states where very few banks lend to agriculture.

Characteristics of Responding Banks

Responding banks were generally smaller than non-responding banks. Loan portfolio, total assets, total deposits, and equity for responding banks averaged less than 50 percent of similar measures for all 169 banks with reported agricultural loan volume in the geographic sample (Table 1). The loan to deposit ratio of sample banks as of September 30, 1999 averaged 86.6 percent while the same ratio of those responding was 85.2 percent. One of the responding

[3] Specifically, Michigan, Ohio, West Virginia, Virginia, Pennsylvania, Maryland, Delaware, New Jersey, New York, Vermont, Connecticut, Massachusetts, Rhode Island, New Hampshire and Maine.

banks had a loan to deposit ratio in excess of 142 percent and used commercial paper and Federal Funds as a source of loan funds. In general, large city based banks with relatively modest agricultural loan volume compared to total bank loan volume tended not to respond to the survey. At many of the non-responding banks, agricultural loans are a very small proportion of total loans and management may decide that study results would not be of sufficient value to them to justify responding to a questionnaire. In other cases senior management may not have not been sufficiently interested in the study to be sure that the questionnaire got to the appropriate person.

The characteristics of all banks and responding banks in this study compared to the banks in the LaDue et al[4] 1991 study showed considerable expansion in bank size, with most measures of size doubling to tripling during in the 8 year time period. The agricultural loan portfolio of all agricultural banks in the region averaged $28 million. Volume was about equally divided between agricultural production loans and loans secured by farm real estate. In 1991, the amounts were in the same proportion, but at about one-half of current levels. The increase was larger for responding banks, which averaged $42.3 million in total agricultural and real estate loans in 1999 compared of $13.9 million in 1991.

Table 1. Characteristics of Responding Banks and All Agricultural Banks Northeast and Eastern Corn Belt Banks, 2000

Characteristic	All Agricultural Banks[a]	Responding Banks[b]
	--- Average Value (Thousand Dollars)---	
Total loans	5,196,568	2,393,224
Total assets	8,611,946	3,218,063
Total deposits	5,732,501	2,171,377
Equity	639,728	273,502
Net income before extra items	84,979	31,603
Ag production and farm loans	14,436	23,764
Farmland loans	14,112	18,586
Total ag loans	28,548	42,350

[a] 169 banks in the study area with $5 million of agricultural real estate loans or $2.5 million of non-real estate (agricultural production) loans.

[b] 52 responding banks.

The size of the market area served by responding banks varied considerably (Table 2). Although some of the banks viewed their market area as regional, state or national, over 70 percent indicated that they served a local area. The geographical size of the market area of those banks that served a local market averaged 62 miles radius from the bank. Only 10 percent of the

[4] LaDue, E. L., W. F. Lee, S. D. Hanson, G. D. Hanson and D. M. Kohl, "Credit Evaluation Procedures at Agricultural Banks in the Northeast and Eastern Cornbelt", Department of Agricultural Economics Res. 92-3, Cornell University, February 1992.

banks were classified as serving clientele in a state or national market. Consequently, 90% of the replies are from banks that served a local or regional market.

Table 2. Geographical Size of the Bank Market Area
52 Northeast and Eastern Corn Belt Region Banks, 2000

Market Area	Percent of Banks
Local[a]	71
Regional	19
State	6
National	4

[a] Average local market radius of 31 banks was 62 miles

Use of Technology

Many of today's businesses rely upon the internet and e-mail for communication as well as dissemination and delivery of products and services. Information available on the internet increases in magnitude daily. Customer contacts and sales that used to be limited to the local area can be expanded to state, country and worldwide markets via the internet. Those businesses that have not adopted the new technology likely face a shrinking market, while others are expanding their clientele base. This is particularly true for the banking and financial services industry where many products are standardized and money can be wired to a distant location almost instantly. Technology frequently allows faster and lower cost service.

ATMs

Automatic teller machines (ATMs) represent a technology that replaces labor for the bank and provides convenience for the customer. Although not a new technology, the level of use of ATMs is indicative of a bank's commitment to the use of technology. Sixty-three percent of the banks indicated that they operated between one and ten ATMs (Table 3).

Table 3. Number of ATM Machines Per Bank
48 Northeast and Eastern Corn Belt Region Banks[a], 2000

Number	Percent of Banks
1-10	63
11-50	27
51-100	4
Over 100	6

[a] Four banks did not respond to this question.

Three banks, making up six percent of the responses operated over 100 machines. The average number of ATMs operated was 82. However, extracting three banks with over 3200 combined units reduced the average to 14 ATMs per bank. The banks with local market areas as discussed previously average 9 ATMs per bank.

E-mail

There is a wide variation in availability and use of e-mail at agricultural banks (Table 4). Nearly half of all banks surveyed did not have e-mail capability. Others used it many times each day. At about 70% of the banks, loan officers use e-mail once a week or less.

