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Long-term performance of rival banks around bank failures

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Abstract

This paper examines the impact of bank failures on the long-term performance of rival banks. We find that bank failures are associated with changes in long-term performance at rival banks. However, the change in performance is not the same for all banks. Specifically, if the bank failure is a result of a problem that is unique to the failing bank, rival bank performance increases after the failure. However, if the bank failure is due to a general economic decline, rival bank performance decreases after the bank failure. Other differences between the two subgroups are also identified.

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1. Introduction

Contagion effects resulting from bankruptcy announcements have long been the focus of empirical analyses. The majority of the literature has examined bankruptcy of non-financial firms.¹ In the banking industry, however, failure of a firm is different than for non-banks.

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¹ Lang and Stulz (1992) examine the contagion of failure announcements across many industries in the U.S. Their findings suggest that contagion effects exist and are heightened when an industry is highly leveraged and highly competitive. They further suggest that the effect turns significantly positive (i.e., failure is procompetitive) in highly concentrated, low leverage industries.

Specifically, unlike any other industry, a failing bank can not be closed until regulators evaluate the situation for its impact on the safety and soundness of the financial system, arrange a purchaser of the bank's assets and liabilities (or another liquidation method), and declare the bank closed. Additionally, before 1997 and the enactment of the Reigle-Neal Interstate Banking and Branching Efficiency Act, banks were not completely free to expand outside their local area. While many banks and their home states had regional reciprocity laws (banks could expand across state lines with neighboring states), complete nationwide expansion was virtually nonexistent. Thus, unlike failures in non-banking industries, a bank failure is more likely to have a direct impact on the performance of rival banks in the failing bank's local area.

In an attempt to clarify the nature of bank failure related contagion on U.S. banks, [Aharony and Swary \(1996\)](#) examine information-based elements of bank failures using large bank failures occurring in the southwest U.S. in the 1980s. They find that the closer the rival bank is to the failing bank the stronger the contagion effect; the larger the rival bank the stronger the contagion effect; and the higher the rival banks' leverage the more negative the impact. They conclude that regional bank failures should send a "red flag" to regulators indicating additional banks in the region may be problematic.

[Akhigbe and Madura \(2001\)](#) further address the cross-sectional variation of contagion effects as well as the risk shifts that are associated with announced bank failures. Their findings suggest that contagion effects are stronger when the failing bank is a multibank holding company, is large, or is publicly held. They further suggest that contagion is heightened when the surviving rival bank is relatively small and when its capital levels are relatively low. They also find that the contagion effect decreases after the passage of the Financial Institutions Reform Recovery and Enforcement Act (FIRREA) of 1989.

In assessing the effects of closure policies on surviving banks, [Davies and McManus \(1991\)](#) conclude that increasing closure levels may have unintended consequences. Depending on the bank, increases in closure levels by regulators may increase or decrease asset risk for otherwise healthy banks. Similarly, increasing closure levels can potentially increase or decrease the level of leverage desired by managers and/or owners. [Garcia \(1995\)](#) examines the FDIC Improvement Act (FDICIA) and its mandatory closure rule. He shows how the mood of regulators can change dramatically through time. While forbearance was encouraged after the Competitive Equality Banking Act (CEBA) of 1987, it was explicitly discouraged after the passage of FDICIA. Although the Prompt Corrective Action (PCA) clause of FDICIA did mandate closure of certain distressed institutions, regulators were not completely stripped of their ability to impose sanctions at their discretion. Thus, the strength of the signal that regulators send by closing a bank varies depending on the regulatory environment.

Existing research finds that bank failures result in industry-wide shocks in the short run. However, no study has cross-sectionally examined the long-term implications of bank failures on rival banks. While a short-run analysis of bank failures allows for the evaluation of investor's *expectations* of future performance changes for rival banks around a bank failure, long-term analysis of rival banks allows for the evaluation of *actual* changes in performance around a bank failure. As regulators set policy regarding the evaluation of a bank failure for its impact on the safety and soundness of the financial system, actual changes in the long-term operating performance of surviving banks around

a bank failure rather than expectations of future performance changes by investors are most relevant.

