To the Graduate Council:

I am submitting herewith a thesis written by Steven C. Green entitled "An Analysis of the Effect of Bank Management, Market Structure, and Economic Conditions on Nonmetropolitan Bank Lending Performance in Tennessee: Pre- and Post-Deregulation." I have examined the final copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Agricultural Economics.

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AN ANALYSIS OF THE EFFECT OF BANK MANAGEMENT, MARKET STRUCTURE AND ECONOMIC CONDITIONS ON NONMETROPOLITAN BANK LENDING PERFORMANCE IN TENNESSEE: PRE- AND POSTDEREGULATION

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In loving memory of my mother whom the Lord called for on December 14, 1981.

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ABSTRACT

The primary objective of this thesis was to evaluate the effects of bank management, market and organizational structure and demand factors on bank lending behavior in pre- and postderegulation periods. This study was composed of four separate but related models that described the total, agricultural, consumer and commercial/industrial lending practice of nonmetropolitan Tennessee banks.

Multiple regression analysis based on eight years (1977-1984) of secondary data on nonmetropolitan Tennessee banks and counties was used to determine which factors (management, structure and demand) were significant in explaining bank lending. In addition, dummy variables were used to represent pre- and postderegulation periods and to test the hypothesis that the two periods represent separate structural models.

Results indicated that bank management factors were significant in explaining lending practice in all four models. A banker's attitude toward risk, measured by the amount of government securities held and the level of nonperforming loans, affected lending overall and in each specific loan category evaluated. Both market structure, i.e., concentration level and amount of nonbank competition, and organizational structure, i.e., whether an independent bank or one affiliated with a holding company, affected bank lending practice in all except the agricultural model. The demand factor, income per capita, was only significant in explaining total and consumer lending behavior.

The null hypothesis was rejected, suggesting that there are a difference in bank lending practice between pre- and postderegulation periods.

These results suggested that deregulation will have an impact on nonmetropolitan capital markets. Deregulation is likely to result in more competitive markets with more affiliated institutions. Such conditions, if they occur in nonmetropolitan counties, suggest that lending to most sectors is likely to increase as a result of deregulation. However, the study was limited in terms of the relatively few postderegulation years included in the study. In addition, results of the agricultural lending model were severely limited by a lack of relevant data.

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CHAPTER I

INTRODUCTION

Problem Statement

The sweeping changes in financial markets brought about by financial deregulation in the early 1980s suggest the need for renewed consideration of factors affecting commercial bank lending practice in nonmetropolitan counties. Competition is expected to increase due to expanded powers for thrift institutions and banks and a loophole in the new law creating the possibility of expansion for nonbank institutions. Thus, the monopolistic power of some banks in rural areas will deteriorate. In addition, interest rates have been deregulated creating greater need for asset-liability management on the part of all banks, but particularly small, rural institutions. Finally, general economic conditions in rural areas, particularly those dependent upon agriculture, mining and some manufacturing industries have deteriorated, potentially affecting the demand for credit from rural financial institutions. In this thesis the impacts of management, bank organizational structure and economic conditions on lending practice in both pre- and postderegulation periods are analyzed.

To fully understand the extent of deregulation begun in 1980, past regulation in the industry must be evaluated first. The early 1920s marked a period of limited government regulation. As a result, the number of new banks rose rapidly to over 30,000 by the end of the decade. However, with the 1929 crash of the stock market, only 14,208

banks remained by June of 1933 [Cooper and Fraser]. With an unregulated banking system, economic instability forced the federal government to impose new, more stringent regulations. In 1933 Congress passed the Glass-Steagall Banking Act, which had several significant goals: 1) to create a more competitive environment; 2) to set minimum capital requirements for national banks; 3) to establish rules on the underwriting of securities; 4) to give the Federal Reserve System power to set the reserve requirement; 5) to create the Federal Deposit Insurance Corporation (FDIC); and 6) to set the maximum interest rate that could be paid on deposits (Regulation Q) [Cooper and Fraser; Kidwell and Peterson].

As a result of these regulations the banking industry became more stable with bank failures a rarity. Banks slowly increased their loan-to-asset ratios in the late 1940s, as they regained some of the vitality lost during the 1930s. The 1960s represented a time of economic expansion, and banks aggressively tried to capitalize on the situation. However, the 1970s and early 1980s marked a period of highly volatile interest rates, thereby putting heavy pressure on many financial institutions. The banks' prime rate rose from 5 percent in 1972 to 12 percent by 1974 only to fall back to 10 percent two years later. By 1980-1981, the prime rate had leaped to 20 percent [Fraser and Kolari]. With the rising prime rate, banks' profitability declined due to loan portfolios composed primarily of long-term, fixed rate, low interest mortgages. Furthermore, disintermediation[1] was occurring since Regula-

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[1]Disintermediation is a process in which investors withdraw funds from commercial banks and reinvest in other financial markets.

tion Q restricted depository institutions from offering an interest rate on deposit accounts competitive with nonbank institutions such as money market mutual funds. In addition, the Federal Reserve System's control over the money supply was reduced by declining enrollment of banks. This decline can be attributed to the requirement that member banks maintain a higher reserve than nonmember banks. Also, credit unions, which perform many of the same functions as member and nonmember banks, did not have any reserve requirements. Therefore, depository institutions were subject to different standards of regulations [Fraser and Kolari].

New legislation was required to combat volatile interest rates, help the Federal Reserve regain control of the money supply and equalize the regulatory burden on all depository institutions. In 1980, Congress passed the Depository Institutions Deregulation and Monetary Control Act (DIDMCA) followed by the Garn-St. Germain Depository Institutions Act of 1982. This new legislation destroyed many barriers between financial institutions and weakened others with the aim of improving overall efficiency in financial markets.

There were several major features of the DIDMCA. First, it allowed nonbank financial institutions to compete with commercial banks in the issuance of transactions accounts, i.e., checking accounts. Second, it allowed the Federal Reserve to set reserve requirements and thus control the money supply for all depository institutions. Third, it phased out interest rate ceilings on deposit accounts (Regulation Q) over a period of six years [Kidwell and Peterson].

The Garn-St. Germain Act made several adjustments to the DIDMCA and continued with additional significant reform of the financial system. First, the Act mandated a new policy to allow for mergers across state boundaries and between different types of institutions in order to prevent bank failures. However, preference was still given to mergers between state institutions and between similar types of institutions. Second, depository institutions were granted the right to offer money market deposit accounts with no interest rate ceilings. Third, depository institutions were given the ability to alter their asset allocation in order to become less interest rate sensitive. This adjustment was to be accomplished through better diversification of assets with a larger percentage of assets being less sensitive to interest rate changes.

Deregulation has forced banks to adjust to a new financial environment. At the same time, each banking decision is different depending on the management team, bank and market structure and the general economy in which the bank operates. As a result, in order to better understand lending practice in pre- and postderegulation environments, it is necessary to evaluate which factors are important in influencing a bank's behavior--management, bank or market structure and economic conditions. Such an evaluation is provided in this thesis.

Research Objective

The primary purpose of this study is to investigate the importance of bank management, bank and market structure and local economic conditions in explaining bank lending practice. In addition, the impact

of deregulation on the relative explanatory power of the variables is considered.

Management is a potentially important determinant of lending practice since bank managers formulate the strategic plan for a bank's future. Thus, management determines how aggressive a bank will be in making loans, creating new products and selling services. The bank's desired level of profitability and tolerance of risk are considered in the decision-making process, while remaining constrained by state and federal regulations governing bank operations. In addition, the influence of deregulation on management has varied. Weaker management teams have fallen victim to bank mergers and acquisitions while stronger management teams have grown and prospered in this era of change. With banks in rural areas being forced to adjust to the downturn in the agricultural sector as well as to deregulation, many independent banks have become affiliates of larger banks as part of a strategy for survival.

As with management, bank structure may influence how a bank behaves in terms of its lending practice. Whether the bank is a small, independent bank or an affiliate of a larger bank holding company may have an influence on the bank's lending, services and products offered, and involvement in community affairs [Edwards; Barkley, Potts and Mellon; American Banking Association]. The goals of each management team may be different, because independent banks may place a high priority on maintaining a high level of community involvement through providing products and services to better meet the needs of the community, while affiliates may focus exclusively on maximizing total profit.

In addition, there may be other goals and objectives, such as risk aversion, which may rank higher with management than the two typically considered: community service and maximizing total profit. However, researchers have not reached a consensus as to whether affiliate or independent banks can best meet a community's credit needs [Colclough and Lange; Kaufman, Mote and Rosenblum; Benston, Hanweck and Humphrey; Weisbrod].

To determine the future demand for credit from local banking institutions, economic conditions must be analyzed. Population and income figures for the county in which a bank operates are typically used as proxies for local economic conditions. As population and income levels rise, the demand for new loans increases. Particularly in a deregulated financial system, additional data on the amount of competition from other financial institutions must also be considered in determining the demand for a bank's products and services. The amount of competition from other financial institutions will influence the bank's market share and thus loan activity.

Deregulation of commercial banks has led to major changes in the banking industry. Profits became highly variable with increased competition from new, nonbank institutions which can now provide products that had previously been restricted to banks [Kaufman, Mote and Rosenblum]. The increased competition among financial institutions has led to a rise in debt formation with the profit margin on loans shrinking [Colclough and Lange]. At the same time, higher concentration of banks in some local markets may result from liberalization of branching laws [Colough and Lange]. This high concentration may result in less

capital available at a greater cost if a monopoly situation arises [Edwards]. In some ways, deregulation has actually led to a reregulation of the commercial banking industry, such as when the Federal Reserve Board tried to simplify the truth-in-lending law (Regulation Z). This process resulted in 159 additional pages of new regulations to which bank management must conform [Eccles].

