

BRANCH REGULATION AND ITS EFFECT
ON COMMERCIAL BANK ENTRY

BY

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January, 1970

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The opinions expressed in the paper are exclusively those of the author and should not be interpreted as representing the opinion of the Federal Reserve Bank of Minneapolis. Comments are welcome and should be addressed to the author.

SUMMARY

This study attempts to determine whether entry regulation is more restrictive in unit or branch banking states.

A model is developed in which entry, defined as the formation of a new bank or branch, is explained as being a response to the general economic climate plus regulation. Using time series data and dating the onset of effective entry regulation with the passage of the banking Act of 1935, it is ascertained that effective entry regulation has caused the aggregate rate of entry into commercial banking to fall by about sixty percent. This analysis included adjustments for changes in economic conditions. The effect of entry regulation, however, has not been uniform. Entry rates in unit banking states is estimated to be seventy percent lower than it would have been in the absence of regulation, while limited branching and statewide branching states have experienced fifty and forty percent declines, respectively.

This analysis suggests that entry in unit banking states has been more restricted than in branch banking states. Two reasons are cited that may account for this differential impact of regulation. First, regulators may tend to be more pessimistic than potential entrants regarding the profitability of a new banking office. This pessimism may not have a significant effect upon entry when other factors indicate a high probability of success, but may be important in marginal cases. Thus, because branch banking states tend to be more prevalent in the west, and because this has been the area of greatest economic growth in the past forty years, the pessimism of regulators would tend to be less apparent in branch banking areas. Second, regulators apparently prefer to issue charters for new branches rather than for new banks because they have more information on which to base their decisions. In addition, if the market demand is misjudged, a branch bank has retained earnings and other branches from which to carry short-term losses.

TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION	1
Statement of the Problem	1
Review of the Literature	2
Methods and Goals	6
II. THEORY OF ENTRY INTO COMMERCIAL BANKING	12
Theory of Capital Formation in the Banking Industry	15
III. EMPIRICAL RESULTS	24
Aggregate Effect of Regulation	24
Differential Effects of Regulation	30
IV. SUMMARY AND CONCLUSIONS	35
REFERENCES CITED	36

CHAPTER I

INTRODUCTION

Statement of the Problem

The purpose of this study is to consider the quantitative effect of branch regulation on the rate of new office formation in the commercial banking industry. Three related questions will be asked. What are the important economic factors leading to entry into commercial banking? Have the regulations imposed by the Banking Act of 1935 had a significant effect on the rate of new office formation in the United States? Does the branching law of a state affect the degree to which entry is restricted by the Banking Act of 1935?

These questions regarding the impact of regulation on the rate of entry have not received much attention.^{1/} Although a large number of studies have considered the relationship between bank structure and bank performance, few studies have attempted to isolate those factors which determine bank structure. The differences in the performance characteristics of various banking structures described in numerous studies are a result of a variety of factors, only one of which may be ease of entry. If it can be shown that branch law does not affect the rate of entry, studies designed to analyze differences in market performance will have to look elsewhere for causal relationships. Of course, even if it can be shown that branch laws do affect the rate of entry and that various degrees of ease of entry are associated with certain performance characteristics, the researcher cannot conclude that the branching law is the force leading to the observed differences in performance.

¹A clear statement to this effect can be found in Robert C. Holland, "Research into Banking Structure and Competition," Federal Reserve Bulletin, November, 1964, p. 1389.

Nevertheless, he can go on to consider what effect the relative ease of entry may have on performance. It should be pointed out, however, that this study does not consider the relationship between bank entry and performance; it is limited strictly to the entry question.

Review of the Literature

Other studies which have approached problems similar to the purposes of this study can be conveniently divided into two classes. One class of study deals only with the effect of regulation on the aggregate rate of entry into commercial banking. Other studies have related performance to entry and were concerned with the entry problem only as a possible reason for explaining different performance characteristics.

To this writer's knowledge, only one previous work has attempted to systematically test the determinants of entry into commercial banking. Sam Peltzman in 1965 estimated the quantitative impact of regulation on new bank entry.¹ Peltzman's goals were two-fold: first, to investigate the economic aspects of new bank entry, and second, to investigate the effect of legal restrictions on entry into banking. In order to determine the economic aspects of new bank entry, he treated entry as part of the more general phenomenon of capital investment where entry is assumed to be motivated by a discrepancy between the desired and actual levels of capital in the commercial banking industry.

¹Sam Peltzman, "Entry in Commercial Banking," (unpublished Ph.D. dissertation, Department of Economics, University of Chicago, 1965). The findings of his dissertation were published in "Entry in Commercial Banking," Journal of Law and Economics, VIII (October, 1965), 11-50. A summary of his dissertation was published in "Bank Entry Regulation: Its Impact and Purpose," National Banking Review, III (December, 1965), 163-177.

Peltzman stated that new entry, as a percentage of total commercial banks, is approximately equal to the percentage change in capital in commercial banking minus the percentage change in average capital size per bank, the rate of mergers, and the rate of commercial bank failures. He assumed that the desired level of capital is a function of the expected rate of return; that desired changes in average capital size per bank, the rate of mergers, and the rate of failures are determined exogenously; and that desired changes are equal to observed changes.

Given these assumptions he developed a regression showing the impact of these variables on the rate of new bank entry. He concluded that entry would have been between 50 and 100 percent greater than it has been since 1935 if there had not been effective regulation.

The second group of studies regards entry only as a factor affecting performance. Donald Jacobs considered the interaction of branching and portfolio restrictions on the performance of commercial banks.¹ As a part of his study, he concluded that because differences in bank structure resulting from branch regulation caused the expected differences in performance, branch regulation can affect performance.

To measure the structural characteristics of the commercial banking industry, Jacobs developed a variety of cross-section linear regressions. The results of his regressions showed that (1) in 1963 the number of banks in branch banking states was significantly less than in unit banking states,

¹Donald Jacobs, "The Interaction Effects of Restrictions on Branching and Other Bank Regulations, Journal of Finance: Papers and Proceedings of the Twenty-third Annual Meeting of the American Finance Association, XX (May, 1965), 332-348.

(2) between 1946 and 1963 fewer new banks were established in statewide branching states, and (3) the absolute change in the number of banking offices, which include new banks plus new branches, was significantly larger in branch banking states during the period 1946 and 1963, but that there was no significant difference in the number of banking offices in existence during 1963.

Jacobs states that these results suggest two conclusions. First, branching restrictions do not affect the number of banking offices in existence. Instead, population and income variables tend to be more important. Second, these results could imply that in 1946 branch banking states were underbanked because of strong barriers to entry during the Great Depression and during World War II, and that during the period of the study these states were catching up to unit banking states.

