# The Political Economy of Bank Entry Restrictions: Theory and Evidence from the U.S. in the 1920s*

*Charles W. Calomiris*
*Columbia Business School,*
*AEI, and NBER*
*e-mail: ccalomiris@aei.org*

and

*Carlos D. Ramírez*
*Department of Economics*
*George Mason University*
*e-mail: cramire2@gmu.edu*

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Comments Welcome

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**Abstract**

Conventional wisdom has it that entry barriers in banking (for example, historical branch banking restrictions in the United States) are motivated by special interest groups, with small, local banks playing a central role in lobbying for protection. In particular, it is thought that unit (single-office) banks in the United States favored branching restrictions because they wanted (and needed) protection from competition from large, multi-office banks. Historically, however, branch banking restrictions also had the support of some classes of borrowers. Borrower support for entry barriers varied across states, and varied over time within states. In our theoretical work, we show that entry barriers affect the terms on which borrowers access credit, and can sometimes be beneficial for some classes of borrowers. While it is true that branch banking tends to increase the overall supply of credit to borrowers, it is also true that in the presence of imperfect capital markets, borrowers may benefit from barriers to entry because such barriers limit the options of the banks in the loan market. We develop two simple models that show how branching restrictions (or more generically, barriers to varying the inter-regional allocation of credit by banks) create strategic advantages for borrowers that hold their wealth in the form of immobile factors of production (e.g., land). In both models these advantages tend to be present only when borrowers' net worth levels are sufficiently high. We report empirical evidence supporting that observation. Our results show that the loan customers that our model predicts should have benefited the most from the strategic advantages of unit banking (landowners in high-wealth states) in fact tended to also prefer unit banking restrictions. By contrast, borrowers that our model predicts would not have benefited as much (landowners in low-wealth states) preferred branch banking. Our results indicate that bank clients, not just unit bankers themselves, may have supported unit banking laws out of informed self interest. We argue that these results also have broader implications for explaining the economic circumstances under which entry barriers to global banking are erected or removed in emerging market economies today.

## I. Introduction

Entry barriers in banking have been an important fact of life historically and currently in many countries. In emerging market economies today, one of the revolutionary changes taking hold in some countries is the entry of foreign-owned banks on more or less equal footing with domestically owned institutions. For example, Argentina, Chile, Mexico, and Brazil saw their banking systems transformed into largely foreign-owned systems by the end of the 1990s. But as recently as the 1980s, foreign ownership in these countries was the exception rather than the rule. In many other developing countries, particularly in Asia, there are rigid barriers to foreign entry. Why, in general, is there so much resistance to competition from foreign-owned banks? And why is it that that resistance is sometimes overcome, as it has been recently in many Latin American countries.

One fact that many observers have noticed is that limits on foreign entry tend to be relaxed after severe adverse economic shocks. For example, in Mexico the financial crisis of 1994-1995 clearly set the stage for the liberalization of foreign entry after 1997. The same pattern is visible in the history of the relaxation of entry barriers in the United States. During the bank distress years of 1920-1939, 15 states relaxed their branching restrictions, while in the four decades that followed (1939-1979) only four states relaxed branching limits. When bank distress returned in the 1980s, once again 15 states relaxed their branching rules (Mengle 1990, Calomiris 2000, pp. 63-7).

One explanation of barriers to entry revolves around the role of local bankers in lobbying for entry barriers. That perspective could also explain the link between economic distress and the relaxation of entry barriers, if economic distress weakens the political power of the local banks. This is certainly a plausible explanation, and in our view, captures an important part of the political struggle over entry barriers. But this is not the only possible explanation, and we will argue that there are reasons to believe that, by itself, it is an inadequate explanation.

In this paper we develop an alternative theoretical approach to explaining entry barriers, which focuses on the gains certain classes of borrowers receive from those barriers under certain circumstances. We apply our models of borrower preference for entry barriers to the historical case of historical U.S. bank entry barriers – laws limiting branching. We argue that a perspective that takes account of borrowers' preferences is necessary for explaining aspects of the political choice for limits on branching in the United States, and we present empirical evidence that is consistent with our theoretical explanations for why borrowers sometimes supported entry barriers.

*Entry Barriers in U.S. History*

Branch banking restrictions have been among the longest-lasting financial regulations in the United States. State laws that had restricted or prohibited the establishment of commercial bank branches date back to the last century. Except for the First and Second Banks of the United States (1791 to 1811, and 1816 to 1836, respectively), antebellum state bank charters dictated the location and activities for each bank at the state level. Before the Civil War banks chartered in the North were unit banks, while many states in the South permitted branch banking. In the postbellum period, branching restrictions continued to be a matter of state law. The creation of national banks under the National Banking Act of 1863 did not materially alter that fact. National banks were chartered to operate in individual states. Although there was no explicit prohibition of within-state branching in the National Banking Act, the Comptrollers of the Currency, who oversaw national banks, interpreted some of the Act's clauses as implicitly prohibiting the establishment of branches.

Although the McFadden Act of 1927 allowed national banks to establish branches, they were allowed these branches only if state law permitted it, and even in such cases, branching was restricted to the city limits of where the main branch was located. The one-town, one-bank structure that characterized the commercial banking industry throughout most of U.S. history has only recently given way to nationwide branch banking. This occurred first in response to changes in state law and regional interstate agreements that permitted branching. These initial changes culminated in the enactment of the Riegle-Neal Interstate Banking and Branching Efficiency Act (IBBEA) in 1994, which further promoted cross-state mergers and acquisitions in the banking industry (for reviews, see Berger, Kashyap, and Scalise 1995, Calomiris and Karceski 1998, Calomiris 2000).

Despite an enormous literature on the economics and politics of branching limits, a convincing theoretical explanation for branching restrictions remains elusive. Regulation can be welfare enhancing when competitive market forces produce monopoly or negative externalities. However, it is hard to justify the existence of branch banking restrictions on these grounds. Branching restrictions decrease the total number of banks that can compete within a local market. Fewer banks with many branches tend to produce greater entry and competition, especially in sparsely populated areas (see the review in Calomiris 2000, Chapter 1). Branching restrictions tend to limit the supply of credit, increase bank failure risk, and can promote monopoly power by local banks.

In recognition of the many shortcomings of a unit banking system, many researchers maintain that vested interests within the industry, rather that the political preferences of consumers, best explain the existence and duration of branch banking restrictions. (See, for example, Economides, Hubbard, and Palia 1996, and Krozsner and Strahan 1999.) The most obvious interest group identified in this literature is unit bankers, who stood to gain a great deal from restrictions that prevented the branches of larger banks headquartered elsewhere from entering their local markets. This explanation, however, seems incomplete for several reasons.

First, there is the unmistakable fact that unit banking laws were often quite popular. Limits on branching were a prominent part of William Jennings Bryan's populist platform. In at least one case, in Illinois in 1924, the question of whether to permit branching was put to a referendum and was defeated (White 1984). Clearly, there was more to the support for unit banking than the political lobbying of unit bankers.

Second, an explanation that focuses on the rent-seeking behavior of unit bankers neglects the fact that competition among unit bankers within a city or county can be just as effective as entry by branching banks in limiting the rents of unit banks. With the exception of the most rural locations, towns, cities, and counties typically contained many competing local banks, and the dissemination of the automobile by the 1920s increased the range of competition among nearby unit banks.

In order to shed light on the importance of unit bankers as a rent-seeking group, we need to know how large (if any) their rents were. In empirical work reported below we examine the extent of competition within unit banking systems in more detail, and show that on average competition was substantial and rents were likely small.

Third, as we will explain in detail in our theoretical discussion, some bank borrowers stood to gain strategically from supporting limits on branch banking. Unit banking served as a commitment device to prevent local banks from moving funds out of the local economy. In our models, we consider circumstances under which borrowers might have been advantaged by these limits, despite their costs.

After developing these theoretical models, we turn to an empirical study of unit banking laws. One of the most striking facts about unit banking is the large and robust premium on bank earnings that branching restrictions created for unit banks. These premiums ranged from 33% to 50%. We argue that, for the most part, these premiums are not traceable to greater monopoly power. The unit banking premium on earnings survives the inclusion of a large array of control variables, which proxy for demand conditions as well as the possible effects of alternative regulatory environments. We conclude that the earnings premium associated with unit banking largely reflects the greater risks faced by unit banks.

Our models suggest that some borrowers of unit banks were willing to absorb the costs associated with the regulatory choice of unit banking (reflected in higher loan rates and lower deposit rates) because unit banking provided benefits to those borrowers that more than offset these costs. The benefits borrowers receive, according to our models, depend on imperfections in capital markets resulting from asymmetric information. The benefits are of two kinds: first, a pecuniary benefit from differences in loan pricing policies of unit banks, and second, credit insurance provided to borrowers in the form of an implicit commitment not to move funds out of the borrowers' local market in reaction to adverse changes in local collateral (land) values. The model predicts that, when the net worth of landowners (farm-owners and homeowners) is sufficiently high, these two types of gains accrued by borrowers more than offset the disadvantages from limiting branching.

Our empirical findings, reported in Section III, are consistent with the theoretical predictions of our models. We develop a regression analysis to test this proposition more formally, after controlling for other differences across states. Furthermore, we generalize the link between support for unit banking and landowning borrowers to include homeowners in cities, as well as rural landowning farmers. We find that, to the extent to which farms and homes were owned by their occupants, the population tended to favor unit banking over branch banking. The fact that we are able to detect large profit margins for unit bankers suggests substantial imperfections in local credit markets (which made borrowers willing to pay such a hefty price for the gains from unit banking).

We also find that the presence of manufacturing interests is negatively associated with support for unit banking. Manufacturers (which primarily rely upon mobile factors of production) should have benefited less from the protection granted to owners of immobile factors of production. Furthermore, manufacturers had financing needs that were far larger than what unit banks could provide at a reasonable cost, given the limited size of unit banks and the large minimum efficient scale of production in manufacturing by the late nineteenth century.

We find further support for the credit-insurance view of unit banking laws in an examination of debt moratorium legislation. If unit banking provided a means of limiting the withdrawal of credit from borrowers, then after controlling for other effects, unit banking should have reduced the need to impose debt moratoria as a means of preventing the withdrawal of credit in the 1920s and 1930s. We find that this was the case.

The rest of the paper is organized as follows. The models of borrower preference for unit banking are developed in Section II. The empirical findings are presented in Section III. Section IV concludes.

## II. Theory

In this section, we develop two complementary models of borrower preferences for unit or branch banking. Both models depend on imperfect capital markets to generate a borrower demand for unit banking under some states of the world (when wealth is high). The first model emphasizes the benefits for borrowers from the loan pricing strategy that unit banking produces, while the second model focuses on the way that unit banking limits changes in the inter-regional flow of credit in response to stochastic shocks to borrower wealth.

### A. Branch Banking, Diversification, and Loan Pricing

In a geographical place (a state), there are two regions (or counties). Each region has a continuum of borrowers of mass $N_k$, where $k$ denotes the region (either 1 or 2).

In each region, there are two types of borrowers and two types of projects: Type A borrowers can engage only in Type 1 projects, which have a certain gross return, $R_c$; Type B borrowers can engage in either Type 1 projects or Type 2 projects, which pay a gross return of $R_s$ if successful and 0 if unsuccessful. The probability of a successful outcome is $p$, so $(1-p)$ is the probability of an unsuccessful outcome. We assume that the size of the project, $X$, is the same for both types. Also, we assume that the gross return of a Type 1 project exceeds the expected gross return of a Type 2 project, with the safe return in between. That is, $R_c >$

$(1+r)X > pR_s$, where $r$ is the risk-free interest rate. Type A borrowers constitute $\alpha$ percent of total borrowers in a region and Type B borrowers constitute $(1-\alpha)$ percent. Borrowers are aware of their own type, and are risk-neutral.

There is only one lending period in the model, which we identify as Period 2. (We discuss what takes place in Period 1 below.) At the beginning of the lending period, borrowers demand and the bank supplies loan funds for the projects, given the amount of collateral owned by the borrowers.

Banks are risk-averse. We model banking behavior using the standard portfolio selection framework. All banks face a choice as to how to invest their funds: either in loans (which will finance projects) or in riskless assets ("government bonds"). After choosing the proportion of assets that will be invested in loans, banks choose the interest rate to charge borrowers. Unit banks can make loans only to borrowers in the region in which the bank is located. Branch banks can make loans to borrowers in both regions. If $\theta_k^b$ is the proportion of bank assets invested in loans in region $k$ (region 1 or 2), under banking regime $b$ (unit or branch), $(1-\theta_k^b)$ is the proportion of assets invested in government bonds. Since branch banks can offer loans in both regions, they face a larger set of portfolio choices than unit banks do—they choose the proportion of assets to be invested in Region 1, $\theta_1^{branch}$, the proportion of assets to be invested in Region 2, $\theta_2^{branch}$, and the proportion of assets to be invested in government bonds, $(1-\theta_1^{branch}-\theta_2^{branch})$.