In this paper, we examine the affect of bank failures on the long-term operating pretax cash flow return on assets of rival banks. We find that a bank failure is associated with changes in the long-term operating performance of rivals. However, the change in performance is not the same for all banks. Specifically, if the bank failure is a result of a problem that is unique to the failing bank, rival bank operating performance increases after the failure. However, if the bank failure is due to a general economic decline, rival bank operating performance decreases after the bank failure. The failure of a bank due to a firm-specific problem creates an opportunity for a shift of customers from the failing bank to its healthy rivals. The result is an increase in the operating pretax cash flow return on assets of these rivals. However, a bank failure due to general economic decline does not result in the same opportunity for a shift in customers. In fact, the spread of the economic decline results in a decrease in operating pretax cash flow return on assets of rival banks. For rival banks in a firm-specific bank failure we find that the improved long-term performance is associated with the growth in both industry-adjusted deposits and loans with no deterioration in the loan quality as well as to an increase in liquidity. For rival banks in bank failures due to a general economic decline we find the decrease in performance is associated with a decrease in industry-adjusted growth in deposits and loans, deterioration in the quality of the remaining loans, and an increase in liquidity risk. Finally, we find that the size of the change in performance is related to the failed bank's asset size, whether the failed bank is a multiple bank holding company or a unit bank, the total capital ratio of the rival banks, the number of rival banks, and whether the bank failure occurred before versus after the passage of the Financial Institutions Reform, Recovery and Enforcement Act of 1989. It needs to be noted that other factors (such as geographic location, economic changes, changes in regulation, other mergers in the market, or restructuring by particular banks) could affect the change in rival bank performance. Thus, rather than an attempt to test explicit hypotheses about the interactions between failed and surviving banks, this paper characterizes the data for rival banks around a bank failure. Specifically, we find that after a bank failure there is a significant improvement in the performance of banks of similar size, that operate in the same geographic area, and that operate with a similar loan portfolio composition as the failed bank.

The remainder of the paper is organized as follows. Section 2 summarizes the impact of bank failures on rival banks. Section 3 discusses the data and methodology. Section 4 presents the results of the paper and Section 5 concludes the paper.

2. The impact of a bank failure on rival banks

Commercial banks perform several important functions in the U.S. economy. For example, commercial banks channel funds from those with surplus funds to those with fund needs most efficiently and at the lowest cost. Further, because deposits of commercial banks are a significant component of the money supply, commercial banks play a key role in the transmission of monetary policy from the central bank to the rest of the economy. To protect borrowers, depositors, and the overall economy against the consequences of bank

failures, regulators impose layers of protective mechanisms or regulations on the industry. One specific area of regulation is the entry and exit of banks from the industry. Increasing or decreasing the cost of entry and exit into an industry affects the profitability of firms competing in the industry. Thus, regulations on the entry and exit of banks from the industry affect banks' performance.

If regulations on entry and exit in banking result in imperfect competition, negative announcements from one bank (such as a bank failure) could shift customer demand from the announcing bank to its rivals, thus increasing the rivals' performance. Further, the opportunity for such a shift in customers should be the greatest when the adverse announcement is specific to the one bank. That is, if a bank failure is the result of mismanagement of a single bank, closure of that bank should result in a shift of loans and deposits to its rival banks. As a result, subsequent to a firm-specific bank failure, the long-term performance of rival banks should increase as customers of the failing bank shift their business to healthy rival banks (in this less than perfectly competitive industry). If, however, a bank failure is the result of a general economic decline, the potential for a shift in customer business is reduced. In fact, as found by [Aharony and Swary \(1996\)](#) this announcement could indicate that the long-term performance of rival banks will deteriorate. In this paper, we look at the impact of bank failure announcements on the long-term performance of rival banks. In this less than perfectly competitive market, we expect a firm-specific bank failure to lead to a redistribution of business from the failing bank to the remaining rival banks.

3. Data and methodology

This study examines the long-term operating performance of rival banks subsequent to bank failure announcements from 1980 through 2000. Three data sources are used to develop the sample of bank failures. First, we use FDIC Annual Reports and the FDIC Bank Cost Analysis study to identify failures of banks with greater than \$200 million in assets. Second, for 1980 through 1996, we add failures of banks with less than \$200 million in assets and analyzed in [Akhigbe and Madura \(2001\)](#). Akhigbe and Madura compile their list by searching the "Federal Deposit Insurance Corporation" section of the *Wall Street Journal* Index.² Third, we extend the sample of bank failures used by Akhigbe and Madura to include 1997–2000 by searching the *Wall Street Journal* Index for these four years, adding any bank failure involving assets of less than \$200 million to our sample. This selection criterion allows us to examine those bank failures that should have the largest impact on rival banks (i.e., large bank failures and those in which news of the bank failure

² Because our study examines rivals relative to the year of failure rather than the exact day of failure, three events in [Akhigbe and Madura \(2001\)](#) involving Banc Texas Group, Inc. are combined into one. The three failure-related events span two years (1986–1987). As is the case with the rest of their study, the earliest related event date is used, which places the failure in 1986. Further, the sample from Akhigbe and Madura includes two separate failures involving a common bank holding company. These two events are combined into one. Finally, the sample from Akhigbe and Madura includes an event related to the collapse of the C.H. Butcher bank empire. This series of failures involves the closure of several banks in Tennessee that were controlled by two Butcher brothers and their associates. Because the exact number and identification of each associated bank is not exactly known, the event is screened from the sample. These changes leave us with a sample of 95 out of 99 used by Akhigbe and Madura.