Other studies and data show that after considering the economic factors which influence the number of banks, more offices exist in branch banking states. Using the March, 1961 issue of Polk's Bank Directory and the 1960 census, Paul Horvitz and Bernard Shull compared the number of commercial banking offices with the number of people in different non-metropolitan areas. In the smaller non-metropolitan areas (under 5,000 population) there were more banking offices per community in unit banking states. In all communities of more than 5,000 people there were more banking offices in statewide branching states. Using a regression they found that population was a significant determinant of the number of banking offices, but that branch law was only of borderline significance.¹ Because they felt that this result could be due to regional differences, they then separated the United States into seven geographic areas

¹Paul M. Horvitz and Bernard Shull, "The Impact of Branch Banking on Bank Performance", National Banking Review (March, 1964), reprinted in Studies in Banking Competition and the Banking Structure (Washington, D. C., Comptroller of the Currency, 1966), p. 146.

and compared non-metropolitan communities in unit and branch banking states.

They conclude: -

The finding that the apparent advantage in number of offices of small unit banking communities disappears when regional comparison are made, while the advantage of large branch banking communities is maintained, exactly parallels our finding reported previously with respect to numbers of competing banks.

We would conclude that branch banking is likely to result in somewhat greater convenience of banking facilities in moderate and large sized non-metropolitan areas. The number of additional facilities on average is small in all but the largest communities. The difference in the very small communities is negligible.¹

Schweiger and McGee, in their study of "Chicago Banking," divided Chicago and San Francisco into mile squares and compared the number of banks per square. They chose these two cities because of their similar population densities and prevalence of large banks. They found that in 1959 approximately 41 percent of the San Francisco squares had two or more banking firms represented, and 4 percent of the squares had five or more banking firms established. In Chicago, however, approximately 6 percent of the squares had two or more banks, and about one-half of 1 percent of the squares were represented by five or more banking firms.²

The implication of the findings of these foregoing studies is that entry into commercial banking is retarded by regulation. It also appears that entry regulation is less restrictive in branch banking states than in unit banking states, for banking facilities appear to be more numerous and conveniently located in branch banking areas than in unit banking areas.

All of the studies that have compared rates of entry or the number of banks and banking offices of unit with branch banking states exhibit a basic

¹Ibid., p. 147.

²Irving Schweiger and John S. McGee, "Chicago Banking," The Journal of Business of the University of Chicago, XXXIV (July, 1961), 351.

weakness. They only compare unit and branching states after the industry is already regulated. - If the purpose of study is to determine the effect of entry regulation, a better comparison to make is in relation to what would happen without regulation. The way to make this comparison is not by observing the industry after it is regulated, but by observing the behavior of the industry before and after the advent of regulation.

Methods and Goals

The goals of this study, as stated in the introduction, are to isolate some of the factors that lead to office formation in the commercial banking industry, to determine if the Banking Act of 1935 had a significant aggregate effect on the rate of entry into commercial banking, and to compare the effect of the Banking Act of 1935 on the rate of entry in states with different branch laws.

To determine if branch regulation affects entry into banking it is not adequate to simply count the number of charter application approvals and rejections.¹ This method is unsatisfactory for a number of reasons. First, more than one person or group of persons may apply for a charter in the same location at the same time. Each group may think that this location can support only one facility, but each may also think that the chartering authority will grant only one charter. Each group, therefore, hopes to receive this single charter. In fact, if the chartering authorities did grant a charter to two of these groups, one of the groups would not take advantage of their charter. Thus, because some of these potential owners are rejected in favor

¹For a comparable criticism of the rate structure in the electric utility industry, see George Stigler and Claire Friedland, "What can Regulators Regulate? The Case of Electricity," Journal of Law and Economics, V (October, 1962), 1-16.

of other groups of people, and because some of these groups would not form a new office if another group did receive a charter, a numerical count of rejections would overestimate the effect of regulation. Second, if one group is rejected another second group may feel that they can persuade the chartering authorities to issue a charter. If, however, the first group did receive a charter the second group would not make an application. To the extent that the rejection of the first group is counted, a physical count would again overestimate the effect of regulation. Third, a group's application for a charter may be denied. Thinking that the authorities may change their ruling, this same group may reapply, and a mere count would overestimate the effect of regulation. Fourth, it is possible that a group of potential investors interested in forming a new bank or office may think that their application will be denied and will not even bother to make a formal application. Or, similarly, an interested group of investors may informally consult with the chartering authority to try to get an idea what the result would be if a formal application was made. If the chartering authorities are not optimistic about a charter approval, this group may not make a formal application. In either case, a count of actual rejections would underestimate the effect of regulation on office formation.

It is evident that a count of actual rejections is not sufficient to determine if the rate of entry is restricted by the chartering authorities or if the rate of entry is discriminatorily restricted under different branch laws. In addition, it is not sufficient to look at regulations and automatically suppose that they are effective.

One method that has been used successfully is not to ask the authorities if they are restricting entry, but to observe the behavior of the industry before and after the advent of effective regulation. George J. Stigler and

Claire Friedland employed this type of approach when studying regulated and unregulated sectors of the electric utility industry.¹ They compared electric utility rates between regulated and unregulated electric utility companies and hypothesized that electric utility rates were determined not only by regulation, but also by various economic factors. They concluded that after considering these economic factors, regulation was ineffective in determining the average level of rates to consumers, the differential in prices between industrial and consumer users, and the rates of return to stockholders.

A Stigler-Friedland approach can be used to determine if regulation has affected the rate of entry into commercial banking. A difference between the commercial banking industry and the electrical utility industry is that all new offices in the commercial banking industry must receive a charter either from state or national banking authorities. Consequently, it is not possible to compare regulated and unregulated portions of the commercial banking industry as was done for the electric utility industry. It is possible, however, to compare bank entry before and after the advent of effective regulation. In this paper, the passage of the Banking Act of 1935 is assumed to initiate the onset of effective entry regulation in the United States:

The historical development of the legal restrictions on entry in banking can be summarized briefly. The century prior to 1935 may fairly be described as an era of "free banking," though the history books apply the term only to the part of this period up to the National Bank Act of 1863. Such legal restrictions as were placed on the formation of new banks by both Congress and state legislatures in 1863 and thereafter were largely ineffective. The reason for this was that the state and Federal chartering authorities operated independently of one another -- neither had any check on the other within a given state. This legal framework encouraged competition between state and national authorities in the issuance of charters; where an application for a national bank charter was rejected, the state authorities were frequently more than willing to accommodate the spurned

¹Ibid.

applicant, and vice versa. Competition for charters manifested itself not only in the reluctance of the chartering authorities to use the discretionary powers given them by law, but also in attempts by them to make the law less restrictive. For example, the Comptroller of the Currency, the chartering agent for national banks, responded to low state minimum capital requirements by successfully urging Congress to lower capital requirements for national banks. This competition for charters lasted until the collapse of the banking system in the 1930's. The widely shared belief that this competition, and the consequent "over-chartering" of banks, had contributed to the collapse of the banking system provided the impetus for an end to free banking in the United States.¹

The passage of the Banking Act of 1935 imposed an established minimum requirement for new office formations. Since most commercial banks prefer to have their deposits insured,² the establishment of the Federal Deposit Insurance Corporation effectively imposed uniform minimum requirements for new office formation throughout the country. If a state imposes higher minimum requirements than those established by the national authorities, a potential entrant can apply for a national charter. If a state's minimum requirements are lower than the requirements imposed by the national authorities, a potential entrant must still meet the minimum requirements imposed by the Federal Deposit Insurance Corporation.