Table 4. Use of E-mail for Business Purposes by Agricultural Loan Officers
52 Northeast and Eastern Corn Belt Region Banks, 2000

Frequency of Use	Percent of Banks
E-mail unavailable	44
Once a month	12
Once a week	15
Once a day	4
Multiple times a day	25

Those bank officers who have e-mail capabilities use it primarily for correspondence with customers and credit committees (Table 5). Over half used e-mail to correspond with customers. As customers continue to expand their e-mail capabilities, this method of exchange of information will likely see increased usage.

Table 5. Activities for Which Loan Officers Use E-mail Correspondence
28 Northeast and Eastern Corn Belt Region Banks with E-mail, 2000

Activity	Percent of Banks Used
Loan documentation	29
Correspond with customers	61
Correspond with credit committees	61

With the decreasing number of banks in the United States and the increasing number of branches per bank, the geographical separation of credit committee members makes physical credit committee meetings more difficult. At this point in time 61% of the banks are using e-mail to facilitate credit committee functioning. However, email is used for loan documentation at only 29% of the banks.

The limited e-mail use is likely the product of several factors. Many banks have been slow in adopting this technology and making it available to their loan officers. Furthermore, only a limited number of customers have e-mail capacity. As of 1999, only 47 percent of farmers had computer access[5]. Thus, the technology is only useful for part of the customer base. Finally, some loan officers still see this as something else to learn and prefer to do it "the old

[5] National Agricultural Statistics Service, "Farm Computer Usage and Ownership" July 1999

Internet use by Loan Officers

The internet is a worldwide connection of computer users that allows one to obtain and disseminate information regarding products, services and informational topics. It includes access to all kinds of services and products, which can be used on-line or are available for purchase. About 40% of the agricultural loan officers indicated that internet access was unavailable for business use at their bank (Table 6). This response was similar to the previous report of 44% of the banks where e-mail was not available to the loan officers.

Table 6. Frequency with which Agricultural Loan Officers Access the Internet For Business Purposes
50 Northeast and Eastern Corn Belt Region Banks[a], 2000

Frequency of Use	Percent of Banks
Access unavailable	40
Once a month	18
Once a week	20
Once a day	10
Multiple times per day	12

[a] Two banks did not respond to this question.

A total of 78% of the loan officers reported using the internet once a week or less. About twice as many banks used e-mail multiple times a day compared to using the internet multiple times a day.

The banks with internet access were about equally divided between those using regular phone line modem (54 percent) and those that had purchased a service that provided speeds faster than the phone line (46 percent). Nearly fifty percent of the banks with the faster modem speed reported officers using the e-mail for business purposes either once a day or multiple times per day, compared to only 36 percent for those with slower speed. Either higher speed resulted in more usage or higher usage resulted in a demand for higher speeds. Agricultural banks located in smaller towns often do not have access to lines capable of higher modem speeds.

Web sites

According to a study by Financial Institution Consulting[6], small business customers who use electronic banking have higher than average demand deposit accounts and loan balances, better customer base penetration and lower than average attrition rates. This implies that many of the better bank customers appear to use web sites and that web sites could be important to bank success.

[6] NACHA, Electronic Payments Association, Internet Report 2000

Availability and Development

Individual web sites on the internet were reported by eighty-one percent of the banks responding. Of those with web sites slightly over one-third of the sites were developed within the last 12 months (Table 7). Only 12 percent of the banks reported web sites in existence for over three years.

Table 7. Length of Time Bank has had a Web Site
41 Northeast and Eastern Corn Belt Region Banks with Web Sites, 2000

Time	Percent of Banks
Less than 6 months	12
6 months to 1 year	25
1 year to 3 years	51
More than 3 years	12

An important issue in the use of web sites is who develops and maintains them. The design determines available features, presentation and functionality. An out-of-date web site, or one that contains incorrect information, can cause more problems than not having a site. Fifteen percent of the banks used outside consultants or technology firms to design and maintain their web sites (Table 8). This leaves 85 percent of the banks that use internal staff or company staff to author and maintain the web site.

Table 8. Primary Responsibility for Authoring and Maintenance of the Bank Web Site
40 Northeast and Eastern Corn Belt Region Banks, 2000

Responsible Party	Percent of Banks
Internal bank staff	63
Private consultant	5
Bank holding company staff	22
Technology firm	10

Fifty-one percent of the banks reported that one full-time equivalent staff was devoted to maintaining and monitoring the bank web site (Table 9). Those 23 percent of the banks reporting "none" in terms of full time staff are most likely using either outside hired consultants or have less than a full-time equivalent staff allocated to the position. One regional bank reported requiring over 10 full time equivalent staff to handle the maintaining and monitoring of their web site.