Research Approach

This research is designed to investigate the relative significance of three sets of independent variables (bank management, bank or market structure and local economic conditions) in explaining nonmetropolitan bank lending practice. While the theoretical basis for including particular independent variables in the model is discussed in Chapter II, past research suggests that these are relevant classes of variables to include in such an analysis. In addition, deregulation is expected to result in structural change in financial markets and, therefore, changes in factors affecting lending practice. As a result, it is hypothesized that there are significant differences in factors affecting bank lending practice in a pre- and postderegulation period. However, to statistically test this hypothesis, a null hypothesis is formulated that there are no significant differences in factors affecting bank lending practice in a pre- and postderegulation period. Rejection of the null hypothesis is anticipated.

Multiple regression analysis is used to investigate which factors are significant in explaining nonmetropolitan bank lending practice. Four models are used to analyze factors affecting total, agricultural,

consumer and commercial/industrial lending. In each model, the same subsets of independent variables are included: management, structure and economic conditions. In addition, the null hypothesis is tested by using dummy variables in the analysis to represent the predereguIation (1977-1980) and postderegulation (1981-1984) periods.

In Chapter II the theoretical basis for this research and a review of the available literature on this topic are provided. In Chapter III a description of the models used in testing the hypotheses and a justification of each model's composition are provided. Results of the analysis are contained in Chapter IV. In Chapter V a summary of the results, relevant conclusions and a critique of the research approach are provided. Furthermore, implications from the analysis which apply to the rural/agricultural sector are drawn.

CHAPTER II

THEORY AND LITERATURE REVIEW

Theoretical Basis for Determining the Impact of Market and Organizational Structure on Bank Lending Practice

The commercial banking industry at the local county level has been characterized as an oligopoly, composed of a few banks where the actions of one bank affect the decisions of another [Edwards; Alhadeff]. The legal restrictions placed on the chartering of new banks, branch banking and interstate banking created a natural oligopoly among county banks. Furthermore, government regulations restricting the products that banks could offer created a relatively homogeneous industry. Theory suggests that firms in an oligopoly must constantly consider the reactions of other institutions when new products are offered or prices are changed [Nicholson]. When a bank decides to introduce a new product, for example, some form of retaliation may be expected from rival banks.

Banks that operate in a highly concentrated market, either due to a low market demand for products and services such as in a sparsely populated county or due to horizontal mergers, are responsive to the actions of other firms such as lowering prices or introducing new products [Nicholson]. With high levels of concentration in an industry, the price of products will rise in order to provide a wider profit margin, while the quantity of products produced will fall. Since firms cannot increase market share through a price or product change, nonprice competition is employed. A bank's most common means of nonprice compe-

tition is through offering quality, personal service to its customers, generally through conveniently located bank branches.

In a highly concentrated bank market, there is little or no competition among commercial banks. Lack of competition can lower the quantity and quality of benefits that the community receives, as well as increase the cost of services [Benston]. Conversely, in a highly competitive market with a low concentration level, a high level of banking services can be expected.

The demand relationship for an oligopoly is typically explained by use of a kinked demand curve. Based on economic theory, as the price of a product in an oligopoly market increases, the demand curve is more elastic than what it is with a price decrease--creating the kinked demand curve. Above point i_o in Figure 1, other banks may not respond to an increased interest rate by one bank. Therefore, the bank will lose customers and D will be the relevant demand curve. If the bank lowers the interest rate below i_o, other banks will be forced to respond and the demand curve will be D'. The initial price reduction generally occurs when a firm can take advantage of lower per unit cost, possibly due to economies of scale. Thus, the process creates what is called the kinked demand curve.

Some branch banks or those banks affiliated with a multibank holding company system may lower the price of a product(s) below cost (loss leader strategy) in order to improve their market share, a strategy that is particularly costly to independent banks [Edwards]. Furthermore, through the establishment of branches or affiliates, banks are able to service a larger number of customers than can be reached by

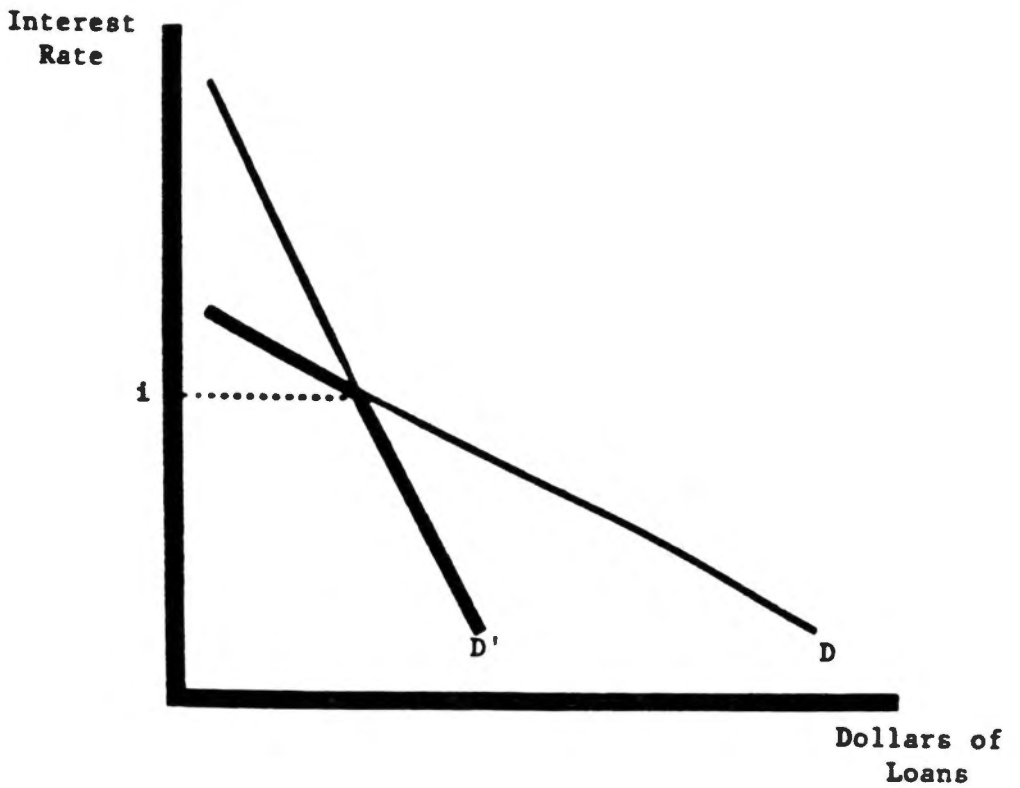

FIGURE 1

Kinked Demand Curve

independent banks [Benston]. Branching or acquisition may permit the banking industry to reach a stage of optimality where all the customers are serviced adequately.

With an imperfect market such as that described above, the optimal price-quantity relationship is not necessarily attained, as it would be under perfect competition. Excess capacity is created in the market while price is artificially held high. According to Edward Chamberlin, banks will "...protect, over short periods, their profits, but over longer periods, their numbers, since prices do not fall costs rise, the two being equated by the development of excess productive productivity" [Chamberlin, p.94]. Under these circumstances, a bank will seek stability in banking operations while forfeiting some degree of profits.

The level of concentration or oligopoly influence in a local banking market must be considered before an evaluation of bank lending practice can be made. Bank concentration levels are typically measured through employment of the Herfindahl Index[2], as used in this analysis.

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[2]The Herfindahl Index (HI) analyzes the level of concentration in a market by considering the market share controlled by each bank within the county. This index is formulated as follows:

$$HI = \sum_{i=1}^{N} (A_i / A)^2$$

where,

N = number of banks within each county
A = total assets of all banks in the county
A_i = assets of bank i

When this index equals one, a bank monopoly exists in the county. As this index approaches zero, the banking market is less concentrated.

In addition, a competition variable (the percentage of total assets in the county accounted for by other competitors) will be used to determine the influence of nonbank financial institutions within a county.

The type of commercial banking organization (affiliate or independent) is included as a variable in this study to investigate how lending practice differs depending upon whether a bank is centrally managed through a holding company or managed independently. Although the theoretical basis for determining how bank organizational structure affects lending performance is rather limited, there is an abundance of empirical evidence available. These studies were used as the basis for including a bank organizational structure variable in this study and are reviewed below.

Review of Literature on the Impact of Market and Organizational Structure on Bank Lending Practice

A study by Edwards in 1965 concluded that bank practice was significantly affected by only minor changes in market structure. Data were obtained from the Federal Reserve Board for 1400 banks that were located in 36 standard metropolitan statistical areas (SMSAs). The SMSAs were selected to obtain a variety of population sizes, banking structures and banking markets. Based on the results of the empirical analysis, market concentration was found to be the primary factor affecting bank performance. The study noted that as bank concentration levels increased, the interest rate earned on savings deposits decreased and the finance charge on loans increased. This result suggests that imperfect competition existed in the banking industry, which in turn

affected bank profitability. Also, bank output, as measured by the loan-to-deposit ratio, was found to decrease as market concentration increased. However, a high degree of multicollinearity between the variables measuring concentration and demand prevented identification of the precise factors that affected bank practice, so the results were based on a grouping of several variables to measure bank concentration and demand.