Table 1
Year of bank failure announcements and reason for bank failure

Year of bank failure	Full sample of firms	Firm-specific failure	General economic decline	Reason for failure unknown
1980	3	3	0	0
1981	3	1	2	0
1982	3	3	0	0
1983	9	6	0	3
1984	7	5	1	1
1985	10	4	2	4
1986	35	9	11	15
1987	8	2	5	1
1988	14	0	4	10
1989	8	1	2	5
1990	10	2	4	4
1991	22	1	15	6
1992	22	5	15	2
1993	6	3	1	2
1994	1	1	0	0
1995	2	1	1	0
1996	1	1	0	0
1997	0	0	0	0
1998	1	1	0	0
1999	1	1	0	0
2000	0	0	0	0
Total	166	50	63	53

The year of the bank failure is the failure date listed by the FDIC or the initial announcement in the *Wall Street Journal* Index of an actual bank failure or critical event that is related to the failure of the bank. Firm-specific vs. general failure are determined by searching articles in LEXIS/NEXIS. Each failure is categorized as firm-specific, general economic decline, or reason for failure unknown.

was widely disseminated). We do not examine banks that came close to failure, but were bailed out or involved in an arranged merger by the federal government. News that banks are close to failure may result in the loss of some loans and deposits. However, because these banks do not actually fail, the loss of business to rivals should not be as large as that for banks that actually fail and are examined here. The final sample includes 166 bank failure announcements. Table 1 lists the distribution of the sample by year. The majority of the failures (129) occurred in 1985–1992 as the U.S. economy declined and eventually entered a recession. In contrast, during the U.S. economic boom in the mid- and late-1990s few banks failed.

We examine the effect of bank failures on the operating performance of rival banks based on the reason for the bank failure: firm-specific versus general economic decline versus reason for failure unknown. Thus, for each announcement we searched LEXIS/NEXIS to identify the stated reason of each bank failure. We assign a failure as firm-specific if articles relating to the failure indicate a problem specific to the failing bank. For example, a press report pertaining to the 1996 failure of Metrobank of Philadelphia stated “lack of banking knowledge by Metrobank’s board, resulting in poor decisions that led to poor asset quality, insufficient earning-asset base and ineffective management, also were cited as reasons for

the closure”. We are able to identify a firm-specific reason for the failure in 50 events. We define a failure as due to a general economic decline if articles indicate a more wide spread reason for the bank failure. For example, a press report for the 1981 failure of Northwest Commerce Bank of North Bend, Oregon stated “the bank experienced deposit

Table 2
Descriptive statistics for failing and rival banks

	Full sample of banks	Firm-specific failures	General economic decline	Reason for failure unknown	
Panel A: failing banks					
Failing banks, asset size (in millions of dollars)					
Average asset size	2,704.63	1,629.45	4,222.62	1,914.56	
Median asset size	383.47	209.56	1,048.39	151.22	
Minimum asset size	5.61	8.53	7.15	5.61	
Maximum asset size	57,913.15	57,913.15	40,466.95	43,981.18	
MBHC	30	6	18	6	
OBHC or unit bank	136	44	45	47	
Pre-FIRREA	92	33	25	34	
Post-FIRREA	74	17	38	19	
Money center bank	1	1	0	0	
Non-money center bank	165	49	63	53	
	Mean	Median	Standard deviation	Minimum	Maximum
Panel B: rival banks					
Assets (in millions of dollars)					
Full sample	1,856.63	123.89	10,125.32	18.13	92,965.83
Firm-specific failures	613.87	79.73	3,493.49	21.34	24,557.91
General economic failure	1,306.05	264.91	4,896.71	18.13	37,296.19
Reason for failure unknown	3,649.65	64.27	16,639.71	18.52	92,965.83
Capital ratio (%)					
Full sample	8.31	8.15	2.18	0.66	21.42
Firm-specific failures	8.57	8.13	2.23	6.23	21.42
General economic failure	7.86	8.04	1.72	1.93	12.89
Reason for failure unknown	8.61	8.36	2.52	0.66	17.87
OPCFROA (%)					
Full sample	1.35	1.44	0.50	-1.72	3.05
Firm-specific failures	1.43	1.50	0.52	-0.26	2.44
General economic failure	1.26	1.35	0.34	0.44	1.80
Reason for failure unknown	1.37	1.47	0.63	-1.72	3.05

Failing bank assets are as of year-end prior to the failure announcement and are collected from the Federal Reserve Bank of Chicago’s Call Report database. Failing bank organizational form (MBHC or other) is also identified from this database. Failure events are classified as pre-FIRREA if they occurred in or before 1988 and post-FIRREA if they occurred after 1988. Assets of rival banks are the average year-end assets in the three years prior to the bank failure announcement. Capital ratio is the average total capital to book value of total assets of the rival banks in the three years prior to the bank failure announcement. OPCFROA is the average of operating pretax cash flows to book value of total assets of rival banks in the three years prior to the bank failure announcement. Rivals are defined as all banks in the same MSA and same asset class group as the failed bank. We are able to identify rivals for 164 of the 166 failing banks using this filter.

growth problems, primarily the result of a depression in the last few years in the lumber and timber industry that dominates the North Bend area". We are able to identify a decline in the economy as the reason for the bank failure in 63 events. We are unable to identify a reason for the bank failure as either firm-specific or general for 53 of the events and thus list them as unknown. The distribution of the reason for the bank failures is listed by year of failure in Table 1.