Table 9. Number of Full-time Equivalent Staff Devoted to Maintaining and Monitoring Bank Web Site
39 Northeast and Eastern Corn Belt Region Banks, 2000

Full-time Equivalent Staff	Percent of Banks
None	23
One	51
Two-five	15
Six-ten	8
More than ten	3

The officers were asked their opinion of their bank's web site compared with their closest competition. While one-third of the banks indicated that their site was either more or less advanced than the competition, the majority (67%) said it was about equal to their competitor's (Table 10).

Table 10. Comparison of Web Site with Closest Competitor's Site
42 Northeast and Eastern Corn Belt Region Banks, 2000

Comparison (My web site is:)	Percent of Banks
More advanced	14
About equal	67
Less advanced	19

Viewable Services (Information)

The information that a customer can view on the web site varies considerably from bank to bank. Some banks offer services that other banks not only do not provide, but also have no plans to offer in the future. For example, some banks allow customers to view their credit card balances and transactions. However, over half of the banks have no plans to provide this service (Table 11).

Table 11. Viewable Banking Services Currently Available and Planned on the Internet
43 Northeast and Eastern Corn Belt Region Banks, 2000

Information that can be viewed	Currently Available	Plan to Offer in: 1 Year or Less	1-5 Years	No Plans
	----------Percent of Banks----------			
Deposit rate information	54	9	14	23
Deposit account balances	39	23	12	26
Loan rate information	42	12	14	23
Stock price & investment information	49	14	2	35
Links to community businesses	37	5	12	46
View credit card balances & transaction	17	17	15	51
View deposit transfer of funds	44	24	12	20
View loan transfer of funds	39	22	12	27

The viewable banking services that were most frequently provided on the bank's web site were deposit rates and stock and investment information. Approximately half of the banks provided these services. Only about 40 percent of the banks provided deposit balance information but nearly one quarter of the banks planned to add this to their web site in the next 12 months. This still leaves 26 percent of the banks with no plans to provide deposit balance information. The ability to view the transfer of loan or deposit funds was offered by only a few of the banks. Relatively few banks offered the ability to view credit card balances and transactions on line. The reason for the latter is that often the smaller agricultural banks do no offer credit cards directly and often sub-contract with another credit card vendor.

One of the important issues in the design of a web site for a bank is determining which services customers will use. Assessing this situation is confounded by the fact that many customers are new computer users, so they have to learn how to make effective use of the services offered. A low level of use of a service may mean that customers do not find it of value, or it may mean that customers have not figured out how to make effective use of the service. Some customers do not have computer access or do not want to use the computer for their banking.

Table 12. Customer Use of Viewable Bank Services on Internet Site
40 Northeast and Eastern Corn Belt Region Banks, 2000

Information that can be Viewed	Number of Banks Replying	Weighted Average Percent of Customers [a]	Percent of Customers Using:				
			0	0-10	11-50	51-75	75-100
			----------Percent of Banks----------				
Deposit rate information	18	20.1	6	56	22	16	0
Deposit account balance	15	26.3	7	53	20	0	20
Loan rate information	15	11.6	13	67	13	7	0
Stock & investment information	18	16.4	6	56	33	5	0
Links to community businesses	14	10.1	7	72	21	0	0
View credit card balances & transactions	7	22.3	29	42	0	29	0
View deposit transfer of funds	14	24.0	7	64	7	7	15
View loan transfer of funds	13	23.2	15	54	8	15	8

[a] Assuming each bank is at the midpoint of the use category indicated.

The most used viewable site information was deposit account balances (Table 12). This is not surprising, as it is the most variable and possibly the most critical information provided for many customers. Although only a small number of banks allowed customers to view deposit or loan transfers, a relatively large number of customers, 23-24 percent, actually used this information at banks where it was offered. Only 10 -12 percent used loan rate information or links to other businesses. This information may lead one involved in planning web sites to focus on deposit information rather than stock and other community links that have very low use rates.

However, care must be exercised in translating frequency of use data into appropriate web site design. Everyone who banks has an interest in their account balances and may find the web a method of easily checking them frequently. People have need for loans only occasionally, and thus, the frequency that loan terms and interest rates will be accessed can be expected to be much lower. But, this does not mean that having this information is less valuable to the bank.

There are two other reasons for the lower availability of loan information. First, account information is highly sensitive and banks may perceive high costs of safeguarding the confidentiality of customer data. Second, disclosing rates to customers also discloses those rates to the competition. There is a trade off between providing rates to lure new customers and providing the competition with detailed information on loan products.

Interactive Services (Transactions)

Somewhat surprisingly 90 percent of the banks currently offered customers the ability to send e-mail to bank personnel via the web (Table 13). However, the loan officer at one-third of

the banks that offer that service to customers did not have email. This implies that email access by customers is limited to certain officers or a bank response line.