In a more recent study, Smirlock proposed that bank market share[3] affected the profitability of the bank, not market concentration. Two years of data, 1973 and 1978, were obtained from the Federal Reserve Bank for 2,700 banks from seven unit banking states operating within the Kansas City Federal Reserve district. The study showed that the market share variable was significant and positively related to bank profitability. Thus, when the market share of the bank was determined, bank profits could be calculated without considering the level of market concentration. This finding suggests that an increase in bank market share rather than bank collusion led to increased profits.

In 1976, Heggestad and Mingo studied how market structure affected the ability of the bank to recruit customers. The study analyzed how bank concentration was related to bank prices and services. They hypothesized that as the monopoly power in a market increased, bank prices would also increase, with bank services falling. Data on 332 banks were collected from 69 SMSAs by means of a telephone survey, with

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[3]The market share of the bank was measured by the dollar value of deposits held by the bank divided by the dollar value of deposits held by all banks in market.

primary interest being the rivalry among individual banks for household deposits. Multiple regression analysis was used to determine the effect of varying levels of market concentration on bank prices and services. Results indicated that the relationship between market concentration and bank prices and services was statistically significant and for certain prices and services, the relationship was best described by a curvilinear model. These results indicated that an increase in concentration for a market with a relatively low level of concentration would have a greater impact on bank prices and services than the same increase in concentration for a highly concentrated market. These findings imply that if bank concentration increases then bank performance may be significantly reduced, especially in bank markets with relatively low concentration.

"Economic theory posits that a relationship exists between market structure and the performance of firms in the market" [Heggestad and Mingo, 1977, p. 649]. To evaluate this relationship, a telephone survey was conducted in April, 1973, to collect data on 236 banks that were located in 52 SMSAs. The data consisted of prices for two products that the banks offered--car loan interest rate and demand deposit service charge. Bank concentration and price were found to be positively related, with an increase in the concentration level associated with an increase in the price of products offered. Thus, the authors concluded that "effective monopoly" did exist in bank markets that were concentrated, as they generally are at the local level. The authors found that 13.3 percent of U. S. non-SMSA counties were monopolized by a single bank. This study also considered the possible effects of deregu-

lation on the financial system. Findings indicated that a major market restructuring would occur when thrift institutions were allowed to offer a wider range of products in competition with banks. This process would lower concentration levels and thus price, but "effective monopoly" might remain in some areas of the banking industry.

All but one of the studies reviewed above found a statistically significant relationship between the level of concentration in banking markets and bank practice. Smirlock's results to the contrary may have been due to the focus in his study on unit banks, while other studies considered varying types of banking structures and markets. This thesis will be more limited than previous studies by using data only from the State of Tennessee. However, a total of eight years will be analyzed to examine the changing environment of the banking industry. In addition, based on past research, a bank market concentration variable is incorporated in the models to examine its effect on bank lending practice, taking into account measures of bank management, organizational structure and local economic conditions.

The issue of how bank organizational structure affects bank practice was the purpose of a study by Barkley, Potts and Mellon in 1984. A comparison was made between nonmetropolitan communities in Colorado, a unit banking state, and Arizona, which permits unlimited branching. Data on branch banks in Arizona were obtained from each branch main office for the period of 1977-1980. The Polk's World Bank Directories and Federal Reserve Bank reports were sources of data for the unit banks in Colorado. Loan-to-deposit ratios (LDRs) were used as the dependent variable in a regression analysis including a number of

independent variables related to conditions in the bank market: population, age classification, income, type of employment, unemployment rate, competition from other institutions and market concentration (as measured by the Herfindahl Index). Dummy variables were used in the model to designate whether an institution was a branch or unit bank, an independent or affiliate of a bank holding company and whether a new bank entered the market or the market remained the same.

This study found that in rapidly growing communities, branching contributed to a higher lending base due to an intrarural transfer of funds from slowly growing to more rapidly growing rural areas. Also in these communities, larger branch banks were managed more aggressively, as shown by comparison of LDRs, to discourage any competitive institutions from entering the area. This aggressive management contributed to a higher lending base due to management's willingness to accept more risk, instead of maintaining a high capital reserve. The LDRs in slower growth Arizona communities with branch banks were lower when compared to the unit banks of Colorado, suggesting that less credit was extended to these communities as funds were likely shifted via branches to high growth Arizona communities. LDRs were found to be rising when the economy of the community experienced constant growth in population and income with a high level of competition from competing financial institutions. Also, a highly variable bank market share was found in the unlimited branching state as compared to the unit banking state. This finding suggests that a constant disequilibrium occurs in markets permitting branching, possibly due to the continuously changing situation involved in branch banking, i.e., greater ability for innovation.

Barkley, Potts and Mellon provided an in depth comparison of a state that allowed branch banking and a state that allowed unit banking. However, the variable used to measure local competition ignored the market share controlled by competing institutions. In addition, no variable was used to explicitly measure the aggressiveness of bank management. Additional independent variables are incorporated into this thesis to improve on the research conducted by Barkley, Potts and Mellon.

Operating behavior differences (between affiliate and independent banks) in the capital market have been identified. Kolb proposed that because of these differences, affiliate banks and independent banks could be treated as two separate entities. A data set was collected from the Federal Reserve Reports of Condition on 4,592 national banks for 1975-1976. Although the study did not control for individual bank size, a dummy variable was used to designate whether the bank was located in an SMSA or non-SMSA.

Results from Kolb's multiple regression analysis indicated that independent banks maintained a higher ratio of capital to assets and had a faster rate of capital growth than did affiliates. Furthermore, independent banks paid lower dividends and operated at a lower level of expenditures than affiliates. The flow of capital from affiliates to their holding company is restricted by regulation, so capital flows to the holding company are likely hidden. Such a practice would explain the high dividends and operating expenses paid by affiliates. However, the reverse flow from the holding company to affiliates is not restricted. When a holding company has control over capital, it can

efficiently allocate capital to affiliates that are in need of additional funds to meet public needs. This process allows affiliates to better meet, potentially, the demand for loans in their market as compared to independent banks.

Kolb found some major differences between affiliates and independent banks in terms of capital availability. Affiliates may or may not be able to meet the local needs of the public, because major decision making for affiliates is centralized at the holding company level. The failure to control for bank size may have biased the results against affiliate banks in terms of the lower capitalization rate found.

With the advent of banking deregulation, Kaufman, Mote and Rosenblum examined how commercial banks could respond to this policy change. Many banks had "brick-and-mortar" branches that were considered economically infeasible with the elimination of Regulation Q. With this change, the number of bank personnel was also too high since service was not the only means of allowable competition. Bank holding companies which were used as a means of regulatory avoidance prior to deregulation were expected to continue to grow with a focus on new product formation and increased geographical expansion.

Lawrence and Watkins conducted an evaluation of the impact of multibank holding company (MBHC) entry into rural areas. Data were collected from 177 rural counties in Iowa and Missouri for the years 1972-1983 and divided into two time periods: prederegulation (1972-1980) and postderegulation (1981-1983). The first time period was used as a basis for comparison to evaluate the effect of bank deregulation and the agricultural recession on MBHC entry. Based on the findings of

a logit analysis, it was concluded that MBHCs were entering rapidly growing rural areas that were not highly concentrated. No significant difference was found between the two time periods. Thus, the conclusion was drawn that the effects of banking deregulation and recession in the agricultural sector had no influence on the entry of MBHCs.

The results of the studies reviewed above suggest that bank organizational structure has an effect on bank performance. As a result, an organizational structure variable was included in the model of bank lending practice used in this study. In addition, the last two studies reviewed concluded that deregulation and MBHCs were creating change in the banking industry, although the full effect of the structural change has not been realized. However, the study by Lawrence and Watkins was limited by the three years of data after initial passage of the DIDMCA in 1980. Passage of major deregulatory policies did not end until 1984, so the commercial banks were still in a period of adjustment. The postderegulation data set used in this thesis was extended to four years (1981-1984) in order to allow for adjustment by commercial banks to the major aspects of deregulation.

Theory of Credit Demand

The credit demands of a community are responsive to present economic conditions and expectations for the future. According to economic theory, several factors can affect the demand for credit, including the income of consumers, inflation rate, a change in trends or customs, and population.

According to demand theory, bank loans can be classified as a superior good, because the demand for loans increases proportionately more than an increase in consumer income, ceteris paribus [Mansfield]. This income effect occurs due to the positive relationship between consumer income and the demand for loans. The opposite effect may also occur: when consumer income falls, the demand for loans may drop at a proportionately higher rate. When the overall level of population increases, the demand for loans by consumers and businesses will also increase. Higher rates of inflation have an effect on bank loans, for as the inflation rate rises, the real interest rate decreases, causing bank loans to become relatively inexpensive. The last major factor affecting demand for loans is a change in trends or customs in the market with the most recognizable being general economic trends. After a recession, the market will expand through the development of new office complexes, shopping centers and residential subdivisions. This trend increases the demand for bank loans to fund construction projects. All of these factors contribute in some way to determination of credit demand.

Literature Review on Local Economic Conditions

A study by Barkley and Helander evaluated whether local economic conditions affected the loan volume of banks or whether bank loan volume affected economic conditions. Data were collected from state records and individual banks in nonmetropolitan Arizona communities. A test for causality was applied to a time-series data set (1975-1980) with variables included to examine the flow of funds, through sales and loans,

from one community to other communities of equal or larger size in terms of population, retail sales and employment. The results indicated that bank loan volume was affected by local economic conditions rather than the reverse.