One qualification of the preceding paragraphs should be introduced. The statement that the period prior to 1935 was characterized by free entry is not entirely accurate. For example, even if the individual states and the Federal authorities did compete for charters, each authority did adhere to certain minimum requirements; it was very possible that both authorities did

¹Peltzman, Journal of Law and Economics, VIII (October, 1964), 11-12

²See the 1965 Annual Report of the Federal Deposit Insurance Corporation, p. 117. Of the 30,968 offices in existence on December 31, 1965, 652 were not insured. This amounts to approximately 2 percent of the total number of offices.

deny the charter applications of certain potential entrants. To the extent that this could have occurred during the period between 1920 and 1935, the commercial banking industry did not exhibit the rates of entry that would have actually occurred in the absence of any chartering authority. Another a priori argument may be made to show that the existence of any chartering authority will usually cause the rate of entry to be less and will certainly not induce more entry than would occur in the absence of a chartering authority. The initiative to form a new banking office must come from the private sector rather than from the chartering authorities. If the chartering authorities would like to see a new banking office formed, but the same time potential investors do not agree that there is a need for a new office, the office will not be formed. If, however, potential investors do see a need for a new office, they will petition for a new charter. If the application is rejected, the chartering authority will have been "effective" and the rate of entry will be lower than it would have been under a system of free entry. In the first case the chartering authority would not have restricted the rate of entry. By being "ineffective," however, the rate of entry would not be larger than it would have been in the absence of any chartering authority.

It is still possible to use the Stigler-Friedland approach even though it cannot be proven that the 1920-1935 period was one of "free" entry into commercial banking. In fact, any conclusions that support the contention that the Banking Act of 1935 effectively restricted entry will be underestimates of the true amount that bank entry is restricted if free entry did not, in reality, exist prior to 1935. Consequently, if it can be shown that entry has been more difficult since the time when competition for charters was abolished, it can be said that chartering restrictions do, in fact, restrict entry.

The methodology used here to determine if entry is restricted in banking, or if entry is differentially affected by different branch laws is similar to the methodology employed by Friedland and Stigler in their study regarding electric utility rates and by Sam Peltzman in his study relating to bank entry. A theory is developed here that explains bank entry as a result of changes in selected economic variables and in entry regulation. Least squares regressions for the period 1920 through 1965 are used to test the theory. Regulation is measured through the use of a dummy variable which takes on the value one during the regulatory period and is equal to zero during the preregulatory period. The dummy variable measures the effect that regulation has had on the entry function. Since it is hypothesized that regulation restricts entry, the value of the regulation coefficient is expected to be negative.

Separate regressions are also made for the following three groups of states: (1) states with statewide branching laws; (2) states with limited branching laws; and (3) states with unit banking laws. The coefficient of the regulation variable is tested for significance in each regression to determine if the entry function shifted downward in the regulatory period. To quantify the effect of regulation, the actual average rate of entry is compared to the predicted rate of entry without regulation. The differences between these two measures show how much the entry function dropped in the regulatory period.

CHAPTER II

THEORY OF ENTRY INTO COMMERCIAL BANKING

This chapter explores a theory of entry as a prerequisite for developing equations to measure the effect that regulation has on the rate of entry into commercial banking.

For the purposes of this study entry is defined as the establishment of a new banking facility. This definition is chosen for a number of reasons. First, the purpose of this paper is to determine the effect that regulators have on the rate of entry. To the extent that branches may substitute for unit banks in branch banking states, and since regulators authorize charters for both new banks and new branches,¹ the definition of entry should include a consideration of the establishment of all new facilities. If entry was defined as being only the formation of new banks, the rate of entry by definition would be biased and would underestimate entry into branch banking states. Second, existing firms in the industry may be viewed as potential entrants, for owners of existing banking facilities may want to construct additional facilities in areas where they are not presently established. If entry was defined as the number of new firms or new facilities established by new owners entry would be understated by the amount that existing firms established new facilities. Third, this definition is useful in evaluating the differential response to changes in economic conditions by the banking industry when under different branching regulations. If only the number of new banks or the number of banks established by people not already in the commercial banking industry was considered, the response of the industry to changes in the economic climate would be underestimated.

¹Raymond P. Kent, Money and Banking (Fifth edition; New York: Holt, Rinehart, and Winston, Inc., 1966), p. 190.

Even though there are alternative definitions of entry, all the definitions have one thing in common. Entry, defined in any way, requires similar considerations by firms; firms must decide whether they want to commit themselves to the spending outlay needed to construct a new facility. Entry in commercial banking, therefore, may be viewed as a problem in capital and investment theory. Because the theory of capital and the theory of investment differ,¹ both should be used to explain and predict an optimum level of capital and the speed with which this optimum level will be reached after an equilibrium has been disturbed.

Theory is further explored to explain and predict how this capital will be used. Will the capital stock be used by many small banks or by a few large commercial banks?

When treating entry into commercial banking as a problem in capital theory, the level of capital can be linked to the number of commercial banking offices in the following manner:²

$$(1) \quad B = \frac{C}{S}$$

where: B = Total number of banking offices
 C = Capital invested in commercial banking
 S = average size of commercial banking office

The percentage change in the number of banking offices can be explained in terms of changes in the level of capital employed in commercial banking and in the average size of banking office:

¹See Trygve Haavelmo, A Study in the Theory of Investment (Chicago: Univ. of Chicago Press, 1960), p. 4, where he states, ". . . This also means that a desire for more capital in any particular circumstance is, implicitly, the same as a desire for a higher rate of gross investment (= replacement). None of this has to do with the dynamic process of increasing (or decreasing) the amount of capital. In particular, the speed of transition from one amount of capital to another (i.e. net investment) is a question of an entirely different nature, as far as economic behavior is concerned."

