12-1986

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ABSTRACT

The Free Banking Era, noted for numerous bank failures and large creditor losses, has been traditionally viewed as the experiment in laissez-faire banking that failed. Current researchers have found evidence suggesting that bank failures and creditor losses were limited to selected states and have linked the cause of bank failures to periods of falling asset prices. Free banks were required to hold long-term assets as primary reserves for short-term liabilities. Current banking theory suggests that the maturity imbalance between assets and liabilities increases the free bank's exposure to interest rate risk. Some states imposed a secondary reserve, the specie reserve requirement, that partially corrected the imbalance.

This paper proposes that the link between bank failures and falling asset prices can be explained in part by one of the regulations imposed on the free banks. Six free banking states were selected to test the hypothesis that the secondary reserve requirement reduced bank failures. The evidence indicates that high-specie-reserve states experienced fewer bank failures than low-specie-reserve states.

1. Introduction

Throughout American history the banking industry has been closely regulated. From the beginning, restrictions have been imposed on bank entry and on bank conduct in one form or another. Generally, bank entry has been regulated by requiring the entrant to receive a special charter from a state or federal regulatory body and to meet minimum capital requirements, while bank conduct has been regulated by placing restrictions on portfolio selection, demand deposit creation, and capital adequacy. However, from 1837 to 1863 entry was not determined by the approval of a state or federal body. This period, known as the Free Banking Era, has been viewed as an experiment in free-market banking that failed. Historians cite numerous bank failures, a plethora of bank notes, and large noteholder losses to be typical of this era. Contrary to this view, recent literature has pointed out that the banks which had been considered free actually operated under several restrictions; the stories of the numerous bank failures and large noteholder losses were limited to only a few states.

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Economists such as Hugh Rockoff [3], Arthur Rolnick and Warren Weber [4, 5, 6, 7] have attempted to explain the causes of the wide variety of banking experiences during this period. Rockoff contends that certain restrictions created perverse profit opportunities in which the stockholder of a free bank could make a quick capital gain on his investment by closing the bank. In Rockoff's theory, the capital gain arose from the transfer of wealth from the creditors to the stockholder when the assets were liquidated. Rolnick and Weber refute this claim, arguing that term-structure risk brought about many of the bank failures. According to Rolnick and Weber the stockholder closed the bank in order to minimize capital losses. Both

theories focused on a reserve requirement that linked the banks' liabilities to marketable securities; they also disregarded other portfolio restrictions. This paper examines an alternate restriction, the specie reserve requirement, and presents evidence suggesting that the lenient restrictions of this provision strongly influenced bank failure, given the other portfolio restrictions.

The paper proceeds as follows. Section 2 contains an historical overview of the free banking system and the major asset restriction. A review of the arguments of Rockoff, Rolnick and Weber are explained in section 3. Section 4 contains a discussion of the specie reserve provision and evidence indicating a link between the leniency of this provision and banks leaving the market. Univariate statistical tests are applied to the data. In Section 5 the empirical results are discussed in light of the Rolnick and Weber hypothesis. Section 6 contains the concluding remarks.

2. Historical Overview

Prior to the Free Banking Era, state legislatures regulated entry and bank activities through the licencing of individually constructed bank charters which contained provisions regulating the activities of the specified bank. One such provision, common to all the charters, allowed the banks to issue banknotes; that is, promissory notes circulating as currency. The banks, however, were required to redeem the banknotes for specie (gold or silver) on demand. Failure to do so would have jeopardized charter privileges.

This system of regulating banks by legislative licencing gave way to the free banking system. Nineteen states enacted free banking laws; banks in

these states were "free" to enter the banking market and were subject to uniform restrictions such as minimum capital requirements. Unlike the charter banks, the free bank could not print banknotes, but could obtain banknotes from the state banking authority by depositing marketable securities with the state authority. The state would hold the securities in reserve for the ultimate redemption of the banknotes. Like charter banks, the free banks were required to redeem the banknotes for specie on demand. If a bank failed to honor the request of a noteholder, the bank would be required to close and the securities would be sold by the state for the redemption of the circulating notes.