In the study by Barkley, Potts and Mellon described earlier, the analysis included variables on population, income and major types of employment as measures of local economic conditions in nonmetropolitan communities. The counties that experienced the highest rate of growth in terms of population were found to have the highest demand for loans.

In a study by Lawrence and Watkins, bank profitability and population were used as measures of rural economic conditions. Counties with a high population growth rate were more likely to experience entry by multibank holding companies in response to such growth.

The results of these studies suggest that economic conditions affect bank lending. While Barkley and Helander used retail sales in their causality analysis, this variable did not reflect the amount of funds that may have flowed out of a community. Consequently, income is used in this thesis as a proxy for local economic conditions in the bank lending models. In addition, the importance of including a population variable was supported by the results of Lawrence and Watkins. The inclusion of both population and income variables should strengthen the results of this study.

Theory of Management Decision Making

The primary objective of management in a static analysis is assumed to be profit maximization. However, profit maximization is

limited by how managers decide to measure profit and the risk level that management is willing to accept [Moyer, McGuigan and Kretlow]. Profitability is commonly considered as a measure of a firm's welfare. However, this variable is biased since such factors as performance, economic conditions and expectations are not considered. Managers must be concerned with short- and long-term planning, overall efficiency of bank operations, continuing education programs and community awareness [Myers]. This planning process takes into account and is influenced by how aggressive and innovative the management is in coping with changing conditions in the banking industry, e.g., interest rates, regulations. If the bank is able to maintain a good level of performance in lending operations, then the bank should experience continued long-term profitability [Myers].

In order to increase profits, the cost of operations must be reduced. As a result, managers are using new technological devices such as automatic teller machines and microcomputers and have employed part-time employees as a cost reduction measure [Bruere]. With the advent of deregulation, bank managers can no longer maintain a conservative attitude toward bank operations. The ease of entry into bank markets is creating increased competition and pressuring managers to accept greater levels of risk in order to maintain the same market share [Horvitz and Shull]. Managers are now removing funds from low risk government securities and placing them into loans with a higher risk level.

Bank managers must be able to evaluate the market and judge what the future may hold, because bank loans must be structured to meet

customer needs and repayment schedules in order to minimize the risk of default [Morsman, Jr.]. Those loans that are eventually classified as nonperforming, whether or not collected at a later time, create extraordinary administrative expenses due to the extra paperwork and collection time required. Furthermore, delinquencies cause cash flow problems in the management of funds by the lender.

Review of Literature on Management

In a 1984 report on small banks, Lowe, Thomas and Lowe stated that management would become more aggressive in the 1980s due to the development of new products and services and the recruitment of better educated employees. In order to remain competitive, bank management would have to concentrate on better meeting the needs of the community by developing "growth strategies." These strategies are defined as short- and long-term planning with three primary goals: to increase the number of new customers, to increase use of bank facilities and to increase profit margins. The two key factors hypothesized to affect bank growth in the postderegulation period are local economic conditions and the number of different competitors entering the financial market. These factors, along with extensive market research, must be considered in deciding on the type of strategy to follow. For example, if other banks in the market were found to be vulnerable to competition, then a competitive strategy would be followed. Since the authors were evaluating community banks, they suggested that the welfare of the customer should be a high priority for bank personnel in strategy formation.

According to Bruere (1986), chairman of the Community Bankers Council for the American Bankers Association, small banks can continue to prosper through aggressive management in the employment of new technology. Bruere recognized that market share would be lost to nonbank institutions under deregulation. However, through the introduction of new products, he believed that the loss in bank market share would be minimal.

The attitude of management towards risk was the subject of a study by Milkove. Data were obtained on banks from the Federal Reserve Reports of Condition and Income (1978-1981). Banks were then divided in two ways for purposes of comparison: by metropolitan versus nonmetropolitan status and by bank size (classified into six groups). Portfolio variables were used to measure the risk position taken by bank management. Loan losses were found to be lower for nonmetropolitan than metropolitan banks, suggesting that nonmetropolitan banks accepted lower risk loans. However, loan losses of both metropolitan and nonmetropolitan banks actually declined as bank size increased. The study found metropolitan banks to be less profitable, as measured by return to equity capital, than nonmetropolitan banks. When analyzing the ability of banks to adjust to changing market conditions, measured by volume of large money market certificates, nonmetropolitan banks were found to adjust as rapidly as metropolitan banks when pressured to do so.

These studies suggest the need for dynamic bank management in order to develop new products and services and to meet increased competition from nonbank institutions. Barkley, Potts and Mellon found evidence of this aggressive management through comparison of loan-to-

deposit ratios. However, the study lacked a variable to precisely measure the aggressiveness of management. As a result, variables such as total government obligations and lagged nonperforming loans that measure how management reacts in both a competitive (postderegulation) and noncompetitive (prederegulation) environment are included in this thesis. Increased competition forces management to operate more aggressively and, thereby, accept a higher level of risk in order to maintain the same market share. Milkove found that management of nonmetropolitan banks could be very aggressive as compared to metropolitan banks, when forced to react. This finding suggests that nonmetropolitan banks may become even more aggressive with the advent of deregulation in order to maintain their market share. Because nonmetropolitan banks have been more profitable than metropolitan banks in the past, nonmetropolitan bank markets may experience a higher rate of entry due to changes in regulatory policy. This increased competition presents an important challenge to the management of nonmetropolitan banks.

Impact of Deregulation on Factors Influencing Bank Lending Practice

Deregulation is expected to have an impact on the structure of the banking industry. Bank management will likely undergo a pronounced change between the pre- and postderegulation periods, due largely to an increasingly competitive market structure at the local level. Managers will likely be forced to accept greater levels of risk in their portfolios in order to compete with nonbank institutions. Deregulation is expected to affect bank organizational structure and cause a shift

toward affiliation with a bank holding company. Bank affiliates have greater flexibility due to their larger and more diversified capital base, suggesting a greater ability to respond to economic change, particularly in rural areas.

Summary

The literature reviewed above indicated the importance of bank market and organizational structure in explaining lending practice. Therefore, both of these factors are included in this study. With the lack of empirical evidence found on the influence of local economic conditions on lending practice, economic theory was used to suggest proxy variables to measure the credit demand in each nonmetropolitan county (population and income). Previous empirical studies focusing on bank management lacked explicit variables to measure the effect of management upon lending performance, so such variables were included in this study to make it more comprehensive. Thus, bank market and organizational structure, local economic conditions and bank management variables were included in this study.

An explanation of the procedures and models to be used in testing the effect of these factors on bank lending practice is included in the next chapter. Each variable and its expected influence on lending (i.e., whether a positive or negative effect) is described. In addition, the sample and sources of data are also discussed at the end of the chapter.

CHAPTER III

METHODS

Model Justification and Discussion of Expected Signs on the Independent Variables

Based on the results of studies examined in Chapter II, three types of independent variables were chosen to be used in this thesis: bank management, market and organizational structure and local economic conditions. The primary objective was to determine which of these factors was important in explaining bank lending practice. In addition, this study hypothesized that there are significant differences in factors affecting bank lending practice in pre- and postderegulation periods.

This study was composed of four separate but related models with the following dependent variables: total loan-to-deposit ratio, agricultural loan-to-deposit ratio, consumer loan-to-deposit ratio and commercial and industrial loan-to-deposit ratio. Each model analyzed the banking market from a different perspective by including variables that pertained to a specific segment of the bank's loan portfolio.

Two variables were used to evaluate the market structure faced by banks. The Herfindahl Index was used to measure the concentration level of banks within the county. Inclusion of a market concentration measure was important since as the number of banks declines due to mergers or acquisitions, there is a greater possibility that some form of collusion may arise between rival banks. This Herfindahl Index has been used in several previous studies by Heggestad and Mingo; Heggestad and Rhoades;

Barry and Pepper; and Barkley, Potts and Mellon. The expected result of increased concentration is a reduction in lending. The loan-to-deposit ratio is expected to decrease as the market becomes more concentrated as shown in the studies by Edwards and Barkley, Potts and Mellon.

A competition variable was used to measure the total assets controlled by nonbank financial institutions (credit unions and savings and loan associations) within the county. No prior study has used this type of a competition variable. In a highly competitive market, a higher loan-to-deposit ratio was expected due to more aggressive lending by banks. This positive relationship between market competition and the loan-to-deposit ratio was suggested indirectly in a previous study [Barkley, Potts and Mellon]. These relationships between competition and concentration in an imperfect market and bank lending practice are consistent with the tenets of oligopoly theory.

Bank organizational structure was identified by a 0,1 dummy variable in order to distinguish between an affiliate of a bank holding company and an independent bank. The studies by Lawrence and Watkins; Barry and Pepper; Rose and Fraser; and Barkley, Potts and Mellon suggested the importance of using a bank organizational structure dummy variable. Results from these studies found a positive relationship between affiliation with a holding company and loans to deposits. Therefore, with the dummy variable equal to one for an affiliate of a bank holding company, the sign of the dummy variable was expected to be positive in the total loans to deposits model.

Bank management was evaluated through the inclusion of a government obligations variable and a lagged nonperforming loans variable. The coefficients for these two variables were expected to exhibit negative and positive signs, respectively. Since the government obligations variable represented an alternative use of loanable funds, an inverse relationship was expected to exist between this variable and the loan-to-deposit ratio. However, bank management that was overly conservative would likely maintain a higher proportion of assets in low risk government obligations. The second variable measured the nonperforming loans in the bank's loan portfolio. This variable was expected to have a positive sign, because management that was aggressive in lending practices would likely have a higher percentage of nonperforming loans. The variable was lagged since it was assumed that management would use the previous year's nonperforming loans to determine the amount of loans to be created in the current year. Both of these variables were used in the study by Milkove to examine bank attitude toward risk.

