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Did Antebellum Illinois Free Banks Take Undue Risk With Their Bond Portfolios?:

An Analysis of Decision-Making Prior to the Civil War

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1. Introduction

In recent times, economic historians have reexamined the antebellum period. Popularly characterized as having chaotic and “wildcat” banking episodes, economic historians have sought to find an alternative explanation for the failures of the system. Rolnick and Weber’s (1983, 1984) review of the period suggested the cause of the failures was not the lack of regulations, but rather the regulations themselves. The requirement for the free banks to hold long-term bonds to back short-term liabilities was a recipe for bank panics during the significant downturn in bond prices. Most investigations have examined the period *ex post* and focused on the banks that failed. Only two studies, by Dwyer and Hafer (2003) and Jaremski (2010), have examined *ex ante* bank behavior prior to a downturn to determine whether bank failures were caused by banks that were taking too much risk. As Dwyer and Hafer’s discussed, were these banks taking excess risk due to lack of regulation or were they instead impacted by an unexpected and sudden large decline in the price of bonds?

Dwyer and Hafer (2003) found that free banks in Illinois, Indiana, and Wisconsin that took greater *ex ante* risk were more likely to fail.¹ These assessments of *ex ante* portfolio risks of free banks were evaluated further in another study. Jaremski (2010) found that free banks with greater asset diversification with loans and fewer notes in circulation were more likely to survive. Previous studies have assessed the *ex ante* decision making of banks prior to crises and others have indicated *ex post* that greater regulation of the banks’ bond portfolios would have reduced failures. However, these studies do not explain adequately if the banks adjusted their risks in times of higher market uncertainty in order to avoid potential bankruptcy. For this study,

¹ Dwyer and Hasan (2005) then examined the suspension of specie payments in Wisconsin versus in Illinois and determined that there was a lower likelihood of bank closures and noteholder losses in Wisconsin than Illinois.

some of the data for bond prices was found sourced from Dwyer (1999), quotations in Banker's Magazine, and Sylla (2003). I have also discovered new bond pricing data from issues of the American Railroad Journal during this period and have combined the prices found in that journal with the other sources I have listed to use a more complete pricing data for my analysis.

This study will make assessments regarding the *ex ante* portfolio allocation of the Illinois free banks to market conditions; however, it will also investigate whether the free banks actively made changes in their portfolios in response to political developments prior to the Civil War. In the 1850s, free banks faced two significant declines in bond prices over a short period of time providing sufficient experience for managers to understand the inherent risks of their portfolio, but potentially little time to make adjustments. These events should have provided sufficient uncertainty of Southern debt to warrant Northern banks hedging their portfolios. My analysis will help explain whether banks were active in managing risk and if they responded to political events during 1860 up until Lincoln's election.

The decision-making of Illinois free banks in constructing their bond portfolios can be assessed by examining their choices given the information that was publically available at the time. Since bond pricing data was published in periodicals and other sources, it is possible to determine whether banks were properly taking into account the historical risk variability in constructing their bond portfolio. Two measures of risk are used. Value-at-risk, the amount of the bank's portfolio at risk during low likelihood negative events, and the Sharpe ratio, which helps to measure each bank's risk per unit of expected return, will be methods of assessing the security allocation of the *ex ante* free bank bond portfolios. While these decisions would become important during the panics of 1854 and 1857, they would also be important later in Illinois' free banking period as the Civil War developed and bond prices declined. By looking at what reports

were available in newspapers at any point in time and changes that free banks made to their bond holdings on their balance sheets, it will help assess whether banks reacted to events effecting political risk, such as the nomination of Lincoln as the Republican candidate for President in the May of 1860. It will not assess changes after the presidential election of 1860, since that would no longer be an assessment of *ex ante* decision-making.

The results of the study indicate that both the value-at-risk and the Sharpe ratio decreased from November of 1858 to November of 1860. For banks that were already in existence in 1858, however, there was greater value-at-risk and greater amounts of Southern bond holdings in 1860 versus banks that entered the market between 1858 and 1860. For all of the banks in 1860, greater amounts of Southern bonds were associated with higher levels of value-at-risk and lower Sharpe ratios. Additionally, using the total market bond portfolio in 1858, which had greater holdings of Southern bonds, as a benchmark for the 1858-1860 period banks operating in 1858 slightly lowered their value-at-risk over the two years relative to the benchmark in 1858. This reduction in risk was due to the greater net inflows of lower risk Northern bonds versus Southern bonds overall from 1858 to 1860. Following the May nomination of Lincoln for the November presidential election, however, Southern bond net inflows actually increased versus earlier in the 1858-1860 period. Overall, while adjustments were made to the bond portfolios of the Illinois free banks to reduce Southern bond exposure, the Illinois free banks appeared to be taking undue risk since the Southern bonds remained a large portion of their portfolio in November 1860 despite indications being from 1858-1860 that they were more risky. This study's addition of more complete and new price data has allowed for more extensive quantitative analysis of the free banking era in Illinois, along with analysis of whether the markets reacted to political events during 1860 prior to the October and November elections.

2. Free Banking, Illinois Legislation and Early Developments

The period of free banking in the United States from about 1838 to 1860 enabled banks to begin operations without government charters as long as they met the statutory requirements including minimum investment with specified state or federal bonds deposited with the Illinois Auditor and meeting redemption requests for gold specie on demand. This development followed the dissolution of the Second Bank of the United States that had served as the U.S. central bank in 1836. In contrast to the prior banking system, free banking made entry into banking more possible given businessmen had the necessary funds. Free bankers who purchased state or federal bonds that met the statutory coupon interest rate requirement and deposited them with the Illinois Auditor were then issued banknotes by the Illinois Auditor. Banknotes of each free bank then functioned as a paper currency, but, by law, each bank needed to redeem its banknotes for gold specie on demand. Free banks could then exchange their banknotes with the public in order to issue loans as well as to add to their gold specie reserves in order to fulfill banknote redemption requests.²

Free banking was established in Illinois following prolonged political debate. In the 1840s, the Whig Party supported the establishment of a general banking law that would allow free banking to develop, whereas the Democratic Party favored the banning of banks and instead supported gold specie being used as a currency.³ The Whigs had opposed a third Bank of the United States, instead favoring the establishment of local banking that free banking would permit. Chartered banking had allowed banks to issue notes based on each bank's equity and

² Arthur J. Rolnick and Warren E. Weber. "Explaining the Demand for Free Bank Notes." *Journal of Monetary Economics* 2, no. 1 (1988), pg. 4.

³ George Dowrie, *The Development of Banking in Illinois* (Urbana, IL: University of Illinois Press, 1913), pg. 132.

these notes were redeemable in specie. However, free banking would allow entry into the market to be easier provided that a bank had the necessary capital.⁴ When the Democrats gained control of the Illinois state legislature in 1847 and presided over the writing of the 1848 Illinois Constitution, they included provisions that prohibited the State of Illinois from becoming a shareholder in any bank and required bank shareholders to be personally liable for bank liabilities.⁵ The new Constitution superseded the 1818 Constitution written soon after Illinois became a state.⁶ After free banking legislation was passed by the Illinois legislature in 1851, it was initially vetoed by Illinois Governor Augustus French, a Democrat; however, the legislature overrode his veto and the legislation became law following a legislatively required referendum.⁷

The 1851 Illinois legislation was based on the free banking laws of the State of New York, which were believed to have been successful up to that point.⁸ The laws initially allowed banknotes to be issued with the security of both U.S. treasuries and bonds issued by state governments.⁹ U.S. treasuries and state bonds, excluding Illinois, were to be valued for note issuance based on the average price in the prior six months of trading in New York, but not exceeding the bonds' par value.¹⁰ The law required that Illinois bonds could only be valued at 80% of their market based on the average price in New York trading for the previous 6 months, but not exceeding the bonds' par value.¹¹ The haircut applied initially to Illinois bonds was

⁴ Andrew Economopolous, "The Illinois Free Banking Experience," *Journal of Money, Credit, and Banking*. Vol. 20, No. 2. (1988), pg. 250.

⁵ Dowire, *The Development of Banking in Illinois*, pg. 134.

⁶ Frank Kopecky and Mary Sherman Harris. "Understanding the Illinois Constitution." *Illinois Bar Foundation* (1986), pg. 2.

⁷ Dowire, *The Development of Banking in Illinois*, pg. 138.

⁸ *Ibid.* pg. 138

⁹ *General Laws of the State of Illinois: Passed by the 17th General Assembly*. (Springfield: Lanphier & Walker, Printers, 1851), pg. 163

¹⁰ *Ibid.* pg. 164

¹¹ *Ibid.* pg. 163

intended to promote increased diversification of the free banks' bond portfolios.¹² Additionally, banknotes could only be issued to a free bank at the market value by the Illinois Auditor if the bonds had a coupon rate of 6%, with a 50% haircut if the coupon rate was below 6%.¹³ Each bank was required to have \$50,000 worth of U.S. and state bonds in order to begin operations and needed to be deposited with the Illinois Auditor.¹⁴ If banknotes that were in circulation were not redeemed by the bank in question in gold specie on demand, the Illinois Auditor was to redeem these notes following the sale of the bonds deposited with the Illinois Auditor.¹⁵ The law also specified what happened if banks' bond holdings declined in value and if the bank did not choose to deposit additional bonds or to redeem enough of their circulation so that their collateral would be sufficient security for their note issue outstanding.¹⁶ Under these circumstances, a free bank would be closed and noteholders would have their notes redeemed in gold specie following the sale by the Illinois Auditor in New York City of the state securities that were serving as collateral for the note issue.¹⁷ If the Illinois Auditor did not have sufficient funds after selling the bond collateral to fully redeem the noteholders, the noteholders would be redeemed in gold specie based on their *pro rata* share of banknote circulation outstanding.¹⁸

The 1851 law also required three bank commissioners to be appointed by the Governor in order to oversee the accounting statements and financial conditions of the free banks.¹⁹ The commissioners were to report their audits of the banks to the Illinois Auditor on an annual

¹² Benjamin Chabot, et al. *Bank Panics, Government Guarantees, and the Long-Run Size of the Financial Sector: Evidence from Free-Banking America*. (Federal Reserve Bank of Chicago, Working Paper, 2013), pg. 15

¹³ *Ibid.* and 17th *General Assembly*. pg. 163

¹⁴ *Ibid.* pg. 164

¹⁵ *Ibid.*

¹⁶ *Report of the Bank Commissioners of the State of Illinois* (Springfield: Office of the Bank Commissioners, December 30, 1854), pg. 3.

¹⁷ 17th *General Assembly*. pg. 167

¹⁸ 17th *General Assembly*. pg. 169

¹⁹ *Ibid.* pg. 171

basis.²⁰ The reports issued on each bank included the amount of bonds held, the value of real estate, claims on debt issued to other banks, debts owed to other banks, banknotes in circulation, loans, and holdings of other banks' banknotes.²¹ The purpose of the audits was to determine whether banks were following the free banking laws' requirements, including the amount of notes in circulation, average specie on hand, and whether interest charged on loans followed legal requirements.²² The upper limit on interest for debt that was either issued or incurred by a free bank was placed at 7%, which served as a usury provision of the legislation.²³ Shareholders in each free bank faced double liability for the debts and other liabilities that their bank incurred if the bank itself failed to meet the liabilities.²⁴

2.1. Cause of Bank Failures

The "wildcat banking" hypothesis for free bank failures was established Hammond (1957) and Knox (1903).²⁵ Those researchers believed that free banks only having an asset requirement for establishment allowed banks to make it difficult for noteholders to seek redemption by establishing in towns with a low population.²⁶ Rockoff (1974) researched the topic further and discussed how establishing a bank in an area with a low population allowed a free bank to be issued banknotes and to put them into circulation, but made it difficult for noteholders to redeem them for gold.²⁷ He then theorized that the so-called "wildcat bankers"

²⁰ Ibid. pg. 172 and "Annual Report of the Bank Commissioners" *Banking in Illinois* (May 1854), pg. 102.