Previous research has found that the short-term impact of a bank failure on other banks in the industry is affected by the size of the failing bank, whether the failing bank is a multibank holding company (MBHC) versus a one bank holding company (OBHC) or unit bank, and whether the failing bank is a money center bank (MCB) versus a non-money center bank. Further, research has found that the impact of a bank failure on other banks changed before versus after the passage of FIRREA. We also examine the impact of these factors on long-term rival bank operating performance. Panel A of Table 2 lists descriptive statistics for these variables. The largest failing bank in the sample, Continental Illinois Bank that failed in 1984, is much larger than the rest of the sample. To make sure that our results are not driven by this outlier, we conduct all tests with and without Continental (and its rival banks) included. The inclusion or exclusion of Continental makes no difference in any results or conclusions in the paper.

To measure the impact of the bank failure on rival banks, we identify rival banks using Bank Call Report data available from the Federal Reserve Bank of Chicago website.³ We define rival banks using three different filters. First, we compile all banks in the same metropolitan statistical area (MSA) as the failing bank (or with all banks in the same and surrounding counties if no banks existed in the same MSA as the failing bank or if the failed bank was a rural bank). By limiting rival banks to the same MSA (or MSA-match) we reduce the impact of distance between the failing and rival banks. It is possible that distant rivals may be affected less than nearby (local) rivals. By limiting rivals to those in the same MSA or those in the failing banks' local counties, we eliminate the very distant rival banks from the analysis and reduce (at least to some extent) the impact of distance. We are able to find rival banks for each of the 166 events using this filter. The maximum number of rivals is 323 and the minimum is 1. It is possible that the number of rivals may reflect the degree of market concentration and market structure in the failing banks' operating area. We examine whether and to what extent the number of rival banks affects the results below in the regression analysis.

Second, to address the possible effects of dissimilarity between failing banks and their rivals, we control for size of the failing banks. Specifically, we compile all banks in the same MSA and of the same size class as the failed banks.⁴ We are able to find rival banks

³ We examine the performance of multiple rival banks rather than just the most similar rival to avoid the possibility that changes in rival performance around a bank failure may be due to a rival bank-specific event (e.g., dividend increase) rather than the bank failure. By examining the performance of multiple rivals, changes in performance around a bank failure due to a rival bank-specific event will be diluted.

⁴ Asset groups are for average total assets during the three years just prior to the failure event date. We use the four asset size groupings commonly used by the Federal Reserve: less than \$100 million, between \$100 million and \$1 billion, between \$1 billion and \$10 billion, and greater than \$10 billion. The asset filter we use includes

for 164 of the 166 events using this filter (49 failures due to a firm-specific event, 62 failures due to a general economic decline, and 53 failures due to unreported reasons).

Third, we compile all banks in the same MSA (or MSA-match), of the same size class, and with similar concentrations of loan types. Specifically, for each failing bank in the sample, we look at consumer and mortgage loans, commercial and industrial loans, and agricultural loans, respectively, as a percent of total loans at year end before the failure. The bank is then classified as a particular niche bank (e.g., agricultural loan bank) based on the largest lending area. If a second (and sometimes third) lending area is within 5% of the largest area, the bank is considered to have two (or three) niche areas. We then classify rival banks as those in the same MSA (or MSA-match), same asset class size, and same lead lending (or niche) area(s). This filter allows us to examine whether a failure of a bank with a specific niche affects banks in the same niche more so than other banks. We are able to identify rival banks for 131 events using this filter.⁵

Rival banks must exist for the entire period of analysis. Thus, we exclude all rival banks (identified using any of the three filters) that fail or exit the industry for some other reason in the three years before or after a sample bank failure. While this requirement may create a survivorship bias, our goal in this paper is to examine the long-term performance of rival banks around a bank failure. Accordingly, we analyze only those rival banks that operate over the long term.

The measures we use to test rival bank operating performance around bank failures are those in [Cornett and Tehranian \(1992\)](#) and [Cornett, Mehran, and Tehranian \(1998\)](#). Cornett and Tehranian look at merger-related operating performance in commercial banks. Cornett et al. look at performance around voluntary versus involuntary equity issuances at commercial banks. We collect cash flow data for the rival banks both before and after the bank failure announcement. A comparison of the post-failure values with the pre-failure benchmark allows us to measure the impact of the bank failure on the performance of the rival banks. Like Cornett and Tehranian and Cornett et al., we use operating pretax cash flows (defined as income before taxes and extraordinary items plus interest on subordinate notes and debentures) divided by the year-end book value of assets (OPCFROA) to evaluate performance.

We obtain the pre-failure operating pretax cash flow performance benchmark for years –3 to –1 before the announcement of a bank failure. We divide the measure by the book value of assets to provide a return metric that is comparable across firms. The post-failure operating cash flows of the rival banks are computed for years 1–3 after the bank failure announcement.⁶ Again, the cash flow measure is deflated by the book value of assets to yield a normalized measure of performance. We examine cash flow performance changes for the full sample, i.e., rival bank performance around the bank failure announcement. We

the same group as the failing bank and the next closest group. For example, if the failed bank's asset size is \$1.5 billion, rival banks include all banks in the same MSA and with asset size between \$100 million and \$10 billion. If, however, the failing bank is less than \$50 million or greater than \$50 billion in assets, only the same group as that for the failing bank is used.