Although two variables, population and income, were initially considered as proxies for demand, a high degree of correlation between the two led to the elimination of one variable. Since income data were available for and specific to each type of model, income per capita was included. Based on economic theory, this variable was expected to have a positive relationship with loans to deposits, because as the community expands and prospers, the credit demand would likely increase due to new development projects and a desired higher level of living, e.g., new

auto, larger house. Barkley, Potts and Mellon; Lawrence and Watkins; and Heggestad and Mingo found this same relationship in their studies.

The first model examined lending practice in total by using the total loan-to-deposit ratio as a dependent variable. This model was formulated as follows:

Model I -

$$TLD = f(HI,CP,IC,GA,NL,OS)$$

where,

TLD = total loans to deposits

HI = Herfindahl Index

CP = percentage of total assets controlled by competitive nonbank institutions in the county (credit unions and savings and loans)

IC = total county personal income per capita

GA = all government obligations

NL = gross charge-offs on bank loans lagged one time period

OS = organizational structure - 1, if bank holding company; 0, otherwise

Model I analyzed the total loan portfolio without consideration of the specific type of loans contained therein. Therefore, the next three models analyzed specific categories within this portfolio. The second model focused on the factors affecting agricultural lending practice and was formulated as follows:

Model II -

AGLD = f(HI,CP,FIC,GA,NL,OS)

where,

AGLD = agricultural loans to deposits

HI = Herfindahl Index

CP = percentage of total assets controlled by competitive nonbank institutions in the county (credit unions and savings and loans)

FIC = total county farm income

GA = all government obligations

NL = gross charge-offs on bank loans lagged one time period

OS = organizational structure - 1, if bank holding company; 0, otherwise

This model was different from Model I in two ways. First, the agricultural loan-to-deposit ratio was used as the dependent variable instead of total loans to deposits. Second, total farm income was used rather than the broader variable, total personal income per capita, used in the previous model. The total farm income variable was chosen as a proxy variable to better evaluate demand for credit in the local agricultural industry. However, yearly farm population data were unattainable, so a per capita value could not be calculated. In addition, the expected sign on the bank organizational structure variable was negative, since affiliation with a bank holding company is generally associated with lower levels of agricultural lending.

The third model considered a second segment of the bank's loan portfolio--consumer loans. The model was formulated as follows:

Model III -

CNSLD = f(HI,CP,CIC,GA,NL,OS)

where,

CNSLD = consumer loans to deposits

HI = Herfindahl Index

CP = percentage of total assets controlled by competitive nonbank institutions in the county (credit unions and savings and loans)

CIC = total county nonfarm personal income per capita

GA = all government obligations

NL = gross charge-offs on bank loans lagged one time period

OS = organizational structure - 1, if bank holding company; 0, otherwise

This classification included loans made to individuals for personal expenditures. All of the independent variables were identical to Model I, except the variable for income. Total nonfarm personal income per capita was used to target the consumers who obtained loans in this category.

The last segment of the loan portfolio to be analyzed in this study was the commercial and industrial loans made by the banks. This model was formulated as follows:

Model IV -

CILD = f(HI,CP,IC,IPN,GA,NL,OS)

where,

CILD = commercial and industrial loans to deposits

HI = Herfindahl Index

CP = percentage of total assets controlled by competitive nonbank institutions in the county (credit unions and savings and loans)

IPN = number of business establishments in county

GA = all government obligations

NL = gross charge-offs on bank loans lagged one time period

OS = organizational structure - 1, if bank holding company; 0, otherwise

All of the independent variables were identical to Model I except the proxy variable for demand. Instead of an income or income per capita variable, the number of business establishments within each county was included. The inclusion of this variable was justified by the fact that as new establishments are opened, new loans are required. The variable was judged to be a better demand proxy for commercial and industrial loans than an income variable.

These four models enabled investigation of how bank management, market and organizational structure, and local economic conditions affected bank lending practice. Each of these three factors was evaluated in relationship to total loans to deposits, agricultural loans to deposits, consumer loans to deposits and commercial and industrial loans to deposits.

Hypothesis Testing

This section examines the procedures used to test the null hypothesis that there are no significant differences in factors affecting bank lending practice in pre- and postderegulation periods.

Multiple regression analysis was used to test the null hypothesis using a pooled cross-section and time-series data set. A 0,1 dummy variable was used to represent the pre- and postderegulation time periods (REG = 1 if 1977-1980 and REG = 0 if 1981-1984). In addition, slope interaction terms were introduced into the models to test for slope changes over the two time periods. This formulation of the model permitted testing of the null hypothesis, with a significant coefficient on the dummy variable or any of the interaction terms leading to rejection of the null. The results will also show which variables are responsible for slope changes between the two periods and, thus, how the explanatory power of the independent variables may have changed over time.

The Sample and Data Sources

The major proportion of data for this study was drawn from the Federal Reserve Bank Reports of Income and Condition on banks located in the 68 nonmetropolitan counties of Tennessee (see Table 6 in Appendix) for the years 1977-1985. Banks that were not in operation for all eight years of the study period were deleted from the data set, resulting in 191 commercial banks being included for analysis. In addition, the Tennessee Statistical Abstract was used to obtain the per capita personal income of nonmetropolitan counties. A listing of the total dollar value of loans created by nonbank institutions was obtained from the Tennessee Department of Financial Institutions for credit unions and from the Federal Home Loan Bank Board for savings and loan associations. County Business Patterns was used to obtain data on the number of business establishments contained within each nonmetropolitan county.

Summary

Four separate but related models, each containing a different dependent variable--total loans to deposits, agricultural loans to deposits, consumer loans to deposits and commercial and industrial loans to deposits--were used in this study. The three subsets of independent variables--market and organizational structure, bank management and local economic conditions--and their expected relationship to their respective dependent variables, whether positive or negative, were examined and justified. The method for testing the null hypothesis that the pre- and postderegulation periods were the same was described in detail.

The results of the multiple regression analysis are discussed in Chapter IV. The explanatory power of bank management, market and organizational structure, and local economic conditions is examined. In addition, the impact of deregulation on these three factors is discussed.

CHAPTER IV

RESULTS

The results of multiple regression analysis are presented in this chapter. First, the results for each of the four models are presented separately. The significant independent variables are highlighted, and their relationship to the respective dependent variables is explained. Second, the test of the null hypothesis for each of the four models is explained, and the variables contributing to differences in the structural models for the two time periods are evaluated. Third, similarities among the results of the four models are highlighted. Finally, the results of this study are compared to those of previous research.

Factors Influencing Bank Lending Behavior with Results of Testing the Null Hypothesis

As detailed in Chapter III, four models were employed to investigate the influence of management, bank and market structure and demand factors on total, agricultural, consumer and commercial/industrial lending behavior in nonmetropolitan areas. (Mean values for the dependent and independent variables are given in Appendix Table 7). In addition, a dummy variable, REG (= 1 if 1977-1980, = 0 if 1981-1984), and a series of slope interaction terms were introduced into each model in order to test the null hypothesis that there are no significant differences in factors affecting bank lending practice in a predereguIation (1977-1980) and postderegulation (1981-1984) period.

In general, the R^2 achieved in each model was relatively low but was in line with that found in other similar studies. The R^2 for the total loans to deposits model was the highest, .20, while the R^2 for the agricultural lending model, .05, was the lowest. Specification problems in the latter model are discussed in Chapter V.

Total Loans to Deposits Model

In the first model, using total loans to deposits (TLD) as the dependent variable, only one market structure variable was found to be statistically significant at the 5 percent level, as shown in Table 1. Competition (CP) from local nonbank institutions exhibited a positive relationship with TLD as expected. This type of relationship indicates that as credit unions and savings and loans become relatively more important in the local market, the TLD ratio will increase. Competition apparently forces banks to create more loans than when banks lacked this competitive pressure.

The demand variable, personal income per capita (IC), was statistically significant. This variable exhibited a negative relationship with TLD indicating that as income per capita increased, TLD decreased, which was unexpected. This result may be due to the fact that increased income led to a greater increase in deposits within the county than loans. This result would suggest a lack of demand for loans in these counties.

One management variable was found to be statistically significant. The government obligations (GA) variable was negatively related to TLD indicating that bank management substituted low risk, low return government securities for additional loans. The lagged nonperforming

TABLE 1

Effect of Factors Influencing Bank Lending Behavior
in the Total Loans to Deposits Model

Independent Variable	Coefficients	t-values
Intercept	0.65299946	17.31**
Herfindahl Index (HI)	-0.00311690	-0.09
Nonbank competition (CP)	0.08123532	2.16*
Personal income per capita (IC)	-0.01345850	-3.05**
Government obligations (GA)	-0.0000157	-7.07**
Lagged nonperforming loans (NL)	0.0000229	2.19**
Organizational structure (OS)	0.08421754	7.43**
REG (= 1 if 1977-1980, = 0 otherwise)	-0.06353414	-1.21
HI*REG	0.09868960	1.85
CP*REG	0.07179658	1.21
IC*REG	0.01181807	1.61
GA*REG	-0.0000068	-1.53
NL*REG	0.00022285	4.20**
OS*REG	-0.01459856	-0.69

*Significant at 5 percent level.
**Significant at 1 percent level.