²¹ 17th General Assembly. pg. 172

²² "Annual Report of the Bank Commissioners" *Banking in Illinois* (May 1854), pg. 103.

²³ 17th General Assembly. pg. 172

²⁴ 17th General Assembly. pg. 173

²⁵ Andrew Economopolous, "The Illinois Free Banking Experience," pg. 251.

²⁶ Ibid.

²⁷ Hugh Rockoff. "The Free Banking Era: A Reexamination." *Journal of Money, Credit, and Banking*, Vol. 6, No. 2: (May 1974), pg. 148

could profit by receiving banknotes based on the par value of the bond by backing the notes with bonds trading below par and then putting the banknotes into circulation.²⁸

For purpose of their analysis, Rolnick and Weber (1984) used two criteria to define a failed bank has having met the wildcat banking explanation: if their bond holdings were trading below par and if they were in business for less than a year.²⁹ Economopoulos (1988) applied the Rolnick and Weber criteria to Illinois and found that asset price decline was more responsible for failures. Only 11 of the 104 banks in Illinois were consistent with the criteria for wildcat banks.³⁰ Seventy-four of the 104 failed banks analyzed failed during periods of declining asset prices, indicating that the overall market was responsible for more of the bank failures.³¹ Two of the 104 failed banks analyzed met the criteria of declining asset prices and wildcat banking.³² Futhermore, Economopoulos (1988) used three additional criteria for a wildcat bank: being operational for less than a year, the town they are located in having less than the 200 residents statutorily required, and if the bank purchased bonds when the bank would receive more notes based on the par value than the bond's actual market value.³³ Economopoulos found that 52 of the Illinois banks had no wildcat characteristics, 37 had at least one wildcat characteristic, and only one had all three characteristics.³⁴ He concluded that wildcat banking was not the primary cause of bank failures, instead finding that most free banks failed during periods of declining asset prices.³⁵ He also found that free banks failing to meet a request from the bank

²⁸ Ibid. pg. 145

²⁹ Arthur J. Rolnick and Warren E. Weber. "The Causes of Free Bank Failures: A Detailed Examination." *Journal of Monetary Economics*, Vol. 14. (1984) pg. 11

³⁰ Ibid. pg. 24

³¹ Ibid.

³² Ibid.

³³ Ibid. 254, 261

³⁴ Ibid. 261

³⁵ Ibid.

commissioner to deposit additional securities, in order to meet collateral requirements, was responsible for more of the failures than banks' failure to redeem noteholders in gold.³⁶

Subsequent amendments to the free banking law were in reaction to financial panics and perceived abuses of the banking law by “wildcat bankers.” The term “wildcat banking” refers to banks that opened for a short-period, and it has been deemed as the cause of free bank failures and the failure of banks to redeem banknotes. If a decline in the bonds deposited by free banks is to blame for the failure to redeem banknotes rather than fraudulent activity, the *ex ante* allocation of bonds purchased by the free banks and their ability to respond to events in the marketplace is of greater importance.

2.2 Amendments to the Free Banking Law and Other Developments

Over time, amendments were passed by the Illinois legislature in reaction to how the free banks functioned and problems that were observed over time. In August of 1853, amendments were passed by the Illinois legislature in an attempt to prevent the circulation of other certificates of deposit that had been functioning similarly to banknotes as currency despite the issuing entities not being organized under the free banking laws of Illinois.³⁷ The provisions of the amendments stated that any payments made with illegal bills or certificates of deposit were null and void.³⁸ It allowed the payee to sue to recover payment from anyone who had used the illegal financial instrument to pay a bill owed to that entity or person.³⁹ The amendments also permitted the Illinois Auditor to place banks that violated these laws regarding illegal methods of payment

³⁶ Ibid.

³⁷ Joseph William Charlton, *The History of Banking in Illinois Since 1863* (University of Chicago, 1939), pg. 40.

³⁸ *General Laws of the State of Illinois: Passed by the 18th General Assembly*. (Springfield: Lanphier & Walker, Printers, 1853), pg. 33

³⁹ Ibid.

into liquidation.⁴⁰ The effect of increasing substitution into legal banknotes would also increase the amount of loans and other activities that could be initiated by free banks, allowing for the potential of greater profits.

The 7% interest rate on bank loans that was instituted as a usury provision in the 1851 legislation was not being uniformly followed. In an 1854 report by the Illinois Bank Commissioners, it was noted that free banks were making loans to other corporate entities that then made loans at a 10% rate of interest.⁴¹ The Commissioners noted that the low valuation of Illinois bonds at 80% for note issuance decreased the return on those bonds, but if accepted at a par valuation would allow banks to increase their earnings without exceeding the usury rate.⁴²

2.3 Development of Banking in Illinois and Free Banking Competitors

To understand the context of free banking in Illinois, it is important to recognize how Chicago grew as a city of economic importance in the United States and how banking competitors negatively impacted free banking in Chicago and resulted in changes to the free banking law. Developments regarding transportation in Chicago helped accelerate the city's economic dominance, as the Illinois-Michigan canal was completed by April 1848 and thousands of miles of railroads were emanating from the city by 1854.⁴³ Agricultural produce increasingly went through Chicago to travel to the eastern United States and Europe following the building of this infrastructure, as travel west to St. Louis or Galena, Illinois decreased.⁴⁴ This infrastructure allowed Chicago to participate more fully in the American economy, with the growth of banks in

⁴⁰ Ibid.

⁴¹ *Report of the Bank Commissioners*, (December 30, 1854) pg. 2.

⁴² Ibid.

⁴³ Charlton, *The History of Banking in Illinois Since 1863*, pg. 9.

⁴⁴ Ibid. pg. 10

the city reflecting this development.⁴⁵ Free banking did not completely dominate the financial landscape of Illinois, however, as other entities sought to compete with them with the banknote market. The Chicago Marine and Fire Insurance Company, later known as the Marine Company of Chicago, had certificates of deposit (CDs) that were readily redeemed for gold, although this company's CDs were not usually used as currency.⁴⁶

Financier George Smith and others, however, were inspired by this company in his development of the Wisconsin Marine and Fire Insurance Company.⁴⁷ Free banks criticized the Wisconsin Company since people who wanted gold specie were more likely to redeem the free banks' notes at par rather than redeem Smith's CDs at a discount.⁴⁸ The 1853 amendments to the Illinois banking law made banknote issuance explicitly illegal for companies that were not authorized to issue notes.⁴⁹ The competition between the Chicago free banks and the illegal bank entities did lead all of the Chicago free banks to liquidate prior to the Civil War, except the Marine Bank which only had a small proportion of Southern securities.⁵⁰ Since Southern securities later declined the most in value, having less Southern securities would be advantageous for a free bank. Free banks in Illinois other than Chicago had to endure the outbreak of the Civil War and the decline in Southern bond holdings.⁵¹ While private banking and illegal note issue had started off as being more prominent in Illinois, Chicago and the surrounding region remained of commercial importance and free banknotes would come to be used as a currency in Chicago instead.

⁴⁵ Ibid. pg. 32

⁴⁶ Ibid. pg. 25

⁴⁷ Ibid. pg. 25

⁴⁸ Ibid. pg. 39

⁴⁹ Ibid. pg. 40

⁵⁰ Ibid. pg. 46

⁵¹ Ibid. pg. 46

2.4 The Panic of 1857 and the 1857 and 1861 Amendments

After the legislature responded to the competition of illegal CD issue, it also sought to limit the issue of notes as well as making wildcat banking more difficult. Amendments passed in February of 1857 also served to respond to developments in finance and banking. All state bonds and U.S. treasuries, including Illinois, were required to be valued for purposes of note issuance at 90% of their market value, rather than the previous valuation of 80% of market value for Illinois bonds and 100% of market value for all other state bonds and U.S. treasuries, with the amount received not exceeding the bonds' par values.⁵² The haircut on note issuance for Illinois bonds was reduced since the state was considered to have improved its creditworthiness since the free banking law was initially passed in 1851.⁵³ A tax was also introduced on the bond deposits held by the Illinois free banks equal to the then-tax on real estate in Illinois.⁵⁴ In a provision that sought to decrease the potential of wildcat banks to be established in remote locations in Illinois so that note redemption would be difficult, banks were now required to be in a city or town with a population of 200 or more.⁵⁵ The usury provisions of the free banking laws were also modified so that 10% interest would be the maximum that could be demanded of or received by a free bank.

The 1857 amendments to the Illinois free banking law were instituted prior to the Panic of 1857, a steep decline in financial markets, later that year. Federal and state bonds were traded, but the trading of railroad securities expanded in the decade prior to the Panic and they were the

⁵² *General Laws of the State of Illinois: Passed by the 20th General Assembly*. (Springfield: Lanphier & Walker, Printers, 1857), pg. 24

⁵³ *University of Illinois: Studies in the Social Sciences*. (Urbana, IL, University of Illinois, 1913). pg. 143.

⁵⁴ *20th General Assembly*. pg. 25

⁵⁵ *Ibid.*

primary private securities that traded.⁵⁶ Increased speculation in railroad securities up until 1857 followed by a decline in optimism in 1857 is one of the causes of the Panic.⁵⁷ The newspaper *The Ottawa Free Trader* commented that, despite the Panic of 1857, confidence remained in state bonds in the long run since it was believed that states whose bonds declined were solvent.⁵⁸ The “bears of Wall Street” were instead blamed for the Panic and the subsequent decline in value for state securities, effectively assessing an increased liquidity risk versus the increased default risk that emerged as the Civil War started.⁵⁹ The view that financial panics were seen as transitory even during them is noteworthy, since banks would want to stay in business if they believed a recovery in security prices would happen eventually. When war was looming, banks would not desire to meet calls on their note issues by depositing additional securities or redeeming holders of banknotes, since the decline in their bond portfolio was a longer term problem and the bond prices would have already declined substantially.

New York bank loans peaked in August 1857 and declined to their lowest levels during the Panic by December 1857.⁶⁰ The contracting of loans and move into liquid positions of gold by New York banks was criticized at the time by *Hunt's Merchants' Magazine* and later J.S. Gibbons for causing the Panic.⁶¹ Gibbons noted that the New York country banks that withdrew deposits from the New York City banks were to blame for the contracting of loans by those city banks, however.⁶² Until late August, the New York money market was functioning normally, but

⁵⁶ Charles W. Calomiris and Larry Schweikart, “The Panic of 1857: Origins, Transmission, and Containment”, *Journal of Economic History*, Vol. 51, No. 4: (Dec. 1991) pg. 809

⁵⁷ *Ibid.* pg. 811

⁵⁸ “The Financial Storm,” *Ottawa Free Trader*, October 3, 1857.

⁵⁹ *Ibid.*

⁶⁰ J.S. Gibson, *The Banks of New York, Their Dealers, The Clearinghouse, and the Panic of 1857* (New York: D. Appleton and Co., 1858), pg. 348.