⁵ Because the results using all three filters lead to identical conclusions, we report them for only the second rival filter in which we analyze 164 events. Results using the other filters are available from the authors on request.

⁶ At the time the data were collected, we were able to obtain only two years of post-failure data for the rival banks in the 1999 bank failure announcement.

also compare performance based on the reason for the bank failure. That is, we analyze rival bank performance for firm-specific bank failures, general bank failures, and bank failures due to unknown reasons, separately.

Panel B of Table 2 presents descriptive statistics for the rival banks, including average assets, average total capital ratio (total equity and subordinate debt to total assets) and average OPCFROA in the three years prior to the bank failure announcements. The average asset size of the rival banks is \$1,857 million, much smaller than the failed bank. The total capital ratio for the rival banks averages 8.31%. During most of the period of study, the required total capital ratio ranged from 5 to 6.5%.⁷ Thus, in contrast to the failing banks, the rivals are quite healthy in terms of their equity levels. Finally, the average OPCFROA for the rivals before the bank failures is 1.35%.

Changes in the pre- and post-failure operating performance are examined on both an unadjusted basis and industry match adjusted basis. A change in unadjusted operating performance may be due to factors other than the bank failure. For example, most of the bank failures occurred during the credit crisis of 1985 through 1989. Further, the U.S. economy experienced a recession during 1991 and 1992. As a result, the Federal Reserve took several steps to raise the capital of banks⁸ and to counteract the recession. These changes were intended to directly affect bank performance. Accordingly, a finding that the unadjusted performance of rival banks changes around a bank failure does not rule out the possibility that the performance changes for a reason other than the bank failure. Industry match adjusted comparisons allow us to examine performance changes of rival banks irrespective of any industry-wide factors that may be affecting OPCFROA. Following our classification of rival banks, we classify industry banks as all banks not in the same MSA as the failing bank, but in the same asset class as the failing bank.⁹ Matching the rival banks to these characteristics allows us to compare their performance to that of the most similar competitors.

To identify the sources of the operating pretax cash flow performance, we evaluate six common bank performance indicators (as in Cornett & Tehranian, 1992): profitability indicators, capital adequacy indicators; asset quality indicators; operating efficiency indicators; liquidity risk indicators; and growth indicator. The specific measures used to represent these factors are defined in Table 3. We examine these six indicators of bank performance in an attempt to identify specific areas within the rival banks that might drive any differences in operating pretax cash flow performance. We examine these ratios for the full sample of rival banks and for subsamples based on whether the bank failure was due to firm-specific, general economic, or reason unknown problems.

There is collinearity between some of the specific ratios representing the different factors (e.g., loans to equity and loans to assets). Therefore, changes in the various areas of

⁷ Even with the introduction of risk weighted capital adequacy rules in 1993, banks were required to maintain a total capital ratio, defined as core capital divided by book value of assets, of 5% or above to be classified as well capitalized.

⁸ Cosimano and McDonald (1998) find evidence on how the equity value of similar sample banks increased because of a reduction in reserve requirements.

⁹ This is the industry match for our second rival filter. For our first rival filter, we classify the industry as all banks not in the same MSA as the failing banks. For our third filter, we use all banks not in the same MSA, but in the same size class and with a similar distribution of loan concentration as the failing bank.

Table 3

Definitions of ratios used to analyze performance of rival banks around bank failure announcements between 1980 and 2000^a

Ratio	Definition
Profitability indicators	
(1) Return on assets	Net income after taxes as a percent of book value of total assets
(2) Return on equity	Net income after taxes as a percent of book value of total equity capital
(3) Net interest margin	Interest income minus interest expense as a percent of book value of total assets
Capital adequacy indicators	
(4) Total capital to assets	Total equity and subordinate debt as a percent of book value of total assets
(5) Loans to total capital	Total loans as a percent of book value of total capital
(6) Deposits to total capital	Total deposits as a percent of book value of total capital
Asset quality indicators	
(7) Allowance for loan losses to loans	Allowance for loan losses as a percent of total loans and leases
(8) Loan loss provision to loans	Loan loss provision as a percent of total loans and leases
Operating efficiency indicators	
(9) Noninterest exp. to noninterest rev.	Operating expenses as a percent of operating revenue
(10) Noninterest exp. to net operating inc.	Operating expenses as a percent of net interest income plus noninterest revenue
(11) Noninterest exp. to total assets	Operating expenses as a percent of book value of total assets
(12) Interest and fees on loans to loans	Interest and fee income on loans as a percent of total loans and leases
(13) Personnel exp. to total assets	Personnel expenses as a percent of book value of total assets
(14) Fixed assets to total assets	Fixed assets as a percent of book value of total assets
(15) Total assets to employees	Book value of total assets to total employees
(16) Net income to employees	Net income after taxes to total employees
Liquidity risk indicators	
(17) Loans to total assets	Total loans as a percent of book value of total assets
(18) Core deposits to total assets	Demand deposits plus savings deposits plus time deposits as a percent of book value of total assets
(19) Loans to total deposits	Total loans as a percent of total deposits
(20) Liquidity ratio	Cash and marketable securities as a percent of book value of total assets
Growth indicators	
(21) Asset growth rate	Change in book value of total assets as a percent of book value of total assets in the previous year
(22) Deposit growth rate	Change in core deposits as a percent of core deposits in the previous year