To generate demand for loan diversification under branch banking, we assume that the outcomes of Type 2 projects are perfectly negatively correlated across the two regions. Hence, if a successful outcome takes place in Region 1, an unsuccessful one takes place in

Region 2. (In a model with a large number of regions, independence of outcomes rather than negative correlation, would produce similar results.)

We assume that the total quantity of funds available for lending in a given region is not sufficient to fund all borrowers in that region. Thus, if $F_k$ is the total quantity of funds available in Region $k$, $F_k < XN_k$. For clarity and simplicity, we make the assumption that $F_1 = F_2 = \overline{F} < \min[XN_1, XN_2]$. Since $(\overline{F}/XN_k) < 1$, there may be credit rationing in equilibrium if moral hazard limits interest rate increases to clear the market and if not enough funds can be imported from the other region (which only branch banks will be able to do).

*Timeline of events*

Period 1

In period 1, voters (borrowers) in both regions choose the type of banking regime that will service the region (a particular state in the United States). They do so by voting on a law that either allows or disallows branching. Their basis for preferring one regime to the other is their expected profits.

For simplicity, in some of our discussion below we assume that initial collateral levels are the same across regions. In the appendix we show that this does not qualitatively affect our results.

Period 2

The level of collateral in each region is exogenously given at the start of the lending period, as described above. Thus, all borrowers in region $k$ start with the same amount of collateral, $C_k$, and demand the same loan amount, $X - C_k$, where $X$ is the project size. We assume that $X$ is the same in both regions.

a) First, the bank chooses $\theta_k^b$. Assuming it is positive, the bank then chooses an interest rate, $i_k$, to charge its borrowers. The same rate is charged to all borrowers. The bank sets this interest rate without knowing:

   i) the type of any given borrower, only that the probability of encountering a Type A borrower is $\alpha$ and the probability of encountering a Type B borrower is $(1-\alpha)$;

   ii) the type of shock that will occur during the period, only that the probability of a good outcome is $p$ and the probability of a bad outcome is $(1-p)$.

b) Borrowers choose whether to accept the interest rate offer. Assuming that they do, Type A will do project 1, while Type B borrowers must choose the type of project they will undertake (either 1 or 2).

c) At the end of the period, after the shock occurs, the borrowers realize their returns from their projects—they repay their loans, if possible, and consume the rest, if any.

*Solution of the Model*

In order to solve the model, we first determine what takes place in Period 2, the lending period. Once the expected payoffs are derived, we can analyze the voting decision that takes place in Period 1.

*Period 2: Lending Period*

*A. Demand for Loans*

The following analysis applies to a particular region only. In Period 2, all borrowers start with collateral $C_k$, and the bank is unable to distinguish between the two types of borrowers.

*Type A Borrowers*

A Type A borrower can only engage in a Type 1 project. His expected return from this investment is $R_c - (1+i_k)(X - C_k)$. The (gross) opportunity cost of his collateral is the alternative (risk-free) investment with rate of return, *1+r*. Hence, the total return (net of the opportunity cost) is:

$$\pi_{1,k}(i_k, C_k) \equiv R_c - (1+i_k)(X - C_k) - (1+r)C_k \qquad (1)$$

Since, by assumption, funds are scarce, borrowers do not know with certainty whether they will be offered credit. However, they form expectations of bank credit offers based on a rational understanding of a bank's optimal credit allocation decision. Let the probability of being offered funds in region *k* under banking regime *b* be $\lambda_k^b$. Naturally, this probability will be related to $\theta_k^b$, and will be determined by $C_k$, and the choice of banking regime.

After accounting for the probability of being offered credit, a Type A borrower's expected return (before being granted credit) is:

$$\Pi_k^{A,b} \equiv \lambda_k^b\left(\theta_k^b, C_k\right) \times \pi_{1,k}(i_k, C_k) \tag{2}$$

*Type B Borrowers*

A Type B borrower can engage in either a Type 1 or a Type 2 project. His expected return from investment in a Type 1 project is $\pi_{1,k}(i_k, C_k)$. His expected return from investment in a Type 2 project for period 1 is:

$$\pi_{2,k}(i_k, C_k) \equiv p\{R_s - (1+i_k)(X - C_k)\} - (1+r)C_k \tag{3}$$

After accounting for the probability of being offered credit, a Type B borrower's expected return (before being granted credit), if he chooses to do a Type j project is:

$$\Pi_k^{B,b} \equiv \lambda_k^b\left(\theta_k^b, C_k\right) \times \pi_{jk}(i_k, C_k) \tag{4}$$

We now derive conditions that determine project choice and profitability for both Type A and Type B borrowers.

Assuming he gets credit, a Type A borrower's expected return is $\pi_{1,k}(i_k, C_k)$. He will only wish to borrow as long as this return is positive. Hence, a Type A borrower will borrow (invest) only if $i_k \leq i_k^{\max,1}$, where:[1]

$$\pi_{1,k}\left(i_k^{\max,1}, C_k\right) = 0 \tag{5}$$

Equivalently:

$$1 + i_k^{\max,1} \equiv \left(\frac{R_c - (1+r)C_k}{X - C_k}\right) \tag{6}$$

A Type B borrower can engage in either a Type 1 or a Type 2 project. His expected return from investment in a Type 1 project is $\pi_{1,k}(i_k, C_k)$; his expected return from investment in a Type 2 project is $\pi_{2,k}(i_k, C_k)$. A Type B borrower will prefer a Type 1 to a Type 2 project if, for a given collateral level, $\pi_{1,k}(i_k, C_k) \geq \pi_{2,k}(i_k, C_k)$. This will happen as long as $i_k \leq i_k^{switch}$, where:[2]

$$1 + i_k^{switch} \equiv \frac{R_c - pR_s}{(1-p)(X - C_k)} \tag{7}$$

Hence, a Type B borrower will borrow for a Type 1 project only if $i_k \leq \min[i_k^{switch}, i_k^{\max,1}]$; he will borrow for a Type 2 project only if $i_k^{switch} < i_k \leq i_k^{\max,2}$, where:

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[1] Note that $\pi_{1,k}(i_k, C_k)$ is decreasing in $i_k$.

[2] Note that $i_k^{switch}$ is simply the interest rate that satisfies the following: $\pi_{1,k}\left(i_k^{switch}, C_k\right) = \pi_{2,k}\left(i_k^{switch}, C_k\right)$.

$$\pi_{2,k}\left(i_k^{\max,2}, C_k\right) = 0 \tag{8}$$

Equivalently:

$$1 + i_k^{\max,2} \equiv \left( \frac{R_s - \left(\frac{1}{p}\right)(1+r)C_k}{X - C_k} \right) \tag{9}$$

<u>Case 1</u> ($C_k < C^*$):

We show in the appendix that if $C_k$ is below the threshold level $C^*$, then $i_k^{switch} < i_k^{\max,1} < i_k^{\max,2}$. The threshold level $C^*$ is defined as follows:

$$C^* \equiv \left(\frac{p}{1-p}\right)\left(\frac{R_s - R_c}{1+r}\right)$$

<u>Case 2</u> ($C_k \geq C^*$):

We show in the appendix that if $C_k$ is above the threshold level $C^*$ instead, then $i_k^{switch} \geq i_k^{\max,1} \geq i_k^{\max,2}$.

The choices of project type as a function of interest rates and collateral level are summarized in Figures 1 and 2.

Figure 1: $C < C^*$

| | | | |
|---|---|---|---|
| Both Type A and Type B borrowers doing Type 1 projects | Type A borrowers doing Type 1 projects; Type B borrowers doing Type 2 projects | Only Type B borrowers doing Type 2 projects | No borrowing |

0 $\quad i_k^{switch} \quad i_k^{\max,1} \quad i_k^{\max,2}$

Figure 2: $C \geq C^*$

| | | |
|---|---|---|
| Both Type A and Type B borrowers doing Type 1 projects | Both Type A and Type B borrowers doing Type 1 projects | No borrowing |

0 $\quad i_k^{\max,2} \quad i_k^{\max,1} \quad i_k^{switch}$

*B. Supply of Loans: Bank behavior and interest rate offers*

We model the bank's risk-averse behavior using Tobin's (1958) portfolio diversification approach, which incorporates a risk-free alternative to the efficient set of feasible investment portfolios.[3] Since the bank's problem depends on the banking regime in which it is operating (either unit or branching), we discuss each solution separately.

*Unit banks*

Unit banks have several risk-return combinations available that span their portfolio choice set. These combinations depend on the level of collateral. We list them below.

Table 1: Risk-Return Alternatives Under Unit Banking

| Interest rate | $C_k < C^*$ $(i_k^{switch} < i_k^{\max,1} < i_k^{\max,2})$ | | $C_k \geq C^*$ $(i_k^{switch} \geq i_k^{\max,1} \geq i_k^{\max,2})$ | |
|---|---|---|---|---|
| | **Risk** | **Expected Return** | **Risk** | **Expected Return** |
| 1. $r$ on bonds | None | $\rho_r \equiv (1+r)$ | None | $\rho_r \equiv (1+r)$ |
| 2. $i_k^{switch}$ on loans | None. All borrowers do Type 1 | $\rho_{i_k^{switch}} \equiv \left(1+i_k^{switch}\right)$ | No borrower participates | $\rho_{i_k^{switch}} \equiv N.A.$ |
| 3. $i_k^{\max,1}$ on loans | Some. (1-α) fraction do Type 2 | $\rho_{i_k^{\max,1}} \equiv \left(\alpha+(1-\alpha)p\right)\left(1+i_k^{\max,1}\right)$ | None. All do Type 1 | $\rho_{i_k^{\max,1}} \equiv \left(1+i_k^{\max,1}\right)$ |
| 4. $i_k^{\max,2}$ on loans | Significant. All do Type 2 | $\rho_{i_k^{\max,2}} \equiv p\left(1+i_k^{\max,2}\right)$ | None. All do Type 1 | $\rho_{i_k^{\max,2}} \equiv \left(1+i_k^{\max,2}\right)$ |

**Lemma 1: Minimum fraction of Type A borrowers, $\alpha$***

*For any value $C_k$, there is an $\alpha^* \geq 0$, such that for $\alpha > \alpha^*$,* $\rho_{i_k^{\max,1}} > \max\left[\rho_{i_k^{switch}}, \rho_r\right]$

[3] Portfolio allocation models in banking have a large history in the literature. Some of the well-known papers include Pyle (1971, 1972). For a comprehensive survey see Santomero (1984).

**Proof:**

*See Appendix*

Lemma 1 establishes the range of $\alpha$ values that are of interest in our model, in particular when $C_k < C^*$. Intuitively, it states that when $C_k < C^*$, if the fraction of Type A borrowers in the market is high enough, the bank will find it more profitable to lend at the interest rate that makes Type A borrowers indifferent as to whether to undertake the project, even though it makes Type B borrowers do Type 2 projects. Since $\alpha$ is exogenous, we assume it is greater than $\alpha$* throughout the rest of the model.[4]

*Collateral and credit allocation*

**Proposition 1: Bank's Expected Return Order**

*A. There is a critical collateral level, $C^{low} \leq C^*$, such that for $C_k < C^{low}$, the bank's expected returns are ordered as follows:*

$\rho_{i_k^{\max,1}} > \rho_r > \rho_{i_k^{switch}}$

*For $C_k \geq C^{low}$, the bank's expected returns are ordered as follows:*

$\rho_{i_k^{\max,1}} \geq \rho_{i_k^{switch}} \geq \rho_r$

*B. For any C, $\rho_r > \rho_{i_k^{\max,2}}$*

*Where $C^{low}$ is defined as:*

[4] When $\alpha < \alpha^*$ the model yields uninteresting or trivial results, especially if $\alpha$ is so low that $\rho_r > \rho_{i_k^{\max,1}}$.

$$C^{low} \equiv C^{*} - \left( \frac{R_c}{1+r} - X \right)$$

**Proof:**

*See Appendix*

**Proposition 2: Unit bank's optimal interest rate offer and optimal allocation of credit**

*a. For* $C_k < C^{low}$*: Invest* $\theta_k^{unit}\left(C_k < C^{low}\right) < 1$ *on loans at interest rate* $\dot{i}_k^{\max,1}$*; invest the rest on government securities.*

*b. For* $C^{*} > C_k \geq C^{low}$*: Invest* $\theta_k^{unit}\left(C^{*} > C_k \geq C^{low}\right) = 1$ *on loans. Offer some loans at interest rate* $\dot{i}_k^{switch}$*, and the rest at interest rate* $\dot{i}_k^{\max,1}$*. Since the bank cannot distinguish between Type A and Type B borrowers, it will randomize among applicants when deciding who receives loan offers at interest rate* $\dot{i}_k^{switch}$ *or* $\dot{i}_k^{\max,1}$*.*

*c. For* $C_k \geq C^{*}$*: Invest* $\theta_k^{unit}\left(C_k \geq C^{*}\right) = 1$ *on loans at interest rate* $\dot{i}_k^{\max,1}$*.*

**Proof:**

a. Proposition 1 indicates that when $C_k < C^{low}$, risk-return combinations 2 and 4 (from Table 1) are strictly dominated by alternative 1 (from Table 1). Although alternative 3 offers a higher return for the bank, it is riskier than alternative 1. According to Tobin's (1958) optimal portfolio allocation model, a risk-averse bank will select a portfolio that invests a fraction of its assets in alternative 1, and the rest in alternative 3.

b. For $C^{*} > C_{k} \geq C^{low}$, risk-return combinations 1 and 4 (from Table 1) are strictly dominated by alternative 2 (from Table 1). Although alternative 3 offers a higher return for the bank, it is riskier than alternative 2. According to Tobin's (1958) optimal portfolio allocation model, a risk-averse bank will select a portfolio that invests a fraction of its assets in alternative 2, and the rest in alternative 3.

c. For $C_{k} \geq C^{*}$, none of the alternatives carry any risk. Hence, the bank will select the highest interest rate compatible with borrower participation in the market, $i_{k}^{\max,1}$.