Interactive services on approximately 40% of the sites include viewing transfer of funds, transaction searches, and making payments. While only 12% of the sites currently provide the opportunity to open accounts on the web, about one-third of the banks offering customer interactive services plan to offer the ability to open an account on the web in the next 12 months.

Table 13. Interactive Services Available and Planned on Bank's Homepage
41 Northeast and Eastern Corn Belt Region Banks, 2000

Interactive Services	Currently Available	Plan to Offer in: 1 Year or Less	1-5 Years	No Plans
	----------Percent of Banks----------			
Open an account	14	33	18	35
Make payments	40	23	16	21
On line loan applications	23	28	19	30
Transaction searches	42	23	14	21
E-mail to bank personnel	88	0	2	10

Approximately 75% of the banks with web sites either have or expect to offer most of the interactive services within the next 5 years. Surprisingly, most of the banks who do not offer email contact to bank personnel have no plans to ever do so.

The loan officers were asked to estimate the percentage of their total customers who were using various interactive services on the web. Although the proportion of customers who were using these services was quite low, it is significant that about 20% of their customers were currently using interactive services (Table 14).

Table 14. Customer Use of Interactive Bank Services on Bank's homepages
40 Northeast and Eastern Corn Belt Region Banks, 2000

Interactive Service	Number of Banks Offering	Weighted Average Percent of Customers [a]	Percent of Customers Using: 0	0-10	11-50	51-75	75-100
			----------Percent of Banks----------				
Open an account	5	16.1	40	40	0	20	0
Make payments	13	16.3	15	62	8	15	0
Online loan applications	7	12.9	29	57	0	14	0
Transaction searches	13	23.6	8	61	8	15	8
E-mail to bank personnel	29	11.0	3	78	24	0	0

[a] Assuming each bank is at the midpoint of the use category indicated.

The ability to conduct transaction searches was the most heavily used interactive service. It was offered at most banks and was used by the highest proportion of customers at those banks. The ability to make loan applications was the service least used by customers. This is surprising since many large national companies, like the auto industry, now offer potential customers internet loan applications and approval. If this trend continues, additional banks may be forced to adopt this new technology.

Why Internet Banking Services are Offered

There are several reasons why banks may offer internet banking services. The responding bankers indicated that their most important reasons were to give a progressive image, increase customer base and expand the size of their banking network (Table 15). These rationale were clearly focused on methods to get more customers rather than to better service their existing customers.

Table 15. Reasons For Offering Internet Banking Services
40 Northeast and Eastern Corn Belt Region Banks, 2000

Reason	No. of Banks Responding	Level of Influence: Weak 1	2	Medium 3	4	Strong 5	Average Influence[a]
		----------Percent of Banks----------					
Customer demanded the services	22	9	18	23	23	27	3.4
Local competition was offering similar services	22	5	18	23	36	18	3.5
National competition was offering similar services	23	17	17	13	36	17	3.2
Increase bank efficiency and reduce banking cost	23	9	9	22	17	43	3.8
Increase customer base	23	4	4	13	36	43	4.1
Generate additional fees	23	14	17	26	26	17	3.2
Give progressive image	3	4	4	13	36	43	4.1
Expand the size/range of your banking network	23	4	0	17	43	36	4.0

[a] On a scale where 1 is weak influence and 5 is strong influence.

Surprisingly, it does not appear that competitive pressures, either local or national, nor customer demand, are the primary factors encouraging banks to develop web pages. Some banks believe that large national banks are very important, but some others do not consider that source of competition to be important. Similarly, the web is not viewed as an important method of generating additional fees. Improving bank efficiency and improving profitability were more important considerations than generating additional fees.

Why Internet Banking Services Are Not Offered

Banks without internet technology or services responded to a set of potential reasons for not offering the internet-banking technology (Table 16). The foremost reason was that the perceived costs outweighed the perceived benefits. At this point in time, these banks believed that the internet did not offer enough potential for the bank to make the development of an internet site a profitable venture. Lack of local internet service was not an important reason for not adopting internet–banking technology. Security concerns were also important for many of the banks without internet sites.

Table 16. Reasons Why Banks Have Not Adopted Internet-Banking Technology or Services 43 Northeast and Eastern Corn Belt Region Banks, 2000

	Banks Without Web Sites		Banks With Web Sites	
Reason	Number Responding	Average Agreement[a]	Number Responding	Average Agreement[a]
Lack of customer demand	8	3.3	17	2.8
No threat of competition	8	2.5	17	2.8
Perceived costs outweigh perceived benefits	8	3.9	17	2.9
No local internet access	8	2.1	17	1.4
Bank protections (firewall)	8	3.0	18	2.9

[a] On a scale where 1 is strongly disagree and 5 is strongly agree.