²Peltzman, Journal of Law and Economics, VIII (October, 1964), 14.

$$(2) \quad b_t = c_t - s_t$$

where:

$$b_t = \frac{B_{t+1} - B_t}{B_t} \cdot 100 = \text{percentage change in banking facilities during period } t$$

$$c_t = \frac{C_{t+1} - C_t}{C_t} \cdot 100 = \text{percentage change in the level of capital employed in commercial banking during period } t$$

$$s_t = \frac{S_{t+1} - S_t}{S_t} \cdot 100 = \text{percentage change in the average size of banking office during period } t$$

This expression shows that the percentage change in the number of banking facilities is approximately equal to the percentage change in the capital employed in commercial banking minus the percentage change in the average size of banking facility. Since this study is concerned with new entry, the percentage change in the number of banking facilities can also be determined by the rate of new formation of banking facilities minus the rate of office closures:

$$(3) \quad b_t = e_t - f_t$$

where: e_t = new office formations, expressed as a percentage of existing facilities

f_t = office closures, expressed as a percentage of existing facilities

After substituting the right-hand side of (3) for the left-hand side of (2) and rearranging terms the following expression is obtained:

$$(4) \quad e_t = c_t - s_t + f_t$$

This breakdown shows that after adjustments are made for closures of banking facilities the rate of entry is approximately equal to the percentage change in the level of capital employed in banking, minus the percentage change in average size of banking facility. This breakdown also permits the

formation of a hypothesis which explains entry in banking or in any other industry by first exploring those factors that affect the aggregate level of capital in the industry and then determining the factors that affect the size of the firms in that industry.

Theory of Capital Formation in
the Banking Industry

In this paper the term capital refers to equity capital furnished by the owners of commercial banks. While this is not exactly the meaning usually given to the word, it is sufficiently exclusive to explain bank entry. It may appear at first that equity capital should not be considered a factor of production, but if it is remembered that commercial banks create claims against themselves in order to obtain claims against deficit budget economic units, a rationale for viewing equity capital as a resource input is furnished. Equity capital acts as a buffer in case the bank's claims against deficit budget units are not honored; the more capital a bank has the more the value of its assets can fall before depositors incur losses.¹

A stock-flow model developed by Robert W. Clower may be conveniently used to explain the level of capital and the rate of capital investment in the banking industry.² Using Figure 1 as a guide,³ the banking industry would be in equilibrium with capital stock K_1 at market price P_1 if expected profits equaled π_1 . At any other market price the industry would not be in equilibrium,

¹See, for example, Annual Report of the Federal Deposit Insurance Corp. for the year ended December 31, 1945 (Washington D.C.: Federal Deposit Insurance Corp., 1945), p.9.

²R. W. Clower, "An Investigation into the Dynamics of Investment." *American Economic Review* XLIV (March, 1945), p. 64-81.

³For a detailed discussion of the theoretical framework see my dissertation entitled "The Differential Effect of Branch Law Regulation on Commercial Bank Entry" (Unpublished Ph.D. dissertation, Department of Economics, Washington State University, 1969), p. 15-48.

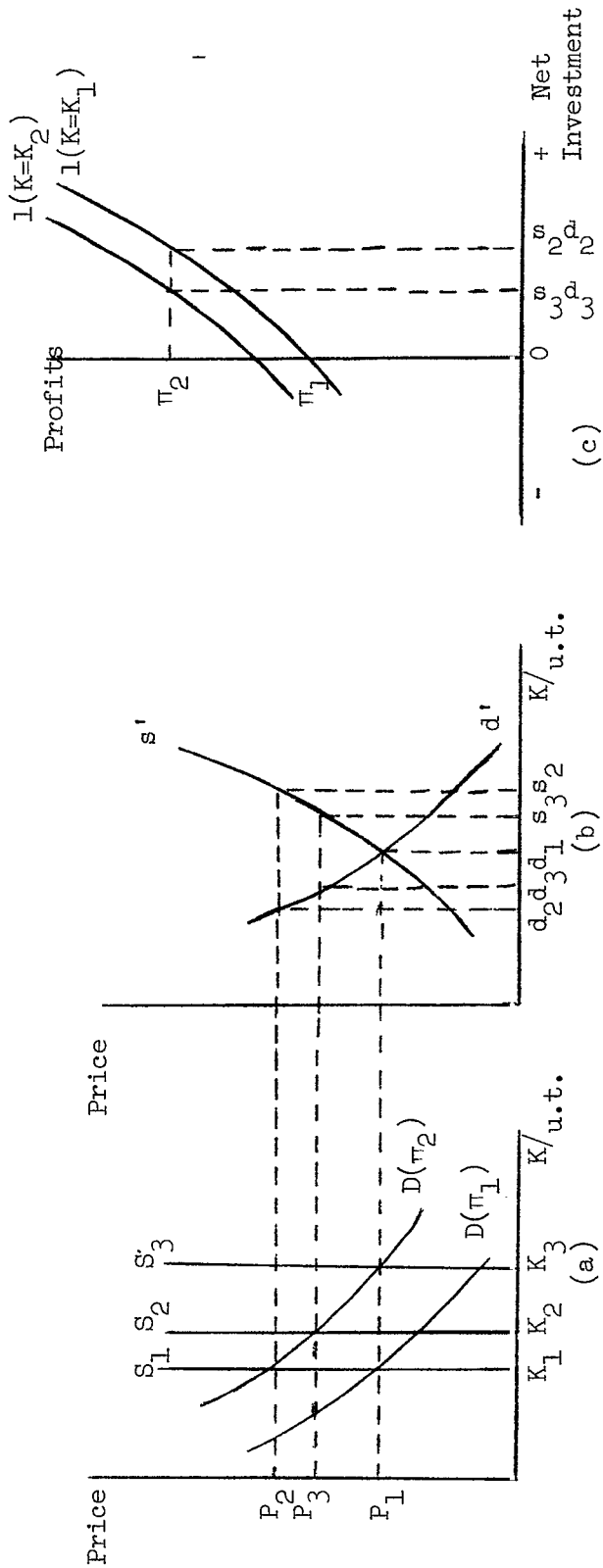


Fig. 1. --- The rate of expected profits as a determinant of the desired level of capital, and of the rate of investment in the commercial banking industry.

for investors would desire to invest more or fewer dollars in banking than existing owners would want to disinvest. Suppose profits rose to π_2 . This would mean that the demand per banking capital as a factor of production would rise, and the market price of capital would rise to P_2 ; because the supply of capital is fixed in the very short run, all changes in demand will be mirrored by proportionate changes in price. At the higher price, P_2 , however, the flow supply of capital (which investors wish to invest in banking) exceeds the flow demand (investment which existing owners wish to use for consumption) by d_2s_2 , and capital will increase to K_2 ($K_2 - K_1 = d_2s_2$) by the end of period 1. As a consequence, price will decline to P_3 . At this lower price flow supply will still exceed flow demand, but the difference will be less than in the preceding period. This means that the profit-investment schedule portrayed in figure 1(c) must have shifted to the left, for expected profits are still equal to π_2 . This process will continue until the stock supply of capital has increased to K_3 at which time the market price has returned to P_1 .

