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Full Length Research Paper

The impact of three major banking statutes on bank failures in the U.S., 1970 - 2008

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Bank solvency questions and bank failures in the U.S. have become issues of renewed concern in recent years. Given the significance of bank solvency and bank failures for the health and stability of the U.S. economy, it is imperative to have insights into factors that systematically influence bank failures, including major federal government banking statutes that have been implemented. Accordingly, this empirical study investigates factors influencing the bank failure rate in the U.S. over the period 1970 through 2008, with emphasis on three major banking statutes: the Community Reinvestment Act of 1977 (revised and enhanced in 1995), CRA; the Federal Deposit Insurance Corporation Improvement Act of 1991, FDICIA; and the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994, RNIBA. After allowing for a variety of economic and financial variables over the study period, the evidence strongly implies that, FDICIA acted to reduce bank failures whereas (presumably by increasing competition and/or increasing costs through branch bank expansion) RNIBA induced a net increase in bank failures in the U.S. Finally, the evidence implies that, the CRA also led to increased bank failures in the U.S., arguably by exposing banks to greater credit risk.

Key words: Bank failures, banking regulation, banking deregulation.

INTRODUCTION

Not since the years of the Great Depression had the U.S. government regulatory authorities closed so many banks as they did during the 1980s and early 1990s. For the period from 1943 through 1981, relatively few banks were closed because of insolvency. However, this situation changed dramatically beginning with the year 1982, during which 42 banks were closed, followed by 48 closings in 1983 and 79 closings in 1984. The number of closed banks increased sharply thereafter, surpassing 100 closings annually through the early 1990s. Indeed, the bank closing rate did not decline significantly until after the implementation of the provisions of FDICIA, the Federal Deposit Insurance Corporation Improvement Act of 1991 (Benston and Kaufman, 1997; Cebula, 1996; 1999).

Abbreviations: RNIBA, Riegle-Neal interstate banking and branching efficiency act; **CRA,** community reinvestment act; **FDICIA,** federal deposit insurance corporation improvement act.

JEL codes: G21, G28.

Unfortunately, beginning in 1998 and 1999, the bank failure rate in the U.S. began to climb again. Given the significance of bank failures for the overall health and stability of the economy, this increased bank failure rate which is problematic, as reflected in the arguably rather Draconian “bailout” measures undertaken during 2008 by the Bush Administration and under the Obama Administration in 2009, measures ostensibly undertaken in part under the doctrine of TLTF (too large to fail). Indeed, it would seem appropriate to revisit the issue and attempt to identify key factors, including federal banking statutes such as the CRA (Community Reinvestment Act of 1977, revised and enhanced in 1995), the FDICIA (Federal Deposit Insurance Corporation Improvement Act of 1991), and the RNIBA (Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994), statutes that may have influenced bank failures in the U.S., not only in the latter part of the 20th century but in more recent years since 2000 as well.

Accordingly, the purpose of this empirical study is to identify key economic, financial, and statutory determinants of U.S. bank failures for the period 1970 through

2008 with a particular focus on any evidence as to whether the three statutes (CRA, FDICIA, and RNIBA) exercised statistically significant impacts on bank failures. Section II of this study provides the basic model. The empirical results are provided and discussed in Section III of the study. Section IV provides the study conclusions.

AN ECLECTIC MODEL

For purposes of this study, a bank failure occurs when a bank is forced by regulators either to close or to merge with another banking institution. This study adopts an eclectic model of bank failure determinants in the aggregate. This eclectic perspective is based largely on the findings and observations in previous related studies (Amos, 1992; Barth et al., 1992; Benston and Kaufman, 1997; Cebula, 1996; Chao and Cebula, 1996; Gropp et al., 2006; Loucks, 1994; Saltz, 1994; Wheelock and Wilson, 2000). In particular, most of these studies have empirically investigated models that are fundamentally eclectic in nature, presumably reflecting the observations made in these studies that the causes of bank failures at the aggregate level are rather diverse. To the extent that is true, a myopically based model is unlikely to provide useful insights into bank failures at the aggregate level. However, the model and analysis differ from previous studies at least the following two ways: (a) the study period runs through the year 2008 and thus is more current; and (b) it accounts explicitly for the impact not only of FDICIA, as in Cebula (1996; 1999) and Benston and Kaufman (1997), but also for the potential impacts of the CRA and the RNIBA.