The free banking states allowed two types of marketable securities as security for bank notes: state bonds and mortgages on unencumbered real estate. State bonds were allowed by eighteeen states , whereas mortgages were accepted as security in only a few states.

The amount of banknotes issued by the state banking authorities was also specified by the laws. In the early years of free banking legislation, the states required that notes issued to banks be equal to the par value of the bonds. This restriction was known as the par evaluation provision. Later in the period the states required that the amount of notes issued to banks be equal to the market value of the bonds or the par value, whichever was less. A few states placed stronger restrictions by limiting note issue to less than 100 percent of the market value of the bonds.[1]

Mortgages were treated differently than state bonds. In general, a mortgage was eligible as collateral if the mortgage value was no more than half the market value of the mortgaged land. The amount of notes issued by the authorities could not exceed the mortgage value.

In addition to the market security requirement, some states enacted a specie reserve requirement. The restriction required banks to hold specie equal to a specified percentage of the amount of notes in circulation.[2] In general, the restrictions specified that the required amount of specie was to be on hand at all times, but some of the states allowed the required amount of specie to be the average specie holdings for a specified period.

Although the market security and specie reserve provisions were enacted with the intent of protecting the noteholders of the free bank from losses, the evidence seems to indicate that large losses were experienced in several states. The critics have claimed that these losses were a result of the free competition among banks. Economic historian Bray Hammond, a representative of this group, states that "Free banking was an application of laissez faire to the monetary function."[3] Such association, however, is unwarranted, since the free banks were subject to various restrictions. Current researchers have reexamined the restrictions imposed on free banks and have concluded that some of the restrictions imposed on free banks influenced banking behavior.

3. Current Theories

Hugh Rockoff was one of the first to reexamine the free bank experience and to develop a theory on the impact of free bank restrictions on the free bank market. Rockoff found states that enacted the par evaluation restriction experienced a large number of bank failures and large noteholder losses. He also found that subsequent changes in the restriction from par evaluation to market evaluation reduced bank failures and noteholder losses.

From this evidence, Rockoff theorized, that under certain circumstances the free bank investor in par evaluation states could make a quick capital gain by closing the bank. When the market value of the eligible security was below the par value of the security, the free bank investor would receive banknotes in an amount greater than his investment. The free bank investor could make a quick capital gain by issuing all the banknotes, presumably through a loan to himself or to a relative, then close the bank and leave town. This scenario, however, would have been possible only if the free bank investor had been able to convince the public to accept and hold the banknotes at face value. Thus, the unsuspecting noteholder would have been holding banknotes that were not fully backed, and would have received only the market value of the securities, while the free bank investor would have received a capital gain on his investment equal to the difference between the par value and the market value of the securities.

However, Rolnick and Weber also reviewed the free banking experience and found evidence that refutes Rockoff's hypothesis. Although they did not deny that there were frequent bank failures and large noteholder losses within some states, they rejected the hypothesis that the minor specifications in the laws caused free bank failures and noteholder losses. Rolnick and Weber presented an alternative theory which suggested that economic disturbances may have contributed to the bank failures and to the noteholder losses.

According to Rolnick and Weber, a major drop in asset prices would have been sufficient to generate a run on the banks and would have possibly forced some of the banks to close. As a proxy for asset prices, Rolnick and Weber used bond prices to measure economic activity. Their reasoning was that bonds were primarily used as collateral for note issue and in most cases

bonds were a large portion of the free bank's asset portfolio. A drop in bond prices would have lowered the market value of the bonds backing the notes as well as lowered the value of the free bank assets. If noteholders perceived that the drop in bond prices was large enough to jeopardize the solvency of the bank, they would have gone to the bank and attempted to redeem their notes at par value. The bank would not have honored the request if the noteholders were correct in their assessment. To honor the request would have meant an additional capital investment by the bank's stockholders. Instead the stockholders of the bank would have allowed the notes to be protested and the bank to close. Consequently, the bonds would have been sold by the state banking authorities at a price below the original purchase price and the noteholders would have been paid off at some fraction of the face value of the note.