Two points which emerge from the preceding discussion should be emphasized. First, the desired level of capital will be partially determined by expected profits. Second, the rate of investment will be determined by the discrepancy between the actual and desired levels of capital.

By changing the demand for commercial banks' goods and services, income can also affect the stock demand for capital in banking. Figure 1(a) related the rate of expected profits to the stock demand for capital. This figure may also be used to illustrate the effect of the level of income on the stock demand for capital. The position of each demand curve is determined not only by the expected rate of profits, but also by the level of income.

It is almost certain that income has some effect on the demand for commercial banks' goods and services. As James Witte stated:

. . . To any level of national income there corresponds a more-or-less unique pattern of sales expectations on the part of businessmen; the imprecision of this statement results from the realization that more than one distribution of the pattern of over-all demand is probably consistent with any given level of national income -- the importance of this reservation can only be determined empirically. In any event the level of sales expectations should be expected to vary directly with the level of national income.¹

Although it is not possible to predict the effect that changes in income will have on the demand for banking goods and services, it is generally believed that these goods and services are "normal".² This means that a change in income will have a direct effect on the stock demand curve for capital and will cause the income investment schedule to slope upward in a way analagous to the profit investment schedule. Like the profit investment schedule, if the new level of income remains constant the income investment schedule will shift leftward in ensuing periods.

Income may be incorporated with expected profits to determine the level of capital and the rate of capital investment into commercial banking. The addition of the effects of changes in the level of income to the changes in the rate of expected profits leads to:

$$(5) \quad C^* = f(\pi, Y, \dots)$$

and:

$$(6) \quad c_t^* = g(C, \pi, Y, \dots)$$

Where:

¹James G. Witte, "The Microfoundations of the Social Investment Function," Journal of Political Economy, LXXI (October, 1963), pp. 441-456.

²Compare Donald P. Jacobs, "The Interaction Effects of Restrictions on Branching and Other Bank Regulations," Journal of Finance: Papers and Proceedings of the Twenty-third Annual Meeting of the American Finance Association, XX (May, 1966), pp. 333-338.

C^* = desired level of capital in banking

π = level of profits in banking

Y = level of income

c_t^* = rate of capital investment in banking

C = actual level of capital in banking

A change in the level of capital in banking can take two forms: it can serve to change the number of facilities or it can change the size of existing facilities. The question to consider now is whether it is possible to determine how much of this change in capital will be used to change the size of existing facilities and how much will be used to change the number of facilities.

It could be assumed that there is a unique optimum size of banking office and that all offices are of that size. In this case it would not be difficult to isolate the effects that changes in capital have on the number and size of offices. All changes in capital would take the form of new offices. In other words, the percentage change in capital would be equal to the percentage change in commercial banking offices. The available literature in this area, however, suggests that commercial banking offices do not have a well-defined minimum average cost. Rather, average costs tend to decline steeply at low levels of output and then continue at this level over a wide range of output.¹ Since there is a wide range of output where costs are at a minimum, there is not a perfect relationship between the rate of capital

¹ Among the more important recent studies are Paul Horvitz, "Economies of Scale in Banking," Private Financial Institutions (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1962); Lyle E. Gramley, A Study of Scale Economies in Banking (Kansas City: Federal Reserve Bank of Kansas City, 1962); and Frederick W. Bell and Neil B. Murphy, Economies of Scale in Commercial Banking (Boston: Federal Reserve Bank of Boston, 1967).

investment and the rate of entry.¹ In fact, capital investment can be accompanied with either positive or negative changes in the average size of office or with even no change in average firm size.

To the degree that there is an indeterminate optimum size of banking office, an attempt to determine entry through investment in commercial banking will necessarily be arbitrary. Nevertheless, some method to isolate the effect that changes in capital will have on the average size of commercial banks and on the rate of new entry must be considered.

One way to approach this problem is through the use of location theory. If it were true that average costs fall to a minimum at some low level of output, this implies that it is possible for smaller banks to compete effectively against large banks and that the strategy for banks to follow is to situate themselves to be more accessible to service potential customers. This competitive strategy is even more important as population becomes more dispersed, for as the banking office becomes more distant the cost to the consumer increases both in terms of dollars and inconvenience. It is expected, then, that the average size of banking office is smaller in states where population is more dispersed.² For these reasons it is expected that population density serves as a proxy for intended changes in size of banking office. This relationship is summarized as follows:

¹Another argument which could lead to the assumption that average costs are minimum over a wide range of output in the commercial banking industry could also be presented. George Stigler, in his Theory of Price (3rd ed.; New York: The Macmillan Co.), pp. 159-160, states, "If we observed the distribution of firms by size in an industry over a period of years and it did not change (random fluctuation aside), one could make several valid inferences And second, the firms of various sizes would be equally efficient, because if any size were more efficient, this size would be more profitable and firms would tend either to move to this preferable size or to leave the industry." With respect to banks, the average deposit size, in general, seems to be increasing, but there seems to be no tendency for banks to move toward a unique size. Rather, most banks still seem to fall within a wide range of deposit sizes.

²Jack M. Guttentag and Edward S. Herman, Banking Structure and Performance, New York University of Finance, Bulletin No. 41/43 (New York, February, 1967), p. 29.

$$(7) \quad s_t^* = s(L_t)$$

where: s_t^* = change in average size of commercial banking office
 L_t = population density (this variable is measured as the urban population in a state expressed as a percentage of total population)

To complete the theoretical discussion, the effects of regulation should be considered.¹ The most important effect of regulation is to shift the position of the stock demand curves for capital at different levels of expected profits and incomes, and to change the position and shape of the investment opportunities schedules at different levels of expected profits and incomes. Since it is not sufficient to discuss how much capital that potential and actual owners of commercial banks are willing to hold or to invest in commercial banking when regulators are effective in restricting the amounts that owners can actually hold or invest, the stock demand and investment opportunities schedules are formulated in terms of what entrepreneurs are willing to hold and to invest with the regulators' permission. Before explicitly including regulation in the entry model, the possible effects of regulation are considered.

First, the advent of regulation may decrease both the stock demand curve for capital and the investment-opportunities curve. This means that at any rate of expected profits or at any level of income there will be a lower rate of entry into commercial banking: the entry function will decrease after the advent of regulation. This is the most direct test of regulation, for a significant lowering of the entry function affirmatively answers this question: if everything else remains the same is the average rate of entry in the regulatory period lower than in the pre-regulatory period?

¹See Sam Peltzman, Journal of Law and Economics, pp. 32-35. The arguments presented in this section are primarily taken from his explanation.