**Corollary 1: Optimal project choice for Type B borrowers:**

*Given banks' optimal interest rate offers, a Type B borrower will choose to do a Type 2 project if his collateral is below $C^{*}$ and the interest rate offer is larger than $i_{k}^{switch}$. He will choose to do a Type 1 project if his collateral is above $C^{*}$ or the interest rate offer is below $i_{k}^{switch}$.*

**Proof**: *Follows from Figures 1 and 2.*

*Branch bank behavior: interest rate offers and credit allocation across regions*

The branch bank must decide how to allocate funds between the two regions, and how much to invest in the risk-free alternative. Since a branch bank can invest in either region, it has a total of seven possible interest rate alternatives from which to choose: $i_1^{switch}$, $i_1^{\max,1}$, or $i_1^{\max,2}$, in Region 1; $i_2^{switch}$, $i_2^{\max,1}$, or $i_2^{\max,2}$, in Region 2; or $r$ in government bonds.

Because the branch bank's risk-return choices include those available to unit banks, it can replicate the unit bank's portfolio in each region, and therefore, its expected profits. In practice, however, the risk-return choice set is much larger for branch banks than for unit banks. In fact, because of the perfectly negatively correlated outcomes across regions, the choice set will include the zero-risk portfolio alternative.

Both $i_k^{switch}$, and $i_k^{\max,1}$ increase with $C_k$, while $i_k^{\max,2}$ decreases with $C_k$.[5] Hence, the level of collateral determines interest rate offers as well as the allocation of funds. It follows that equilibrium outcomes will also depend on collateral levels. In particular, conditions on $C^{low}$ determine the branch bank's expected return order, while conditions on $C^*$ determine

[5] Note that $\frac{\partial\left(1+i_k^{\max,1}\right)}{\partial C_k} > 0$, since $R_c > (1+r)X$; similarly, $\frac{\partial\left(1+i_k^{\max,2}\right)}{\partial C_k} < 0$, since $pR_s < (1+r)X$. It is straightforward to note that $\frac{\partial\left(1+i_k^{switch}\right)}{\partial C_k} > 0$.

credit allocation, as established in the following propositions.

**Proposition 3: Branch Bank's Expected Return Order**

| *When collateral level $C^{low}$ is:* | *Expected Return Order is:* |
|---|---|
| 1. $C_2 < C_1 < C^{low}$ | $\rho_{i_1^{\max,1}} > \rho_{i_2^{\max,1}} > \rho_r > \rho_{i_1^{switch}} > \rho_{i_2^{switch}}$ |
| 2. $C_2 < C^{low} < C_1$ | $\rho_{i_1^{\max,1}} > \rho_{i_2^{\max,1}} > \rho_r$<br>$\rho_{i_1^{\max,1}} > \rho_{i_1^{switch}} > \rho_r > \rho_{i_2^{switch}}$ |
| 3. $C^{low} < C_2 < C_1$ | $\rho_{i_1^{\max,1}} > \rho_{i_2^{\max,1}} > \rho_{i_1^{switch}} > \rho_{i_2^{switch}} > \rho_r$ |

*For any C,* $\rho_r > \rho_{i_2^{\max,2}} > \rho_{i_1^{\max,2}}$

**Proof:**

*The result follows from Proposition 1, and the fact that* $i_k^{\max,1}$ *increases with* $C_k$ *.*

The following proposition establishes how the branch bank will behave assuming the same degree of risk aversion as that of the unit bank.

**Proposition 4: Branch Bank's optimal interest rate offers and credit allocation across regions**

*1.* $C_2 < C_1 < C^*$*: Invest 0 <* $\theta_1^{branch}\left(C_2 < C_1 < C^*\right)$ *< 1 in Region 1 and 0 <* $\theta_2^{branch}\left(C_2 < C_1 < C^*\right)$ *< 1 in Region 2 with* $\theta_1^{branch}\left(C_2 < C_1 < C^*\right) + \theta_2^{branch}\left(C_2 < C_1 < C^*\right) = 1$. *Offer interest rate* $i_1^{\max,1}$ *on loans in Region 1 and* $i_2^{\max,1}$ *on loans in Region 2.*

*2.* $C_2 < C^* \le C_1$*: Invest* $\theta_1^{branch}\left(C_2 < C^* \le C_1\right)$ *= 1 in Region 1 on loans at interest rate* $i_1^{\max,1}$.

*3.* $C^* \le C_2 < C_1$*: Invest* $\theta_1^{branch}\left(C^* \le C_2 < C_1\right)$ *= 1 in Region 1 on loans at interest rate* $i_1^{\max,1}$.

**Proof:**

*See Appendix*

*Analysis of Voting Period*

At the beginning of period 1, voters (borrowers) must decide on the banking regime they prefer. Borrowers in Region *k* prefer to be serviced by the type of regime that gives them the highest expected profits, $\lambda_k^b\left(\theta_k^b, C_k\right) \times \pi_{j,k}\left(i_k, C_k\right)$, where *j* indicates the type of project undertaken, and *b* the banking regime.

In our model thus far, Type A borrowers sometimes do not earn positive profits because, by assumption, in many states of the world banks are able to extract all profits from them through the loan contracts that are offered (e.g. $\pi_{1,k}(i_k, C_k) = 0$ when $i_k = i_k^{\max,1}$). Type B borrowers, by contrast, are able to earn positive profits in more states than Type A borrowers, because they sometimes find it advantageous to pretend to undertake the riskless project, when actually undertaking the risky project.

Of course, more realistically, borrowers would earn expected "control rents" from undertaking projects whenever they receive funding. We define that control rent as ε for borrowers receiving loans. Thus, in the context of our model, a Type A borrower who is offered a loan at rate $i_k = i_k^{\max,1}$ will accept the loan since he will receive ε in control rents, even though $\pi_{1,k}(i_k, C_k) = 0$. A Type B borrower who chooses to do a Type 2 project when $i_k = i_k^{\max,1}$, will earn $\pi_{2,k}(i_k^{\max,1}, C_k) \equiv s > 0$, plus the control rent ε. We adopt this assumption in order to ensure that borrowers have sufficient stake in choosing between branching and unit banking.

In our discussion of the voting, we will allow collateral to be either "high" or "low" (that is, below or above the critical value $C^{low}$), but we will assume, for simplicity, that collateral is always below $C^*$. Our central conclusion about loan markets and bank entry barriers – that low levels of collateral will lead borrowers to prefer branch banking over unit banking, and that at high levels of collateral, that preference is reversed – is not dependent on the assumption that $C < C^*$.[6]

[6] Specifically, for the very high range of collateral values not specifically considered in the equilibrium below (those in excess of $C^*$), where collateral levels are identical across regions, borrowers are indifferent between choosing unit or branch banking.

For simplicity, and without loss of generality, we will also assume in this section that the levels of collateral are the same in the two regions.

Finally, we also make the simplifying assumption, again without loss of generality, that banks are very risk-averse. Specifically, we assume that when forced to undertake risky lending, banks withdraw from the loan market (i.e. $\theta_k^b$ is zero). This extreme assumption simplifies the computation of $\lambda_k^b$, but is not necessary to generate our qualitative results.

We now consider the expected profits of Type A and Type B borrowers. We begin with the case where initial collateral is low. As shown in Table 2, in this "low-collateral" case, under the above simplifying assumptions, Type A borrowers face two possibilities: receiving credit when the loan interest rate is set at $i_k = i_k^{\max,1}$ (and earning control rent ε), or not receiving credit, and thus earning no profit. Type B borrowers face a similar scenario, but with different profits: receiving credit at $i_k = i_k^{\max,1}$ and earning $s$ plus ε, or receiving no credit, and hence, no profit. Both types of borrowers face the same probability of being granted credit. If branching is chosen, that probability is $\overline{F}/XN_k$. If unit branching is chosen, the probability of being granted credit is zero. Thus, in Case 1, Type A borrowers expect to earn $\left(\overline{F}/XN_k\right)\varepsilon$ while Type B borrowers expect to earn $\left(\overline{F}/XN_k\right)(s+\varepsilon)$ under branching, and both types expect to earn zero under unit banking. Clearly, in this low-collateral case, both types of borrowers prefer branch banking.

When initial collateral is in the "high" range (above $C^{low}$), the result is the reverse: both types of borrowers prefer unit banking. In this case, the probability and payoffs from being granted credit, if branching is chosen, are the same as in the case of low collateral. But unit banking delivers higher expected profits to both types of borrowers than it does in the low-collateral case, and that level of profit is also higher that the expected profit from branching in the high-collateral case. The reason is that under unit banking, the payoffs conditional on being granted credit are higher, and the probability of being granted credit are the same as under branching. The reason profits are higher is that, in the high-collateral case, the interest rate on loans is set at $i_k = i_k^{switch}$, implying a positive amount of rents earned by borrowers in addition to ε.[7]

The intuition for the result that borrowers prefer unit banking when collateral is high is as follows: When collateral is high, under unit banking, banks will choose to lower interest rates as a means of solving the moral-hazard problem (since low interest rates induce borrowers to invest in the good project).[8] Branch banking would induce banks, instead, to keep interest rates higher and rely on diversification of risk across regions to limit losses from moral hazard. Thus, when collateral is high, borrowers prefer unit banking. In contrast, when collateral is low, under unit banking, banks will not supply credit, while under branch banking, diversification will induce banks to continue to supply credit.

In summary, the empirical implications of our model are as follows:

(i) In "poor" states of the world (when collateral levels are low), branching will be unambiguously preferred;

(ii) In relatively "rich" states of the world, unit banking will be preferred.

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[7] Note that is true even for Type B borrowers, since for $i_k \leq i_k^{switch}$,
$\pi_{1,k}(i_k, C_k) \geq \pi_{2,k}(i_k, C_k) > \pi_{2,k}(i_k^{\max,1}, C_k) \equiv s$.