^a All values used to calculate these ratios are taken from financial statements reported on the Federal Reserve Bank of Chicago Call Report database.

performance, reported in the next section, may be a result of common elements. Differences in the change in rival bank performance based on (i) firm-specific and general economic decline bank failures, (ii) firm-specific and reason unknown bank failures, and (iii) general economic decline and reason unknown bank failures are tested using the *t*-statistic,

$$t = \frac{\sqrt{n_1 n_2 / (n_1 + n_2)} (\bar{X}_1 - \bar{X}_2)}{\sqrt{\left[\sum_{i=1}^{n_1} (x_{1i} - \bar{x}_1)^2 + \sum_{j=1}^{n_2} (x_{2j} - \bar{x}_2)^2 \right] / (n_1 + n_2 - 2)}}, \quad (1)$$

where \bar{x}_1 and \bar{x}_2 are the means of the performance measure of the rival banks to firm-specific failures and rival banks to general economic decline failures (or firm-specific and reason unknown failures, or general economic decline and reason unknown bank failures), respectively, n_1 and n_2 are the numbers of observations in the samples, respectively, x_{1i} and x_{2j} are the performance measures for the i th and j th bank in the samples.

4. Empirical results

4.1. Cash flow returns

Table 4 presents the results for operating pretax cash flow return on assets. Panel A of Table 4 lists median annual OPCFROA and median industry match adjusted annual OPCFROA (IAOPCFROA) for the full sample of rival banks in the years surrounding the bank failure announcements. It is difficult to draw conclusions from median rival bank results because these data do not adjust for industry factors that may be affecting the cash flow returns of the banks. Any trend would affect values for the rival bank medians, so a change may be due to factors other than the bank failure. Thus, we account for the impacts of contemporaneous events and focus our discussion on industry match adjusted median performance measures. Both before and after the bank failure OPCFROAs are not significantly different from industry matched banks. The median IAOPCFROA ranges from -0.17 in year -1 before the bank failure announcement to 0.11 in year -2 . Further, the percent of positive IAOPCFROAs over the three years before and after the bank failure for the 164 events is not significantly different from 50% (the results are not driven by outliers). Thus, for the full sample of rival banks the bank failure announcement is unrelated to rival bank performance relative to the industry.

Panels B–D of Table 4 present rival bank and industry matched adjusted OPCFROA for the three subgroups of rival banks before and after the bank failure. Panel B presents results for rival banks when the bank failure is due to a firm-specific event, Panel C lists results when the bank failure is due to a general economic decline, and Panel D lists results when the reason for the bank failure is unknown.

Panels B–D show that, prior to the bank failure, all three subsamples of rival banks performed similar to the industry. The median IAOPCFROA for rival banks in the firm-specific failure group is -0.06% during the three years prior to the bank failure, for rival banks in the general economic decline failure group is 0.07% , and for rival banks when the reason for the failure is unknown is -0.08 . After the bank failure, however, we see significant differences in rival bank performance compared to the industry across the subsamples. For rival banks in firm-specific failures (Panel B) the median IAOPCFROAs range from 0.63 to 0.71% in the three years after the bank failure. Over the three years the median IAOPCFROA is 0.69% , which is significant at the 1% level. Further, the percent of the sample with positive IAOPCFROAs is consistently greater than 70%. Thus, the results are not driven by outliers.

Table 4

Rival bank and industry match adjusted median annual operating pretax cash flow return on assets in the years surrounding the failure of commercial banks between 1980 and 2000