⁶¹ Calomiris, “The Panic of 1857: Origins, Transmission, and Containment”, *Journal of Economic History*, pg. 807

⁶² *Ibid.*

it began to enter panic at the end of the month.⁶³ The greatest decline in bond and stock prices in New York took place from August 22 to October 1.⁶⁴ While loan collection was becoming very difficult, banks decided to call their loans back and along with redemption requests from country banks and depositors led to the suspension of specie payments in New York City on October 14, 1857.⁶⁵

As the Panic of 1857 spread to Chicago by September, there were consequences for the local financial system. There was a contraction in the money market in Chicago, as well as high demand for gold specie, and a limited amount of banknotes from the east were available.⁶⁶ Illinois and Wisconsin banknotes were widely available in Illinois, but Chicago merchants had problems exchanging these banknotes for other currencies and therefore could not pay their eastern debts.⁶⁷ This diminished trade in general in Illinois, since farmers, merchants, and others had problems paying their bills in general.⁶⁸ Although, before the Panic, Illinois banknotes had served as half of the currency in circulation overall in Missouri their use ceased in St. Louis as the Panic spread.⁶⁹ Since the declining Missouri bonds were a large portion of the Illinois bond portfolios, Missouri was effectively harming their own bond market by refusing to use Illinois banknotes and they soon resumed their usage.⁷⁰ By October 17, 1857, there was a bank run on

⁶³ Gibson, *The Banks of New York*. pg. 353.

⁶⁴ Ibid. pg. 358

⁶⁵ Ibid. pg. 360 and "The Crisis at Last," *New York Times*, October 14, 1857.

⁶⁶ "The Bank Flurry," *Ottawa Free Trader*, September 5, 1857.

⁶⁷ "The Progress of the Pause," *Ottawa Free Trader*, October 10, 1857.

⁶⁸ Ibid.

⁶⁹ "Illinois Banks in St. Louis," *Ottawa Free Trader*, October 10, 1857.

⁷⁰ Ibid.

This topic is discussed further in "Banks Distance from Missouri"

the Bank of Missouri, the only bank in Missouri legally allowed to issue currency until that same year.⁷¹

Additional amendments to the free banking law were passed by the Illinois legislature in February of 1861. These amendments allowed only Illinois and U.S. bonds to be held as security for note issuance by free banks that were starting operations, with preexisting free banks being able to maintain other states' bonds as collateral for their note issue.⁷² This was a response to the decline in other states' bond prices as the U.S. Civil War was about to start, as it was thought that free banks would be able to meet redemption more easily if they had less risky bonds.⁷³ The amount of notes that could be issued was also increased to the total par value of the bonds.⁷⁴ The amount of capital required for a new free bank to enter into operations was decreased from \$50,000 to \$25,000.⁷⁵ The amendments also mandated that new free banks had to be located in towns or cities with a population of 1,000 or more, increased from the 200 population requirement in the 1857 amendments.⁷⁶ The only free bank at that point still in Chicago was the Marine Bank, however, which had reduced its circulation to \$50,000 by the time of the amendment's passage.⁷⁷

2.5. Periods of Free Bank Failures in Illinois

Economopoulos (1988) found three periods of price declines used as a proxy for Tennessee bonds, during which most the Illinois free banks failed, during the period from 1851

⁷¹ "Progress of the Bank Panic," *Ottawa Free Trader*, October 17, 1857 and Mark Geiger. "Yale Series in Economic and Financial History ": Chapter 2 "New Banks"

⁷² *General Laws of the State of Illinois: Passed by the 22nd General Assembly*. (Springfield: Lanphier & Walker, Printers, 1861), pg. 39

⁷³ Charlton, *The History of Banking in Illinois Since 1863*, pg. 47.

⁷⁴ 22nd *General Assembly*. pg. 39

⁷⁵ 22nd *General Assembly*. pg. 46 and Charlton, *The History of Banking in Illinois Since 1863*, pg. 47.

⁷⁶ 22nd *General Assembly*. pg. 46

⁷⁷ Charlton, *The History of Banking in Illinois Since 1863*, pg. 47.

to 1863. The first period was from March 1854 to December 1854, the second period included the Panic of 1857 during the period from June 1857 to October 1857, and the third period was from June 1860 to June 1861.⁷⁸ Two of the Illinois failures occurred in 1857, when the banks failed to meet requests to deposit additional securities, and 89 failed during the June 1860 to June 1861 decline.⁷⁹ During the last price decline, the banking commissioners at times asked noteholders to receive bonds instead of gold to prevent a precipitous decline further in bond prices.⁸⁰

3. Integration of United States Financial Markets

As the Panic of 1857 demonstrated, changes in New York City financial markets spread throughout the country, resulting in specie payment suspension. Financial integration would also allow banks in Illinois to recognize and react to changes in bond prices in New York City. It is important to note, however, that financial integration of the United States was already established prior to 1857. Greater technological capacity emerged in the early 19th century and progressed throughout the 19th century, with information transmitted through the telegraph and the financial press and goods moved on railroads.⁸¹ The increased speed of information and goods flow allowed financial funding to move throughout the United States geographically and into emerging industries more quickly.⁸² Regional interest rate differences then decreased and U.S. financial markets became integrated as the 19th century progressed. Lance Davis found in a study that, by the middle of the 19th century or earlier, interest rates were equal throughout most

⁷⁸ Andrew Economopolous, "The Illinois Free Banking Experience," pg. 262.

⁷⁹ Ibid.

⁸⁰ Ibid. 262-263

⁸¹ Howard Bodenhorn, *A History of Banking in Antebellum America* (Cambridge, UK: Cambridge University Press, 2000), pg. 85.

⁸² Ibid. pg. 86.

the United States.⁸³ Research by Bowdenhorn (2000) also found that interest rates⁸⁴ within the frontier of the U.S. were close to and correlated with those of New York City based on intermittent data in the 1820s and consistent data after the mid-1830s.⁸⁵

U.S. financial markets were integrated by the time free banking started in Illinois, so free banks were able to engage in portfolio rebalancing based on bond price changes and their effectiveness in doing so can be assessed. If updated information on bonds and other financial products in New York was known by the Illinois free banks, there would be enough information for a free bank to engage in efficient financial practices such as diversification and to compare the risk return profile between the different securities in the asset class of U.S. and state bonds. These banks would also be knowledgeable about how particular bonds' prices reacted during previous declines in the bond market during financial panics. They would therefore be able to determine which bonds were safer and could increase their security allocation to those bonds that were less risky so they could survive financial turmoil. Using financial measures such as value-at-risk and the Sharpe ratio allows banks' behavior to be quantified and their actions can be compared to the information publically available to free banks at any given point in time.

While private bankers during this period lent to the manufacturing, farming, and merchant communities, they were not that well known in the financial centers of New York and London.⁸⁶ However, corresponding banking between private banks and exchange brokers enabled the discounting of bills of exchange and promissory notes and the brokering of state

⁸³ Ibid. pg. 122.

⁸⁴ Interest rates were calculated by taking the loan income divided by the average volume of loans outstanding, but this calculation did not take into account other costs associated with losses on the loans made and other bank costs (Ibid. pg. 122)

⁸⁵ Ibid. pg. 128

⁸⁶ Ibid. pg. 184

banknotes, which helped integrate regional financial markets.⁸⁷ Corresponding bankers in cities were also involved in discounting and purchasing government and corporate securities.⁸⁸ Loans initiated by country banks of balances held by city correspondents and the discounting of bills in rural areas with eastern correspondents were also important factors in the integration of financial markets prior to the Civil War.⁸⁹ Thus, free banks had access to corresponding relationships with other banks to make portfolio changes through transactions in New York and knowledge of interest rate developments and free banks' financial conditions was also available.

In contrast to the Panic of 1837, when regional financial markets had collapsed, during the Panic of 1847 and Panic of 1857 the markets did not disintegrate.⁹⁰ Improvements in communication using the telegraph, as well as coordination among banks' Southern branches not only allowed for the market to survive, but also for changes in interest rates to spread across the country.⁹¹ When interest rates on commercial paper were 10% in New Orleans, it only took 4 weeks for the contagion to spread from Wall Street and rates to rise to 24-36% in New Orleans.⁹² Although financial markets were more likely to continue functioning during crises, the integration of financial markets made it more likely for a rise of interest rates in one region to spread throughout the country.

4. Usury Laws

The integration of the financial market by this period in time clashed with state regulations, in particular the usury laws. When prevailing market interest rates exceed the usury

⁸⁷ Ibid. pg. 182

⁸⁸ Ibid.

⁸⁹ Ibid. pg. 185

⁹⁰ Ibid. pg. 155

⁹¹ Ibid. pg. 156

⁹² Ibid.

ceiling, banks face a portfolio decision: they could charge a rate above the ceiling, either 6 or 7%, and face a lawsuit or they could find alternative ways to extend credit. Law suits, however, were unlikely in rural areas. The government was not continuing to monitor the interest rates that banks were charging. Instead, bank clients had to make a complaint that the state's usury laws were being violated.⁹³ Since customers desired to maintain business with the bank, they were unlikely to report the bank for fear that the bank would no longer do business with them.⁹⁴ In a small town environment, other banks would also likely avoid doing business with someone who reported another bank for violation of usury laws.⁹⁵

In larger cities, significant portfolio adjustments and alternative relationships were made by banks. Bodenhorn (2007) found that the primary effect of usury restrictions on banks in New York during the 19th century was less credit availability for high risk borrowers if the interest rate rose much higher than the usury rate. Bowdenhorn also found that usury rates were not completely followed, but that the relationship between banks and their clients were of greater importance. Benmelech, et al. (2008) found that usury did negatively impact the ability of financial institutions to lend in general; however, usury laws loosened as interest rates rose and this helped reduce their impact. Since bankers in New York were able to avoid usury, it is possible Illinois free banks may have also employed those methods, but there are other known ways that they did this. Usury laws applied to the free banks and not private bankers so free banks were able to avoid the usury laws by lending banknotes to associated private banks that

⁹³ Ibid. pg. 148

⁹⁴ Ibid. pg. 146

⁹⁵ Howard Bodenhorn, "Usury ceilings and bank lending behavior: Evidence from nineteenth century New York," *Explorations in Economic History*. (Vol. 44, no. 2, 2007). pg. 184

made loans rates higher than the usury rate.⁹⁶ The purchase of commercial paper was another method that banks used to avoid the usury rate, as interest rates on such paper were often double the usury rate.⁹⁷ Banks could also force customers who take out loans to maintain compensating balances, which would force them to deposit money with the bank for a few days before withdraw, effectively increasing the interest rate beyond the usury rate.⁹⁸

5. Modeling of Risk and Return

Usury laws, even with avoidance, likely influenced the portfolio allocation decisions of banks and therefore contributed to their portfolio allocations and whether they met a particular risk-return profile. For antebellum banks, the portfolio allocation decision was not only constrained by the usury laws, they also face the bond collateral provision of banknotes. Recent researchers, Economopoulos (1988), Rolnick and Weber (1984), and others, have found that the decline in state bond prices, Southern bonds in particular, led to most of the bank closures and failures of free banks in Illinois. Public information about the bond portfolios of the banks, coupled with the general understanding of the bond backing structure of banknotes, presented antebellum bank managers with a risk-return decision. Furthermore, the call provision in the law did not give bank managers flexibility during periods of bond price decline which could trigger a demand on specie. Thus, the bond portfolio choice not only included the risk associated with the bonds themselves, but also redemption, or liquidity, risk.

Given the uncertainty of the value of the bond collateral, the public's reaction to bond prices could force banks into liquidation, even though they were solvent. Consequently, Rolnick

⁹⁶ Gerald P. Dwyer. "Wildcat Banking, Banking Panics, and Free Banking in the United States." *Economic Review*. (Federal Reserve Bank of Atlanta, December 1996). pg. 12.

⁹⁷ Bodenhorn, *A History of Banking in Antebellum America*. pg. 149.