Even if the noteholders were wrong in their assessment of the financial position of the bank, the banker still could have been forced to close the bank in order to liquidate some of the assets. Rolnick and Weber suggested that some of the solvent banks may have closed permanently rather than continue to operate under such turbulent conditions.

The Rolnick and Weber study contends that the market security provision increased the interest rate risk exposure of the free banks' portfolio. Of course, interest rate risk of any portfolio depends on all the assets of the portfolio. The free banker could have used his banknotes to purchase perfectly riskless assets such as specie, thereby reducing the probability of default on note redemption to zero. As the banker reduced the percentage of notes backed by specie the probability of default increased. In other words, the specie reserve provided security against interest rate risk of the market

securities backing the notes and reduced the probability of banks leaving the market.

4. The Specie Reserve Provision

The specie reserve requirements of six free banking states are examined in this section: New York, Indiana, Minnesota, Wisconsin, Virginia, and Louisiana.[4] These states represent a cross-section of specie reserve requirements and experiences.

The specie reserve requirements enacted by these states varied from a zero to a thirty-three percent specie reserve requirement. Virginia and Louisiana represent states that enacted high specie reserve requirements - greater than or equal to 20 percent.[5] New York and Indiana represent states that enacted, and later repealed, 12 1/2 percent specie reserve reqirements. The repeal came shortly after the original enactment. Minnesota and Wisconsin represent states that never enacted a specie reserve requirement during the free banking period.

The experiences varied from no bank failures and noteholder losses to numerous bank failures and large noteholder losses. Information concerning the experiences in each state was obtained from state auditor reports that the banks prepared for the state banking authorities.[6] The number of banks that entered and exited was collected from these reports. Banks that exited were divided into two classes: banks that closed and banks that failed. A closed bank was defined as a bank that was able to redeem its banknotes at par (i.e., no noteholder losses) whereas a failed bank was defined as a bank that was unable to redeem its notes at par (i.e., noteholders suffered losses). A detailed listing of each bank that operated in a given state was

made and the tabulation of all closing and failing banks was compiled from this list. The following discussion presents the final compilation for each state.

4.1 The Experiences of the States

Initial support for the hypothesis that a lenient specie reserve requirement increased the incidence of bank exits is revealed by the data presented in Table 1. (Since the the size of the banking markets varied from state to state, the number of banks that operated under each law in each state and the percentage of operating banks that left the market for each state are also included in Table 1.)

The aggregate experience for each state indicates that exits were generally higher in zero percent specie reserve states than in high specie reserve states. The high specie reserve states, Virginia and Louisiana, record the fewest number of banks leaving the market. In the 12 1/2 percents specie reserve states, the evidence shows conflicting experiences. Indiana experienced a large number of bank exits, while New York experienced few bank exits. This result also holds after adjusting for market size. In the states that did not enact a specie reserve requirement, the number of banks leaving the market were the highest among the states examined. Even after adjusting for market size, these states had the highest percentages of bank exits, recording at least 30 percent of the operating banks leaving the market.

The states are also grouped according to the laws under which they operated and are presented in Table 2. In this table the number of free banks that operated in the market under each provision is indicated along

TABLE 1

ENTRY AND EXIT IN SELECTED FREE BANKING STATES

State	Date	Reserve Requirement	(1) Total Operated	(2) Total Closed	(3) Total Failed	(4) Total Exited	(4) ÷ (1) Percentage Exited
Indiana	1856-1863	0%	23	6	1	7	30.4%
Minnesota	1857-1863	0%	16	2	9	11	68.8%
New York[a]	1841-1863	0%	426	122	31	153	35.9%
Wisconsin	1842-1863	0%	140	42	37	79	56.4%
Indiana[b]	1852-1855	12 1/2%	93	32	23	55	59.1%
New York[b]	1838-1840	12 1/2%	74	2	3	5	6.80%
Virginia	1851-1860	20%	23	4	0	4	17.40%
Louisiana	1853-1859	33%	7	0	0	0	0.0%

[a]The New York tally does not include charter banks that entered under the free banking law after their charter expired. Information on the redemption rates of four New York banks was not available and is not included in the number of banks exiting.