$R^2 = 0.203179$

loans (NL) variable exhibited a positive relationship suggesting a willingness by management to create additional loans even while incurring higher loan losses. Both of these variables exhibited the expected signs and were important factors explaining the bank's lending behavior.

The last variable found to be significant was the bank organizational structure dummy variable (OS). This variable was found to be significant at the 1 percent level. A positive relationship exists between OS and TLD as expected, indicating that affiliated banks had significantly higher TLD ratios than did independents. This result suggests that affiliate banks place a higher percentage of deposits into their markets as loans. For example, when the bank is an affiliate of a holding company, thus OS = 1, then the TLD ratio will increase by 0.08 as compared to an independent bank.

One of the slope interaction terms was significant at the 1 percent level while the intercept dummy was not. These results suggest that the pre- and postderegulation periods represent different structural models and should be analyzed separately, leading to rejection of the null hypothesis.

The lagged nonperforming loans interaction variable (NL*REG) was found to be positively related to TLD and the coefficient was greater in the first time period than the second. One possible explanation of this result is that NL was more frequently used as a management tool for determining lending levels prior to deregulation. This change may have resulted from the rapid increase in nonperforming loans during the 1981-1984 period. An analysis of the ratio of nonperforming loans to total loans for the sample of banks indicates that this ratio only

changed from 0.0039 percent to 0.0073 percent in the prederegulation period, but over the entire study period, the ratio increased to a peak of 0.0179 percent in 1983. Given the volatility of this index, bank managers may have shifted to the use of other factors such as interest rates and/or margin spreads as their primary means of determining how much to lend. This result may reflect the fact that lenders have turned to differential pricing methods with floating interest rates to better respond to changing economic conditions, as suggested by Barry and Calvert.

In summary, this TLD model found that the local demand variable, income per capita, was a significant factor explaining bank lending. In addition, both of the management variables, GA and NL, were significant. One market structure variable (CP) and the bank organizational variable (OS) were found to be significant. All of the coefficients except on the income variable had the expected signs. These results indicate that more conservative independent banks operating in a market with higher income per capita and without much nonbank competition will have a lower total loan-to-deposit ratio than more aggressive affiliate banks operating in relatively competitive markets.

The significance of one of the slope interaction terms suggests that different structural models apply to the two time periods studied, leading to rejection of the null hypothesis. The coefficient on the lagged nonperforming loan interaction term (NL*REG) was greater in the prederegulation period, suggesting the greater importance of this variable to management before deregulation.

Agricultural Loans to Deposits Model

The second model analyzed the agricultural portion of the bank's loan portfolio with the dependent variable being the agricultural loan-to-deposit (AGLD) ratio (Table 2). Only one variable had significant explanatory power and that was government obligations (GA). This variable exhibited a negative relationship with AGLD as expected due to the fact that banks are willing to substitute low risk government securities for higher risk loans while giving up the possibility of earning higher returns.

This model contained one slope interaction term and an intercept dummy that were significant at the five percent level, as shown in Table 2. The slope interaction term was significant at the 1 percent level. These findings suggest that different structural models apply to the two time periods and that the data should be analyzed separately, leading to rejection of the null hypothesis.

The level of bank concentration in the market, as shown by the interaction term HI*REG, was found to be a significant factor in the first time period (1977-1980). However, HI was not a significant variable when included on its own. This result would indicate that the AGLD ratio was affected positively by the level of bank market concentration before deregulation but not significantly after. A negative relationship was expected between HI and AGLD. This result suggests that a more concentrated bank market in the prederegulation period would be associated with a higher AGLD ratio. This result may be explained by the fact that banking markets in agricultural areas prior to deregulation were typically highly concentrated. In this case, high concentra-

TABLE 2

Effect of Factors Influencing Bank Lending Behavior
in the Agricultural Loans to Deposits Model

Independent Variable	Coefficients	t-values
Intercept	0.05402153	10.94**
Herfindahl Index (HI)	-0.01541526	-1.41
Nonbank competition (CP)	-0.01790051	-1.49
Personal farm income (FIC)	-0.0000002	-1.34
Government obligations (GA)	-0.0000026	-3.58**
Lagged nonperforming loans (NL)	-0.0000035	-1.04
Organizational structure (OS)	-0.00346407	-0.96
REG (= 1 if 1977-1980, = 0 otherwise)	-0.01756259	-2.20*
HI*REG	0.03386728	1.97*
CP*REG	0.03044749	1.63
FIC*REG	0.0000014	3.83**
GA*REG	0.0000001	0.09
NL*REG	-0.0000257	-1.50
OS*REG	-0.00539320	-0.79

*Significant at 5 percent level.
**Significant at 1 percent level.

$R^2 = 0.053424$

tion levels would tend to be associated with higher agricultural lending during the period of expansion in 1977-1980. With high agricultural loan failures in the postderegulation period, banks in these counties may have reduced the amount of loans created. This high rate of loan failure was caused by the agricultural recession due to overproduction problems combined with a strong dollar on the export market. In addition, deregulation has led to reduced concentration in some nonmetropolitan banking markets as new institutions entered more freely than in the past.

The farm income interaction term (FIC*REG) was significant in explaining AGLD in the first time period (1977-1980) with the expected positive sign, but income was not a factor in explaining lending behavior when included on its own. This finding could be explained by the high variability of farm income after the agricultural recession of 1980. Prior to 1980, farm income on average was fairly stable. With the high variability of farm income, bank managers may be less willing to rely solely on income as a measure of loan quality and may be reluctant to create loans due to the higher risk of default.

To summarize, this model found the demand variable to be insignificant. Only one management variable, GA, was significant with a negative coefficient as expected. However, neither the market nor bank structure variables were significant. These findings indicate that a more conservative bank will have a lower agricultural loan-to-deposit ratio.

Two slope interaction terms and an intercept dummy were found to be significant, indicating that the null hypothesis could be rejected.

Thus, two different structural models exist, a prederegulation model and a postderegulation model. The dummy interaction terms, FIC*REG and HI*REG, had positive coefficients, indicating their importance in the prederegulation but not postderegulation period.

Consumer Loans to Deposits Model

Model III focused on consumer loan practice during the pre- and postderegulation periods with the dependent variable being the consumer loan-to-deposit (CNSLD) ratio (Table 3). The competition variable (CP) was significant and had a positive sign as expected, suggesting that as credit unions and savings and loans became more competitive with commercial banks, bank lending increased. As competition increased, the loan-to-deposit ratio increased and a higher percentage of deposits were placed as loans in the local market.

A demand variable, personal nonfarm income per capita (CIC), was significant. A negative relationship existed between CIC and CNSLD which was unexpected. This finding indicated that as CIC increased, the CNSLD ratio decreased, suggesting that the amount of funds deposited by consumers may be rising more rapidly than loans, thereby lowering this ratio.

One variable reflecting management's influence was found to be significant. Again, government obligations (GA) was negatively related to the dependent variable as expected, suggesting substitution of low risk, low return government securities for loans which have a potentially higher return but greater risk.

Bank organizational structure was also found to be highly significant in explaining bank lending behavior. As expected, the results

TABLE 3

Effect of Factors Influencing Bank Lending Behavior
in the Consumer Loans to Deposits Model

Independent Variable	Coefficients	t-values
Intercept	0.20153900	8.85**
Herfindahl Index (HI)	0.00994190	0.49
Nonbank competition (CP)	0.06141097	2.76**
Personal nonfarm income per capita (CIC)	-0.00658871	-2.42*
Government obligations (GA)	-0.0000039	-2.95**
Lagged nonperforming loans (NL)	0.0000072	1.17
Organizational structure (OS)	0.03306857	4.95**
REG (= 1 if 1977-1980, = 0 otherwise)	-0.00386486	-0.12
HI*REG	0.05214876	1.64
CP*REG	0.05903171	1.67
CIC*REG	0.00071045	0.16
GA*REG	-0.0000046	-1.77
NL*REG	0.00012508	4.00**
OS*REG	0.00933754	0.75

*Significant at 5 percent level.
**Significant at 1 percent level.

$R^2 = 0.150129$

suggest that when a bank is an affiliate of a bank holding company, it maintains a higher CNSLD than an independent bank.

The results from the model showed a significant relationship for one of the interaction terms, suggesting again that the pre- and postderegulation periods were separate structural models, and the null hypothesis was rejected.

One of the management evaluation interaction terms was found to be significant. The coefficient on the lagged nonperforming loans interaction term (NL*REG) was greater in the first time period (1977-1980). The increased importance of lagged nonperforming loans in the first time period may have occurred due to the increased competition in the financial market from credit unions and savings and loans. Management may have been forced to rely on other evaluation techniques instead of the nonperforming loan ratio during this period of high loan losses (after 1980), as stated earlier.

In summation, the analysis again found one demand variable, CIC, to be significant. A single management variable, GA, was significant with a negative relationship as expected, and both a market structure variable (CP) and a bank organizational variable (OS) were significant with positive signs as expected. This result would indicate that a more conservative, independent bank operating in a market with higher income and without nonbank competition would have a lower consumer loan-to-deposit ratio than a more aggressive affiliate bank operating in a more competitive market. When the effects of deregulation were considered by means of the interaction terms, one of the slope interaction terms was significant, suggesting separate structural models. The management

interaction term (NL*REG) had a positive coefficient, indicating its greater importance in the predereguIation period.