⁹⁸ *Ibid.*

and Weber and Economopoulos categorized banks leaving the market as “closed” or “failed.” Closed banks are banks that stopped operating, but that were able to repay their noteholders in full and therefore were able to manage their portfolios properly, but a problem with liquidity resulted when a decline in bond prices led the Illinois Auditor to shut down the bank.⁹⁹ Failed banks are banks that stopped operating, but banks failed to redeem their noteholders for the full value of their notes from the holdings of the bonds that they deposited with the Illinois Auditor.¹⁰⁰

Although recognizing the cause of the banks leaving the market *ex post* is important, analysis of free banks’ *ex ante* decision making should help determine whether the banks were taking undue risk. If banks were taking greater risk, the downturn in prices would result in those banks failing and unable to repay their noteholders. If banks were more aware of the risk, the downturn in prices would have resulted in banks closing, and paying off their noteholders in full. The differences in *ex ante* bond security allocation between closed and failed banks was previously examined by Dwyer and Hafer (2003) who used the efficient frontier to find differences in portfolio allocations, with the banks that failed taking greater risk per unit of return than those that survived. While this analysis will examine the Sharpe ratio as a risk-return metric rather than the efficient frontier, it will also use the financial model of value at risk to determine whether banks’ bond assets were more susceptible to decline during a market downturn.

Diversification allows for financial institutions to reduce their risk due to differences in correlation for the assets that they hold, while seeking to maintain as high of a return per unit of risk as possible. The ability of the free bank to choose the security allocation of its bond portfolio

⁹⁹ Gerald P. Dwyer and R.W. Hafer. *Bank Failures in Banking Panics: Risky Banks or Road Kill?*, (Federal Reserve Bank of Atlanta, Working Paper, March 2003), pg. 10.

¹⁰⁰ *Ibid.*

enables it to manage according to the principles of diversification. A banker who purchases only one kind of bond is facing all the risk associated with the bond and issuer. The risk is measured by the asset's standard deviation. If any particular bank was to divide its investment by purchasing two different bonds, the risk associated with the portfolio is based on the relationship between the bond returns. If the bond returns are perfectly negatively correlated, so that the bond increases in value by the exact same percentage as the other decreases, the value of the portfolio would not change as the bond prices move. If the bond returns are perfectly positively correlated, the value of the portfolio would increase or decrease by the amount both bonds increase or decrease. Thus, the risk of the bond portfolio depends on price correlations among the bonds and the weightings of each bond in the portfolio. The market, expecting to be compensated for the risk, would price the securities based on their relative risk to the portfolio.

5.1. Value at Risk

Value at risk (VaR) is a financial measure that helps to measure the potential loss in worst-case scenarios for a portfolio of securities.¹⁰¹ For instance, a measure of 1% VaR¹⁰² for daily returns would find the minimum decline in the value of the portfolio that would occur 1 out of every 100 observations, while 99 out of every 100 observations would have a decline less than that figure, would be unchanged or have a gain.¹⁰³ 5% and 1% VaR are the standard measures that are used in the financial industry.¹⁰⁴ For bonds, VaR can be determined using either price

¹⁰¹ Zvi Bodie, Alex Kane, and Alan J. Marcus, *Essentials of Investments*, 7th ed. (New York: McGraw-Hill Irwin, 2010), pg. 116.

¹⁰² VaR is a useful measure of how much is at risk even when the returns are not normally distributed, even though the calculation utilizes the standard deviation. (Bodie, et al. *Essentials of Investments*, pg. 117.)

¹⁰³ Donald J. Smith, *A Primer on Bond Value at Risk* (Boston University), pg. 1.

¹⁰⁴ *Ibid.* pg. 2

data or yield data. For this study, price VaR will be used since bond prices are critical to a free bank's liquidity risk.¹⁰⁵

The usage of VaR to assess the risk of banks' bond portfolios is important since it can help determine the amount of risk that could be determined *ex ante* by Illinois free banks prior to the developments of the Civil War. While some previous studies have alleged that wildcat banking was the main cause of noteholder losses, it is important to look at the change in price of bank assets instead if the cause was the decline in bond prices rather than the fraud of wildcat bankers. The anticipation of the Civil War itself drove the prices down for fear of the ability of states to pay back their debts. For this reason, value at risk should be a useful measure of how banks could have perceived their ability to survive a substantial downturn in the prices of bonds. While the financial measure of value at risk did not become a prominent measure to calculate riskiness of a portfolio of securities until 1994¹⁰⁶, it should demonstrate the quantity in losses that banks should have perceived as likely during market downturns. Therefore, it should serve as an effective measure of losses even during a low probability market destabilizing event.

By using VaR, it can assess the risk associated with a particular bond portfolio and help examine questions about the banks' decision making. Since the Illinois Auditor could make calls for additional bonds or notes if the value of the bonds deposited drops below the threshold, the VaR would be an excellent measure to assess the likelihood of a call. Any "public" call by the Auditor would be a significant signal to the public about the bank's liquidity risk or default risk.¹⁰⁷ For the free bankers, they would be concerned with both the liquidity risk and default risk

¹⁰⁵ *Ibid.*

¹⁰⁶ *Ibid.* pg. 1

¹⁰⁷ However, if information regarding price cycles of bond prices is assumed to be public knowledge, the public would be able to differentiate between whether they needed to redeem their notes due to default risk or whether

of their bond holdings, but if the public believes that the bank will default on their redemption promise, it could lead to liquidity risk with their failure to meet redemption.

Given the greater uncertainty in the market due to tensions emerging among the U.S. states, two hypotheses are examined.

Hypothesis #1: As the Civil War became more likely, banks adjusted their bond portfolio for the increased risk by holding lower VaR portfolios between 1858 and 1860.

Hypothesis #2: As the Civil War became more likely, VaRs are likely to be higher in banks holding a higher percentage of Southern bonds.

5.2. Sharpe Ratio

The risk as measured by the VaR would suggest greater exposure, but individual bankers may be willing to accept such risk if they were compensated for it. The Sharpe ratio will be used to help determine the efficacy of the decision-making of the Illinois Free Banks regarding their bond portfolios. In order to measure the tradeoff between risk and return, the formula used for the Sharpe Ratio in the analysis is as follows:

$$SR = \frac{\text{1 Month Holding Period Return} - \text{Risk Free Return}}{\text{Standard Deviation of 1 Month HPR}}$$

It will demonstrate whether Illinois free banks were taking appropriate risk given the expected return per standard deviation of its bond holdings. Gold specie with no return will be counted as the risk free asset, since the noteholders of the Illinois free banks had to be redeemed

a bond price decline was temporary. The *Banker's Magazine* in April 1860 suggests this to the reader regarding a recent call in Illinois.

in gold specie. Therefore, the excess return will be the same as the actual one month holding period return for each free bank's portfolio.

Hypothesis #3: Banks' Sharpe ratios are likely to be negatively correlated with the bank's VaR

There are a number of caveats that impact both the usage of VaR and Sharpe ratios. Although VaR will capture the price risk associated with the bond portfolio, it does not capture the total price risk of the bank. Consequently, there are a few potential reasons that free banks would be willing to hold portfolios with relatively high VaRs. First, the free bank had the ability to offset a potential decline in their bond portfolio through their security allocations among their non-bond assets. They could manage their loan portfolio by holding more short-term and liquid loans, higher gold specie reserves, or not circulate the maximum amount of notes that they could issue legally. Second, a VaR may appear high, but not high enough that it would trigger a call by the auditor, requiring note redemption or the deposit of additional bonds by the free bank. Under those circumstances, free banks would not need to be as cautious.

Third, the potential of a large decline in the value of a bond portfolio in a short period would also be less impactful if it was thought to be transitory. For instance, the Panic of 1857 was a relatively short-term liquidity risk in a financial panic and some states stepped in to protect banks by suspending specie payments until markets returned to normal, but the 1860-61 bond price decline was different since the default risk of bonds became highly probable.¹⁰⁸ The degree to which free banks would have recognized the permanence of the decline and the timing of this recognition is important, since banks would be more likely to adjust in response to increased

¹⁰⁸ Interest on Southern state debt accrued during the Civil War, however the states had stopped paying it to bondholders. Southern state resumption of payments may have been as possible, but unlikely in the immediate future. See William Amasa Scott, *The Repudiation of state debts*, (T.Y. Crowell & Co., 1893), pg. 231.

default risk. Fourth, VaR risk generally measures the historical risk at the current evaluation of the bond portfolio. However, for the free banker, the risk that it faces is evaluated at the book value of the portfolio. Banks would need to deposit additional securities or redeem notes if their notes outstanding did not have sufficient collateral. If a bank's bonds had already appreciated or depreciated since banknotes were issued, the book value on a bank's balance sheet may not accurately show the value of losses and risk of a call that a bank could face.

Fifth, the geographic location of a bank could lead to a different security allocation for more intangible reasons, such as a bank wanting to generate good will in a neighboring state where they do business. For instance, a greater purchase of Missouri state bonds for free banks in Illinois that are closer to the Missouri border could therefore be an efficient allocation of resources for that particular even if its Sharpe ratio is lower.

Finally, individual free banks could have lower risk based on their asset allocation to gold specie reserves and loans. If a bank held greater specie reserves, that bank would be more able to satisfy net demand for gold specie on any given day and therefore a decline in their bond portfolio would be less likely to compromise their ability to redeem noteholders. Banks apparently deviating from the frontier by taking greater risk for an expected return could be holding greater specie reserves to compensate for greater risk in their bond portfolio. Greater asset allocation to loans could be another way that free banks could offset greater standard deviation in their bond portfolio, as the loans made by the bank could be relatively low risk loans and they also allow for greater asset diversification in the bank's portfolio. The loans would also be a shorter term asset versus bond holdings, allowing a free bank to meet redemption for banknotes sooner than holdings of other assets. Given these caveats, two additional hypotheses are examined:

Hypothesis #4: Free banks' were able to offset their risky bond holdings with greater holdings of safer non-bond assets, such as loans, or by issuing less than the maximum amount of banknotes allowed by law

Hypothesis #5: The closer a bank was to a neighboring state, such as Missouri, the more likely they are willing to hold their bonds.

5.3. Monthly Net Bond Flows

Finally, although the previous measures of risk can determine ex ante risks, they are based on historical information. Changes in the current market and expected market are not fully captured by these measures. To capture expectations of bankers, we can examine the changes in bond flows. Correlations can be calculated based on what any particular state's bond was yielding in a particular month with the net bond flows; that is subtracting bond outflows from any bond inflows. This is another way of determining whether the bankers were responding to any increased risk or they continued to pursue yield. Given the tensions emerging among the U.S. states, another hypothesis is examined:

Hypothesis #6: Free banks purchased lower yielding, lower risk bonds during any particular month, after the nomination of Lincoln in May of 1860.

6. Data and Analysis

Data was gathered from several sources and are given in Table 1. Dwyer, et al. included weekly prices of Georgia, Kentucky, Louisiana, Missouri, North Carolina, Ohio, Pennsylvania, Tennessee, and Virginia state bonds from October 1856 to October 1860. Additional information from Bankers' Magazine (1856) included limited information on the prices of Illinois state bonds, primarily twice monthly updates in prices during 1855 and was also used for the value at

risk calculation. The bond price data from Dwyer, et al. was generally available weekly during the March 1855 to October 1860 period. When data from one week was not available, that respective week was omitted from the calculation of standard deviation, correlation coefficient, and ultimately value at risk.