To begin, this study follows several earlier related studies (Amos, 1992; Barth et al., 1992; Cebula, 1996; Loucks, 1994; Saltz, 1994; Wheelock and Wilson, 2000) by including economic/financial variables. These variables include the percentage growth rate of real GDP (Y), which is adopted in order to reflect the overall performance of the economy. The stronger the performance of the economy, as reflected in this study by a higher value of Y, the better the performance of bank loan portfolios, and as a result, the lower the likelihood of bank failures (Amos, 1992; Barth, 1991; Barth et al., 1992; Loucks, 1994). Next, the higher the cost of funds for banks (COST), the lower the bank profitability, and over time, the greater the probability of bank failures (Bradley and Jansen, 1986; Barth, 1991; Barth and Brumbaugh, 1992; Barth et al., 1992; Loucks, 1994; Saltz, 1994), *ceteris paribus*. It has also been suggested in a number of studies that economic or financial market volatility tend to have an adverse impact on commercial bank's (indeed, on financial institution) performance and, ultimately, on their solvency (Amos, 1992; Barth, 1991; Barth and Brumbaugh, 1992; Barth et al., 1992; Loucks, 1994; Cebula, 1999; Chao and Cebula, 1996; Gropp et al., 2006). These studies argue that greater financial market or economic volatility makes it more difficult for banks to assess risk and uncertainty and hence, makes bank decision making to be less efficient. In addition, greater financial market or economic volatility makes banks to be more reluctant in extending credit and engaging in branch bank expansion.

To reflect financial market volatility (VOL), this study adopts the standard deviation in each year of the monthly averages of the Standard and Poor (S and P) 500 Stock Index; presumably, the more volatile the S and P 500 Stock Index, the greater the likelihood of bank failures, *ceteris paribus*. The last of the economic/financial variables is the interest rate yield on new 30 year fixed-rate home mortgages (MORT). Banks have been active in financing real estate mortgages, including those of the 30 year fixed-rate variety, and in so doing, there is obvious financial benefit when the interest rate yield on these new home mortgages is higher, *ceteris paribus*. There are at least two reasons for this. First, in the period over which the bank holds the mortgage, the higher the MORT level, the greater the profitability of mortgages (Bradley and Jansen, 1986; Cebula and Belton, 1994; Loucks, 1994). Second, the higher the MORT level, the higher the price banks can extract when selling the mortgage in question on the secondary market (Madura, 2008: 207-208). Thus, it is expected that the bank failure rate is inversely a function of MORT (Bradley and Jansen, 1986; Barth et al., 1992; Loucks, 1994; Madura, 2008; Saltz, 1994), *ceteris paribus*.

Given the economic/financial variables provided above, this study seeks also to investigate the impacts of three federal banking statutes. These statutes are the Community Reinvestment Act of 1977 (revised and enhanced in 1995), CRA; the Federal Deposit Insurance Corporation Improvement Act of 1991, FDICIA; and the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994, RNIBA.

The practice of "redlining" served as a *de facto* means of controlling credit risk. To illustrate, two neighborhoods (A and B) are considered, each of which offers a variety of loan opportunities. Banks will extend loans in both A and B, until the holding interest rate and other relevant factors are constant and the perceived riskiness of loans made to the two neighborhoods is at equal margin. In this fashion, banks control their credit risk. However, if one neighborhood says A provides, predominantly or solely, high-risk lending opportunities, the banks will direct all or nearly all of their lending to the low-risk neighborhood, B. The bank would in effect have drawn a red line around the high-risk community, A, to which it extends few, if there are any loans.

The Community Reinvestment Act of 1977 sought to require that banks meet the credit needs of qualified borrowers in their communities, that is, in the geographic areas in which they operate and accept deposits, even those that would-be borrowers have low or moderate incomes (Madura, 2008, p. 502). In principle, the CRA is/was not intended to force commercial banks to make high-risk loans *per se*; rather, it is/was in principle intended

to help ensure that lower-income *and* qualified borrowers receive the loans they request/apply for. In 1995, the Community Reinvestment Act was revised and strengthened. Indeed, the 1995 revisions were credited with helping to substantially elevate the volume of loans made to small businesses and to low- and moderate-income borrowers for home loans (Apgar and Duda, 2003). Some part of the increase in the latter type of lending was likely attributable to increased efficiency in the secondary market for mortgage loans. Indeed, the revisions to this statute in 1995 facilitated the securitization of Community Reinvestment Act loans containing "subprime mortgages". In October of 1997, First Union Capital Markets and Bear, Stearns and Co. launched the first publicly available securitization of such loans. The securities were guaranteed by Freddie Mac and had an implied "AAA" rating. According to Apgar and Duda (2003), the CRA, especially after its revisions in 1995, had been rather successful in encouraging bank lending in previously "redlined areas." Nevertheless, the possibility that the CRA exposed banks (and other institutions) to increased credit risk, which would jeopardize banks' profits and solvency, can be argued, especially in the era of the sub-prime mortgage (Avery et al., 2000). Accordingly, this study hypothesizes that the CRA contributed to increased bank failures by exposing them to increased credit risk, *ceteris paribus.* The FDICIA statute includes provisions (FDIC, 1995: 26) for "…prompt corrective action measures to be taken when an insured institution's capital falls below prescribed levels, increased examination frequency, and mandated standards for safety and soundness of real estate lending and interest rate risk management." In theory, appropriate enforcement of such provisions should lead to increased bank safety and reduced bank failures. As Cebula (1999: 152) observes, "…both the numbers of problem banks and bank failures have declined dramatically since the enactment of FDICIA." Hence, it is expected here that the bank failure rate was a decreasing function of FDICIA, *ceteris paribus*.