[b]Information on twenty-seven Indiana banks was not available and is not included in the number of banks exiting.

TABLE 2

FREE BANK EXPERIENCES GROUPED ACCORDING TO RESERVE REQUIREMENTS

Experience	Specie Reserve Requirement		
	0%	12 1/2%	20% and Above
Free Bank Operated	605	167	30
Percentage Closed	28.4%	20.3%	13.3%
Percentage Failed	12.9%	15.6%	0.0%
Percentage Exited	41.3%	35.9%	13.3%

with the percentage of banks that closed, the percentage that failed and the percentage of banks that left the market. As in Table 1, the figures indicate that the banks operating under the more lenient zero percent requirement had a higher percentage of banks leaving the market than those operating under the stricter requirements. These figures combined with those in Table 1 appear to indicate that differing specie reserve requirements among the states could explain the number of banks leaving the market.

4.2 Univariate Test

The notion that differing specie reserve requirements explains exits is strengthened by the results of a univariate test performed on the data. The evidence in the previous section indicates that a larger percentage of banks left the market under a lenient specie reserve requirement than under a strong specie reserve requirement. Since the evidence is represented as proportions, the appropriate test is the difference between two sample proportions.[7]

Three variables were constructed for the test: the failure rate, the closure rate, and the below par rate. The failure rate is defined as the number of banks that failed divided by the number of banks that operated under the particular restriction. This variable measures the percentage of all existing banks that were failures. Using this percentage facilitates comparisons between states having different numbers of banks.

The closure rate is defined as the number of banks that closed divided by the number of banks that operated during the free banking period. As with the failure rate closing banks are divided by operating banks to facilitate comparison across states. This variable measures the percentage of all

existing banks that closed. Both the failure rate and closure rate are constructed in order to isolate the effects of the specie reserve provision on banks exiting the market.

The below par rate is defined as the number of failures divided by the number of banks that exited. This variable measures the percentage of banks that were leaving the market that failed. The purpose of this variable is to indicate the effects that different specie reserve restrictions had on the likelihood that an exiting bank would be a failure.

The observations for each variable are categorized under three specie restrictions: Zero percent, Twelve percent, and Twenty percent and Above. (Let zero, twelve, and twenty and above be assigned group numbers 1, 2, 3, respectively, and let the sample proportion of group i be denoted as X_i.) Since it is expected that a lenient specie reserve would result in a larger number of failures, the hypothesis tested is that the mean of the failure rate, closure rate, and below-par rate under a zero specie reserve is significantly larger than the means of the twelve percent or the twenty percent and above specie requirements:

$$H_1^1 : X_1 - X_2 < 0,$$
$$H_1^2 : X_1 - X_3 < 0, \text{ and}$$
$$H_1^3 : X_2 - X_3 < 0,$$

where H_1^j is the jth hypothesis being tested. Alternately, the null hypothesis states that there is no difference between the proportions.

The results of the tests, given in Table 3, indicate that there is a significant difference in the failure rates between states that enacted specie reserve requirements less than and equal to twelve percent, and states

that enacted specie reserve requirements of twenty percent and above. Both the sample proportions of zero percent and twelve percent are significantly larger than the sample proportions of twenty percent and above at the 99 percent and 95 percent significance level, respectively. However, the null hypothesis cannot be rejected for the difference in proportions of zero and twelve percent specie reserve.