[8] Technically, as Proposition 2 indicates, the unit bank will offer loans at $i_k^{switch}$ and $i_k^{\max,1}$, and randomize among borrowers as to who gets which interest rate. The proportion of borrowers receiving credit at $i_k^{switch}$ will increase with the degree of risk-aversion of the bank. Thus, even if the bank is not very risk-averse, borrowers

Table 2

| | *Collateral Order* | *Value of* $\theta_k^b$ | *Value of* $\lambda_k^b$ | *Borrowers Expected Returns* | |
|---|---|---|---|---|---|
| | | | | Type A | Type B |
| 1 | $C_2 = C_1 < C^{low^*}$ | $\theta_1^{unit} = 0$<br>$\theta_1^{branch} = 0.5$<br>$\theta_2^{unit} = 0$<br>$\theta_2^{branch} = 0.5$ | $\lambda_1^{unit} = 0$<br>$\lambda_1^{branch} = \frac{\overline{F}}{XN_1}$<br>$\lambda_2^{unit} = 0$<br>$\lambda_2^{branch} = \frac{\overline{F}}{XN_2}$ | $\Pi_1^{A,unit} = 0\varepsilon = 0$<br>$\Pi_1^{A,branch} = \frac{\overline{F}}{XN_1}\varepsilon$<br>$\Pi_2^{A,unit} = 0\varepsilon = 0$<br>$\Pi_2^{A,branch} = \frac{\overline{F}}{XN_2}\varepsilon$ | $\Pi_1^{B,unit} = 0(s+\varepsilon) = 0$<br>$\Pi_1^{B,branch} = \frac{\overline{F}}{XN_1}(s+\varepsilon)$<br>$\Pi_2^{B,unit} = 0(s+\varepsilon) = 0$<br>$\Pi_2^{B,branch} = \frac{\overline{F}}{XN_2}(s+\varepsilon)$ |
| 2 | $C^{low} < C_2 = C_1$ | $\theta_1^{unit} = 1$<br>$\theta_1^{branch} = 0.5$<br>$\theta_2^{unit} = 1$<br>$\theta_2^{branch} = 0.5$ | $\lambda_1^{unit} = \frac{\overline{F}}{XN_1}$<br>$\lambda_1^{branch} = \frac{\overline{F}}{XN_1}$<br>$\lambda_2^{unit} = \frac{\overline{F}}{XN_2}$<br>$\lambda_2^{branch} = \frac{\overline{F}}{XN_2}$ | $\Pi_1^{A,unit} = \frac{\overline{F}}{XN_1}\pi_{1,1}\left(i_1^{switch}, C_1\right)$<br>$\Pi_1^{A,branch} = \frac{\overline{F}}{XN_1}\varepsilon$<br>$\Pi_2^{A,unit} = \frac{\overline{F}}{XN_2}\pi_{1,2}\left(i_2^{switch}, C_2\right)$<br>$\Pi_2^{A,branch} = \frac{\overline{F}}{XN_2}\varepsilon$ | $\Pi_1^{B,unit} = \frac{\overline{F}}{XN_1}\pi_{1,1}\left(i_1^{switch}, C_1\right)$<br>$\Pi_1^{B,branch} = \frac{\overline{F}}{XN_1}(s+\varepsilon)$<br>$\Pi_2^{B,unit} = \frac{\overline{F}}{XN_2}\pi_{1,2}\left(i_2^{switch}, C_2\right)$<br>$\Pi_2^{B,branch} = \frac{\overline{F}}{XN_2}(s+\varepsilon)$ |

## B. Unit Banking as Credit Insurance

In this section, we extend our model to allow the value of collateral to change in between the voting period and the lending period, and by allowing the levels of collateral to differ across regions. We show that, in this case, borrower preferences for entry barriers (unit banking) can revolve around the benefits of credit insurance. In essence, unit banking limits lenders' opportunities to exit markets when the value of local, immobile factors of production (e.g., land) fall in value prior to the lending period. In high initial wealth states of the world, this insurance is valued and unit banking tends to be chosen, while in low initial wealth states, the gains of free entry (branch banking) dominate. Thus the empirical predictions of this extension of the earlier model (which we will call the "credit insurance" model) are quite similar to those of the simpler model presented above.

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will prefer unit banking as long as <u>some</u> of them receive credit at interest rate $i_k^{switch}$.

There are two regions, each of which begins the first period with identical initial amounts of wealth in the form of an immobile factor of production (land), which could be high (greater than $C^{low}$) or low (less than $C^{low}$). We assume that the initial wealth levels are the same in the two regions for simplicity. At the beginning of the first period, cognizant of the initial level of wealth but before experiencing the shock to wealth, the population votes on whether to have unit or branch banking. At the beginning of the second period, the value of land collateral is subject to a valuation shock. The valuation shock can produce four possible outcomes: both regions' land values are high, both regions' land values are low, region 1 has high land values while region 2 has low values, or vice versa. After the valuation shock is observed, lenders provide credit in each region, as in the previous section, depending on the valuation shock and the regulatory regime (unit or branch) that was chosen initially.

Borrower voting behavior depends on the payoffs to borrowers in each state of the world, and the probabilities of those states of the world. Importantly, we will assume that there is serial correlation in wealth states. That is, if wealth is initially high, the probability of it remaining high is large. We define the probabilities of different states as follows: ${}_H p^{1,2}$ (the probability that both regions' land values are initially high and remain high), ${}_H p_{1,2}$ (the probability that both regions' land values are initially high and become low), ${}_H p_2^1$ (the probability that, given that both regions' land values are initially high, region 1 values remain high, but region 2 values become low), and ${}_H p_1^2$ (the probability that, given that both regions' land values are initially high, region 1 values become low, but region 2 values remain high). If wealth is initially low, the comparable probabilities are ${}_L p^{1,2}$, ${}_L p_{1,2}$, ${}_L p_2^1$, and ${}_L p_1^2$. We assume that regions are identical ex ante and that there is serial correlation in land values, which implies the following relative probabilities: ${}_H p^{1,2} > {}_L p^{1,2}$, ${}_H p_{1,2} < {}_L p_{1,2}$, ${}_H p_2^1 = {}_H p_1^2$, ${}_L p_2^1 = {}_L p_1^2$.

Using the results from our previous model, the effects of entry regulations (unit or branching) on bank decisions and borrower payoffs are as follows: If wealth is the same in both regions, then lending will be greater when wealth is high than when wealth is low. When wealth is low in both regions, lending will be greater under branch banking than under unit banking. When wealth is high in both regions, lending will be equal under unit and branch banking. But when *wealth is high in one region and low in the other,* under branch banking lending in the low-wealth region will be lower than it would be under unit banking (because a substantial amount of lending shifts from the low-wealth region to the high-wealth region). This last result was not derived in the simplified model presented above, but can easily be derived by considering the case where wealth levels are different across regions. These results imply differences in expected payoffs borrowers face under different states of the world and different regulatory choices. In Table 3, we denote these as $Z_i$, $i \in \{1,2,3,4,5,6\}$, where $Z_i > Z_j$, if $i > j$ ($j \in \{1,2,3,4,5,6\}$). That is, we are able to rank the payoffs shown in Table 3.

Payoffs are defined as follows: Under branching, the possible payoffs received by borrowers are $Z_4$, $Z_3$, $Z_6$, and $Z_1$. $Z_4$ is the expected payoff to a borrower in either region if wealth is high in both regions. $Z_3$ is the payoff if wealth is low in each region. $Z_6$ is the payoff is wealth is high in your region and low in the other. $Z_1$ is the payoff if wealth in high in the other region and low in your region. Under unit banking, only the wealth level in one's own region matters in determining borrowers' payoffs (since banks within one region cannot lend in the other region). If wealth is high, the payoff is $Z_5$, and if wealth is low, the payoff is $Z_2$. Table 3 summarizes these results.

Table 3: Region 1 Payoffs and Wealth in Period 2 Under Either Branching or Unit Banking

| *Region 1 Borrower Payoffs: Branching* | *Region 1 Borrower Payoffs: Unit Banking* |
|---|---|
| High Wealth in Both Regions<br>$Z_4$ | High Wealth in Both Regions<br>$Z_5$ |
| Low Wealth in Both Regions<br>$Z_3$ | Low Wealth in Both Regions<br>$Z_2$ |
| High Wealth in Region 1, Low in Region 2<br>$Z_6$ | High Wealth in Region 1, Low in Region 2<br>$Z_5$ |
| High Wealth in Region 2, Low in Region 1<br>$Z_1$ | High Wealth in Region 2, Low in Region 1<br>$Z_2$ |

The relative sizes of payoffs can be derived as follows from the previous section's findings about the sizes of relative payoffs under unit and branch banking (shown in Table 2). $Z_5 > Z_4$ restates our earlier result that payoffs from unit banking in high-wealth states are higher than payoffs from branch banking. $Z_3 > Z_2$ restates the earlier result that unit banking delivers lower expected payoffs than branch banking when wealth is low. $Z_5 > Z_2$ and $Z_4 > Z_3$ simply restate the result that borrower payoffs increase when wealth is higher. $Z_6 > Z_1$ because the flight of capital from one region to another under branch banking raises payoffs for borrowers in the high-wealth region when the other region has low wealth. Together, these various inequalities imply a unique ranking of expected payoffs.

Given these contingent expected payoffs and the relative probabilities of different levels of wealth, one can establish conditions under which borrowers would vote for unit banking or branch banking by comparing the expected payoffs from either regulatory regime. When initial wealth is low, borrowers will vote for branch banking if:

$$_{L}p^{1,2}\,(Z_4 - Z_3) + {}_{L}p_{1,2}\,(Z_3 - Z_2) + {}_{L}p_2^1\,(Z_6 + Z_1 - Z_5 - Z_2) > 0.$$

Note that this condition is satisfied if ${}_{L}p_{1,2}$ is sufficiently high. Similarly, when initial wealth is high, borrowers will vote for unit banking if:

$$_{H}p^{1,2}\,(Z_5 - Z_4) + {}_{H}p_{1,2}\,(Z_2 - Z_3) + {}_{H}p_2^1\,(Z_5 + Z_2 - Z_6 - Z_1) > 0.$$

Note that this condition is satisfied if ${}_{H}p^{1,2}$ is sufficiently high. In other words, if wealth levels are persistent (meaning that ${}_{L}p_{1,2}$ and ${}_{H}p^{1,2}$ are both large), then in high-wealth states of the world borrowers in the two regions will vote for unit banking, and in low-wealth states they will vote for branching.

## III. Empirical Analysis

*A. Data*

We investigate the empirical determinants of a state's choice of branching restrictions by looking at the cross-sectional variation of an array of variables across states. We obtained data on the legal status of branch banking for all states in 1924 from White (1985). This legal status was classified into four categories, in ascending order of restrictiveness: (1) states that permitted branching in the entire region; (2) states that permitted only limited branching (typically restricted to a city); (3) states that did not have an explicit legal prohibition of branching, but that had some judicial or administrative prohibition; and (4) states the prohibited branching by law. Table 4 lists the states and their branching restriction status.

Our choice of the 1920s as the era on which to focus our empirical work reflects several considerations. First, as noted earlier, the 1920s saw significant changes in bank branching regulation in reaction to widespread rural bank failures. Thus, there is substantial cross-sectional variation in the laws governing branching. Second, a wide variety of data on the economic and demographic characteristics of states are available for the 1920s. Third, the widespread diffusion of the automobile had occurred by the 1920s, which should have enhanced competition among neighboring unit banks. Thus, the 1920s offer greater promise for limiting the influence of pure rents on observed bank income.

We next obtained information on state characteristics (which we take as exogenous to bank regulatory choices) which could be used to explain the choice of the degree of restrictiveness with regard to branch banking. To measure the influence of farm owners, we included the state's farm wealth relative to its farm population and the amount of total agricultural employment income in the state relative to its farm population. To measure the influence of manufacturing interests, we included the total amount of manufacturing capital in the state relative to its non-farm population. The underlying data used to construct these variables were obtained from the *Statistical Abstract of the United States*, the *Census of the United States*, and from Leven (1925).

## *B. Findings*

The tendency for higher wealth in rural areas to be associated with a preference for unit banking at the state level was noted in Calomiris (1993, 2000, Chapter 1), based on data for 1900 and 1910. Rural per capita wealth (as of 1900) in states allowing some branching (as of 1910) averaged 0.8, compared to 1.5 in states that did not allow new branching. In what follows, we improve on this simple observation in two ways: first, we look at landownership in both rural and urban areas; second, we control for other potential influences on the choice of banking regulations.

### 1. Probits and Ordered Probit Models

The model predicts that the greater the value of landownership in the hands of borrowers, the more borrowers should benefit from unit banking laws. Manufacturing interests, which we assume own relatively mobile factors of production, should prefer branch banking instead. We test these hypotheses by estimating probit regressions predicting the choice of branching restrictions on variables that measure cross-state differences in the strength of these competing borrower interest groups.

Tables 5 and 6 present the main probit and ordered probit results. In the probit equations (Table 5), the dependent variable takes on the values zero or one, representing the state's choice of whether to allow branch banking or not: it is equal to one if the state either explicitly prohibited branch banking by law or had a administrative or judicial prohibition, and zero otherwise. In the ordered probit equations (Table 6), the dependent variable is coded in line with the four categories of legal status of branch banking in Table 4; this variable, therefore, is a ranked order of the legal status ranging from full permission to legal prohibition (i.e. from category 1 to category 4 in Table 4).

As independent variables we include several measures of the wealth of agricultural interests, as well as the economic importance of manufacturing interests, and the percent of home ownership in the state. To capture the effects of farm landowners' wealth, we include farm wealth divided by the state's farm population.[9] We capture the effect of manufacturing interests by including the value of manufacturing capital (aggregated at the state level) divided by the non-agricultural population in the state. The percentage of home ownership is also included to control for homeowners interests in the state's choice of branching restrictions. Homeowners are in a position similar to landowning farmers, and stand to benefit from unit banking laws when their wealth is high.