It is interesting that the banks with web sites had similar opinions as to the reasons why other banks did not have sites. The biggest difference between the "haves" and "have-nots" were those without sites had a stronger opinion that it was due to the perceived costs and benefits.

Competition In Agricultural Lending

As one might suspect, community banks, credit unions, regional banks and mutual funds were cited as the primary current competition for deposits (Table 17). Super regional banks and thrifts were much less important. Not surprisingly, finance corporations and foreign banks were not important since finance corporations do not usually use deposits as a source of funds and there are few foreign banks that are very active.

Table 17. Comparative Rating of Competition for Various Deposit/Loan Type
52 Northeast and Eastern Corn Belt Region Banks, 2000

Competition Type	Number of Replies	Deposit/Loan Type		
		Deposits	Agr. RE Loans[a]	Agr. Non-RE Loans
		-------Average Competitiveness Ranking [b]---------		
Community Banks	46	4.4	3.7	3.8
Thrifts	43	2.9	1.3	1.4
Credit Unions	45	3.9	1.2	1.5
Regional Banks	45	3.6	2.6	2.8
Super Regional Banks	45	3.0	2.0	2.3
Foreign Banks	40	1.1	0.9	1.0
Farm Credit System	46	NA	4.5	3.9
Finance Corp.	41	1.5	1.6	1.8
Mutual Funds	42	3.4	NA	NA

[a] Agricultural real estate loans

[b] Ranking of 5 is extremely competitive and 1 is not competitive

The bankers considered Farm Credit System the most competitive for agricultural real estate loans and non-real estate loans, followed by community banks (Table 18). Regional and super regional banks were viewed as less competitive for loans than for deposits. These larger banks appear to be more successful in appealing to general depositors where convenience and rate are more important than they are in lending where reliability as a lender, service and other factors are more important.

Most respondents believed that foreign banks were not currently competitive. Foreign banks may be unattractive to farmers or the foreign bank may not have developed a farm service approach that appeals to farmers.

In an effort to assess the changing nature of competition, lenders were asked to provide ratings of competition for deposits and loans three years in the future. Community banks were expected to continue to provide the strongest competition for deposits, but the greatest increase in competitive pressure over the next three years was expected to come from mutual funds and regional and super regional banks.

Table 18. Comparative Rating of Competition for Deposit/Loan Types Based on Banking, Three Years in the Future.

52 Northeast and Eastern Corn Belt Region Banks, 2000

Competition	No. of Replies	Deposit/Loan Types		
		Deposits	Agr. RE Loans	Agr. Non-RE Loans
		---------- Average Competitive Ranking [a] ----------		
Community Banks	44	4.3	3.7	3.9
Thrifts	43	2.9	1.5	1.6
Credit Unions	43	3.8	1.4	1.9
Regional Banks	43	4.0	2.9	3.1
Super Regional Banks	43	3.5	2.4	2.8
Foreign Banks	39	1.6	1.3	1.4
Farm Credit System	42	NA	4.4	4.0
Finance Corp.	39	1.9	1.9	2.2
Mutual Funds	36	3.9	NA	NA

[a] Ranking of 5 is extremely competitive and 1 is not competitive.

The Farm Credit System is expected to continue to be the strongest competition in agricultural lending, with community banks following reasonably close behind. The primary change in the competitive position is a general increase in competitive pressure from all other sources. Given the general increase in loan volume of non-institutional lenders, it is somewhat surprising that finance corporations were viewed as weak competition now and in the future. This may imply that non-institutional lenders are not providing particularly competitive terms, but are getting their loan volume by focusing on higher risk situations where higher rates are appropriate and bankers are not particularly desirous of obtaining that kind of business.

Usefulness of Computer Tools to Lenders

In an effort to determine the types of computer tools that would be useful to agricultural lenders, respondents were asked to rank the value of different types of programs and to indicate their level of interest in specific programs. Rankings varied widely, with little consensus on which types of tools would be of most value to lenders. Farm financial planning tools received the highest rating, though not substantially above an average ranking (Table 19).

Table 19. Ranking of Types of Computer Programs for Credit Analysis
52 Northeast and Eastern Corn Belt Region Banks, 2000

Computer Programs	Banks Replying	Average Ranking [a)]
Access to peer group farm data similar to RMA	37	2.6
Calculator and graph generator	36	3.0
Credit score generator for a given borrowers data	37	3.0
Computer based farm financial planning	37	2.3
Analysis models	37	3.1

[a] On a scale where 1 is highest rank and 5 is lowest rank.

When asked about specific tools, lenders did differentiate somewhat more (Table 20). A set of Farm Financial Standards Council consistent forms received the highest rating, followed by annual cash flow, annual pro forma statements and access to data on peer groups of farms similar to that found in Robert Morris Associate's publications. Crop insurance and land price models were of least interest.