Table 1: Bond Price Data during the Antebellum Period of Bonds Held by the Illinois Banks

Source	Period	Bonds	Availability
Dwyer, Hafer, & Weber	Weekly from 1855-1861	GA, KY, LA, MO, NC, OH, VA, TN, US	Very consistent, occasional missing observations
<i>Banker's Magazine</i>	Bimonthly 1855-1861	IL47, NY	Very limited - IL47 and NY after 1859
<i>American Railroad Journal</i>	Weekly 1856-1858, 3/1859	GA, KY, LA, MO, NC, OH, TN, IL47, NY	IL47, NY: Consistent data 1856-1859 Others: Consistent, filled missing observations from Dwyer, et al. series
Sylla, Wilson, & Wright	Weekly 1857-1860	SC, MI, MN, IA, IL6	IL6: 2 years, MI: Over 1 year MN, IA: Less than 1 year SC: Scattered for few months at a time

Sources: Gerald P. Dwyer, Jr., et al. *Weekly U.S. and State Bond Prices*. Federal Reserve Bank of St. Louis. <http://alfred.stlouisfed.org/release?rid=264>. J. Smith Homans, ed. *The Bankers' Magazine and Statistical Registrar*. Vol. 13 (Vol. 8 New Series) 1858-1859. Henry Poor, ed. *American Railroad Journal*. Vol. 29-32: New York: J.H. Schultz, 1856-1859. Richard E. Sylla, Jack Wilson, and Robert E. Wright. "Price Quotations in Early U.S. Securities Markets, 1790-1860." *Economic History Association*. <http://eh.net/database/early-u-s-securities-prices/>

In addition to the existing data that I have consolidated from other sources, I have also found additional sources of information in archives of the *American Railroad Journal*. While the *Railroad Journal* primarily listed the prices of railroad securities, there were also prices of U.S. and state securities from around 1855 to 1861. This additional information helped to fill gaps within the data of the existing sources and allowed for the continuity of prices that was needed in order to have reliable figures for changes in prices from week to week.

For the overall VaR calculation, a normal distribution of returns was assumed and the 1% VaRs were calculated using a z-score. Some correlations between the bond price movements of different states were not available, generally in states that had limited holdings such as Iowa, Michigan, and Minnesota where there was limited availability of bond price data. Some

correlations, price movements, and holding period return movements were also omitted where certain bonds had limited availability of price data, such as bonds issued for canals, South Carolina bonds, and alternate bond issues by Illinois.

Where information on state securities was still intermittent between different weeks, however, a graduation of prices was used to fill the weekly gaps in prices so that correlations and price changes for different states' bond prices could be found. Finally, in some cases bond prices did not overlap for a limited number of periods. For correlation analysis, if there was missing information that was needed to find a correlation: two types of bond price proxies were calculated. One proxy was the multiplication of common correlations. For instance, there was no pricing data for Michigan during one of the two year periods being examined, and a correlation between Illinois 6s and Michigan could not be computed. Correlations could be calculated between Illinois 6s and South Carolina, and South Carolina and Michigan. Thus a proxy for the correlation between Illinois and Michigan was computed by their multiplication. A second proxy was the substitution of a correlation that most reflected the two bonds. Missing data on some of the Illinois bonds prevented correlation calculation. Data was available for two similar bonds in New York and their correlations were used. A simple average of the prices of the two other Illinois state securities was used as a proxy for an Illinois bond issue, the Interest 1860 bond, since default risk was likely similar to the other Illinois bond issues and correlations should have been similar. Additionally, for correlation analysis, if there was missing information that was needed to find a correlation in bond prices. The information for the vast majority of bonds was available, however, and for the ones where the pricing data was scarce only represented a small fraction of the Illinois banks' portfolios.

Data for monthly net bond flows was gathered from the Auditor's ledgers on bond registrations. In these ledgers, the date, state, and the amount in par value of the bond was recorded. The ledger also included the date that the bonds were withdrawn. These ledgers were the basis of the free banks' annual reports to the legislature. Using the annual report of October of 1858 and calculating monthly totals for all of the free banks during the November 1858 to October 1860 period, a monthly portfolio can be calculated and a net flow of bonds by the banking system as a whole in each month can also be determined.¹⁰⁹

6.1 Bond Portfolios

The bond portfolios of the Illinois banks were composed of a variety of state and U.S. bonds that could be used as collateral for their issue of banknotes. The following table represents an overall summary of the bond holdings of the Illinois free banks in November of 1858 and November of 1860.

¹⁰⁹ Economopolous, Andrew. Individual Illinois Free Bank Bond Flow Information.

Table 2: Composition of the Illinois Free Bank Portfolios

State/Country	Percent in 11/1858	Percent in 11/1860
Virginia	11.61%	9.1%
Georgia	1.2%	2.3%
Missouri	49.5%	24.2%
Ohio	2.9%	2.1%
Kentucky	0.2%	0.4%
Louisiana	5.5%	3.7%
North Carolina	4.2%	6.13%
South Carolina	1.5%	0.7%
Tennessee	10.3%	22.8%
Illinois	10%	15.9%
Iowa	1.3%	0.7%
Michigan	1.8%	3.7%
Minnesota	0.1%	1.0%
New York	0%	2.06%
U.S.	0%	5.2%

By analyzing the changes in price of these bond issues over time, as well as the amount of holdings each bank had in each bond, the amount of any given bank's bond portfolio at risk based on its price history and correlation can be calculated. Additionally, the amount of return

for every unit of risk, using the standard deviation as a measure of risk, can be calculated, which can also be used to compare between banks and time periods.

6.2. Value at Risk

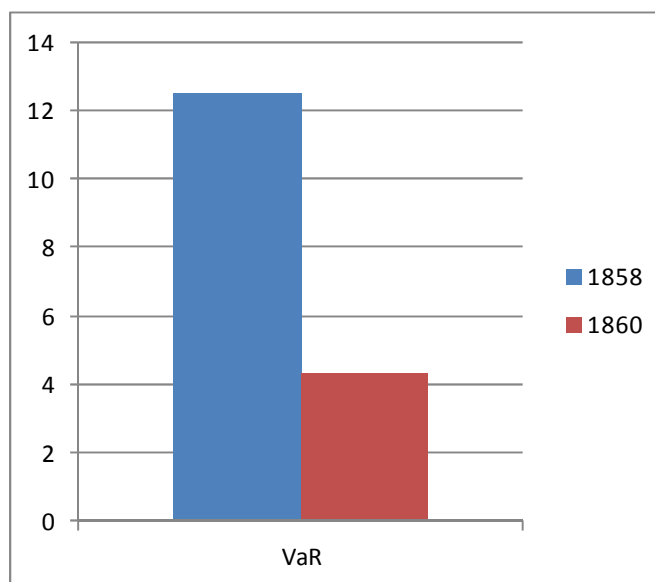
The empirical analysis below will compare the VaR for a particular bank and the composition of their bond portfolio. Hypothesis #1 suggests that banks in Illinois will adjust their portfolios such that they would reduce their VaR as they approached the Civil War, and hypothesis #2 suggests that banks holding a high allocation of Southern bonds and did not have high VaR figures, they were *ex ante* diversified. If the high VaRs are associated with a high allocation of southern bonds, it indicates they were not *ex ante* diversified. These banks, however, may have been able to offset this risk in other parts of their balance sheet, based on their allocation to loans, specie, and what percentage of notes they were issuing from bond holdings. Banks with portfolios that had low VaRs may have increased their risk in other parts of their balance sheet; however, so those factors should be evaluated for these banks as well.

The 1858 value at risk for Illinois free banks' bond portfolios was calculated based on the banks' holdings in November of 1858 and the weekly changes in the bonds' prices during the approximately two year period from October 31, 1856 to October 29, 1858. The 1860 value at risk for Illinois free banks' bond portfolios was calculated based on the banks' holdings in November of 1860 and the weekly changes in the bonds' prices during the approximately two year period from November 5, 1858 to October 26, 1860. This allows for a similar period of price changes in order to compare the two periods. The 1856 to 1858 period includes the Panic of 1857, showing what bank managers could have expected their potential losses to be in the event of a rapid decline in prices. After evaluating changes in prices during declines, including

financial panics and political risk events, it can serve as a quantitative measure of how managers should have viewed the riskiness in their portfolios. While the 1858 to 1860 period does not include a period of financial panic, it shows changes that banks made with their portfolio over time that changed their risk relative to the market. It will also demonstrate whether the composition of their portfolio changed their value at risk over time. For the VaRs in 1860, the Illinois free banks also divided into banks that were already in existence in November of 1858, or "old" banks, and those banks that entered between November of 1858 and November of 1860, or "new" banks.

The first VaR measure is based on the total portfolio of bonds held by the Auditor. This would represent the total risk of the Illinois free banking system. (See Chart 1.)

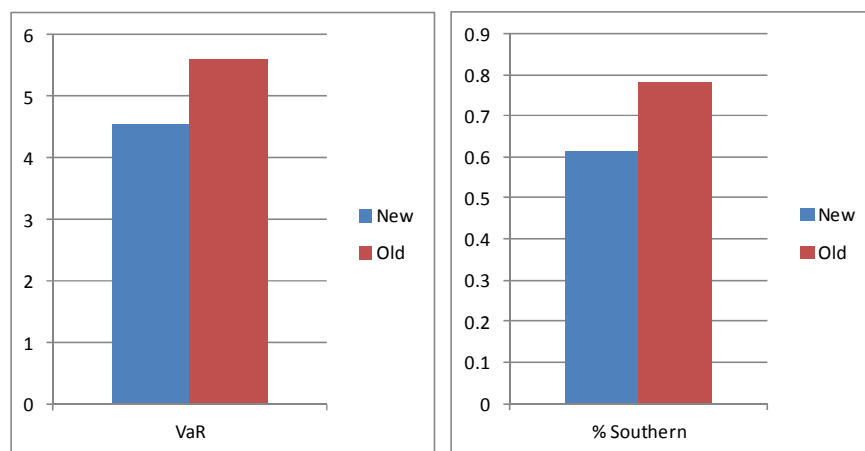
Chart 1: VaR for the 1858 and 1860 Total Market Bond Portfolios



The VaR for the total bond market portfolio in 1858 was 12.46% and was almost three times greater than the VaR of 4.31% in 1860. The significance of this difference is that a one out of 100 event in the previous two years could have wiped out any buffer that the law provided in

the 1858 portfolio while there would have to be over two back to back events in the later period. This would appear to confirm the hypothesis that banks made adjustments between 1858 and 1860 to lower their VaR. This significant difference is not surprising since the period between 1858 and 1860 was one of relative calm, while the period proceeding, however, included the panic of 1857 that had already ended by November of 1858. There are other factors that must be considered, however, including distinctions between the new and old banks as well as whether it was the difference in price changes during the 1856-1858 period versus the 1858-1860 period that contributed to the decrease in VaR. The analysis of those other factors is examined further by examining the portfolios between old and new banks.

Charts 2 and 3: Average VaR and Southern Allocation Differences Between New and Old Banks in 1860



As Chart 2 shows, the average 1860 value at risk for old banks was 5.58% versus 4.53% for new banks. For the purpose of this analysis, Southern states include Virginia, Georgia, Louisiana, North Carolina, South Carolina, Tennessee, and Missouri. The average percentage holdings of Southern bonds in 1860 for new banks was 60.98% versus 77.66% for banks that had already been in existence. This indicates that new banks were tending to allocate less toward Southern bonds overall.