Commercial and Industrial Loans to Deposits Model

In Model IV, the commercial and industrial lending practice of commercial banks was examined, using commercial and industrial loans to deposits (CILD) as the dependent variable (Table 4). The nonbank competition variable (CP) measuring the percentage of assets controlled by local nonbank institutions was significant in explaining CILD. This variable was positively related to the dependent variable as expected, indicating that as the level of competition rose, the percent of commercial/industrial loans created also increased.

Again, management was found to substitute low risk government securities for loans, as suggested by the negative sign on the government obligations (GA) variable as expected. This variable was significant, but the influence was small. Bank managers might be conservative in making commercial/industrial loans, possibly due to the substantial loss that could occur if the loan was classified as nonperforming. These loan losses could occur in any of the other loan categories, but commercial/industrial loans are traditionally larger in dollar amount then agricultural and consumer loans. Therefore, when several commercial/industrial loans are classified as nonperforming, the bank may become severely hampered by these loan losses, especially if the bank is a small independent bank with a limited loan base and no bank holding company to provide additional capital.

TABLE 4

Effect of Factors Influencing Bank Lending Behavior in the Commercial and Industrial Loans to Deposits Model

Independent Variable	Coefficients	t-values
Intercept	0.08639802	7.65**
Herfindahl Index (HI)	-0.01038083	-0.52
Nonbank competition (CP)	0.04489209	2.09*
Number of business establishments (IPN)	0.0000097	0.71
Government obligations (GA)	-0.0000033	-2.87**
Lagged nonperforming loans (NL)	0.0000100	1.85
Organizational structure (OS)	0.03042345	5.25**
REG (= 1 if 1977-1980, = 0 otherwise)	-0.02517613	-1.44
HI*REG	0.03241798	1.02
CP*REG	0.07314062	2.15*
IPN*REG	-0.0000040	-0.20
GA*REG	0.0000004	0.15
NL*REG	0.0000387	1.42
OS*REG	0.00978166	0.90

*Significant at 5 percent level.
**Significant at 1 percent level.

$R^2 = 0.093918$

The bank organizational structure dummy variable (OS) was highly significant throughout the study period. This variable was positively related to CILD as expected, indicating that affiliates of bank holding companies created more commercial/industrial loans than independent banks. These results suggest that independent banks may not have the capital base, knowledge for constructing large loans, or are just not willing to take the risk of creating commercial/industrial loans.

In the commercial/industrial loans to deposits model (CILD), a single slope interaction term was significant at the 5 percent level suggesting that the pre- and postderegulation periods are separate structural models, thus leading to rejection of the null hypothesis. Competition from local nonbank institutions was significant in explaining CILD in both pre- and postderegulation periods. However, the coefficient was larger in the prederegulation period than in the postderegulation period.

This result suggests that commercial banks from outside of the nonmetropolitan counties of Tennessee, both in state and out of state, may have provided capital for creating commercial/industrial loans in the postderegulation period. In addition, the Small Business Administration may have been a source of funding for high risk, small business ventures. Sources of internal funding have also been ignored in this study, such as issuance of commercial paper, stocks and bonds.

In summary, this model found no demand factor to be significant, and only one management variable (GA) was significant with a negative relationship as expected. A market structure variable, nonbank competition (CP), and bank organizational structure (OS) were significant with

positive coefficients as expected. These findings suggest that a more conservative, independent bank operating in a market without nonbank competition will have a lower CILD than a more aggressive affiliate bank operating in a competitive market.

When the pre- and postderegulation periods were compared, a single slope interaction term was significant, indicating that two separate structural models were required. Thus, the null hypothesis was rejected. The CP*REG term had a positive coefficient, suggesting that local competition had a greater effect on the commercial/industrial loan-to-deposit ratio prior to deregulation.

Comparison of the Four Models

As shown in Table 5, several of the independent variables had significant explanatory power in three of the four models. Only one variable was significant throughout all four models.

Considering the importance of management variables in explaining loan practice, several observations are important. The management variable, government obligations (GA), was significant with the expected negative sign in all four models. While a negative sign was expected due to the balance sheet constraint faced by the banks, there is a theoretical basis for such a result. Bank managers can place assets into loans, government obligations, or more liquid assets. The choice between loans and government obligations reflects the managers attitude toward risk. The other management variable, lagged nonperforming loans (NL), was significant in the total loans to deposits model, and there was evidence that it was more important in the predereguIation period

TABLE 5

Signs of Significant Coefficients*

Independent Variable	Dependent Variable: Loans to Deposits			
	Total	Agricultural	Consumer	Commercial/ Industrial
Intercept	+	+	+	+
Herfindahl Index (HI)				
Nonbank competition (CP)	+		+	+
Personal income per capita (IC)	-			
Personal farm income (FIC)				
Personal nonfarm income per capita (CIC)			-	
Number of business establishments (IPN)				
Government obligations (GA)	-	-	-	-
Lagged nonperforming loans (NL)	+			
Organizational structure (OS)	+		+	+
REG (= 1 if 1977-1980, = 0 otherwise)		-		
HI*REG		+		
CP*REG				+
IC*REG				
FIC*REG		+		
CIC*REG				
IPN*REG				
GA*REG				
NL*REG	+		+	
OS*REG				

*Significant at 5 percent level.

for both the total and consumer loan models. In both models, the coefficients exhibited the expected positive signs.

Two of the four models had a significant demand variable. In both models, the demand variable was negatively related to the dependent variable contrary to expectations. This result suggests that an increase in income may have actually contributed to larger deposits for the bank without a similar increase in loans, thereby lowering the loan-to-deposit ratio.

Throughout the study period, market and bank organizational structure were found to significantly affect lending practice as shown by the competition variable (CP) and the bank organizational structure dummy variable (OS). These two variables were significant with the expected positive sign in all the models except the agricultural loan model.

At least one interaction term was significant in each model leading to rejection of the null hypothesis. This result suggests that the pre- and postderegulation lending behavior of nonmetropolitan commercial banks in Tennessee can be best explained by separate structural models. However, given the other changes associated with the 1981-1984 time period, such as the agricultural recession, increased government and trade deficits, reduced inflation and volatile interest rates, it is difficult to attribute the changes in the structural models strictly to financial deregulation.

Comparison to Previous Studies

The findings of this study, along with the R^2 of all models, are consistent with the results of past research. Barkley, Potts and Mellon found only a limited number of demand factors to be significant in explaining lending practice in Arizona and Colorado. The results of the present study suggest that demand variables, i.e., income per capita were important only in explaining total and consumer lending behavior. In addition, the results suggest that at least in the case of agricultural lending, income was more important in the predereglation period. Furthermore, in all but the agricultural model, the bank organizational structure variable and the nonbank competition variable (although different in the Barkley, Potts and Mellon study) had significant explanatory power.

Barry and Pepper used the Herfindahl Index in a study of agricultural banks and found it to be insignificant. Factors related to bank operating performance and the agricultural market were more important in explaining lending behavior. The results achieved in this thesis did not support this conclusion. HI was significant in this thesis when used as an interaction term in the agricultural loans to deposits model.

These results suggest that demand factors are less important than market structure, bank organizational structure or management in explaining nonmetropolitan lending practice. In addition, the results of the present study support the focus on management factors as variables explaining lending practice and on the use of a more complete variable for measuring nonbank sources of competition in the local market. In general, however, the results achieved here are in line with

those of other studies in terms of factors explaining lending practice.

However, significant differences in the models pertaining to the pre- and postderegulation time periods were found in this study. These results are in sharp contrast to those of Lawrence and Watkins who found no difference between the periods. The present study used a longer time series and identified those specific variables that may have led to differences between the two periods. The method employed here thus permitted a more sensitive analysis of structural changes occurring in the model after 1980.

CHAPTER V

SUMMARY, LIMITATIONS, AND CONCLUSIONS

Summary of Findings

The impacts of bank management, market and bank structure and local economic conditions on bank lending practice in prederegulation (1977-1980) and postderegulation (1981-1984) periods were analyzed in this study. The influence of these factors was evaluated by using multiple regression analysis to see how they explained the total, agricultural, consumer and commercial/industrial lending practice of nonmetropolitan Tennessee banks. The null hypothesis tested in this study stated that there are no significant differences in factors affecting bank lending practice in a pre- and postderegulation period.

In the model using total loans to deposits as the dependent variable, market structure, bank organizational structure, demand and management factors were found to be significant explanatory variables. The market structure variable, nonbank competition, had a positive effect on bank lending practice. As the market share of credit unions and thrift institutions increased, bank lending increased. The positive coefficient on the organizational structure dummy variable suggested that affiliation with a bank holding company was associated with greater lending. As personal income per capita increased, the loan-to-deposit ratio decreased possibly due to a higher rate of increase in deposits than in loans. And the negative coefficient for the risk measurement variable, GA, suggests substitution of low risk government securities for higher risk loans.

In addition, the null hypothesis was rejected, suggesting that the pre- and postderegulation periods were separate structural models. A bank's nonperforming loan ratio was a more important factor in explaining loan practice in the more stable prederegulation period. Also, bank affiliation had no greater effect on lending in the post-deregulation period than in the previous period, as might have been expected.

In the agricultural lending model, only the risk measurement variable was significant. Again, the anticipated negative relationship was found. Specification problems in this model, as discussed later in this chapter, likely affected the results. Again, the null hypothesis was rejected, supporting the conclusion that separate structural models exist for pre- and postderegulation data. Market concentration was important prior to deregulation with increased concentration associated with increased lending but not in the later period. Farm income was an important factor only in the prederegulation period as increased income was associated with increased farm lending.