As probit regression (a) in Table 5 indicates, the farm wealth coefficient is positive and statistically significant. In fact, it remains so in virtually all of the regressions, and is robust to the inclusion of manufacturing interests, and to some extent, to including the home

[9] To be sure, a higher level of land ownership implies a higher level of farm wealth per farm capita; however, the converse is not necessarily true. To control for other variables that may correlate with the farm wealth variable, we also include in the regressions agricultural employment income relative to farm population.

ownership variable. Note that the homeownership variable is closely related to the farm wealth variable, by construction, since farm homeownership is included in both measures. The state's total amount of manufacturing capital relative to its non-farm population is also tested in these regressions. The model indirectly suggests that manufacturing interests should have preferred branch banking over unit banking because their main factor of production, capital, is more mobile than the main factor of production in agriculture, land. We therefore, expected this variable to be negative. Regressions (b), (c), (e), and (g) in Tables 5 and 6 estimate this coefficient. As expected, it is negative (and statistically significant), giving empirical support to the hypothesis that manufacturing interests were in favor of branch banking. This result is also consistent with hypotheses others researchers have investigated. In particular, Lamoreaux (1991), Carosso (1970), Calomiris (1993), and Ramirez (1995), argue that during this period, the scale and scope of the manufacturing sector increased significantly, and thus, so did its capital financing needs. Since the resources of unit banks were clearly limited relative to these needs, large-scale manufacturers preferred the financial services of branch banks.

The results for the ordered probit regressions in Table 6 are weaker than those in Table 5 but of similar signs. Together, the results from Tables 5 and 6 suggest that the key regulatory divide across the states was between permitting and prohibiting branching, not the means or extent of prohibition.

Including agricultural employment income in the regressions underscores the importance of taking farm landownership wealth into account. Table 5 shows that branching prohibitions were more likely in heavily agricultural states. However, not all heavily agricultural states enjoyed high farmer wealth. To distinguish between the size of the farm sector, and farmer wealth levels we include, in specification (f), agricultural employment income as a fraction of the state's farm population. After controlling for this variable, the coefficient in the farm wealth variable nearly doubles (comparing regressions (a) and (f)).

If, as our theoretical discussion and empirical evidence thus far have suggested, credit insurance was part of the motivation for supporting unit banking, then we should also expect to find that unit banking acted as a substitute for debt moratorium legislation. Alston (1984) finds that during this period (the late 1920s and early 1930s) many states adopted farm foreclosure moratoria as a way to protect farmers who had to make mortgage payments while their incomes were declining. The moratoria essentially postponed foreclosures by creditors.[10] Since our model predicts that unit banking granted farm owners some insurance against contractions in loan supply in the face of land value decline, we would expect to observe that states where landowning farmers were able to successfully prohibit branching were also less likely to have adopted farm foreclosure moratoria. To test this hypothesis we undertake a probit analysis of moratorium legislation.

In Table 7, the dependent variable is equal to one if the state had enacted farm foreclosure moratorium legislation by 1934, and zero otherwise. As an independent variable, we include the legal status of branching in the state, a variable that is coded in line with the legal status categories of Table 4 (thus category 4 comprises all states that prohibited branching by legislation). In addition to this variable, we include others to control for

[10] As it turned out, state legislatures were responding to a large demand from the debtors, and by 1934, twenty-five states had passed farm foreclosure moratorium legislation.

conditions that may have influenced the chances that the state passed a moratorium. Thus we include the percentage of home ownership, the state's income per capita, its illiteracy rate, its population destiny, as well as various measure of agricultural and manufacturing wealth.

The results support the hypothesis that farm foreclosure moratoria were less likely to be enacted in unit banking states. In virtually every specification considered, the higher the branching legal status index (meaning the more restrictive is the branching legislation), the less likely is the state to pass moratorium legislation.

## 2. Bank Profitability Regressions

To what extent did unit bankers, as opposed to borrowers, benefit from branching restrictions? This is a difficult question to address. Whether unit banks earned rents or not, their earnings should have been higher. Higher net earnings, in the absence of rents, would reflect the greater risks of operating unit banks (the lack of inter-regional diversification). In other words, the fact that banks earned more in unit banking states could either reflect rents, or the willingness of borrowers to pay for "credit insurance" by unit banks. In our regressions, we will measure the extent to which unit banking produced higher bank earnings, and try to distinguish between rents and higher implicit costs as explanations of these higher earnings.

A natural way of measuring the extent to which entry barriers produced higher earnings is to regress bank profit margins on variables that capture entry restrictions, along with control variables that ensure comparability among banking systems in different states.

Table 8 presents the results of these regressions. The main finding of note is the result that restrictions on branch banking are associated with much larger earnings. Controlling for a large number of conditions, the presence of branching restrictions increases national banks' profitability anywhere from 1.2 to 1.8 percent, depending on the specification. This increase translates into a 33 to 50 percent increase in profitability.

Although the results from Table 8 indicate that almost none of the control variables included carry substantial explanatory power, it is important to include them for purposes of interpreting the branching restriction dummy. Independent variables such as population density and the illiteracy rate are included as they control for market structure and opportunities among the different states. A high population density, for example, may increase the number of banks serving the region, enhance competition, and thus reduce bank profitability. Ransom and Sutch (1972) find that illiteracy was an important factor that slowed down Southern banking development. We therefore, include it to control for this possibility.

Farm profit relative to farm population is included as another control variable since it is possible that the profitability of banks may be dictated by the profitability of the agricultural sector. To control for demand conditions, we also included variables measuring farm capital (or wealth) relative to either farm population or total state wealth (wealthier farm states may demand more banking services, holding everything else constant) as well as manufacturing variables such as manufacturing capital relative to the state's wealth, or manufacturing capital relative to the non farm population.

The other variables included are intended to control for the effects on earnings of other regulatory factors and/or differences in the exogenous competitive environments of the various states. A higher capital requirement, for example, works essentially as an entry barrier, which may increase the rents of banks that are already established in the region.[11] Both the amount of bank assets per capita and the amount of bank assets per bank are included further control for the competitive environment of the banking sector at the state level. Lastly, we include regional dummies to control for unobserved regional characteristics.

Arguably, the most striking result of Table 8 is the large earnings premium branching restrictions seem to have created for unit bankers. This premium is certainly consistent with our model's prediction that unit bankers enjoyed higher profitability as a result of enduring more risk (in supplying the implicit credit insurance premium to landowners). These earnings, however, could also have come from more monopoly power that these restrictions ensured. With the objective of sorting out which of these two stories better explains the unit bank earnings premium, we turn our attention to the basic components of the profit margin – the loan rate earned and the deposit rate paid.[12]

## 3. Loan rate earnings and deposit rate expenses

Basic economic theory predicts that when a bank enjoys monopoly power, it will charge a loan rate that is above the competitive interest rate, and will also pay a deposit rate that is below the competitive rate.[13] How much higher the monopoly loan rate will depend on the demand elasticity of loans and the extent of the bank's market power in the loan market.

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[11] Other entry control variables such as the total amount of assets per bank or assets per capita were included, but they were not statistically significant, and perhaps more importantly, did not affect the profitability premium in any significant way.

[12] Technically, the profit margin should also depend on managerial costs. While we do not explicitly incorporate these costs, we include in the regressions control variables such as population density and illiteracy rate, which indirectly control for them. For an analysis of how these control variables influenced managerial costs in bank profit functions in the post-Bellum era, see James (1978).

[13] See, for example, Klein (1971) and Monti (1972).

Similarly, the supply elasticity of deposits and the bank's market power in the deposit market will determine how much lower is the monopoly deposit rate.

Our identifying assumptions for distinguishing the extent to which banks earn monopoly rents from entry barriers (as opposed to higher loan interest rates to compensate them for credit insurance) are (1) that deposit-supply elasticity and loan-demand elasticity are of similar magnitude, and (2) that if banks enjoy monopoly power, then monopoly rents should be earned both in the deposit market and in the loan market. In contrast, compensation for implicit loan costs should only be earned in the loan market, and should only be reflected in loan interest rates.

Tables 9 and 10 present the loan rate and deposit rate regressions. In both sets of regressions we control for the same variables that we did in Table 8. The noteworthy finding is that while branching restrictions seems to be associated with a reduction in the deposit rate (as the monopoly story predicts), the magnitude of this effect is relatively small. Depending on the specification, the branching restriction dummy increases the loan rate anywhere from 1.1% to 1.5%, whereas it reduces the deposit rate by 0.3%, on average. Thus, there is some evidence indicating that branching restrictions legislation increased the monopoly power for unit banks. However, the estimated monopoly effects are modest at best. Most of the increase in bank earnings margins is coming from higher loan rates, an observation which lends some empirical support to our model.

The small average effect of branching restrictions on competition by the 1920s likely reflects the decline in the economic isolation of the rural economy, particularly as the result of the automobile. Previous work on the competitive effects of branch banking (e.g., Evanoff 1988) emphasizes that branch banks improved competition primarily in very thinly populated areas. Branch banks' ability to open low-overhead branch offices was likely to exert an important constraining influence in areas where only one or two high-overhead-cost unit banks could have operated if branching were not allowed, but in other areas competition among unit banks would have similarly limited monopoly power. This logic suggests that unit banks could only gain some degree of monopoly power in low-population density areas. We present evidence that supports that view in Table 11.

Specifically, we examine the number of bank facilities at the county level in a "matched sample" of two states that were similar in many respects, but differed in their bank entry laws: Virginia (which allowed branch banking) and West Virginia (which did not).[14] To test the hypothesis that unit banks only enjoyed monopoly power in thinly populated areas, we regress the total number of banks per county on several control variables, as well as the bank branching restriction indicator variable (equal to 1 if the county permitted bank branching, 0 otherwise), the county's population, and on interaction effects between population quartiles and the bank branching variable.

Regardless of the specification considered, the main finding is that permitting bank branching increased the number of bank facilities only in counties with a population level in the first quartile (having 11,500 people or less). Hence, to the extent that monopoly rents in unit banking states were a source of bank profit, it appears to only have been a factor in these thinly populated markets. These findings are consistent with the earlier results, which

[14] These two states were chosen since they were similar in most respects, except for different branching legislation.

indicate that bank monopoly power can only account for a modest increase in the unit bank earnings premium.[15]

**IV. Conclusions**

We develop two models to show why some bank borrowers (those who own immobile factors of production), in high net worth states of the world, would find unit banking attractive. In particular, we argue that the unit bank earnings premium could represent a payment for the implicit cost of providing credit insurance to these borrowers.

We find empirical evidence of a substantial unit bank earnings premium. Branch banking restrictions increased banks' earnings by as much as 50%. The unit bank premium is robust to the inclusion of a large array of variables that control for demand conditions, different regulatory environment, and even the industrial structure of the banking sector in the state. We also find that the premium does not seem to be the result of more monopoly power.

Loan customers who were more likely to benefit from entry barriers (farm landowners and homeowners in high-wealth states of the world) were in fact associated geographically with the political preference for unit banking. We find that the probability of a state having branching restrictions increases with farm wealth, and with the proportion of the population that had home mortgages, and declines with the importance of manufacturing (large-scale borrowers with mobile factors of production that should have opposed unit banking).

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[15] As an extension of this analysis, we included in the bank profit margin regressions the fraction of the state population that lived in thinly populated counties (having 12,000 habitants or less). This variable was statistically insignificant in all of the specifications we tested.

The value to landowners of implicit credit insurance from entry barriers is corroborated by analyzing the determinants of farm foreclosure legislation in the early 1930s. We show that states with legal prohibition of branch banking were less likely to have passed foreclosure legislation, which was a substitute for the credit insurance provided by branching limits.

Although we have argued that branching restrictions were beneficial to certain segments of the population, we emphasize that it does not follow that branching restrictions were beneficial to society as a whole. Calomiris (2000) reviews in detail all of the reasons to believe that branching restrictions were highly socially costly from the standpoint of macroeconomic growth and stability. Our point is that in states where a critical mass of borrowers existed that supported these entry barriers, they were able to successfully lobby for unit banking. Our interpretation shifts attention away from unit bankers as the prime special interest group to support unit banking, and focuses instead on certain bank borrowers.

Some implications from our empirical findings are relevant to today's global wave of mergers and consolidation in the banking industry. Despite the fact that branching is superior to unit banking on macroeconomic growth and stability grounds, it is likely that some emerging market countries will continue to oppose entry by foreign banks, perhaps at the behest of domestic borrowers that own immobile factors of production. As in Mexico and other countries, shocks that reduce the wealth of this class of borrowers is likely to produce a window of opportunity for foreign bank entry, which should be seized by reformers.