6.3. Value at Risk, Year of Bank Entry, and Southern Bond Holdings

Since old banks had both greater Southern bond holdings and value-at-risk, comparing the value-at-risk for each free bank with its holdings of Southern bonds could help show how much a bank's Southern bond holdings contributed to an increased price risk for each bank. The correlation coefficient between each bank's value-at-risk in 1860 and the percent of their Southern bond holdings was 0.54, with a slightly stronger correlation for new banks than old banks. Since the correlations for the old and new banks were slightly different, including whether a bank was new and old can show whether when a bank entered the market also contributed to the banking system's value-at-risk. A regression was run with the 1860 VaR of each bank as the dependent variable and a dummy variable indicating whether it is a net or old bank, and the percent of Southern bonds as the independent variable. The results were as follows:

Dependent Variable: V = Value at risk of the free bank in 1860

Independent Variables: Y = Dummy variable for old and new banks

("old" around by 1858 = 0, "new" around by 1860 = 1)

S = Percentage holdings of Southern bonds in 1860

$$V = 4.283 - 0.77Y + 0.01667S$$

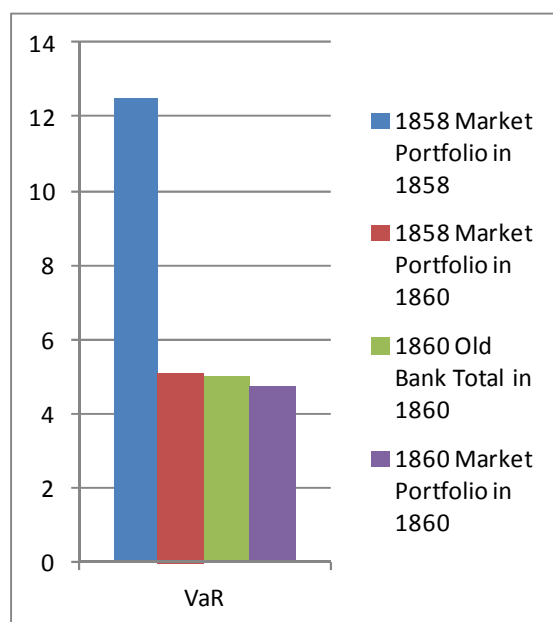
$$t = 16.05 \quad -3.818 \quad 5.85$$

$$\text{Adjusted } R^2 = 36.78\% \quad \text{Observations} = 106$$

The results indicate that when any bank, new or old, held an increased proportion of Southern bonds in its portfolio, an increased value at risk is also indicated. A portfolio of 100% southern bonds would increase the bank's VaR by 1.66 or about an increase of 39% over a bank with no Southern bonds. Furthermore old banks selected a portfolio with a higher VaR than newer banks holding the percent of Southern bonds constant. An old bank on average held a portfolio with a VaR that was 0.77% higher than a new bank. Although this is statistically

significant, it is not practically significant. 36.78% of the change in banks' value-at-risk was explained by the independent variables, with a bank's holdings of Southern bonds being a stronger association than whether a bank was new or old, although both factors are significant.

There was a significant drop in VaR among the banks from 1858 to 1860. However, this could have been due to the general calm in the market and not any active management on the part of bankers. The VaR for the total market portfolio of all the free banks in 1858 was 12.46%, indicating that 1% of the time that the total market portfolio would lose that much percent in a week. To determine if banks' choices increased or decreased risk over the period, a VaR benchmark for the 1860 analysis was created using the portfolio weights of the total market portfolio of 1858. Thus, any change in the benchmark would be due to pure price changes and not portfolio adjustments. Comparing the results showed that the benchmark VaR dropped from 12.46% (blue) to 5.09% (red) in 1860. The drop showed a strong calming of the market as the VaR value decreased greatly. Additionally, an old bank total portfolio VaR using the portfolio weights of all of the old banks based on their holdings in 1860 was created. Weighting the total portfolio of the old banks based on their holdings in 1860 allows their results to be compared more directly to the 1858 benchmark VaR. The old banks VaR in 1860 dropped to 5.00% (green), only 9 basis points lower than the benchmark during the same period.

Chart 4: Average VaR Based On Total Market Portfolios in 1858 and 1860

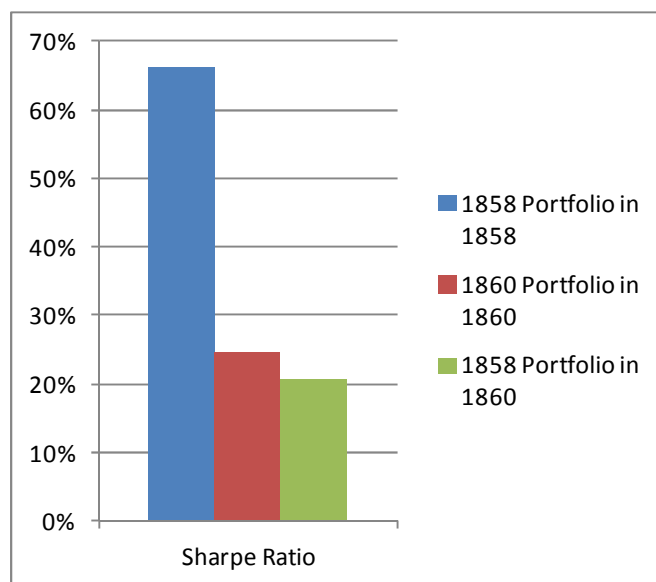
While the difference between the benchmark and actual allocation of the old banks were small, it suggests that there was some activity that adjusted the weights in their portfolio. New banks that entered over the 1858-1860 period are also included in the VaR for the total market portfolio, which shows a drop in the overall system-wide risk to 4.69% (purple). This implies that the new banks reduced their risk more than the old banks did during the same period. It would appear that the old banks were taking more risk with their portfolios than the new banks. Looking at whether banks were adequately awarded for taking greater risk can help show whether they were taking undue risk.

6.4. Sharpe Ratio

The risk exposure of the free bank appears to be relatively high in 1858 and much less so in 1860. Without regulations, banks can choose to accept risk if there is sufficient compensation. The Sharpe ratio will demonstrate this. The overall Sharpe ratio results for all of the banks in the

November 1858 and November 1860 analysis can be found in the Data Appendix. Comparison and analysis of the Sharpe ratio results in both 1858 and 1860 are included in this section.

Chart 5: Sharpe Ratios Based On 1858 and 1860 Total Market Portfolios



Overall, the Sharpe ratio for the Illinois free banks was higher for the total market portfolio in 1858 at 66.1% (blue) than it was in 1860 at 24.7% (red). This indicates that the bond portfolios overall were receiving greater return per unit of risk during the 1856-1858 period versus the 1858-1860 period. However, if the weights of the 1858 portfolio are used to calculate the Sharpe ratio in 1860, the ratio falls to 20.7% (green). Thus, the banks appeared to have underperformed the total market in 1860 if they kept the same weights that they had in 1858. Since the old banks also had the greater value-at-risk in 1860, during the same period of time, when compared directly with the new banks during the same time period, they appear to have been taking greater risk. To test whether the market Sharpe ratio decline is influenced by new banks entering the market, a regression is run

Using the Sharpe ratio as the dependent variable and the year is set to 0 for old and 1 for new being the independent variable, it can be determined whether old or new banks had a better return for every unit of risk. The result of the regression was as follows:

Dependent Variable: SR = Sharpe ratio of the free bank in 1860

Independent Variables: Y = Dummy variable for old and new banks

("old" around by 1858 = 0, "new" around by 1860 = 1)

$$\mathbf{SR = 0.345 + 0.066Y}$$

$$\mathbf{t = 7.07 \quad 2.69}$$

$$\mathbf{Adjusted R^2 = 5.63\% \quad Observations = 106}$$

The results indicate that the new banks had a better return for every unit of risk, since a new bank is estimated to have a Sharpe ratio of 41.1% versus a 34.5% Sharpe ratio for an old bank. Thus, the portfolio allocation and any changes made during the 1858-1860 period were not enough for the old banks, as the new banks outperformed them. The adjusted R^2 figure indicates that a bank being old or new offers some, although fairly low, explanatory power in determining whether a bank makes a greater return for every unit of risk. Since new banks had a higher Sharpe ratio than the old banks and it was the old banks that had a greater value at risk, this indicates that the new banks had both had lower downside risk and had a greater return for every unit of risk.

Additionally, comparing the average Sharpe ratio of the old banks in 1858 and in 1860 can be used to show the change in the risk return tradeoff for the banks over time. The average Sharpe ratio on average for an old bank with their portfolio in 1860 was 19.45% versus a 67.43% Sharpe ratio on average for an old bank with their portfolio in 1858. The decline in the banks' Sharpe ratio indicates less return per unit of risk for the banks during the 1860 period.

Tracking how much the 1860 Sharpe ratio of a bank changed based on its allocation to Southern bonds can help evaluate the Southern bond allocation of the Illinois free banks further. While the old banks had higher VaRs and higher allocation to Southern bonds than the new banks in 1860, evaluating whether the free banks received an adequate return for greater allocation to Southern bonds is also important. It can also help show whether the correlation between increased Southern bond allocation for all the banks in 1860 and greater value at risk is also echoed here. The results are as follows:

Dependent Variable: SR = Sharpe ratio of the free bank in 1860

Independent Variables: SO = Percent of the free bank's bonds in Southern bonds in 1860

$$\mathbf{SR = 0.3983 - 0.2155SO}$$

$$\mathbf{t = \quad 10.39 \quad -4.35}$$

$$\mathbf{Adjusted R^2 = 14.58\% \quad Observations = 106}$$

Although it only explains a portion of the change in banks' Sharpe ratios, the results of the equation are significant. A greater allocation to Southern bonds is associated with a decrease in the Sharpe ratio, or the banks' risk-return tradeoff. Therefore, banks tended not to receive adequate return for every unit of risk if they allocated more into Southern bonds than other state or U.S. bonds. Bank managers should have had some aversion toward allocating more of their portfolio toward Southern bonds by 1860 if they recognized the lack of reward they were receiving by doing so.

Since the Sharpe ratio is being used to see if the amount of downside risk a bank was taking was offset by greater return per unit of risk, recognizing and accounting differences in the calculations for both metrics is important. The Sharpe ratio compares a bank's holding period return on its bond portfolio based on the bonds' yields, since a bond coupons would offset a

comparable decrease in prices, and changes in price relative to the standard deviation of a bank's holding period return. On the other hand, the value-at-risk assesses the amount of downside price risk a bank faced without accounting for a bond's yield. VaR is important for the free bank since it assesses the immediate nature of a downturn in prices. The average holding period return can also be compared to a bank's VaR to see if return was offsetting extreme downside risk instead of changes in holding period return as a modified Sharpe ratio. To see if using this method of using a modified Sharpe ratio had different results for the results of free banks, a regression was used and the results were as follows:

Dependent Variable: SR = Sharpe ratio of the free bank in 1860

Independent Variables: MSR = Modified Sharpe ratio using VaR as risk measure in 1860

$$\mathbf{SR = -0.034 - 3.82MSR}$$

$$\mathbf{t = -2.33 \quad 22.89}$$

$$\mathbf{Adjusted R^2 = 83.28\% \quad Observations = 106}$$

The modified Sharpe ratio using VaR as the risk measure in the risk-return calculation is explained largely by the traditional Sharpe ratio using holding period standard deviation as the risk measure. Since the traditional Sharpe ratio incorporates standard deviation based on holding period return standard deviations rather than the price standard deviation that is used in the calculation of VaR, the benefits of using the modified Sharpe ratio may be offset. While a modified Sharpe ratio may be necessary if there was a large divergence between the two measures, the traditional Sharpe ratio seems appropriate for the Illinois free banks.