In addition to lowering the average rate of entry, regulation can also affect the response of entry to changes in the economic variables, but a priori statements regarding the effect of regulation on the response of the industry to changes in the economic variables cannot be made since regulation may affect entry in different ways. For example, it is possible that regulators are primarily concerned with avoiding an excessive number of new banking facilities. Since the greatest demand for new offices will occur when the economic climate is favorable, the regulators might turn down more charter applications when the economic variables are more favorable. When the economic variables are less favorable the number of charter applications will decline, and with extremely unfavorable economic conditions, the number of charter applications will approach zero. With unfavorable economic conditions entry under regulation may be equal to that occurring in the absence of regulation. Measured over a range of values for the different independent variables the values of the coefficients of the explanatory variables will decrease in the regulatory period, and it will seem that regulation has caused the industry to become less responsive to changes in the economic climate. In arriving at these conclusions it has been assumed that regulators are insensitive to pressures brought by charter applicants. If regulators are sensitive to public pressure regulation will have an opposite effect on entry. When the economic climate is less favorable and the demand for new charters is lower, it will be easier for the chartering authorities to reject charter applications. As the economic environment improves and the demand for banking services increases, there will be greater pressure for the chartering authorities to approve new charters. If regulators respond positively to pressure they will approve charter applications more readily, and the rate of entry might even approach a free market rate. In this event, when entry is measured over a range of different levels of the economic variables it will appear that the rate of entry is more responsive to changes in the economic climate than it was in the absence of regulation.

Second, for the following two reasons regulation can lead to an increase in the average size of existing facilities: (1) regulation is primarily aimed at restricting entry and is only concerned with minimum sizes of capital stock in existing facilities; and (2) regulators might prefer larger facilities than do potential entrants.¹ To the extent that these two statements are correct regulation can change the form that new capital will take in the commercial banking industry. Some of the capital, that in the absence of regulation takes the form of new facilities, will be used to change the size of existing facilities. By frustrating the plans of some of the potential entrants and by forcing capital to be used to change the size of existing facilities the negative relationship between the rate of entry and changes in average of office size can even appear to be positive

The theoretical discussion may be summarized by the following equations, where the asterisk denotes a desired change:

$$(8) \quad c_t^* = F(C, \pi, Y, R, u)$$

The effects of regulation and a disturbance term have been added to the determinants of the desired level of investment.

Substituting (8) and (7) into the right hand side of (4) results in the following:

$$(9) \quad e_t = f(C, \pi, Y, R, u) - s(L_t) + f_t$$

where:

e_t = new office formations, expressed as a percentage of existing facilities

C = Capital invested in commercial banking

π = expected profits in commercial banking

Y = level of income

R = regulation

u = random error term

L_t = population density

f_t = office closures, expressed as a percentage of existing facilities

¹For example, a frequent cause for charter rejections by banking authorities is that the potential entrants do not have adequate capital.

CHAPTER III
EMPIRICAL RESULTS

To empirically test the entry model, annual data for the years 1921-1965 were used. A detailed description of the sources of raw data and the methods utilized to construct the variables appear in my dissertation.¹ The model was tested in two ways. First, the economic variables were tested both for significance and for confirmation of expectations. Second, the regulatory variable was explicitly considered. If the dummy variable denoting regulation is significantly different from zero, the effect of regulation can be quantified by comparing the actual average rate of entry with the predicted rate of entry that would have occurred without regulation.

Aggregate Effect of Regulation

Equation (10) represents the "best" empirical estimate of the commercial banking entry function²:

$$(10) e_t = 16.482 + 0.123\pi_t + 0.0000 2Y_t - 0.078 L_t$$

$$(0.031)_t \quad (0.00000)_t \quad (0.141)_t$$

$$- 0.048f_t - 3.019C_t - 2.483R_t$$

$$(0.032)_t \quad (2.747)_t \quad (0.428)_t$$

$$R = 0.91$$

$$S_{y.x} = 0.554$$

Overall, the equation explained variations in the rate of entry very well. The multiple correlation coefficient is significant at the one percent

¹Pakonen, "The Differential Effect of Branch Law Regulation on Commercial Bank Entry," 136-151.

²Alternative measures of the economic variables and alternative distributed lags were also considered, but were rejected for a variety of statistical reasons. The various alternatives and reasons for subsequent rejection are discussed in detail in my dissertation.

level and the von Neumann ratio suggests no positive serial correlation in the residuals. Because of collinearity, however, the values of the coefficients for population dispersion and capital employed in banking were not significantly different from zero with any reasonable degree of confidence.

The coefficient of the regulation variable is the important one for purposes of this study. Two questions should be asked. First, does the variable denoting regulation have a significant effect on the regression? Second, does the coefficient of the regulation variable exhibit the expected sign and is the coefficient significantly different from zero? The answer to both of these questions seems to be clearly in the affirmative. The addition of R_t significantly improves the overall characteristics of the regression: the multiple correlation coefficient increases, the multiple correlation coefficient is significant at a higher degree of confidence, the standard error of estimate decreases, and the presence of positive serial correlation which is evident without R_t disappears when R_t is included in each of the regressions. In addition, the coefficient of the dummy variable is negative and significantly different from zero at the one-tenth of one percent level: the absolute value of the coefficient is approximately six times its standard error.

Before continuing with the discussion of the effect of regulation on the rate of entry the interpretation of the coefficient of the dummy variable denoting regulation should be considered. Dummy variables provide a convenient way to isolate shifts in data that occur because of distinct institutional or structural changes. By incorporating a dummy variable which takes on the value zero in one period and the value one during the other period or periods an estimate of the shift of the time series can be determined.

Depending on the behavior of the time series before and after the structural or institutional change the interpretation of the coefficient of

the dummy variable will differ. If the effect of the structural or institutional change is simply to shift the intercept of the equation, the magnitude of the shift may be determined by comparing the coefficient of the dummy variable with the constant term of the regression.¹ If the effect of the structural or institutional change is not only to shift the intercept of the equation, but also to change the slopes of the regression coefficients the appropriate measure of the magnitude is to compare the coefficient of the dummy variable at the means of all the independent variables other than the dummy variable.² Similarly, the effect of the change may be quantified by comparing the value of the dependent variable at the mean of the non-dummy independent variables with the observed mean value of the dependent variable.

As mentioned in the previous section, there seems to be no a priori reason to expect the slopes of the regression functions to remain the same between the pre-regulatory and regulatory periods. Consequently, an average effect of regulation is determined by comparing the position of the entry function with and without regulation at the means of the independent non-dummy variables.

Different methods of stating the effect of regulation may be used. In this paper, the coefficient of the regulation variable is first checked to

¹Roy J. Ruffin, "Free Reserves, Vault Cash, and the Portfolio Behavior of Banks," Journal of Political Economy, LXXV (December, 1967), 891. He states: "The method of dummy variables can be used to capture *parallel* (italics mine) shifts in, say, demand functions. When the dummy variable equals unity, the new intercept is the estimated constant term plus the coefficient of the dummy variable. It follows that the magnitude of the shift in the function can be measured by the ratio of the coefficient of the dummy variable to the constant term."