The evidence on the closure rate in Table 3 also indicates a significant difference between the zero percent, and the twelve and twenty and above reserve requirement at the 95 percent significance level and at the 99 percent significance level, respectively. The null hypotheses cannot be rejected for the difference in proportions of twelve percent and twenty percent and above.

Finally, the test on the below-par rate indicates that the specie reserve does not show a significant difference in the likelihood that an exiting bank will fail; that is the null hypotheses cannot be rejected.

In summary, the evidence supports the previous conclusion that the enactment of a high specie reserve requirement reduced bank failures and closures. A bank that existed under a strong specie reserve restriction was less likely to fail or close than a bank that existed under a lenient specie reserve requirement. In both tests the twelve percent specie reserve proved to be a critical point in specie holdings. A specie reserve greater than twelve percent appeared to reduce the number of failures while a specie reserve of twelve percent and lower significantly increased the number of

TABLE 3

DIFFERENCES IN FAILURE RATES, CLOSURE RATES, AND BELOW PAR-RATES MEASURES UNDER SPECIE RESERVE REQUIREMENTS

Measure		Comparison of Specie Reserve Reqirements		
Differences in		0% & 12 1/2%	0% & 20 & Above	12 1/2% 20 & Above
Failure Rates	%	-2.7	12.9	15.6
	t Ratio	-0.762	3.27*	2.21**
Closure Rates	%	8.1	15.1	7.0
	t Ratio	2.35**	3.96*	1.00
Below-Par Rates	%	-11.9	31.22	43.3
	t Ratio	-1.57	1.34	1.73

* - significant at the 1% level.

**- significant at the 5% level.

closures. However, there was no significant difference in the likelihood that an exiting bank failed. This result is not surprising since the likelihood of a bank failing or closing also depends on the current market conditions. The effects of market conditions on banks exiting under different specie reserve requirements are analyzed in the next section.

5. Comparison with the Rolnick and Weber Hypothesis

The analysis in the preceding section indicated that there may have been some link between the number of banks leaving the market in a particular state and the type of specie reserve requirement that the state required. One explanation of this link is that the specie reserves helped reduce the risk of default associated with an economic downturn. The specie reserve could have helped free bankers meet unanticipated demands for specie that may have been initiated by the fall in bond prices. The reserves could have also offset noteholder losses from the bonds' devaluation.

The reason for the specie reserve's influence is clear. Since the price elasticity with respect to the change in interest rates is larger for a long term asset than a short term liability, a decrease in the interest rate would result in a larger depreciation of the assets than the liabilities. Consequently, a large drop in interest rates, as Rolnick and Weber suggested, would induce noteholders to redeem their notes. If the free banker correctly anticipated a change in asset prices or effectively adjusted his portfolio to meet the change in demand for specie, he could have prevented a suspension of specie redemption. Therefore, by requiring free bankers to back a portion of the banknotes in specie, the downside risk from falling bond prices could have been partially mitigated.

In addition, noteholders in high specie reserve states may not have reacted to a fall in bond prices, since the specie holdings may have covered the bond depreciation.[8] If noteholders disregarded this information and attempted to redeem their banknotes, the bank may have been forced to suspend specie payments and forced into liquidation. As long as the depreciation of bonds was less than the specie holdings, noteholders would not have suffered losses; the bank would have had sufficient specie to cover the loss in asset value.

This explanation does not refute the hypothesis proposed by Rolnick and Weber,[9] that noteholders may have reacted to changes in bond prices, but it does contend that falling bond prices may not necessarily be the only factor determining bank failures. The specie reserve requirement may have been a factor in determining bank failures and closures. To check this hypothesis the sample of state experiences was examined under falling bond price periods as specified in the Rolnick and Weber study.[9] The raw data is presented in Table 4.[10] There were 135 banks identified as exiting during a falling bond price period. The break down of banks that exited indicates that there were sixty-two bank failures under the zero specie reserve, twelve under the twelve percent specie reserve during the falling bond price period.