The RNIBA established nationwide branch banking, ostensibly to help dismantle obstructions to competition in the banking industry and to increase bank operating efficiency. RNIBA effectively removed most restrictions on interstate banking in the U.S. and permitted banks to open branches nationwide, with the goal being to enable bank operations to become more efficient by no longer requiring them to maintain separate banking companies in each state to report to bank regulators. Prior to RNIBA, banks operating in multiple states had to establish separate corporations in each state, along with separate boards of directors (Madura, 2008). Thus, an expected effect of RNIBA was greater efficiency in the banking sector, at least insofar as RNIBA would reduce operating costs of "existing" interstate branch facilities. Nevertheless, to the extent that this statute facilitated the ability of banks to increase the number of their bank branches across state lines and across the nation, it follows that the establishment of these additional new bank branches would lead to "increased competition" in the banking industry. In addition, of course, this pattern of increasing the number of bank branches across state lines would have led to increased construction costs (and/or increased costs associated with the acquisition of branches or facilities of other institutions) and to increased total operating costs associated with this branch bank expansion *per se*. With respect to expansion of branch banking across state lines under the RNIBA, then, it is logical to have expected both increased competition among banks on the one hand and increased costs associated with construction and/or acquisition and operations on the other hand.

Arguably, then, since both increased competition on the one hand and increased total operating and other costs (such as construction or acquisition costs) associated with a larger number of bank branches due to expansion on the other hand would tend to lead to lower profitability in the financial services industry (Barth and Brumbaugh, 1992; Barth et al., 1992; Cebula, 1999), the RNIBA could be regarded as leading to increased bank failures over time, *ceteris paribus*. Ironically, then, it is hypothesized that this particular federal banking statute may well have exercised the opposite effect on the banking system than what was its intention!

EMPIRICAL RESULTS

The model adopted assumes the existence of a linear relationship among the variables analyzed. The basis for this assumption of linearity is the empirical finding that the aggregate bank failure rate was found to have a stronger relationship to each of the non-dummy variables when the variables are expressed in linear form rather than in log form. Based on the eclectic model expressed above, this empirical study estimates the following reduced-form equation:

$$BKFRATE_t = a0 + a1\ Y_{t-1} + a2\ COST_{t-1} + a3\ VOL_{t-1} + a4\ MORT_{t-1} + a5\ FDICIA_t + a6\ RNIBA_t + a7\ CRA_t + u \quad (1)$$

Where, (with source in parentheses):

$BKFRATE_t$ = the percentage of commercial banks that failed that is, were either closed or forced to merge with another bank, during year t (FDIC, 2009);

a_0 = constant,

Y_{t-1} = the average percentage growth rate of the real GDP during year t-1 (Council of Economic Advisors, 2009; Table B-4),

$COST_{t-1}$ = the average nominal cost of funds to commercial banks in year t-1, expressed as a percent per annum (FDIC, 2009),

VOL_{t-1} = the standard deviation of the monthly averages of closing prices of the Standard and Poor (S and P) 500

Table 1. Descriptive statistics.