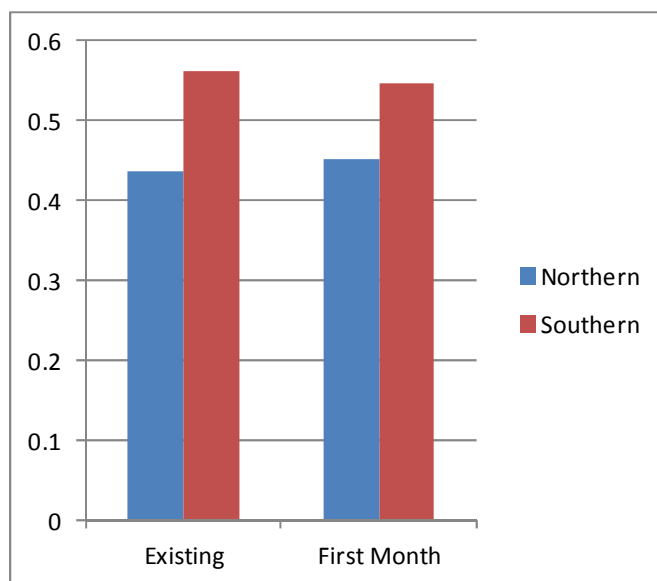
6.5. Bond Flows From November 1858 to October 1860

The nomination of Lincoln as the Republican candidate for President of the United States in May have been seen as making Civil War more likely. Since the winner of the Republican

special election in October of 1860¹¹⁰ indicated growing likelihood of Lincoln winning the presidential election during the next month, any analysis after that point would likely be banks mitigating the fallout of the election and subsequent Civil War rather than ex ante decision-making. Inclusion of the month of November of 1860 would also include some activity after the presidential election regardless. Therefore, monthly bond flows are examined during the period from November of 1858 up through the month of October of 1860.

Hypothesis #7: After May of 1860, the amount of Southern bonds being added by banks would be expected to be lower if they wished to reduce political risk.

Chart 6: Bond Flows During the November 1858 to October 1860 Period



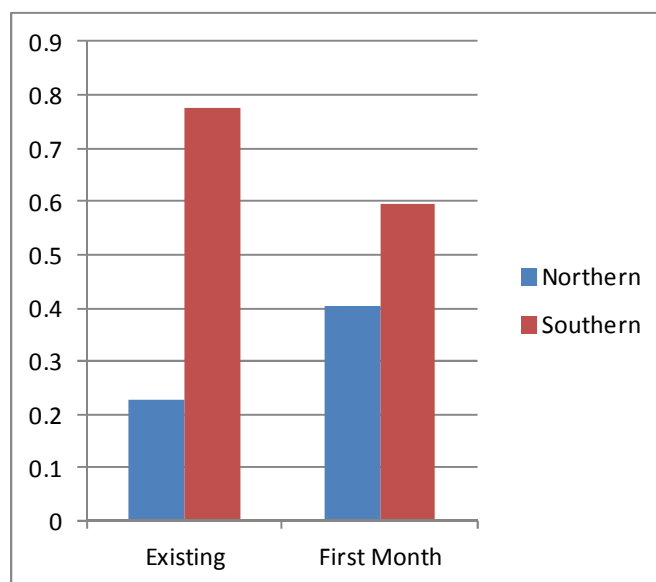
Given that the allocation of the total market bond portfolio toward Southern bonds was 84% in 1860, the flows reflect a trend toward increasing allocation toward Northern bonds. This may appear to reflect some confirmation of Hypothesis #1 since banks seemed to be trying to

¹¹⁰ There were indications of this in *Bankers' Magazine* in October 1860 of the importance of this special election for Governor. See also for the importance of Pennsylvania in the 1860 Presidential Election : James L. Huston, *The Panic of 1857 and the Coming of the Civil War*, (LSU Press, 1999), Chapter 9

reduce their risk over the period. The Southern allocation of the market portfolio of all of the banks, while dropping from 84% to 69% in 1860, still was heavily allocated toward risky Southern bonds. If banks were decreasing their risk, they did not appear to be doing so sufficiently.

If political risk of bond prices contributed to the banker's expectations, the flow of bonds would show that banks deposited more Northern bonds relative to Southern after May when Lincoln became the Republican candidate. Chart 7 shows that the flow of bonds after May for all banks and the results of banks during their first month of operations after entering during a particular month.

Chart 7: Bond Flows During the May 1860 to October 1860 Period



The results indicate that among both banks that were already in operations and those beginning operations on any particular month, Southern bonds were being added more heavily than Northern bonds from May 1860 to October 1860. Given that, prior to May of 1860, banks were adding more Northern bonds versus Southern bonds, it appears that the banks did not

believe political risk to be increasing or they overlooked while making allocations to their bond portfolio. While it is somewhat lower for banks entering the market on any given month, they still favored allocation toward Southern bonds during the period.

One reason that the free banks may have been increasing their allocation toward Southern bond may have been due to them receiving higher yields during the period during which they purchased the bonds. By correlating the net inflows, calculated by subtracting the gross inflows and gross outflows during each month, a correlation with each bond's yield can be calculated. Taking the average of the correlations for each month results in a correlation of 0.12, which is a fairly weak positive correlation. Although some banks may have been purchasing riskier bonds for this reason, it does not seem like they were strongly motivated to by it.

7. Adjustments to Bond Portfolio Risk

7.1. Holdings of Missouri Bonds by the Free Banks

During the Panic of 1857, reports surfaced that the usage of Illinois banknotes declined despite the Illinois banks holding large quantities of Missouri state bonds.¹¹¹ This was despite, before the Panic of 1857, Illinois banknotes had been serving as half of the overall currency in circulation in Missouri.¹¹² Although in this case Missourians had abandoned their holdings of Illinois banknotes, they recognized that their abandonment of the Illinois banknotes resulted in a decline in the value of their own state's bonds. This relationship seemed to indicate that there was a relationship between the banks and currency in circulation in Illinois and Missouri. Given the large decline in the Missouri bonds as the Civil War broke out and those bonds accounting for about 32% of the Illinois free banks' bond holdings as of November 1, 1860, there may have

¹¹¹ "Illinois Banks in St. Louis," *Ottawa Free Trader*, October 10, 1857.

¹¹² *Ibid.*

been interstate banking relationships that could help explain some of the Illinois free bank failures.

Of the 94 banks in the Illinois balance sheet data in November of 1860, 77 were analyzed, with twelve being excluded due to no information on a municipality's population being available, two excluded due to the municipality no longer existing, and three excluded due to lack of bond data availability. Due to the possibility the Illinois banks holding more of its neighboring state's bonds, the relationship between an Illinois free bank holdings based on the distance from the individual free banks in Illinois from St. Louis, Missouri was analyzed. The amount of loans held by a free bank divided by its earnings assets was also considered since a bank may have chosen to hold more loans to offset the risk of holding the Missouri bonds. The results were as follows:

Dependent Variable: MB = Percent of Missouri bonds held as a portion of bond portfolio

Independent Variables: D = Distance of the free bank from St. Louis, MO in miles

LEA = Percent of loans held by free bank as a portion of earning assets

$$\mathbf{MB = 0.1977 + 0.00032D + 0.06779LEA}$$

$$\mathbf{t = 1.73 \quad 0.502 \quad 0.4075}$$

$$\mathbf{Adjusted R^2 = -0.02144 \quad Observations = 77}$$

There was an extremely low amount of explanation for variation in holdings of Missouri bonds due to the independent variables. The results indicate that a relationship between the amount of Missouri bonds held was not significant due to the distance of the bank from St. Louis or the proportion of loans the bank was making. It also indicates that banks would not be more likely to hold more loans specifically to offset the risk of holding more Missouri bonds. Other

factors or operational indifference on the part of the free bankers could help explain the variation in holdings of Missouri bonds.

7.2. Specie Holdings of the Free Banks

Due to the requirement that a free bank be able to repay a noteholder or face the risk of the Auditor placing the bank into liquidation, holdings of specie were important for free bank liquidity. Other factors that the bank is taking that could potentially increase the overall risk the bank faces may have influenced the likelihood of the bank to hold more gold specie on reserve. For instance, banks that held a greater proportion of Missouri bonds would seem more likely to hold specie to offset the price risk of their bond holdings. Banks with a greater distance from St. Louis would also seem more likely to hold less specie since there would be a decline in Missouri. Additionally, banks located in a city or town would seem more likely to hold specie if that municipality had a higher population. Banks that were more isolated would be less likely to face an immediate demand for specie due to their physical isolation.

Of the 94 banks in the Illinois balance sheet data in November of 1860, 77 were analyzed, with twelve being excluded due to no information on a municipality's population being available, two excluded due to the municipality no longer existing, and three excluded due to lack of bond data availability. The results were as follows:

Dependent Variable: SBN = Percent gold specie held by the bank as a portion of banknotes

Independent Variables: D = Distance of the free bank from St. Louis, MO in miles

MB = Percent of Missouri bonds held as a portion of bond portfolio

P = Population of the municipality as of the 1860 Census

$$\text{SBN} = 0.1706 - 0.00068D + 0.12518\text{MB} + 7.42 \times 10^{-6}P$$

$$t = \quad 0.959 \quad -0.658 \quad 0.6893 \quad 1.383$$

$$\text{Adjusted } R^2 = -0.0079 \quad \text{Observations} = 77$$

There was an extremely low amount of explanation for percent holdings of gold as a portion of banknotes due to distance, Missouri bond holdings, and population of the municipality. Given this, it appears that distance from St. Louis and percent holdings of Missouri bonds did not impact a free bank's allocation into its holdings of specie reserves. Additionally, the population of a municipality did not appear to impact its likelihood to hold greater amounts of gold as a percentage of its banknotes. Bank managers did not appear to weigh these other factors that could potentially impact likelihood of customers to demand specie for their banknotes when determining how much gold specie to hold in reserve.

8. Conclusions

The Illinois free banks made adjustments during the period from 1858 to 1860. Although the old banks lowered their allocations of Southern bonds, this only helped to reduce their value-at-risk slightly than if the old banks had held their total portfolio constant from 1858 to 1860. Of all the banks in 1860, higher allocations into Southern bonds were associated with lower Sharpe ratios. Since holding the 1858 total market portfolio constant also resulted in a lower Sharpe ratio than the 1860 total market portfolio, this appears to be consistent during any one period. Although the Sharpe ratios were higher overall in 1858, the higher VaR offsets that benefit, with

the increased risk of holding Southern bonds closer to 1860 making portfolio adjustments necessary in order to reduce risk. Banks only reduced their Southern net flows during the 1858-1860 period somewhat, so it appears that they were taking undue risk by continuing to hold those bonds as part of their portfolio. This also appears true after May of 1860, since Southern bond net flows actually increase between then and the Pennsylvania special election as well as the presidential election in November.

Free banks did not offset their greater holdings of Missouri bonds with greater holdings of gold specie nor were there indications that proximity to St. Louis, Missouri led to greater holdings of Missouri debt. Since Missouri bonds were such a large portion of the free banks' portfolio in 1858 and still were large in 1858, standard allocation or indifference to disproportionate holdings of one state's bonds appeared to lead to this situation.

Although the value at risk is lower for the 1860 total market portfolio versus the 1858 total market portfolio, this was during a time of relatively low volatility and bank managers should have recognized the risk would be higher during events that drive a large asset price decline. While financial panics and war are not the same, war actually being worse, the value at risk does serve as an important measure given that it should have served as at least a minimum estimate of the potential losses the bank could face in one week. Since war would seem to have a more permanent, or at least longer impact, the Illinois free banks would be less likely to inject more capital into their bank to keep it afloat. Thus, even though there was a longer term impact of a civil war versus the shorter effect on financial markets of banking panics, the banks should have recognized the sharp collapses in bond prices that could occur based on previous financial panics. The various allocations by the Illinois free banks do appear to have an impact on their outcome, although other factors also contributed to their ultimate fate.