²William G. Tomek, "Using Zero-One Variables with Time Series Data in Regression Equations," Journal of Farm Economics, XLV (November, 1963), 818. He states: "The coefficients of the dummy variables together with the constant term provide an estimate of the differences among levels of the dependent variable. These differences in levels may be thought of as differences in Y intercepts. However, if the slopes differ among classes, then these differences in levels are only meaningful at the point of means of all observations of the non-dummy independent variables."

see that it differs significantly from zero. If the coefficient of the regulation variable is "significantly" different from zero, a regulation-free average rate of entry can be predicted, and the effect of regulation can be determined by comparing the observed average rate of entry to the predicted average rate of entry; i.e. the effect of regulation is measured by its effect on lowering the entry function.

If it is assumed that all of the effect attributed to R_t is due to regulation, limitations imposed on entry by the Banking Act of 1935 caused entry to decline by about sixty percent. This estimate is obtained by comparing the 4.945 percent predicted regulation-free rate of entry from equation (10) with the observed average entry rate of 1.956 percent. At the five percent level of confidence the true value of the predicted average rate of entry during the 1936-1965 period lies between 4.945 ± 2.015 (0.554), or between 6.061 percent and 3.829 percent. The upper limit of the true rate of unrestricted entry implies that the greatest effect of regulation has been to cause the actual rate of entry to fall by about 65 percent. At the other extreme regulation has caused the actual average rate of entry to decline by about 45 percent.

Before accepting the statement that the Banking Act of 1935 effectively caused the rate of entry to fall by about sixty percent, certain characteristics of the regulation variable should be considered. For a variety of reasons it is possible that the coefficient of the dummy variable includes some of the effects of one or more of the other independent variables. In this event the estimate of R_t would be biased. Because the purpose of this study is to determine if regulation effectively restricted the rate of entry, those factors that could cause a downward bias when measuring the effect of regulation--those factors which cause an overestimate of the effect of regulation--should be considered.

The coefficient of R_t could be biased downward for three basic reasons. First, collinearity between one or more of the other independent variables and the regulation variable could cause some of the effects of that other variable on entry to be passed on to the regulation variable. This phenomenon would be possible especially if one or more of the other independent variables exhibited a pronounced secular trend. Since the regulation variable itself has a secular trend, multicollinearity between the regulation variable and the other independent variable or variables could cause some of the effect on the rate of entry due to these other variables to be transferred to the regulation variable. It is possible, however, that the opposite could result: some of the effect of regulation on the rate of entry could just as well be passed on to the other expressions designating the effects of the other variables. Second, R_t could be biased downward by changes in the secular trends of the other independent variables. The downward bias resulting from a change of this type would be caused by one of these two factors: (1) an increase in the secular trend of a variable that has a depressing effect on the rate of entry, or (2) a decrease in the secular trend of a variable that contributes to entry. Third, an autonomous shift in an independent variable between the preregulatory and regulatory period could cause the regulation variable to be biased downward. To cause a downward bias in the regulatory variable, an independent variable that contributes to entry would also have to shift downward; a variable that depresses entry would have to shift upward.

The first step is to consider if the dummy variable is picking up any of the entry effects caused by variables exhibiting secular trends and to determine if this interaction of variables is causing an overestimation of the effect of regulation. If this is the case, the coefficients of the other variables with secular trends are underestimates of the independent

variables' "true" effects on the rate of entry.

The three variables in equation (10) that seem to be characterized with secular trends are net income of individuals, population density, and capital employed in commercial banking. Of these three variables, net income of individuals has a positive effect on the rate of entry while population density and capital employed in banking have negative effects on entry rate. Since all three of these variables have a negative relationship to regulation if the coefficient of regulation is biased downward (the effect of regulation is overestimated) the effect of net income is either biased upward (overestimated), or population density and/or capital employed in commercial banking is biased upward (underestimated), or a combination of these factors is occurring. Unfortunately, it cannot be determined if the regulation variable is biased downward because of the opposing effects of each of these variables on the regulation variable.

Another factor that should be considered is that changes in secular trend might cause the effect of regulation to be overestimated. Of the three variables exhibiting secular trends, income began to increase at an increasing rate after the advent of regulation. Since income positively affects the rate of entry, the general effect of the increasing secular rate would be to cause an underestimation of the coefficient of the regulatory variable. Population density, defined as being the percent of urban population to total population, and capital employed in commercial banking also experienced increased secular trends. Since both of these variables act to restrict entry, the increases in secular trends could lead to an overestimation of the regulation coefficient. Since the changes in secular trends have opposite effects on the rate of entry it is hard to say whether the regulatory variable is biased upward or downward; some type of balance between the two opposing effects could have occurred.

One more factor should be considered. There seems to be an autonomous shift in the time series of the rate of banking office closures. There is a relatively high negative simple correlation ($r = -0.534$) between the rate of closures and regulation. In addition, there is a significant decrease in the average rate of closures: the rate decreased from 4.082 percent in the pre-regulatory period to 0.222 percent in the regulatory period. Since trend is not apparent in the rate of closures, it appears that after the advent of regulation the rate of closures shifted downward. Because closures tend to have a depressing effect on the rate of entry, this downward shift of closures would, certeteris paribus, cause the rate of entry to increase. This means that the regulation coefficient would, if anything, be biased upward (the coefficient would be underestimated).

On the basis of the foregoing paragraphs it is concluded that any downward bias in the regulation coefficient cannot be readily determined. Those effects that would cause a downward bias seem to be offset by factors that would cause an upward bias. If there is any bias to the regulation coefficient, it seems just as likely to be causing an underestimation of the "true" effect of regulation.

Differential Effects of Regulation

By disaggregating the data, a measure of the differential effects of regulation can be obtained by comparing actual to predicted rates of entry in states with different branch laws. The "best" empirical entry regression for states allowing statewide branching was:

$$(11) \quad e_t = 23.037 + 0.278 \pi_{t-2} + 0.00011 Y_t + 0.537 L_t \\ (0.079) \quad (0.00003) \quad (0.380) \\ - 0.060 f_t - 16.508 C_t - 2.422 R_t \\ (0.077) \quad (7.106) \quad (0.534)$$

$$R = .91$$

$$S_{y.x} = 0.944$$

The entry regression for states allowing limited branch banking was:

$$(12) \quad e_t = 25.900 \pm \frac{0.068}{(0.021)} \pi_{t-2} + \frac{0.00005}{(0.00001)} Y_t - \frac{0.473}{(0.148)} L_t \\ - \frac{0.022}{(0.038)} f_t - \frac{0.051}{(0.245)} C_t - \frac{2.857}{(0.378)} R_t$$

$$R = .91$$

$$S_{y.x} = 0.670$$

The entry regression for states permitting only unit banking was:

$$(13) \quad e_t = 5.576 + \frac{0.242}{(0.040)} \pi_t - \frac{0.00001}{(0.00002)} Y_t + \frac{0.260}{(0.056)} L_t \\ - \frac{0.053}{(0.022)} f_t - \frac{4.491}{(1.651)} C_t - \frac{2.289}{(0.358)} R_t$$

$$R = .87$$

$$S_{y.x} = 0.434$$

In states that allow statewide branching, the predicted regulation-free average rate of entry was 5.451. This implies that regulation effectively restricted entry by approximately 40 percent, for the actual average rate of entry during the regulatory period was 3.287 percent. At the five percent level of significance, the true effect of regulation was to decrease the rate of entry between ten and fifty percent.