In the consumer lending model, market structure, bank organizational structure, demand and management variables had significant explanatory power. Consumer lending was positively influenced by nonbank competition, showing the potential importance of other financial institutions as a source of competition for the consumer lending market. Also, affiliation with a bank holding company was positively related to consumer lending, suggesting that affiliates make proportionately more consumer loans than do independents. Again, the personal nonfarm income per capita variable was negatively related to lending suggesting greater

deposit growth as income per capita rises, thereby lowering the loan-to-deposit ratio. Finally, the risk measure again had the expected negative sign. The null hypothesis was rejected, with lagged nonperforming loans being more important in the earlier period, suggesting increased reliance on more sophisticated management skills in the postderegulation period.

Finally, the model using commercial/industrial loans as the dependent variable again found market and organizational structure and management factors to be significant explanatory variables. Nonbank competition was positively related to lending. Affiliation was associated with higher levels of commercial/industrial lending relative to independent banks. And risk attitude again had the expected negative sign.

The rejection of the null hypothesis resulted from the greater importance of nonbank competition in the prederegulation period, suggesting that after deregulation, capital for commercial/industrial loans may have come from outside the county and, therefore, was not reflected in the local nonbank competition variable.

The results of these four models indicated that several factors may have changed as a result of deregulation. Bank management has become more aggressive as a result of increased competition from nonbanks and out-of-county institutions. In addition, standard measures of lending practice, such as the level of nonperforming loans, did not appear to play as important a role in management decision making in the postderegulation period. Both the market and bank organizational structure variables were found to significantly affect lending practice

in all models except the agricultural loan model, with greater lending by affiliated banks and in relatively competitive local markets.

Only two of the four models found demand factors to be significant, suggesting that the local economy may have less influence on bank lending practice than the behavior of bank management and market and bank organizational structure. However, it is also possible that the variables chosen to measure demand for loans were actually weak estimators.

Limitations of Research Procedure

This study has weaknesses that could be improved upon in later studies. For example, in several situations, some required data were unattainable which may have biased the results. Some of these limitations are consistent throughout all four models, while some are specific to each individual model.

The most obvious weakness is the lack of a larger postderegulation data set. With major deregulatory policy occurring throughout the 1980-1984 period, later data years should be included to show how banks have adjusted. In addition, data on the amount of bank nonperforming loans for each loan category (agriculture, consumer and commercial/industrial) were not available. A price variable, such as an interest rate, was not included, so no price effect was determined. However, given the volatile nature of interest rates over the study period, there would have been no logical means of comparison between pre- and postderegulation periods. Furthermore, no measure of bank size was included in the models. A larger bank may have better educated managers who are

able to maintain higher lending rates than smaller banks and, being larger, may be able to reap the benefits of economies of scale. Finally, a major weakness of all four models is that no macroeconomic data were included in this study. However, this problem is common to other studies, where the macroeconomic aspect is ignored, while micro-economic data are used. With the addition of macroeconomic data, factors outside of the county--such as unemployment, presence of large industries or weather conditions affecting agriculture--that might influence local bank lending practice could be reflected in each model.

Three of the four models were limited by not having some specific data. The agricultural loans to deposits model lacked data on the Farm Credit Services (FCS) which supplied 47.3 percent of the farm debt in the Southeast as of 1985, as compared to 21.5 percent for commercial banks [Wilson and Sullivan]. With the exclusion of this major farm lender, the nonbank competition variable was a weak means of analyzing the effect of competition on bank agricultural lending practice.

Laws and regulations restricted access to data on retail credit card sales, e.g., Sears, Montgomery Ward and JCPenney, for the consumer loans to deposits model. Instead of banks creating these consumer loans, major stores are offering customers credit to purchase merchandise, thus increasing the level of nonbank competition.

The commercial and industrial loans to deposits model was limited by the micro approach of analyzing only in-county data on commercial/industrial loans. With these types of loans often requiring large amounts of capital unattainable within the county, data on loans that

cross the county's boundaries should be included. However, no means of obtaining this type of data were found.

In addition, new management evaluation measures should be developed in future studies to better measure such factors as level of education, years of experience and acceptable risk levels. Factors concerning bank size and the influences of a price effect should also be considered in future research. The problems experienced with data collection may be difficult to overcome, since FCS data were not available for the full time period. However, other ways of gaining access to such data should be explored in the future. The inclusion of some macroeconomic data may be beneficial, especially since deregulation ended many of the restrictions on nonbanks and increased the ease of market entry. In addition, future research will be able to use additional postderegulation years in order to analyze the full effect of deregulation.

Implications for Nonmetropolitan Counties

Findings of this study suggest that bank management was a major factor affecting bank lending practice. In addition, management appears to have changed some methods for making lending decisions. Prior to deregulation, bank managers appear to have relied on certain performance measures, such as the percent of nonperforming loans, to determine lending practice. However, with the high loan losses in the early 1980s and the new deregulation policy, managers appear to be relying on other more stringent evaluation techniques. Managers now must be better educated in order to make appropriate decisions to meet the more aggres-

sive behavior of other banks and nonbank institutions [Williams]. It is unclear whether the reliance on new rules for lending will benefit or hurt rural counties. Some rural businesses may lack the skills required to complete more complex loan applications. On the other hand, if the bank is sound, then there is greater opportunity for the bank to take an active role in stimulating local economic growth.

The local market structure was another important factor that affected lending practice. This result suggests that counties with greater nonbank competition may be better served by their local banks as lending increases. In addition, the importance of the nonbank competition variable relative to the more traditionally used Herfindahl Index suggests the importance of defining the local financial market structure in broader terms to include institutions other than commercial banks. This is particularly important in a deregulated environment where the distinctions between different types of financial institutions are disappearing. In this way, a more accurate evaluation of lending practice can be obtained.

The significance of bank organizational structure as a factor affecting lending practice has important implications for rural areas. Affiliates of bank holding companies were shown to serve the county better through creating more loans than independent banks in all categories except agriculture where no significant difference was found. Thus, nonmetropolitan counties might be better served by affiliate banks than independents. This result suggests that regulations permitting statewide branching or holding company expansion may actually benefit rural areas in a state. However, this analysis did not consider how

banks operating in different types of counties, i.e., growing versus lagging, behave. The results obtained by Barkley, Potts and Mellon suggest that more rapidly growing rural areas may benefit from such expansion at the expense of lagging rural areas in the state.

From a bank regulator's perspective, the findings indicate how increased nonbank competition and affiliation with bank holding companies may increase bank lending. The importance of good management must also be considered in passing new regulations. These results indicate that the goal of deregulation to create a more efficient financial market through increased competition is being obtained. However, this increased competition is likely to result in greater risk for most bankers.

Deregulation has resulted in the creation of a more competitive local banking market. This research suggests that in this type of situation a larger amount of loans are created by management for the banks' customers. In addition, management behavior appears to be an important factor influencing local lending behavior. However, further research is needed to determine the full effect of management upon banking operations after deregulation. Also, this type of research must continue in future years as traditionally regulated boundaries are crossed by banks, nonbanks and their customers, and the effects of deregulation become more ingrained into the banking industry.

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APPENDIX

TABLE 6

Nonmetropolitan Tennessee Counties

Bedford County
Benton County
Bledsoe County
Bradley County
Campbell County
Cannon County
Carroll County
Chester County
Claiborne County
Clay County
Cocke County
Coffee County
Crockett County
Cumberland County
Decatur County
DeKalb County
Dyer County
Fayette County
Fentress County
Franklin County
Gibson County
Giles County
Greene County
Grundy County
Hamblen County
Hancock County
Hardeman County
Hardin County
Haywood County
Henderson County
Henry County
Hickman County
Houston County
Humphreys County
Jackson County
Johnson County
Lake County
Lauderdale County
Lawrence County
Lewis County
Lincoln County
Loudon County
McMinn County
McNairy County
Macon County
Marshall County
Maury County
Meigs County
Monroe County
Moore County
Morgan County
Obion County
Overton County
Perry County
Pickett County
Polk County
Putnam County
Rhea County
Roane County
Scott County
Smith County
Stewart County
Trousdale County
Van Buren County
Warren County
Wayne County
Weakley County
White County

TABLE 7

Means and Ranges for the Dependent and Independent Variables

Variables	Mean	Standard Deviation	Minimum Value	Maximum Value
Dependent:				
TLD	0.6	0.14	0.2	1.0
AGLD	0.0	0.05	0.0	0.3
CNSLD	0.2	0.08	0.0	0.6
CILD	0.1	0.07	0.0	0.6
Independent:				
HI	0.4	0.19	0.1	1.0
CP	0.2	0.14	0.0	0.5
IC[a]	6.6	1.58	2.9	11.1
FIC[a]	5140.5	6843.96	-6865.0	69302.0
CIC[a]	6.4	1.57	2.6	10.7
IPN[b]	434.5	277.69	22.0	1399.0
GA[a]	1654.7	2225.53	0.0	27400.0
LGNL[a]	135.7	341.17	0.0	10008.0

[a]In thousands of dollars.

[b]Number of business establishments.

VITA

Steven Charles Green was born in Maryville, Tennessee, on May 12, 1963. He attended Fairview Grade School in that city and was graduated from Heritage High School in June, 1981. The following September he entered Hiwassee College in Madisonville, and in June, 1983, he transferred to The University of Tennessee at Knoxville where in 1985 he received a Bachelor of Science degree in Agricultural Business with a minor in General Business.

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