**Table 4**
**Legal Status of Branch Banking, 1924**
*Source: Eugene White (1983), Table 3.5, page 158*

| *Legal Status 1* | *Legal Status 2* | *Legal Status 3* | *Legal Status 4* |
|---|---|---|---|
| *State-wide Branching Permitted* | *Limited Branching Permitted* | *Judicial or Administrative Prohibition* | *Branching Prohibited by State Law* |
| Arizona | Louisiana | Iowa | Alabama |
| California | Maine | Kansas | Arkansas |
| Delaware | Massachusetts | Montana | Colorado |
| Georgia | New York | Nebraska | Connecticut |
| Maryland | Ohio | New Hampshire | Florida |
| North Carolina | Mississippi | New Jersey | Idaho |
| Rhode Island | Pennsylvania | North Dakota | Illinois |
| South Carolina | Kentucky | Oklahoma | Indiana |
| Tennessee | Michigan | South Dakota | Minnesota |
| Virginia | | Vermont | Missouri |
| | | West Virginia | Nevada |
| | | Wyoming | New Mexico |
| | | | Oregon |
| | | | Texas |
| | | | Utah |
| | | | Washington |
| | | | Wisconsin |

**<u>Table 5</u>**

**Probit Results**

Dependent Variable: No Branch Banking Allowed.

| | *(a)* | *(b)* | *(c)* | *(d)* | *(e)* | *(f)* | *(g)* | *(h)* |
|---|---|---|---|---|---|---|---|---|
| Constant | -0.564 | 0.311 | -0.529 | -1.055 | -0.258 | -0.555 | 0.182 | -0.644 |
| | (-1.420) | (0.542) | (-0.789) | (-1.955) | (-0.409) | (-1.366) | (0.300) | (-0.927) |
| | [0.156] | [0.588] | [0.432] | [0.051] | [0.683] | [0.172] | [0.764] | [0.354] |
| Farm Wealth/Farm Pop | 2.395 | 2.685 | 1.064 | | | 3.956 | 3.424 | 1.808 |
| | (2.261) | (2.374) | (1.177) | | | (2.558) | (2.140) | (1.238) |
| | [0.024] | [0.018] | [0.239] | | | [0.011] | [0.032] | [0.216] |
| Manuf. K/ Non Farm Pop | | -5.179 | -9.265 | | -9.593 | | -4.408 | -8.658 |
| | | (-2.118) | (-2.876) | | (3.006) | | (-1.643) | (-2.556) |
| | | [0.034] | [0.004] | | [0.003] | | [0.100] | [0.011] |
| % Household Ownership | | | 13.671 | 8.244 | 14.751 | | | 13.831 |
| | | | (2.803) | (2.568) | (3.225) | | | (2.774) |
| | | | [0.005] | [0.010] | [0.001] | | | [0.006] |
| Ag Emp Inc/Farm Pop | | | | | | -7.195 | -3.504 | -3.547 |
| | | | | | | (-1.524) | (-0.682) | (-0.655) |
| | | | | | | [0.128] | [0.496] | [0.513] |
| Chi^2 Statistic | 6.74 | 11.49 | 20.27 | 7.28 | 18.38 | 9.16 | 11.97 | 20.70 |
| Prob > Chi^2 | 0.0094 | 0.0032 | 0.0001 | 0.0070 | 0.0001 | 0.0103 | 0.0075 | 0.0004 |
| Pseudo R^2 | 0.105 | 0.178 | 0.314 | 0.113 | 0.285 | 0.142 | 0.186 | 0.321 |
| Log Likelihood | -28.85 | -26.48 | -22.08 | -28.58 | -23.03 | -27.64 | -26.24 | -21.87 |

**Table 6**

**Ordered Probit Results**

Dependent Variable: Legal Status of Branching (1=state-wide branching allowed; 2=limited branching permitted; 3= judicial or administrative prohibition; 4 = branching prohibited by state law). Source: Table 1.

| | *(a)* | *(b)* | *(c)* | *(d)* | *(e)* | *(f)* | *(g)* | *(h)* |
|---|---|---|---|---|---|---|---|---|
| Farm Wealth/Farm Pop | 1.038 | 1.031 | 0.572 | 8.384 | | 1.650 | 1.233 | 0.684 |
| | (1.607) | (1.551) | (0.944) | (1.992) | | (1.742) | (1.216) | (0.671) |
| | [0.108] | [0.121] | [0.345] | [0.046] | | [0.082] | [0.224] | [0.502] |
| Manuf. K/ Non Farm Pop | | -2.792 | -3.759 | | -3.967 | | -2.555 | -3.634 |
| | | (-1.471) | (-1.911) | | (-2.027) | | (-1.216) | (-1.675) |
| | | [0.141] | [0.056] | | [0.043] | | [0.224] | [0.094] |
| % Household Ownership | | | 5.653 | | 6.333 | | | 5.624 |
| | | | (2.080) | | (2.444) | | | (2.065) |
| | | | [0.037] | | [0.015] | | | [0.039] |
| Ag Emp Inc/Farm Pop | | | | | | -3.330 | -1.108 | -0.579 |
| | | | | | | (-0.871) | (-0.263) | (-0.137) |
| | | | | | | [0.384] | [0.793] | [0.891] |
| Chi^2 Statistic | 2.93 | 5.10 | 9.36 | 4.14 | 8.42 | 3.69 | 5.17 | 9.38 |
| Prob > Chi^2 | 0.087 | 0.078 | 0.024 | 0.042 | 0.015 | 0.158 | 0.159 | 0.052 |
| Pseudo R^2 | 0.022 | 0.039 | 0.072 | 0.032 | 0.065 | 0.028 | 0.039 | 0.072 |
| Log Likelihood | -63.57 | -62.48 | -60.35 | -62.96 | -60.82 | -63.19 | -62.45 | -60.34 |

**Table 7**
**Moratorium Legislation Probit Results**
Dependent Variable: State Adopts Legislation by 1932. Source: Alston

| | *(a)* | *(b)* | *(c)* | *(d)* | *(e)* | *(f)* | *(g)* |
|---|---|---|---|---|---|---|---|
| Constant | -3.505 | -2.495 | -2.275 | -2.261 | -2.714 | 2.301 | -3.920 |
| | (-1.561) | (-1.308) | (-1.226) | (-1.226) | (-1.597) | (2.126) | (-1.989) |
| | [0.119] | [0.191] | [0.220] | [0.220] | [0.110] | [0.034] | [0.047] |
| Branching Legal Status | -0.389 | -0.392 | -0.411 | -0.410 | -0.405 | -0.306 | |
| | (-1.818) | (-1.870) | (-1.969) | (-1.966) | (-1.914) | (-1.587) | |
| | [0.069] | [0.060] | [0.049] | [0.049] | [0.056] | [0.112] | |
| % Household Ownership | 24.822 | 23.145 | 23.321 | 23.360 | 23.179 | | 21.317 |
| | (2.526) | (2.655) | (2.803) | (2.800) | (2.856) | | (2.465) |
| | [0.012] | [0.008] | [0.005] | [0.005] | [0.004] | | [0.014] |
| Income per capita | 0.0002 | -0.001 | -0.0007 | -0.006 | | -0.0008 | 0.00009 |
| | (0.131) | (-0.847) | (-0.607) | (-0.647) | | (-0.943) | (0.059) |
| | [0.896] | [0.397] | [0.544] | [0.512] | | [0.346] | [[0.953] |
| Illiteracy Rate | 27.501 | 23.047 | 22.564 | 22.478 | 24.887 | -5.893 | 25.938 |
| | (2.054) | (1.938) | (1.935) | (1.941) | (2.247) | (-0.984) | (2.147) |
| | [0.040] | [0.053] | [0.053] | [0.052] | [0.025] | [0.325] | [0.032] |
| Population Density | -0.149 | -0.154 | -0.126 | -0.128 | -0.144 | -0.076 | -0.146 |
| | (-1.854) | (-2.087) | (-1.989) | (-2.225) | (-2.736) | (-1.505) | (-2.094) |
| | [0.064] | [0.037] | [0.047] | [0.026] | [0.006] | [0.132] | [0.036] |
| Ag Emp Inc/Farm Pop | -8.887 | | | | | | -4.790 |
| | (-1.015) | | | | | | (-0.702) |
| | [0.310] | | | | | | [0.483] |
| Farm Wealth/Farm Pop | 1.279 | 0.110 | 0.083 | | | | |
| | (0.710) | (0.091) | (0.069) | | | | |
| | [0.478] | [0.927] | [0.945] | | | | |
| Manuf. K/ Non Farm Pop | 2.450 | 3.294 | | | | | 3.440 |
| | (0.595) | (0.807) | | | | | (0.854) |
| | [0.552] | [0.420] | | | | | [0.393] |
| Chi^2 Statistic | 20.38 | 19.31 | 18.65 | 18.64 | 18.22 | 6.71 | 16.25 |
| Prob > Chi^2 | 0.0090 | 0.0073 | 0.0048 | 0.0022 | 0.0011 | 0.152 | 0.0125 |
| Pseudo R^2 | 0.307 | 0.291 | 0.281 | 0.281 | 0.274 | 0.101 | 0.244 |
| Log Likelihood | -23.03 | -23.58 | -23.91 | -23.91 | -24.12 | -29.87 | -25.11 |

## Table 8 : Regression Results on Profit Margins of National Banks

Dependent Variable: Profit margin of National Banks. "Profit margin" is defined as interest earnings on loans and discounts divided by the total amount of loans and discounts minus interest expenditures on deposits divided by the total amount of deposits. "No Branch Allowed" is a dummy variable equal to 1 if the state explicitly prohibited branch banking or had a judicial or administrative prohibition. It is equal to 0 otherwise. "Pop Density" is defined as the square root of the state population in 1920 divided by the area of the state. "Illiteracy rate" is the number of people 10 years of age or older who are illiterate divided by the state's population. "Farm Prof/Farm Pop" is defined as the total amount of gross farm income in 1921 divided by the farm population in the state. "Man. K/Tot. Wealth" is defined as the state's total amount of manufacturing machinery, tools, and implements divided by the state's total wealth. These figures are for 1922. "Farm K/Farm Pop" is defined as the state's amount of farm implements and machinery plus livestock divided by farm population in the state. "Farm K/Tot. Wealth" is defined as the state's amount of farm implements and machinery plus livestock divided by the state's total wealth. These figures are for 1922. "Reg Dummies Include?" stands for Regional Dummies Included in the regression? "Capital Requirement" is a dummy variable equal to 1 if the state required a minimum capital of $50,000 or more per bank, and 0 otherwise. t-statistics are included in parenthesis. (P > |0.05|, indicated by a; P > |0.10|, indicated by b).

| | *(a)* | *(b)* | *(c)* | *(d)* | *(e)* | *(f)* | *(g)* | *(h)* | *(i)* | *(j)* | *(k)* | *(l)* | *(m)* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Constant | 0.036[a] | 0.030[a] | 0.030[a] | 0.027[a] | 0.051[a] | 0.029[a] | 0.028[a] | 0.024 | 0.021 | 0.044[a] | 0.033[a] | 0.032[a] | 0.028[a] |
| | (8.272) | (5.520) | (3.200) | (2.767) | (3.084) | (2.471) | (2.054) | (1.570) | (1.561) | (2.433) | (3.001) | (3.222) | (2.023) |
| No Branch Allowed | 0.013[a] | 0.012[a] | 0.016[a] | 0.018[a] | 0.017[a] | 0.018[a] | 0.016[a] | 0.017[a] | 0.018[a] | 0.018[a] | 0.017[a] | 0.016[a] | 0.016[a] |
| | (2.436) | (2.008) | (2.326) | (2.674) | (2.479) | (2.578) | (2.249) | (2.326) | (2.450) | (2.611) | (2.326) | (2.322) | (2.287) |
| Pop Density | | -0.0003 | -0.0002 | -0.0005 | -0.0007 | -0.0004 | -0.0002 | 0.0003 | -0.0002 | -0.0007 | -0.0001 | 0.001 | 0.001 |
| | | (-0.599) | (-0.359) | (-0.893) | (-0.864) | (-0.518) | (-0.318) | (0.389) | (-0.310) | (-0.818) | (-0.231) | (0.138) | (0.943) |
| Illiteracy Rate | | | 0.093 | 0.118 | 0.084 | 0.112 | 0.108 | 0.073 | 0.139 | 0.109 | 0.085 | 0.107 | 0.095 |
| | | | (1.163) | (1.501) | (1.052) | (1.363) | (1.208) | (0.664) | (1.535) | (1.326) | (1.037) | (1.265) | (0.838) |
| Farm Prof/Farm Pop | | | | 0.024[b] | | 0.025[b] | | | | | | | |
| | | | | (1.861) | | (1.850) | | | | | | | |
| Farm K/Farm Pop | | | | | | | 0.004 | -0.003 | 0.004 | | | | |
| | | | | | | | (0.363) | (-0.199) | (0.393) | | | | |
| Farm K/ Tot. Wealth | | | | | -0.357[b] | | | | | -0.302 | | | |
| | | | | | (-1.640) | | | | | (-1.364) | | | |
| Man. K/Tot. Wealth | | | | | -0.104 | | | | | -0.066 | | | |
| | | | | | (-0.534) | | | | | (-0.334) | | | |
| Man. K/NonFar Pop | | | | | | -0.015 | 0.009 | 0.037 | 0.013 | | | | |
| | | | | | | (-0.307) | (0.190) | (0.693) | (0.270) | | | | |
| Capital Requirement | | | | | | | | | 0.009 | 0.007 | | | |
| | | | | | | | | | (1.561) | (1.169) | | | |
| Bank Assets per cap. | | | | | | | | | | | -0.022 | | |
| | | | | | | | | | | | (-0.384) | | |
| Bank Assets per bank | | | | | | | | | | | | $-2.47x10^{-6}$ | $-3.19x10^{-6}$ |
| | | | | | | | | | | | | (-0.549) | (-0.688) |
| Reg Dummies Incl? | No | No | No | No | No | No | No | Yes | No | No | No | No | Yes |
| Adj. R^2 | 0.095 | 0.082 | 0.089 | 0.138 | 0.104 | 0.119 | 0.151 | 0.043 | 0.193 | 0.111 | 0.071 | 0.074 | 0.066 |
| F-Statistic | 5.93 | 3.11 | 2.54 | 2.88 | 2.09 | 2.27 | 1.49 | 1.26 | 1.64 | 1.98 | 1.90 | 1.95 | 1.47 |
| Prob > F | 0.018 | 0.055 | 0.069 | 0.034 | 0.086 | 0.065 | 0.212 | 0.290 | 0.161 | 0.090 | 0.127 | 0.119 | 0.205 |