Data Appendix

Table 3: Value-at-Risk for the Illinois Free Banks in November 1858

Bank	Value-at-Risk
AGRICLTRE BK	16.36
ALTON BK	18.58
AMER EX BK	12.64
BELVIDERE BK	12.20
BK-AURORA	14.20
BK-BLOOMINGTON	27.64
BK-CARMI	12.32
BK-CHESTER	14.29
BK-COMMONWEALT	14.29
BK-ELGIN	9.95
BK-FED UNION	14.22
BK-GALENA	14.07
BK-GENESEO	13.68
BK-ILL	11.35
BK-NAPERVILLE	13.00
BK-NO ILL	14.29
BK-PERU	14.51
BK-PIKE CO	12.71
BK-QUINCY	14.47
BK-RALIEGH	13.92
BK-REPUBLIC	11.71
BK-SO ILL	13.92
CENTRAL BK	19.71
CITIZENS' BK	13.83
CITY BK,OTTAWA	12.24
CORN EXCHANGE	13.84
EDGAR CO BK	13.64
EJ TINKHAM &CO	11.08
FARM & TRADE	10.19
FRONTIER BK	13.15
GRAND PRAIRIE	12.14
GRAYVILLE BK	14.10
HIGHLAND BK	12.36
INTERNATIONAL	19.25
LAFAYETTE BK	14.19
MARINE BK	26.51
MCLEAN CO BK	14.29
MERCH & DROVER	13.61
MISS RIVER BK	9.56
MORGAN CO BK	14.04
NATIONAL BK	13.30
PRAIRIE ST BK	13.89
RAILROAD BK	10.29
REED'S BK	14.29
SO BK-ILL,GRYV	9.57
STATE BK-ILL	13.74
<u>WARREN CO BK</u>	<u>14.29</u>
TOTAL MARKET	12.46

Table 4: Value-at-Risk for the Illinois Free Banks in November 1860

Bank	Value-at-Risk	Bank	Value-at-Risk
AGRICLTRE BK	4.53	FMRS' BK O/ILL,MTR	5.01
ALISANA BK	5.24	FRANKLIN BK	4.47
ALTON BK	4.99	FRONTIER BK	4.81
AMERICAN BK	2.73	FULTON BK	4.14
AMER EX BK	5.95	GARDEN STATE BK	4.52
BK O/ALBION	2.76	GRAND PRARIE BK	6.54
BK O/ALEDO	4.23	GRAYVILLE BK	6.79
BK O/AMER,CHCGO	7.58	HAMPDEN BK	4.73
BK O/AMER,MT.CARMEL	3.93	HIGHLAND BK	6.45
BK O/AURORA	7.26	HUMBOLDT BK	5.19
BK O/BENTON	5.04	ILL. CENTRAL BK	3.38
BK O/BLMNGTN	4.40	ILL RIVER BK	4.78
BK O/BRKLYN	3.59	ILL ST SCRTY BK	3.58
BK O/CARMI	5.86	ILL STATE BK	5.00
BK O/CHESTER	6.93	INTERNATIONAL BK	2.94
BK O/COMMERCE	4.57	JERSEY COUNTY BK	4.65
BK O/COMMNWLTH	7.47	KANKAKEE BK	4.57
BK O/ELGIN	4.61	KASKASKIA BK	5.00
BK O/FED UNION	6.31	LAFAYETTE BK	6.92
BK O/GALENA	4.00	LAKE MICHIGAN BK	3.75
BK O/GENESE0	5.39	LANCASTER BK	5.26
BK O/ILL,NEW HVN	3.89	MARINE BK	3.58
BK O/INDEMNITY	3.65	MRSHELL CNTY BK	3.65
BK O/JCKSN CNTY	4.00	MCLEAN CNTY BK	5.21
BK O/MTRPLS	4.03	MERCH & DRVRS BK,JLT	5.73
BK O/NAPERVLL	5.45	MERCHANT'S BK,CARMI	3.57
BK O/NRTHRN ILL*	7.58	MISS RIVER BK	4.07
BK O/PERU	6.98	MORGAN CNTY BK	6.88
BK O/PIKE CNTY	4.83	NARRAGANSETT BK	4.41
BK O/QUINCY	7.37	NATIONAL BK	7.13
BK O/RALEIGH	6.72	NEW MARKET BK	5.43
BK O/SO ILL	5.22	OHIO RIVER BK	4.70
BK O/SPARTA	1.95	OLYMPIC BK	3.89
BK O/REPUBLIC	4.63	PAMET BK	6.58
BELVIDERE BK	6.76	PATRIOTIC BK	3.75
BULLS HEAD	3.79	PITTSFIELD BL	2.72
CANAL BK	4.98	PLOWMAN'S BK	5.57
CENTRAL BK	4.68	PRARIE STATE BK	4.82
CHICAGO BK	3.98	RAILROAD BK	4.50
CITIZEN'S BK	7.12	REAPERS BK	4.97
CITY BK,OTTAWA	4.01	REED'S BK	7.58
COLUMBIAN BK	3.64	ROCK ISLAND BK	7.58
COMM BK O/NW HVN	5.32	SHAWANSES BK	4.11
COMM BK/PALSTN	5.43	SO BK O/ILL,GRYVL	5.70
COMM BK,CHCGO	5.25	STATE BK O/ILL	4.18
CONTINENTAL BK	4.36	STATE STOCK BK	3.94
CORN EXCHANGE BK	6.69	TOULON BK	3.90
CORN PLANTERS' BK	5.05	US STOCK BK	4.97
DOUGLAS BK	5.09	UNION BK,CHCGO	4.89
EJ TNKHM & CO BK	6.01	UNION COUNTY BK	2.87
EAGLE BK OF ILL	4.83	WARREN COUNTY BK	5.25
EDGAR CNTY BK	4.84	WESTERN BK O/ILL	4.91
FMS & TRDRS BK,CHLSTN	6.03	WHEAT GROWS' BK	5.34
		TOTAL MARKET	4.32

Table 5: Sharpe Ratio for the Illinois Free Banks in November 1858

Bank	Sharpe Ratio
AGRICLTRE BK	70.38%
ALTON BK	68.80%
AMER EX BK	57.54%
GRAYVILLE BK	62.59%
BK-AURORA	63.40%
BK-BLOOMINGTON	58.70%
BK-CARMI	58.69%
BK-CHESTER	62.59%
BK-COMMONWEALT	62.59%
BK-ELGIN	20.15%
BK-FED UNION	62.05%
BK-GALENA	68.48%
BK-GENESE0	54.34%
BK-ILL	71.75%
BK-NAPERVILLE	50.25%
BK-NO ILL	62.59%
BK-PERU	66.48%
BK-PIKE CO	63.88%
BK-QUINCY	68.48%
BK-RALIEGH	62.88%
BK-SO ILL	62.96%
BK-REPUBLIC	47.77%
BELVIDERE BK	58.18%
CENTRAL BK	77.59%
CITIZENS' BK	64.84%
CITY BK,OTTAWA	53.64%
CORN EXCHANGE	63.16%
EJ TINKHAM &CO	54.94%
EDGAR CO BK	61.24%
FARM & TRADE	48.94%
FRONTIER BK	50.17%
GRAND PRAIRIE	58.52%
HIGHLAND BK	138.56%
INTERNATIONAL	73.19%
LAFAYETTE BK	294.15%
MARINE BK	49.49%
MCLEAN CO BK	62.59%
MERCH & DROVER	72.59%
MISS RIVER BK	58.59%
MORGAN CO BK	63.92%
NATIONAL BK	62.85%
PRAIRIE ST BK	60.32%
RAILROAD BK	43.47%
REED'S BK	62.59%
SO BK-ILL,GRYV	71.31%
STATE BK-ILL	69.73%
WARREN CO BK	62.59%
TOTAL MARKET	66.11%

Table 6: Sharpe Ratio for the Illinois Free Banks in November 1860

Bank	Sharpe Ratio	Bank	Sharpe Ratio
AGRICLTRE BK	46.11%	FMRS' BK O/ILL,MTR	18.29%
ALISANA BK	18.66%	FRANKLIN BK	33.41%
ALTON BK	16.37%	FRONTIER BK	22.19%
AMERICAN BK	154.01%	FULTON BK	42.89%
AMER EX BK	17.45%	GARDEN STATE BK	25.31%
BK O/ALBION	49.51%	GRAND PRARIE BK	10.23%
BK O/ALEDO	36.38%	GRAYVILLE BK	6.79%
BK O/AMER,CHCGO	3.93%	HAMPDEN BK	23.05%
BK O/AMER,MT.CARMEL	25.50%	HIGHLAND BK	-7.79%
BK O/AURORA	4.94%	HUMBOLDT BK	21.58%
BK O/BENTON	20.10%	ILL. CENTRAL BK	33.47%
BK O/BLMNGTN	65.20%	ILL RIVER BK	21.82%
BK O/BRKLYN	30.00%	ILL ST SCRTY BK	27.05%
BK O/CARMI	14.10%	ILL STATE BK	25.07%
BK O/CHESTER	6.85%	INTERNATIONAL BK	53.61%
BK O/COMMERCE	32.87%	JERSEY COUNTY BK	32.64%
BK O/CMMNWLTH	4.36%	KANKAKEE BK	23.92%
BK O/ELGIN	28.00%	KASKASKIA BK	20.86%
BK O/FED UNION	8.09%	LAFAYETTE BK	7.90%
BK O/GALENA	21.90%	LAKE MICHIGAN BK	32.15%
BK O/GENESEO	10.45%	LANCASTER BK	18.42%
BK O/ILL,NEW HVN	46.67%	MARINE BK	30.43%
BK O/INDEMNITY	41.09%	MRSHELL CNTY BK	52.56%
BK O/JCKSN CNTY	25.69%	MCLEAN CNTY BK	14.06%
BK O/MTRPLS	26.92%	MERCH & DRVRS BK,JLT	22.02%
BK O/NAPERVLL	15.42%	MERCHANT'S BK,CARMI	34.25%
BK O/NRTHRN ILL*	3.93%	MISS RIVER BK	35.20%
BK O/PERU	7.25%	MORGAN CNTY BK	6.29%
BK O/PIKE CNTY	19.37%	NARRAGANSETT BK	26.25%
BK O/QUINCY	5.00%	NATIONAL BK	5.71%
BK O/RALEIGH	9.02%	NEW MARKET BK	20.47%
BK O/SO ILL	16.31%	OHIO RIVER BK	22.26%
BK O/SPARTA	99.51%	OLYMPIC BK	42.89%
BK O/REPUBLIC	25.21%	PAMET BK	6.78%
BELVIDERE BK	9.28%	PATRIOTIC BK	31.20%
BULLS HEAD	30.75%	PITTSFIELD BL	28.76%
CANAL BK	21.89%	PLOWMAN'S BK	21.27%
CENTRAL BK	36.60%	PRARIE STATE BK	30.41%
CHICAGO BK	20.41%	RAILROAD BK	27.46%
CITIZEN'S BK	5.85%	REAPERS BK	19.18%
CITY BK,OTTAWA	28.19%	REED'S BK	3.93%
COLUMBIAN BK	38.26%	ROCK ISLAND BK	3.93%
COMM BK O/NW HVN	22.89%	SHAWANSES BK	31.02%
COMM BK/PALSTN	26.89%	SO BK O/ILL,GRYVL	12.07%
COMM BK,CHCGO	18.52%	STATE BK O/ILL	31.72%
CONTINENTAL BK	25.71%	STATE STOCK BK	38.26%
CORN EXCHANGE BK	7.04%	TOULON BK	36.45%
CORN PLANTERS' BK	28.16%	US STOCK BK	19.18%
DOUGLAS BK	20.93%	UNION BK,CHCGO	20.30%
EJ TNKHM & CO BK	35.76%	UNION COUNTY BK	36.55%
EAGLE BK OF ILL	20.92%	WARREN COUNTY BK	12.45%
EDGAR CNTY BK	26.09%	WESTERN BK O/ILL	20.20%
FMS & TRDRS BK,CHLSTN	20.51%	WHEAT GROWS' BK	11.30%
		TOTAL MARKET	24.67%

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