Table 20. Rating of Level of Interest in Specific Individual Computer Programs
52 Northeast and Eastern Corn Belt Region Banks, 2000

Computer Programs	Banks Replying	Ranking of Interest [a]
Access to peer group of farms similar to RMA	40	2.2
Calculator and graph generator	39	2.5
Credit score generator for a given borrower's data	39	2.8
FFSC consistent financial statements	17 [b]	1.9
Annual cash flow planning	35	2.1
Annual pro-forma statements	35	2.3
3-5 year financial planning	34	2.4
Monthly cash flow planning (dairy)	13 [b]	2.9
Capital investment lease analysis	17 [b]	2.7
Farmland lease analysis	36	3.1
Crop insurance evaluator	35	3.3
Maximum bid price for land	35	3.0

[a] On a scale where 1 is highest interest and 5 is lowest interest.
[b] This question not included on Pennsylvania survey.

A basic question involved in making computer programs available to bankers is how programs should be distributed. One of the easiest ways would be to make them available on the internet. Internet availability would be helpful for a majority of banks, but would be of little value to a significant number of banks (Table 21). This likely means that the internet should not be the only method of delivery of computer programs designed for banker use.

Table 21. Ranking of Extent that Delivery Over the Internet Will Affect Bank's Use of Computer Programs 48 Northeast and Eastern Corn Belt Region Banks, 2000

	Unlikely Use		Use Unaffected		Increase in Use	Average Ranking [a]
	1	2	3	4	5	
	---------- Number Distribution of Banks ----------					
All banks	4	9	10	18	7	3.3
Banks with internet	0	5	4	14	7	3.8
Banks w/out internet	4	4	6	4	0	2.6

[a] On a scale of 1 to 5, where 1 is highest rank and 5 is lowest rank.

Credit Scoring

All respondents were asked to provide information on any credit-scoring procedures used in their banks. Credit scoring was defined as the use of quantitative analysis to develop a numerical rating, which is used for assessing credit risk of a loan application. This scoring mechanism includes risk-rating systems, worksheets, spreadsheets and both computerized and non-computerized models.

Level of Use

Credit scoring models were not widely used at the responding banks (Table 22). Only seven of the banks used credit-scoring models to evaluate agricultural real estate and non-real estate loans. Formal credit-scoring systems for consumer loans are in use at slightly over one-third of the banks, and a smaller percentage use the credit scoring on non-farm residential and commercial and industrial loans.

Table 22. Credit-Scoring Models Used to Evaluate Bank Loans 50 Northeast and Eastern Corn Belt Region Banks, 2000

Type of Loans	Percentage of Banks That Use Credit Scoring
Agricultural RE loans	14
Agricultural non-RE loans	12
Consumer loans	34
Non-farm residential loans	26
Non-farm commercial /industrial loans	22

Since few of the responding banks use credit scoring for agricultural loans, the data provided below should be used with extreme caution. The sample size is small enough that individual responses could strongly influence the results presented.

Loan officers at banks that used credit scoring were asked how strongly each of several factors influenced them to adopt and use a credit-scoring model for agricultural loans. The factors included operating efficiency, loan monitoring, risk assessment, consistency and others (Table 23). The factor that received the highest ranking from the respondents was to "price loans more effectively". However, portfolio monitoring, credit risk assessment and improved consistency followed closely behind.

Table 23. Factors Influencing Banks Adoption and Use of Credit-Scoring Models for Agricultural Loans
7 Northeast and Eastern Corn Belt Region Banks, 2000

Factors	Average Rankings [a]
Improve lender and bank operating efficiency	3.3
Price loans more effectively	3.9
Monitor loan portfolio more effectively	3.6
Improve the ability to access credit risk for an individual borrower	3.7
Improve the ability to assess credit risk for loan portfolio	3.1
Improve consistency in loan evaluation	3.6
Loan acceptance/rejection decisions	3.0
Counsel customers about strengths and weaknesses	2.4

[a] Ranking of 1 is weak and 5 is strong

Models were not generally designed to provide a basis to counsel loan customers about strengths and weaknesses of their business, since this factor received the lowest ranking of the 8 factors investigated. Bankers were asked the source of the model they were using. Two-thirds (4 banks) responded that they developed their own model (Table 24). One of the banks reported using a model from a technology firm and the remaining bank adopted their model from another institution. One bank failed to indicate their model source. No banks were using models from a bank holding company or lending school.