Year relative to failure announcement	Panel A: full sample (<i>n</i> = 164)			Panel B: bank failure due to firm-specific reason (<i>n</i> = 49)			Panel C: bank failure due to general economic decline (<i>n</i> = 62)			Panel D: reason for bank failure unknown (<i>n</i> = 53)		
	Rival bank	Industry match adjusted		Rival bank	Industry match adjusted		Rival bank	Industry match adjusted		Rival bank	Industry match adjusted	
	Median (%)	Median (%)	Percent positive	Median (%)	Median (%)	Percent positive	Median (%)	Median (%)	Percent positive	Median (%)	Median (%)	Percent positive
–	1.51	0.09	55.5	1.61	–0.04	55.1	1.55	0.09	56.4	1.41	0.07	56.6
3												
–	1.63	0.11	56.4 ^d	1.69	0.12	53.1	1.66	0.07	51.6	1.54	–0.05	54.7
2												
–1	1.52	–0.17	47.0	1.58	–0.11	51.0	1.53	0.08	51.6	1.50	–0.11	43.4
Median annual performance for years –3 to –1	1.55	–0.06	53.0	1.62	–0.06	53.1	1.55	0.07	51.6	1.49	–0.08	54.7
1	1.54	–0.11	54.8	2.02	0.71 ^a	77.6 ^c	0.81	–0.79 ^a	32.2 ^c	0.95	–0.61 ^b	24.5 ^c
2	1.50	–0.17	44.5	1.99	0.69 ^a	73.5 ^c	0.74	–0.81 ^a	29.1 ^c	0.94	–0.55 ^b	24.5 ^c
3	1.49	–0.09	48.4	1.90	0.63 ^b	73.5 ^c	0.80	–0.76 ^a	33.9 ^c	0.88	–0.45 ^b	22.6 ^c
Median annual performance for years 1–3	1.51	–0.12	48.8	1.99	0.69 ^a	73.5 ^c	0.79	–0.77 ^a	32.2 ^c	0.92	–0.54 ^b	22.6 ^c
Year relative to failure announcement	Panel E: difference in industry match adjusted performance Panel B vs. Panel C			Panel F: difference in industry match adjusted performance Panel B vs. Panel D			Panel G: difference in industry match adjusted performance Panel C vs. Panel D					
	Mean	<i>p</i> -value		Mean	<i>p</i> -value		Mean	<i>p</i> -value				
–3	–0.13	0.731		–0.11	0.754		0.02	0.874				
–2	0.05	0.834		0.17	0.692		0.12	0.741				
–1	–0.19	0.663		0.00	0.994		0.19	0.663				
Median annual performance for years –3 to –1	–0.15	0.719		0.02	0.874		0.15	0.719				
1		1.50 ^a	0.001		1.32 ^a	0.007		–0.18	0.672			
2		1.50 ^a	0.001		1.24 ^a	0.017		–0.26	0.601			
3		1.39 ^a	0.006		1.08 ^a	0.020		–0.31	0.594			
Median annual performance for years 1–3		1.46 ^a	0.002		1.23 ^a	0.019		–0.25	0.628			

Operating pretax cash flow return on assets is income before taxes and extraordinary items plus interest on subordinate notes and debentures as a percent of the book value of total assets as of the end of the year. Rivals are defined as all banks in the same Metropolitan Statistical Area and same asset size class group as the failed bank.

The *p*-values for the binomial tests are based on a Mann–Whitney–Wilcox test.

- ^a Significantly different from zero at the 1% level.
- ^b Significantly different from zero at the 5% level.
- ^c Wilcoxon signed rank test statistic is significant at the 1% level.
- ^d Wilcoxon signed rank test statistic is significant at the 5% level.

In contrast, for rival banks in bank failures due to a general economic decline (Panel C) median IAOPCFROAs range from -0.76 to -0.81% in the three years after the bank failure. Over the three years the median IAOPCFROA is -0.77% , significant at better than the 1% level. Further, the percent of positive observations for the subsample is significantly less than 50%. The results for failures in which the reason for the bank failure is unknown (Panel D) are similar to those for failures due to general economic conditions. Specifically, the median IAOPCFROA for rival banks range from -0.45 to -0.61% in the three years after the bank failure. Over the three years the median IAOPCFROA is -0.54% , significant at better than the 5% level. Further, the percent of positive observations for the subsample is significantly less than 50%. Given the similarity in the results for those bank failures due to a general economic decline and those when the reason for the failure is unknown, it is likely that the majority of the sample of bank failures in which the reason for the bank failure is unknown are, in fact, due to a general economic decline. Even though no details of these bank failures were reported in the periodicals and journals included on LEXIS/NEXIS, the vast majority of these failures occurred in the same local area and in the same years as those failures associated with a general economic decline.¹⁰

Panel E of Table 4 looks at the difference in IAOPCFROAs between rival banks in firm-specific versus general bank failures around the bank failure. In the three years before the bank failures, values range from -0.19 to 0.05% (all of which are insignificant). Thus, before the bank failure IAOPCFROA for rival banks in firm-specific bank failures are no different from those in general bank failures. However, values range from 1.39 to 1.50% over the three years after the bank failure and the difference in IAOPCFROAs for the two subgroups is 1.46% for the three-year period, which is significant at better than the 1% level. Thus, the change in rival bank IAOPCFROA after a bank failure is significantly greater when the bank failure is due to a firm-specific problem than a general economic decline.

Panel F of Table 4 looks at the difference in IAOPCFROAs between rival banks in firm-specific failures versus those bank failures in which the reason for the failure is unknown. Over the three years before the bank failure, the difference in IAOPCFROA for the two subgroups is 0.02 which is insignificant. However, the difference in IAOPCFROA for the two subgroups is 1.23% for the three-year period after the bank failure, which is significant at better than the 1% level. Thus, the change in rival bank IAOPCFROA after a bank failure is significantly greater when the bank failure is due to a firm-specific problem than when the reason for the failure is unknown. Notice that the results (significant versus insignificant levels of IAOPCFROA) in Panel F for reason unknown failures are the same as Panel E for firm-specific failures. However, the levels of significance are slightly smaller in Panel F.