The number of failures and closures as a percentage of the total number of banks that exited is shown in Table 4. It indicates that a larger percentage of exiting banks failed under the lenient specie reserve requirements than under the strict specie reserve requirements. These findings are consistent with the hypothesis that a lenient specie

TABLE 4

BANK EXITS UNDER FALLING BOND PRICES AND SPECIE RESERVE REQUIREMENTS

	Reserve Requirements		
	0%	12 1/2%	20% and Above
Total Operated	605	167	30
Total Exited	108	23	4
Total Failed	62	12	0
	(57.4)	(52.1)	(0.0)
Total Closed	46	11	4
	(42.6)	(47.9)	(100)

( ) Percentage of total exited

reserve requirement, given the market security restriction, may have increased the number of failures. However, further testing is necessary before any conclusive statement can be made about the effects of a specie reserve requirement on bank failures.

6. Conclusion

The evidence indicates that a specie reserve requirement influences bank closings and bank failures. States enacting a strong specie reserve requirement showed a significant difference in bank failings and closings from states that enacted lenient specie reserve requirements. This study suggests that the discrepancy in experiences between states with different specie reserve requirements may be due to a link between the short term liability (i.e. banknotes) and the long term asset (i.e. state bonds). This hypothesis implies that the free banknotes made up a substantial portion of a free bank's liabilities; hence, state bonds were a substantial portion of a free bank's assets. Therefore, in order to make a conclusive statement about the influence of the specie reserve requirement on free banking experience, more information is needed on the portfolios of the individual free bank.

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[8] U. S. Congress. House Executive Documents, Washington. Selected years 1838-1863.

FOOTNOTES

[1]The number of statutes does not necessarily indicate the number of restrictions imposed on the free bank. For example, Tennessee enacted sixteen statutes but these statutes contained the same number of restrictions as New York's which contained thirty-three statutes.

[2]Louisiana enacted a reserve requirement that required banks to hold specie or ninety day commercial paper equal to 100% of the notes in circulation.

[3]Bray Hammond, Banks and Politics in America From the Revolution to the Civil War, (Princeton, N.J.: Princeton University Press, 1957), p. 573.

[4]Virginia's free banking law required a legislative charter and approval. Therefore, some may not consider Virginia a free banking state. However, the charters were uniform in requirements, except for the minimum capital requirement. In addition, the historical records of Virginia indicate that the legislature did not refuse any requests and that a significant number of charters did not go into operation. Contemporaries have claimed that the legislative approval was no different than the state banking authority accepting applications. See [1] for additional information.

[5] In Louisiana, banks were required to hold one hundred percent of their outstanding notes in specie or 90 day commercial paper. In addition to the reserve requirement backing banknotes, Louisiana banks were required to hold 33 percent of their deposits in specie. Since the noteholders in Louisiana free banks had first lien on the assets, and in general the amount of deposits equaled or exceeded note issue, the note issued by the Louisiana bankers were backed by thirty-three percent specie reserves. None of Louisiana's free banks left the market.

[6]Most of the reports can be found in the United States Congressional Serial Set [8]. Additional information was obtained from state auditor reports (See [6]).

[7]The appropriate test statistic is:

$$t = (x_1 - x_2)/(S_{p_1 - p_2})$$

where $S_{p_1 - p_2}$ is the standard error of the difference between two sample proportions:

$$\sqrt{\hat{p}\,\hat{q}\,[(n_1 + n_2)/n_1 n_2]},$$

and $\hat{p}$ is the expected proportion of the combined sample and $\hat{q}$ is the complement of $\hat{p}$.

[8]The free banking laws also contained a provision that allowed the state banking authority to call in banknotes when the market value of the securities was less than the amount of notes issued. The noteholder would also have the assurance that corrective measures would be taken.

[9]This study includes the first part of the N.Y. experience; the Rolnick and Weber study did not.

[10]A test on proportions cannot be used in this analysis. Since the data is divided into time segments, the base number of banks operating varies in each time segment.