## Table 9: Regression Results on Loan Rates of National Banks

Dependent Variable: Loan rate of National Banks. "Loan rate" is defined as interest earnings on loans and discounts divided by the total amount of loans and discounts. "No Branch Allowed" is a dummy variable equal to 1 if the state explicitly prohibited branch banking or had a judicial or administrative prohibition. It is equal to 0 otherwise. "Pop Density" is defined as the square root of the state population in 1920 divided by the area of the state. "Illiteracy rate" is the number of people 10 years of age or older who are illiterate divided by the state's population. "Farm Prof/Farm Pop" is defined as the total amount of gross farm income in 1921 divided by the farm population in the state. "Man. K/Tot. Wealth" is defined as the state's total amount of manufacturing machinery, tools, and implements divided by the state's total wealth. These figures are for 1922. "Farm K/Farm Pop" is defined as the state's amount of farm implements and machinery plus livestock divided by farm population in the state. "Farm K/Tot. Wealth" is defined as the state's amount of farm implements and machinery plus livestock divided by the state's total wealth. These figures are for 1922. "Reg Dummies Include?" stands for Regional Dummies Included in the regression? "Capital Requirement" is a dummy variable equal to 1 if the state required a minimum capital of $50,000 or more per bank, and 0 otherwise. t-statistics are included in parenthesis. (P > |0.05|, indicated by a; P > |0.10|, indicated by b).

| | *(a)* | *(b)* | *(c)* | *(d)* | *(e)* | *(f)* | *(g)* | *(h)* | *(i)* | *(j)* | *(k)* | *(l)* | *(m)* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Constant | 0.059[a] | 0.062[a] | 0.057[a] | 0.054[a] | 0.070[a] | 0.058[a] | 0.055[a] | 0.051[a] | 0.051[a] | 0.063[a] | 0.059[a] | 0.058[a] | 0.053[a] |
| | (16.33) | (10.44) | (6.956) | (6.515) | (4.758) | (5.798) | (4.900) | (4.013) | (4.325) | (3.979) | (6.359) | (6.979) | (4.634) |
| No Branch Allowed | 0.012[a] | 0.011[a] | 0.013[a] | 0.015[a] | 0.014[a] | 0.014[a] | 0.013[a] | 0.014[a] | 0.014[a] | 0.015[a] | 0.014[a] | 0.013[a] | 0.013[a] |
| | (2.614) | (2.169) | (2.282) | (2.578) | (2.240) | (2.447) | (2.132) | (2.259) | (2.322) | (2.381) | (2.305) | (2.296) | (2.320) |
| Pop Density | | -0.000 | -0.000 | -0.0004 | -0.0003 | -0.0002 | -0.0001 | 0.0005 | -0.0001 | -0.0003 | -0.0001 | 0.0002 | 0.001 |
| | | (-0.604) | (-0.429) | (-0.902) | (-0.429) | (-0.323) | (-0.101) | (0.645) | (-0.091) | (-0.379) | (-0.276) | (0.294) | (1.293) |
| Illiteracy Rate | | | 0.055 | 0.074 | 0.047 | 0.063 | 0.064 | 0.042 | 0.089 | 0.070 | 0.047 | 0.072 | 0.070 |
| | | | (0.810) | (1.104) | (0.695) | (0.902) | (0.849) | (0.456) | (1.167) | (0.993) | (0.680) | (1.023) | (0.751) |
| Farm Prof/Farm Pop | | | | 0.018[b] | | 0.020[b] | | | | | | | |
| | | | | (1.667) | | (1.770) | | | | | | | |
| Farm K/Farm Pop | | | | | | | 0.005 | -0.003 | 0.005 | | | | |
| | | | | | | | (0.539) | (-0.263) | (0.570) | | | | |
| Farm K/ Tot. Wealth | | | | | -0.188 | | | | | -0.139 | | | |
| | | | | | (-1.004) | | | | | (-0.731) | | | |
| Man. K/Tot. Wealth | | | | | -0.106 | | | | | -0.071 | | | |
| | | | | | (-0.627) | | | | | (-0.420) | | | |
| Man. K/NonFar Pop | | | | | | -0.027 | -0.007 | 0.016 | -0.005 | | | | |
| | | | | | | (-0.646) | (-0.186) | (0.354) | (-0.113) | | | | |
| Capital Requirement | | | | | | | | | 0.007 | 0.006 | | | |
| | | | | | | | | | (1.415) | (1.213) | | | |
| Bank Assets per cap. | | | | | | | | | | | -0.022 | | |
| | | | | | | | | | | | (-0.462) | | |
| Bank Assets per bank | | | | | | | | | | | | $-3.19 \times 10^{-6}$ | $-4.08 \times 10^{-6}$ |
| | | | | | | | | | | | | (-0.842) | (-1.069) |
| Reg Dummies Incl? | No | No | No | No | No | No | No | Yes | No | No | No | No | Yes |
| Adjusted $R^2$ | 0.110 | 0.098 | 0.091 | 0.126 | 0.071 | 0.114 | 0.055 | 0.070 | 0.077 | 0.082 | 0.074 | 0.085 | 0.114 |
| F-Statistic | 6.83 | 3.55 | 2.57 | 2.70 | 1.72 | 2.21 | 1.54 | 1.44 | 1.65 | 1.70 | 1.95 | 2.09 | 1.87 |
| Prob > F | 0.012 | 0.037 | 0.149 | 0.043 | 0.150 | 0.070 | 0.196 | 0.229 | 0.157 | 0.146 | 0.120 | 0.098 | 0.100 |

## Table 10: Regression Results on Deposit Rates of National Banks

Dependent Variable: Deposit rate of National Banks. "Deposit rates" is defined as interest expenditures on deposits divided by the total amount of deposits. "No Branch Allowed" is a dummy variable equal to 1 if the state explicitly prohibited branch banking or had a judicial or administrative prohibition. It is equal to 0 otherwise. "Pop Density" is defined as the square root of the state population in 1920 divided by the area of the state. "Illiteracy rate" is the number of people 10 years of age or older who are illiterate divided by the state's population. "Farm Prof/Farm Pop" is defined as the total amount of gross farm income in 1921 divided by the farm population in the state. "Man. K/Tot. Wealth" is defined as the state's total amount of manufacturing machinery, tools, and implements divided by the state's total wealth. These figures are for 1922. "Farm K/Farm Pop" is defined as the state's amount of farm implements and machinery plus livestock divided by farm population in the state. "Farm K/Tot. Wealth" is defined as the state's amount of farm implements and machinery plus livestock divided by the state's total wealth. These figures are for 1922. "Reg Dummies Include?" stands for Regional Dummies Included in the regression? "Capital Requirement" is a dummy variable equal to 1 if the state required a minimum capital of $50,000 or more per bank, and 0 otherwise. t-statistics are included in parenthesis. ($P > |0.05|$, indicated by a; $P > |0.10|$, indicated by b).

| | *(a)* | *(b)* | *(c)* | *(d)* | *(e)* | *(f)* | *(g)* | *(h)* | *(i)* | *(j)* | *(k)* | *(l)* | *(m)* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Constant | 0.023$^{a}$ | 0.023$^{a}$ | 0.026$^{a}$ | 0.027$^{a}$ | 0.017$^{a}$ | 0.029$^{a}$ | 0.028$^{a}$ | 0.027$^{a}$ | 0.029$^{a}$ | 0.018$^{a}$ | 0.026$^{a}$ | 0.026$^{a}$ | 0.025$^{a}$ |
| | (23.74) | (14.14) | (12.11) | (12.65) | (5.414) | (11.28) | (9.683) | (8.123) | (9.677) | (5.231) | (10.70) | (12.01) | (7.952) |
| No Branch Allowed | -0.001 | -0.001 | -0.003$^{b}$ | -0.003$^{a}$ | -0.003$^{a}$ | -0.003$^{a}$ | -0.003$^{a}$ | -0.003$^{a}$ | -0.003$^{a}$ | -0.004$^{a}$ | -0.003$^{b}$ | -0.003$^{b}$ | -0.003$^{b}$ |
| | (-1.06) | (-0.815) | (-1.792) | (-2.168) | (-2.927) | (-2.306) | (-2.088) | (-2.017) | (-2.244) | (-2.965) | (-1.707) | (-1.762) | (-1.663) |
| Pop Density | | 0.000 | -0.000 | 0.000 | 0.0005$^{a}$ | 0.0002 | 0.0002 | 0.0001 | 0.0001 | 0.0004$^{a}$ | -0.000 | 0.000 | 0.000 |
| | | (0.402) | (-0.020) | (0.562) | (2.641) | (1.120) | (1.080) | (0.682) | (1.077) | (2.593) | (-0.010) | (0.499) | (0.544) |
| Illiteracy Rate | | | -0.038$^{a}$ | -0.044$^{a}$ | -0.036$^{a}$ | -0.049$^{a}$ | -0.044$^{a}$ | -0.031 | -0.049$^{a}$ | -0.038$^{a}$ | -0.038$^{a}$ | -0.034$^{b}$ | -0.025 |
| | | | (-2.158) | (-2.546) | (-2.414) | (-2.748) | (-2.286) | (-1.294) | (-2.526) | (-2.487) | (-2.086) | (-1.828) | (-0.968) |
| Farm Prof/Farm Pop | | | | -0.006$^{a}$ | | -0.004 | | | | | | | |
| | | | | (-2.005) | | (-1.616) | | | | | | | |
| Farm K/Farm Pop | | | | | | | 0.001 | -0.000 | 0.001 | | | | |
| | | | | | | | (0.430) | (-0.094) | (0.411) | | | | |
| Farm K/ Tot. Wealth | | | | | 0.169$^{a}$ | | | | | 0.163$^{a}$ | | | |
| | | | | | (4.134) | | | | | (3.875) | | | |
| Man. K/Tot. Wealth | | | | | -0.001 | | | | | -0.005 | | | |
| | | | | | (-0.035) | | | | | (-0.144) | | | |
| Man. K/NonFar Pop | | | | | | -0.012 | -0.017 | -0.022$^{b}$ | -0.018$^{b}$ | | | | |
| | | | | | | (-1.109) | (-1.613) | (-1.819) | (-1.686) | | | | |
| Capital Requirement | | | | | | | | | -0.002 | -0.001 | | | |
| | | | | | | | | | (-1.235) | (-0.659) | | | |
| Bank Assets per cap. | | | | | | | | | | | -0.000 | | |
| | | | | | | | | | | | (-0.029) | | |
| Bank Assets per bank | | | | | | | | | | | | $-7.20 \times 10^{-7}$ | $-8.97 \times 10^{-7}$ |
| | | | | | | | | | | | | (-0.725) | (-0.857) |
| Reg Dummies Incl? | No | No | No | No | No | No | No | Yes | No | No | No | No | Yes |
| Adjusted $R^2$ | 0.003 | -0.016 | 0.060 | 0.121 | 0.337 | 0.125 | 0.075 | 0.035 | 0.087 | 0.328 | 0.038 | 0.050 | -0.003 |
| F-Statistic | 1.12 | 0.63 | 2.01 | 2.61 | 5.78 | 2.35 | 1.76 | 1.21 | 1.74 | 4.83 | 1.47 | 1.62 | 0.98 |
| Prob > F | 0.300 | 0.537 | 0.127 | 0.048 | 0.000 | 0.057 | 0.142 | 0.317 | 0.136 | 0.001 | 0.228 | 0.186 | 0.457 |