Variable	Mean	Standard deviation
BKFRATE	0.332	0.489
Y	2.918	2.031
COST	6.06	2.739
VOLt-1	27.59	29.68
MORT	8.872	2.32
FDICIA	0.395	0.495
RNIBA	0.342	0.481
CRA	1.179	0.72

Stock Index in year t-1 financial market (Yahoo Finance Historical Price Table, 2008),
$MORT_{t-1}$ = the average interest rate yield on new 30 year fixed-rate mortgages in year t-1, expressed as a percent per annum (Council of Economic Advisors, 2009, Table B-73),
$FDICIA_t$ = a dummy variable indicating whether the FDICIA (the Federal Deposit Insurance Corporation Improvement Act of 1991) was in effect in year t: $FDICIA_t$ = 1 if FDICIA was in effect in year t, and $FDICIA_t$ = 0 otherwise,
$RNIBA_t$ = a dummy variable indicating whether the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994 was in effect in year t: $RNIBA_t$ = 1 if this statute was in effect in year t (that is, for the years 1994 through 2008), and $RNIBA_t$ = 0 otherwise,
CRA_t = a dummy variable indicating whether the Community Reinvestment Act was in effect in year t: CRA_t = 1 if this statute in its "non-enhanced form" was in effect in year t (that is, for the years from 1977 though 1994); CRAt = 2 if this statute in its "enhanced form" was in effect in year t (that is, for the years 1995 through 2008); and CRA_t = 0 otherwise, and
u = stochastic error term.

The study period runs from 1970 through 2008. Thus, the study period includes a number of years prior to the pattern of deregulation in the form of the DIDMCA (the Depository Institutions Deregulation and Monetary Control Act of 1980) and the GSDIA (the Garn-St. Germain Depository Institutions Act of 1982) statutes. In addition, by running through the year 2008, the study can be regarded as current. For the interested reader, Table 1 contains basic descriptive statistics on the eight variables in the model. The ADF (Augmented Dickey-Fuller) and PP (Philips-Perron) unit root tests reveal that the variables BKFRATE, COST, VOL, and MORT are all non-stationary in levels but stationary in first differences for the study period, whereas the remaining variables are all stationary in levels. Consequently, the variables BKFRATE, COST, VOL, and MORT, are expressed in first differences form in the estimates. Expressing these variables in first differences form is necessary in order to avoid spurious correlation; first differencing in the presence of non-stationarity yields more dependable results.

The empirical estimates of Equation (1) are provided in Table 2. In Table 2, there are three sets of estimates. In all cases, terms in parentheses beneath coefficients are t-values, and the symbol Δ is the first-differences operator. In column (a), results of a step-wise linear regression (STEPLR) are provided, whereas in column (b), results of an ordinary least squares (OLS) estimate are provided. Finally, in column (c) results from a fully modified ordinary least squares (FMOLS) estimate are provided. In the STEPLR estimate in column (a), all seven of the eight estimated coefficients exhibit the expected signs, with two being statistically significant at 1% level or beyond and at the 5% level or beyond, and one being statistically significant at the 10% level. The coefficient of determination is 0.46, so that the model explains more than three-sevenths of the variation in the bank failure rate. The DW of 1.93 implies the absence of serial correlation problems. In the OLS estimate in column (b), all seven of the eight estimated coefficients exhibit the expected signs, with one being statistically significant at the one percent level or beyond, three being statistically significant at the five percent level or beyond, and at 10% level. The coefficient of determination is 0.48, so that the model explains nearly one-half of the variation in the bank failure rate. The DW of 2.01 implies the absence of serial correlation problems.

Finally, in the FMOLS estimate in column (c), all seven of the eight estimated coefficients exhibit the expected signs, with four being statistically significant at the one percent level or beyond and at 10% level. The coefficient of determination is 0.47, so that the model explains nearly one-half of the variation in the bank failure rate. The DW of 2.07 implies the absence of serial correlation problems. As for the specific results, the estimated coefficient on the Y variable is negative in all three estimates, as hypothesized, and statistically significant at the 2.5 prevent level in one case and at 10% level in another. Thus, there is modest evidence that the higher the growth rate of real GDP, the lower the bank failure rate, presumably because of the stronger economy implied by a higher Y and the resulting better loan performance on bank balance sheets.

The estimated coefficient on the COST variable is positive in all three estimates, as hypothesized, and statistically significant at the 1% level in one case, at the 5% level in another case, and at 10% level in the third case. These results imply that the higher the cost of funds to banks, the lower the bank rate of profitability and the higher the incidence of bank failures may be over time. The estimated coefficient on the VOL variable is positive in all three estimates but fails to be statistically significant at 10% level in any of them, providing evidence that the bank failure rate over the 1970 through 2008 study period was not significantly impacted by stock market attributable, at least to some degree, to its being rather highly correlated with the CRA variable (+0.694). The

Table 2. Empirical estimates dependent variable: Δ BKFRATE.