Table 24. Characteristics of Current Credit-Scoring Model
6 Northeast and Eastern Corn Belt Region Banks, 2000

Sources	Percent of Banks
Technology firm	17
Adapted from another institution	17
Developed own	66

The current credit-scoring models in use at banks have been employed for one to ten years, with an average of five years for all loan types (Table 25). Commercial and industrial loan models had been in use slightly longer than agricultural models

Table 25. Years the Credit-Scoring Model Used to Evaluate Loans
6 Northeast and Eastern Corn Belt Region Banks, 2000

Loan Type	Years
Non-real estate agricultural loans	4.8
Loans secured by farm real estate	5.3
Commercial and industrial loans	5.4

In 1991, LaDue et. al. reported that only 21 percent of the formal credit-scoring systems were computerized. Today, this percentage has increased to 33 percent of the models from banks reporting (Table 26). Although it appears that there has been some movement towards computerization, the small sample size makes this conclusion tentative.

Table 26. Computerization of Credit-Scoring Models for Various Loan Types
6 Northeast and Eastern Corn Belt Region Banks, 2000

Loan Type	Percent Computerized
Non-real estate agricultural loans	33
Loans secured by farm real estate	33
Commercial and industrial loans	17

With a credit-scoring model a lender must decide whether to use it on each particular loan application. More complicated non-computerized models tend to get used less than simple computerized models. Some experienced bankers prefer to continue to evaluate loans using their old system, rather than adopt a quantitative system. If a system is not used on many loans, it will lose its ability to communicate standards and portfolio quality to senior management and auditors.

In the last 12 months, the banks had used their credit scoring model on 52 percent of the agricultural loans and 43 percent of the commercial and industrial loans. The level of use on agricultural real estate loans was identical to the level of use on non-real estate loans. These results are significantly lower than the levels of use reported by LaDue, et.al. in 1991. The credit scored loans represented about 65 percent of the total loan dollar volume for agricultural loans and 55 percent of the total loan dollar volume for commercial and industrial loans (Table 27).

Table 27. Volume of Various Loan Types Evaluated with Credit Scoring in last 12 Months
7 Northeast and Eastern Corn Belt Region Banks, 2000

Type of Loans	Percent of Loans
Non-real estate agricultural loans	65
Loans secured by farm real estate	65
Commercial and industrial loans	55

Credit scoring models may be designed for use on only the smaller loans or only larger loans. Some models are used on all sizes of loans. Seventy-one percent of the banks indicated that loan size does affect whether a credit-scoring model is used to evaluate a specific loan request. This did not vary with loan type. All types of loan size policies were found in this study (Table 28). For example, one bank credit scored all agricultural non-real estate loans under $100,000, another all over $50,000 and a third all over $10,000

Table 28. Loan Sizes For Which Banks Typically Use Credit-Scoring Models
4 Northeast and Eastern Corn Belt Region Banks, 2000

Loan Size	Loan Types		
	Agr. RE Loans	Agr. Non-RE Loans	Commercial and Industrial Loans
	----------Percent of Banks----------		
Less than $10,000	25	25	25
$10,000 – $50,000	50	50	50
$50,000 – $100,000	100	100	100
$100,000 – $250,000	75	75	75
$250,000 – $1,000,000	75	75	75
Over $1,000,000	75	75	75

General borrower characteristics had little influence on the level of use of credit scoring. New borrowers and good borrowers were subjected to credit scoring with nearly the same frequency. (Table 29).

Table 29. Effect of Borrower Type on Credit-Scoring Use
7 Northeast and Eastern Corn Belt Region Banks, 2000

Statement	Agricultural Real Estate Loans	Agricultural Non Real Estate Loans
	---------- Average Agreement[a] --------	
Most new borrowers are evaluated with credit scoring	4.57	4.57
Borrowers with strong relationships are evaluated with a credit-scoring model	4.43	4.43
Well collateralized borrowers are evaluated with a credit-scoring model	4.43	4.43
Blue-chip borrowers are evaluated with a credit-scoring model	4.43	4.29

[a] On a scale where 1 is strongly disagree and 5 is strongly agree.

Historically, many banks charged the same interest rate on all loans of a similar type, with no adjustment for the differences in risk between loans. Currently most banks differentiate rates based on size, term, risk and other factors. Six out of the seven bank officers indicated that

interest rates vary depending upon the credit risk of the agricultural borrower. Unanimously, all seven bankers indicated that interest rates on commercial and industrial borrowers vary by credit risk.

Since a credit score is usually an indicator of the level of risk, one of the logical uses of credit scoring is to provide the basis for risk premiums that banks charge. The credit score was used to determine pricing on over half of the farm real estate loans and nearly three-quarters of the farm non-real estate loans. The average interest rate spread between the lowest and highest risk borrower is 175 to 185 basis points (Table 30).

Table 30. Interest Rate Difference Between Lowest and Highest Risk Borrowers
7 Northeast and Eastern Corn Belt Region Banks, 2000

Loan Type	Average Basis Point Differential	Percent of Banks That Use Credit-Scoring Model to Price
Non-real estate agricultural loans	182	71
Loans secured by farm real estate	185	57
Commercial and industrial loans	175	57

Model Design

The importance of individual variables in credit scoring models are determined by what is included and the relative weights given each variable. Repayment capacity is clearly the most important variable in these models, with an average of over 21 percent of the weight (Table 31). Collateral and solvency were also important variables. Each accounted for about 16 percent of the model. Financial efficiency, production efficiency and third party credit ratings were of little importance.