## Table 11

**Banking Services at the County Level**

Dependent Variable: Total number of banks in the county. Source: Polk's Banking Encyclopedia

| | *(a)* | *(b)* | *(c)* | *(d)* | *(e)* | *(f)* |
|---|---|---|---|---|---|---|
| Constant | -56.77[a] | -56.65[a] | -55.16[a] | -55.173[a] | -56.04[a] | -55.84[a] |
| | -13.009 | -12.91 | -12.42 | -12.491 | -12.687 | -12.661 |
| Branching Permitted | 0.391 | 0.215 | 0.670 | 0.664 | 0.207 | 0.322 |
| | 0.506 | 0.279 | 0.851 | 0.873 | 0.288 | 0.457 |
| Log(County Population) | 6.319[a] | 6.218[a] | 6.178[a] | 6.177[a] | 6.220[a] | 6.248[a] |
| | 14.52 | 14.346 | 13.923 | 14.033 | 14.062 | 14.161 |
| 1st pop quart.*Branch | 3.073[a] | 2.947[a] | 2.617[a] | 2.618[a] | 2.454[a] | 2.173[a] |
| | 2.840 | 2.714 | 2.383 | 2.392 | 2.236 | 2.058 |
| 2nd pop quart.*Branch | -0.135 | -0.172 | -0.226 | -0.227 | -0.350 | -0.507 |
| | -0.154 | -0.197 | -0.253 | -0.254 | -0.392 | -0.578 |
| 3rd pop quart.*Branch | -0.440 | -0.496 | -0.608 | -0.608 | -0.508 | -0.603 |
| | -0.547 | -0.614 | -0.739 | -0.742 | -0.617 | -0.738 |
| County Area | 0.001 | 0.002 | 0.001 | 0.001 | 0.001 | |
| | 0.950 | 1.407 | 1.034 | 1.090 | 0.942 | |
| Illiteracy Rate in County | -8.452[b] | -6.258 | -8.087[b] | -8.036[b] | | |
| | -1.760 | -1.348 | -1.642 | -1.725 | | |
| Prop. Farms with Mort. | 9.162[a] | 6.305[a] | | | | |
| | 2.937 | 2.413 | | | | |
| Prop of Homes with Mort | -10.952 | | -0.185 | | | |
| | -1.654 | | -0.033 | | | |
| F-Statistic | 47.80 | 52.80 | 50.08 | 57.62 | 65.85 | 78.90 |
| Prob > F | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Adjusted $R^2$ | 0.732 | 0.729 | 0.718 | 0.733 | 0.716 | 0.717 |
| Num. Of Observations | 154 | 154 | 154 | 154 | 154 | 154 |

## Appendix

1. Proof that $i_k^{switch} < i_k^{\max,1} < i_k^{\max,2}$ under Case 1:

First, note that $i_k^{\max,1} < i_k^{\max,2}$ if:

$$\frac{R_c - (1+r)C}{X - C} < \frac{pR_s - (1+r)C}{p(X - C)}$$

$$\Rightarrow pR_c - p(1+r)C < pR_s - (1+r)C$$

$$\Rightarrow p(R_s - R_c) - (1-p)(1+r)C > 0$$

and $i_k^{switch} < i_k^{\max,1}$ if:

$$\frac{R_c - pR_s}{(1-p)(X - C)} < \frac{R_c - (1+r)C}{X - C}$$

$$\Rightarrow R_c - pR_s < (1-p)(R_c - (1+r)C)$$

$$\Rightarrow p(R_s - R_c) - (1-p)C(1+r) > 0$$

Case 2 can be analogously derived.

Q.E.D.

2. Proof of Lemma 1 (identification of α*):

Consider first the case when $C < C^*$. The bank's expected gross returns from investing at rate *r*, and lending at rates $i_k^{switch}$, and $i_k^{\max,1}$ are:

$$\rho_r = (1+r)$$
$$\rho_{i_k^{switch}} = \left(1+i_k^{switch}\right)$$
$$\rho_{i_k^{\max,1}}(\alpha) = (\alpha + (1-\alpha)p)\left(1+i_k^{\max,1}\right)$$

To establish the proposition, we must show that there is α* ≥ 0, such that for α≥ α*, $\rho_{i_k^{\max,1}}\left(\alpha \mid \alpha \geq \alpha^*\right) > \rho_{i_k^{switch}}$, and $\rho_{i_k^{\max,1}}\left(\alpha \mid \alpha \geq \alpha^*\right) > \rho_r$. This is clearly true for α = 1, since $i_k^{switch} < i_k^{\max,1}$ for $C < C^*$, and since $r < i_k^{\max,1}$ (because $R_c \geq (1+r)X$). To establish the existence of α* it is enough to notice that $\rho'_{i_k^{\max,1}}(\alpha) > 0$, because this implies that the bank's return from lending at rate $i_k^{\max,1}$ decreases as □ declines.

Consider next the case when $C \geq C^*$. In this case, the bank's expected gross returns from investing at rate *r*, and lending at rates $i_k^{switch}$, and $i_k^{\max,1}$ are:

$$\rho_r = (1+r)$$
$$\rho_{i_k^{switch}} = 0$$
$$\rho_{i_k^{\max,1}} = \left(1+i_k^{\max,1}\right)$$

Note that for any α, $r < i_k^{\max,1}$ since $R_c \geq (1+r)X$. Also, for any α, it is trivially true that $\rho_{i_k^{\max,1}}$ > 0.

Q.E.D.

3. Proof of Proposition 1

Proposition 1 establishes that for $\alpha \geq \alpha^*$, $\rho_{i_k^{\max,1}}\left(\alpha \mid \alpha \geq \alpha^*\right) > \rho_{i_k^{switch}}$, and $\rho_{i_k^{\max,1}}\left(\alpha \mid \alpha \geq \alpha^*\right) > \rho_r$.

Hence, we need to show that for $C < C^{low}$, $\rho_r > \rho_{i_k^{switch}}$, and that for $C \geq C^{low}$, $\rho_r \leq \rho_{i_k^{switch}}$;

where $C^{low}$ is defined as:

$$C^{low} \equiv C^* - \left(\frac{R_c}{1+r} - X\right)$$

If $C < C^{low}$, then

$$C < C^* - \left(\frac{R_c}{1+r} - X\right)$$

$$\Rightarrow C < \left(\frac{p}{1-p}\right)\left(\frac{R_s - R_c}{1+r}\right) - \left(\frac{R_c}{1+r} - X\right)$$

$$\Rightarrow \left(\frac{R_c - pR_s}{(1-p)(X-C)}\right) < (1+r)$$

An analogous derivation would obtain for the $C \geq C^{low}$ case.

$\rho_r > \rho_{i_k^{\max,2}}$ holds for any $C$ since $pR_s \geq (1+r)X$.

Q.E.D.

4. Proof of Proposition 4

1. $C_2 < C_1 < C^*$

Under this collateral order, Proposition 3 establishes that $\rho_{i_1^{\max,1}} > \rho_{i_2^{\max,1}} > \rho_r$. Although loans in Region 1 offer the highest expected return to the bank, this return is risky because Type B borrowers will choose to do Type 2 projects. Investing in loans in Region 2 is also risky for the same reason. However, it is possible to find a loan portfolio combination of the two regions that eliminates all risk since outcomes of Type 2 projects are perfectly negatively correlated across regions. Thus, it is possible to find a loan portfolio that, from a risk-return perspective, strictly dominates investment in government bonds. According to Tobin's (1958) optimal portfolio allocation model, a risk-averse branch bank will select a portfolio that invests some of its assets in Region 1 and some in Region 2.

2. $C_2 < C^* \leq C_1$:

According to Proposition 3, the branch bank's loan return is highest in Region 1. Since $C_1 \geq C^*$, Type B borrowers in this region will choose to do Type 1 projects only (as Corollary 1 establishes). Thus, investing in loans in Region 1 is riskless. Hence, this investment alternative dominates all other risk-return combinations available to the branch bank.

3. $C^* \leq C_2 < C_1$:

According to Proposition 3, the branch bank's loan return is highest in Region 1. Since $C_1 \geq C^*$, Type B borrowers in this region will choose to do Type 1 projects only (as

Corollary 1 establishes). Thus, investing in loans in Region 1 is riskless. Hence, this investment alternative dominates all other risk-return combinations available to the branch bank.

Q.E.D

**References**

Alston, Lee J. (1984) "Farm foreclosure moratorium legislation: A lesson from the past," *American Economic Review*, 74, pp. 445-457.

Berger, Allen N., Anil Kashyap, and J.M. Scalise (1995) "The Transformation of the U.S. Banking Industry: What a Long, Strange Trip It's Been" *Brookings Papers on Economic Activity*, No. 2, pp. 55-218.

Bradford, Frederick (1940)*The Legal Status of Branch Banking in the United States*. New York: American Economists Council for the Study of Branch Banking.

Calomiris, Charles W. (1993) "Regulation, Industrial Structure, and Instability in U.S. Banking: An Historical Perspective," in M. Klausener and L. J. White (eds.) *Structural Change in Banking*. Homewood, IL:Business One Irwin.

Calomiris, Charles W. (1995) The cost of rejecting Universal Banking: American finance in the German mirror, 1870-1914, in Naomi R. Lamoreaux and Daniel M.G. Raff, eds.: *Coordination and Information: Historical Perspectives on the Organization of Enterprise* (University of Chicago Press)

Calomiris, Charles W. (2000) *U.S. Bank Deregulation in Historical Perspective.* New York: Cambridge University Press.

Calomiris, Charles W. and R. Glenn Hubbard (1990) "Firm Heterogeneity, Internal Finance, and 'Credit Rationing'," *The Economic Journal*, 100, pp. 90-104

Calomiris, Charles W., and Carlos D. Ramirez (1995) "The evolution of American corporate finance," in Carl Kaysen, ed.: *The American Corporation: A Second Look* (Oxford University Press)

Calomiris, Charles and Daniel M.G. Raff (1996) "The evolution of market structure, information, and spreads in American investment banking," in Michael Bordo and Richard Sylla, eds.: *Anglo-American Finance Systems: Institutions and Markets in the 20th Century* (Irwin Publishers)

Economides, N., R. Glenn Hubbard, and D. Palia (1996) "The political economy of branching restrictions and deposit insurance: A model of monopolistic competition among small and large banks," *Journal of Law and Economics*, 39, pp. 667-704.

James, John A. (1978) "Cost functions of postbellum national banks," *Explorations in Economic History*, 15, pp. 184-195.

Klein, M. (1971) "A theory of the banking firm," *Journal of Money, Credit and Banking* 3, pp. 205-18.

Kroszner, Randall S. and Philip Strahan (1999). "What Drives Deregulation? Economics and Politics of the Relaxation of Bank Branching Restrictions in the United States," *Quarterly Journal of Economics*, November, 1437-67.

Lamoreaux, Naomi (1991) "Information Problems and Banks' Specialization in Short-Term Commercial Lending: New England in the 19th Century," In *Inside the Business Enterprise: Historical Perspectives on the Use of Information*, ed. Peter Temin, 154-95, Chicago, IL: University of Chicago Press.

Leven, Maurice (1925) *Income in the various states: Its sources and distribution, 1919, 1920, 1921*. New York: National Bureau of Economic Research.

Mengle, David L. (1990) "The Case for Interstate Branch Banking," *Federal Reserve Bank of Richmond Economic Review*, 76 (November/December), pp. 3-17.

Monti, M. (1972) "Deposit, Credit, and interest rate determination under alternative bank objectives," In G.P. Szego and K. Shell, eds., *Mathematical Methods in Investment and Finance*, Amsterdam: North-Holland.

Moulton (1922). *The Financial Organization of Society*. Chicago: University of Chicago Press.

Pyle, David H. (1972) "Descriptive Theories of Financial Institutions Under Uncertainty," *Journal of Financial and Quantitative Analysis*, 7 (December), pp. 2009-29.

Pyle, David H. (1971) "On the Theory of Financial Intermediation," *Journal of Finance*, 26 (June), pp. 737-47.

Ramirez, Carlos D. (1995) Did J.P. Morgan's men add liquidity? corporate investment, cash flow, and financial structure at the turn of the twentieth century, *Journal of Finance* 50, 661-678.

Ransom, R. L. and R. Sutch (1972) Debt peonage in the cotton south after the civil war, *Journal of Economic History*, 32, pp. 641-669

Santomero, Anthony M. (1984) "Modeling the Banking Firm: A Survey," *Journal of Money, Credit, and Banking*, Vol. 16, No. 4 (Part 2), pp. 576 – 707.

Tobin, James (1958) "Liquidity Preference as Behavior Towards Risk," *Review of Economic Studies*, pp. 65-86.

Webb, David (1991) Long-Term Financial Contracts Can Mitigate the Adverse Selection

Problem in Project Financing, *International Economic Review* 32, 305-320.

White, Eugene (1986) Before the Glass-Steagall Act: an analysis of the investment banking activities of national banks, *Explorations in Economic History* 23, 33-55.

White, Eugene (1984) "Voting for Costly Regulation: Evidence from Banking Referenda in Illinois, 1924," *Southern Economic Journal*, 1084-98.

White, Eugene (1983) *The Regulation and Reform of the American Banking System: 1900-1929*. Princeton, NJ: Princeton University Press