Variable	Column (a), STEPLR	Column (2), OLS	Column (3), FMOLS
Y	-0.05(-1.28)	-0.084*(1.71)	-0.0083**(2.43)
Δ COST	0.122*(1.69)	0.166**(2.03)	0.185***(3.17)
ΔVOL	0.003(0.08)	0.001(0.04)	0.004(0.16)
Δ MORT	-0.265**(-2.08)	-0.34**(-2.37)	-0.404***(-4.06)
FDICIA	-1.175***(-4.59)	-1.23***(-4.74)	-1.33***(-7.43)
RNIBA	0.524**(1.99)	0.639**(2.16)	0.709***(3.38)
CRA	0.392***(2.64)	0.296*(1.69)	0.289**(2.18)
R2	0.46	0.48	0.47
adjR2	0.35	0.36	0.34
DW	1.93	2.01	2.07
Rho	0.03	-0.01	-0.03

The symbol Δis the first-differences operator. Terms in parentheses are t-values.*** indicates statistically significant at the 0.01 level; ** indicates statistically significant at the 0.05 level, and; * indicates statistically significant at the 0.10 level.

estimated coefficient on the MORT variable is negative in all three cases, as expected, and statistically significant at the 1% level in two cases and at the 5% level in the third case. These findings strongly imply that banks benefited from higher interest rates charged on new 30 year fixed-rate mortgages, sufficiently to reduce the percentage of banks that failed over the 1970 - 2008 study period. As for the federal banking statutes, the estimated coefficient on the FDICIA variable is negative in three estimates. As hypothesized, it is statistically significant at 1% level in the three estimates as well. These results imply that, the FDICIA legislation was effective over the study period in reducing the bank failure rate, a conclusion that is consistent with the earlier studies of the effects of FDICIA by Benston and Kaufman (1997); Cebula (1996, 1999). This finding presumably reflects effects of the kinds of FDICIA provisions broadly identified in Section II shown (FDIC, 1995; esp. p. 26). Regarding the RNIBA variable, its coefficient is positive in three estimates. As hypothesized, it is statistically significant at 1% level in one case and at 5% level in the remaining two cases. These findings are consistent with the hypothesis put forth above that the nationwide branch banking established under the Riegle-Neal Interstate Banking and Branching Efficiency Banking Act of 1994 may have acted to increase the degree of competition within the banking industry, thereby reducing bank profitability. In addition, this statute may have, albeit in unexpected ways, acted on balance also to increase bank operating costs and other costs associated with an increased pace of branch bank expansion, further reducing bank profitability. Over time, such reduced profitability would appear to have led to an increased bank failure rate. Finally, the estimated coefficient on the CRA variable is positive. As hypothesized, it is statistically significant at 1% level in one estimate, at 4% level in another estimate, and at the 10% level in the remaining estimate. Thus, the empirical evidence implies that the provisions of the CRA (revised/enhanced in 1995), albeit intended to reduce/eliminate redlining and to reduce/eliminate discrimination in lending, as Apgar and Duda (2003) find out that it did. Also, it exercised an unintended negative side effect. Namely, it appears that the CRA ultimately also exposed commercial banks to increased credit risk (Avery et al., 2000), which in turn manifested itself in an increased bank failure rate. Thus, the bank failure rate over the 1970 - 2008 study period appears to have been an increasing function on the cost of funds and a decreasing function on the percentage growth rate of real GDP and the interest rate on *new* 30 year fixed-rate home mortgages (Amos, 1992; Barth et al., 1992; Chao and Cebula, 1996; Loucks, 1994; Saltz, 1994; Wheelock and Wilson, 2000). The bank failure rate also, was found to be negatively impacted by the Federal Deposit Insurance Corporation Improvement Act of 1991 (Benston and Kaufman, 1997; Cebula, 1999). Finally, the bank failure rate was found to have been elevated by both the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994 and the Community Reinvestment Act of 1977 (revised and enhanced in 1995).

CONCLUSION

This study investigates factors influencing the bank failure rate in the U.S. over the period from 1970 through 2007. For purposes of this study, a bank failure occurs when a bank is forced by regulators either to close or to merge with another banking institution. The analysis considers four economic/financial factors and three federal banking statutes. Based on the estimates in this study, the bank failure rate over the study period was found to

be an increasing function on the average cost of funds, while being a decreasing function on the percentage growth rate of real GDP and the interest rate on *new* 30 year fixed-rate mortgages. Furthermore, the evidence implies that the provisions of the Federal Deposit Insurance Corporation Improvement Act of 1991 acted to reduce bank failures, whereas the provisions of the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994 (presumably by increasing competition and/or increasing operation and other costs through greater branch bank expansion) induced an increase in bank failures. Finally, there is also evidence that the Community Reinvestment Act of 1977 (revised and enhanced in 1995) may have contributed to increasing the bank failures, presumably by exposing banks to increased credit risk.

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