Table 31. Approximate Percentage Weight Given to Various Categories in Bank Credit-Scoring Model.
4 Northeast and Eastern Corn Belt Region Banks, 2000

Factor	----------Percentage Weight by Loan Types----------		
	Non-RE Agriculture Loans	Loans Secured by Farm Real Estate	Commercial & Industrial Loans
Collateral	16.0	16.0	16.0
Management abilities	8.8	8.8	8.8
Solvency	16.3	16.3	16.3
Liquidity	10.0	10.0	10.0
Profitability	7.5	7.5	7.5
Character of borrower	6.7	6.7	6.7
Financial efficiency	2.5	2.5	2.5
Production efficiency	1.7	1.7	1.7
Repayment capacity	21.3	21.3	21.3
Third-party credit ratings	3.0	3.0	3.0
Other	6.2	6.2	6.2
Total	100.0	100.0	100.0

Why Credit Scoring Is Not Used

The 46 banks not currently using credit scoring were asked their plans for future use. About 13 to 15 percent plan to implement credit scoring for agricultural loans and 28 percent plan to do the same for commercial and industrial loans (Table 32).

Table 32. Plans to Implement Credit-Scoring Model by Banks Not Using a Model
43 Northeast and Eastern Corn Belt Region Banks, 2000

Loan Types	Percent of Banks Planning to Implement
Non-real estate agricultural loans	15
Loans secured by farm real estate	13
Commercial and industrial loans	28

When asked to indicate the importance of selected reasons for not adopting credit scoring, lenders generally indicated their lack of confidence in the ability of models to accurately determine risk (Table 33). The lack of quality information available from the borrowers also ranked high.

Table 33. Reason For Not Adopting a Credit-Scoring Model
34 Northeast and Eastern Corn Belt Region Banks, 2000

Reasons	Ranking By Banks [a)]
Inability of existing models to determine credit risk	3.7
Increased data collection effort or costs	3.1
Negative borrower reaction to evaluations	3.2
Lack of quality information available from borrower	3.4

[a] On a scale where 1 is strongly disagree and 5 is strongly agree.

Conclusions

A mail survey of agricultural banks in the northeast and eastern corn belt found that 60 percent of the banks maintained web sites. Over a third of these sites were less than a year old. Bank personnel rather than consultants developed 85 percent of the sites. Only 46 percent of banks had access to the internet that was faster than a phone modem.

Banks are starting to use the internet for communication. A high proportion of banks offered contact to bank personnel (88%) over the internet. However, only 44 percent of loan officers used email on a regular basis. It was generally used for correspondence with customers and credit committees.

The most important use of the internet was to provide information (viewable services). Deposit rate information (54%), stock price and investment information (49%) and loan rate information (42%) were the most frequently provided. Deposit account balances and links to community businesses were also provided on many web sites. Only 10 to 25 percent of customers were accessing the information available on the internet. Deposit rate information and account balances were the most used services.

Use of the internet for transactions (interactive services) was less developed. Over 40 percent of the sites allowed customers to make payments or conduct transaction searches. The ability to make loan applications (23%) or open an account (14%) were offered less frequently. However, 70 to 80 percent of the banks expected to offer these services within the next five years. Currently, only 10 to 20 percent of bank customers were using the bank web sites' transaction services.

Bank web sites were generally developed to expand customer base rather than provide better service to existing customers. A bank web site was also thought to give the bank a progressive image. Banks without internet banking generally believed that the benefits did not outweigh the costs and there was concern about bank protection (firewall).

Community banks and the Farm Credit System were viewed as the strongest competitors for agricultural banks, both currently and in the future. Regional banks were also expected to be important competition.

Loan officers generally expressed luke-warm interest in computer programs designed to assess particular issues in farm business analysis. In general terms, computer based farm financial planning was the highest rated. Specific programs of interest were a Farm Financial Standards Council consistent set of financial statements, annual cash flow planning and availability of peer group data similar to that offered by Robert Morris Associates.

Use of credit scoring by agricultural banks appears to have declined since a survey of credit scoring practices in 1990. Current systems are used primarily for loan pricing, improved risk assessment, portfolio monitoring and to improve consistency of loan evaluation. About 65 percent of agricultural loans are evaluated with credit scoring systems at the institutions with such systems. Some credit scoring systems are used for only small loans, some for only large loans and some for nearly all loans. Of the variables included in the credit scoring models, the most highly weighted was repayment capacity. This was followed in importance by solvency, collateral and liquidity measures. Third party credit ratings, production efficiency and financial efficiency measures were given little weight.