For states which allow limited branching the actual rate of entry during the regulatory period was 2.317 percent. If regulation had not been effective in restricting entry the average rate would have been 4.736 percent. On the basis of actual and predicted rates of entry regulation has caused entry to fall by about fifty percent. At the five percent level of confidence the true effect of regulation has been to cause entry to fall by thirty to sixty percent.

Regulation caused the average rate of entry to fall approximately seventy percent in unit banking states. If regulation had not restricted

entry the predicted average rate of entry would have been 3.294 percent compared with the actual average of 1.033 percent. At the five percent level of confidence the true effect of regulation has been to decrease entry by sixty to seventy-five percent.

Table 1 summarizes the effects of regulation in states with different branch laws. Because of the overlap in the "true values" of the percentage declines in entry due to regulation, statements regarding statistically significant differences cannot be made in all cases. The difference in the effect of regulation between unit banking and statewide branching states is significantly different, for there is no overlap of the lower and upper estimates of the "true" effect of regulation.

TABLE 1 - - - Comparison of the percentage declines in average entry rates due to regulation in statewide branching, limited branching, and unit banking states

Branch Law	Predicted average "free" rate of entry	Actual average rate of entry	Percentage Decline in Average Rate of Entry	Range of "True Value" of Percentage Decline in Rate of Entry at the Five Percent Level of Significance	
				Lower	Upper
Statewide branching	5.4%	3.3%	39.7	7.8	55.2
Limited branching	4.7%	2.3%	51.1	31.8	61.9
Unit banking	3.3%	1.0%	68.6	57.4	75.2

Why would the branching law of a state affect the extent to which entry has been restricted by the Banking Act of 1935? It appears that the factors which regulators consider when issuing new charters in order to prevent bank failures has tended to make the Act discriminatory against entry in unit banking states. This last statement can be supported by two generalizations. First, regulators look at some of the factors considered important by potential entrants. Two of the factors considered by regulators -- future earnings prospects,

and convenience and needs of the community--are directly related to expected profits. Since potential entrants could overestimate the needs of the market, it is possible that at lower levels of the economic variables the free market rate would greatly exceed the rate that would occur under regulation because regulators would deny charter applications. With a more favorable economic climate the optimism of potential entrants is not as crucial, for a new office, even though it may prove not to be as profitable as expected, can still be operated profitably. Regulators, feeling that the potential entrants are overoptimistic, might still issue the new charter; as a result, entry might more closely approach the free market rate.

To the extent that the reasoning of the previous paragraph is true, regional differences in the economic environment can explain some of the differential effect of branch law regulation on the rate of entry. Branching states are concentrated in the West; limited branching states are primarily found in the East; and unit banking states are most prevalent in the Midwest. Since in the past forty years the West has exhibited the greatest rates of economic and population growth the demand for banking services has been the greatest in this area. The lowest rates of economic growth have occurred in the Midwest. The expectation that the greatest rate of entry should occur in the West is borne out by the data: the predicted rate of entry in the absence of entry regulation is highest in statewide branching states, and unit banking states exhibit the lowest predicted rate of entry. If regulators are sensitive to pressure, it is expected that the actual rate of entry in states which are experiencing rapid economic growth will be more than proportionately greater than in states which are experiencing less rapid growth. A comparison of the differences in predicted entry with the differences in actual rate of entry in states with different branch laws shows that this prediction is also supported by the data.

A second reason for the differential effect of regulation on the rate of entry between states with different branch laws is that when given the choice regulators apparently prefer to issue charters for new branches. This implies that entry restrictions will be less if regulators can issue charters for both new branches and new banks. This phenomenon could be the partial result of regulators having to consider certain banking factors when issuing new charters, and it could be the partial result of regulators' aversion to the possibility of bank failures. When issuing a new charter the banking authorities must consider the financial history and condition of the bank, the character of the bank's management, and the adequacy of the capital structure of the bank. For all practical purposes there is no history to consider for a new unit bank, and the determination of management character and capital adequacy can only be estimated. In the case of a new branch the first two factors are easily determined. There is also a built-in safeguard if the regulators misjudge the market demand: a branch bank has retained earnings from previous years with which to carry the short-term losses incurred by a newly opened branch.

The hypothesis that regulators prefer to issue charters to new branches is supported by the data. Since 1935 a substantial shift has resulted in the composition of banking offices in branch banking states. In 1935 approximately forty-five percent of the total number of banking offices in statewide branching states were branches. By 1965 the percentage of total offices that were branches has risen to about eighty-five percent. Some of this increase in the percentage of branches occurred as a result of the mergers of unit banks, but most of the increase was due to the greater increase in the formation of new branches than in the formation of new banks. In the 1920-1935 period, approximately the same number of new banks and new branches were formed each year. From 1936 to 1965 new branch formations typically have been from six to ten times as great as new bank formations.

CHAPTER IV

SUMMARY AND CONCLUSIONS

The purpose of this study was to determine the quantitative effect of regulation on the rate of entry into commercial banking. Two primary questions were considered: (1) Have the regulations imposed by the Banking Act of 1935 had a significant effect on the rate of new bank office formation in the United States? (2) Does the branching law of a state affect the degree to which entry is restricted by the Banking Act of 1935?

Three general conclusions may be stated from the results of the study. First, the legal restrictions to entry written into the Banking Act of 1935 have effectively caused the aggregate rate of entry into commercial banking to fall by about fifty percent.

Second, the rate of entry in states with different branch laws has not been uniformly affected by the Banking Act of 1935. Entry in unit banking states has been curtailed by seventy percent while limited branching and statewide branching states have experienced fifty and forty percent declines, respectively, in the average rates of entry.

Third, the differential effects on the rate of entry appear to be caused by regulators' concern over bank failures. Thus, if all other factors are equal, when the economic climate is less favorable regulators are more likely to deny a charter application. Since unit banking states have experienced lower rates of economic growth regulators have been more effective in restricting entry in these states. In addition, the chartering authorities seem to favor the establishment of de novo branches because of lower probabilities of failure: short-term losses of a new branch can be supported by retained earnings of the parent bank or by earnings of other branches.

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