Panel G of Table 4 looks at the difference in IAOPCFROAs between rival banks in failures due to a general economic decline versus those bank failures in which the reason for the failure is unknown. Over the three years before the bank failure, the difference in

¹⁰ When we exclude Continental Illinois (and its rival banks) from the sample, the median industry match adjusted annual performance in years -3 to -1 is -0.08 and in years $1-3$ is -0.10 . When we look at the sample of firm-specific bank failures with Continental excluded the median industry match adjusted annual performance in years -3 to -1 is -0.08 and in years $1-3$ is 0.71 . Thus, the inclusion of Continental does not affect our results or conclusions.

IAOPCFROA for the two subgroups is 0.15 which is insignificant. Further, the difference in IAOPCFROA for the two subgroups is -0.25% for the three-year period after the bank failure, which is also insignificant. Thus, the change in rival bank IAOPCFROA after a bank failure is the same when the bank failure is due to a general economic decline as when the reason for the bank failure is unknown.

It appears from these results that closure of a bank that is due to a specific problem within the failing bank may produce a shift in customer demand from the failing bank to its rivals. As a result, rival banks' long-term OPCFROAs increase after the bank failure. However, when a bank closure is due to a general economic decline, the opportunity for a shift in customer demand is reduced. In fact, in this case we find a decrease in long-term IAOPCFROA for rival banks as well. Finally, results when the reason for the bank failure is unknown are identical to those when the bank failure is due to a general economic decline. While we can not find any press reports to confirm this, given that the vast majority of these failures occurred in the same local area and in the same years as those failures associated with a general economic decline these failures are also likely to be due to a general economic decline.

4.2. Accounting ratios

Having found changes in rival banks' IAOPCFROAs after a bank failure, we next attempt to identify the specific sources of these changes by examining accounting ratios commonly used to evaluate various areas of bank performance. These ratios are listed in Table 3. As we did for OPCFROA, we measure all accounting ratios for three years before and three years after the bank failure. The results are reported in Table 5. We examine changes in pre- and post-failure values on both an industry match adjusted (using the same industry matched sample as above) and an unadjusted basis. As discussed above, because industry adjusted measures are more pertinent in evaluating bank performance, we report only industry match adjusted values in Table 5. Further, because changes in IAOPCFROAs for the full sample of rival banks (reported in Table 4) are not significant, we only report results based on the three subsamples of rival banks. That is, Panel A in Table 5 lists mean¹¹ values for the industry match adjusted accounting ratios (before and after the bank failure, as well as the change in the ratios) for rival banks when the bank failure is due to a firm-specific event, Panel B lists the ratios when the bank failure is due to a general economic decline, and Panel C lists the ratios when the reason for the bank failure is unknown. Panel D lists the difference in the ratios for firm-specific bank failures (Panel A) versus general economic decline bank failures (Panel B).¹²

¹¹ We also conducted tests of differences in the change in rival bank performance based on firm-specific and general economic decline or reason unknown bank failures using median values for the various accounting ratios. The results and conclusions using median values are identical to those using mean values of the ratios. Therefore, we do not present the results in the table. The results are available from the authors upon request.

¹² As we find in Table 4, comparisons of the accounting ratios for general economic decline failures and reason unknown failures produce no significant differences. Accordingly, comparisons of firm-specific failures and reason unknown failures produce results and conclusions identical to those of firm-specific versus general economic decline failures. Thus, we do not report the details of these ratio comparisons in Table 5. However, they are available from the authors upon request.

Table 5

Comparison of industry adjusted performance for rival banks in the three years before and after a bank failure between 1988 and 2000

Ratio	Panel A: bank failure due to firm-specific reason			Panel B: bank failure due to general economic decline			Panel C: reason for bank failure unknown			Panel D: firm-specific vs. general economic decline
	Pre-failure	Post-failure	Difference	Pre-failure	Post-failure	Difference	Pre-failure	Post-failure	Difference	Difference in performance change
Profitability indicators										
(1) Return on assets (%)	0.07	0.67	0.60 ^c	0.23	-0.65	-0.88 ^c	0.17	-0.51	-0.68 ^c	-1.48 ^c
(2) Return on equity (%)	0.38	2.98	2.60 ^b	1.17	-1.92	-3.09 ^b	0.99	-1.19	-2.18 ^b	-5.69 ^a
(3) Net interest margin (%)	-0.20	1.31	1.51 ^b	1.06	-0.57	-1.63 ^b	0.54	-0.48	-1.02 ^c	-3.14 ^b
Capital adequacy indicators										
(4) Total capital to assets (%)	-0.43	-0.15	0.28	0.29	0.09	-0.20	0.32	0.18	-0.14	-0.48
(5) Loans to total capital (X)	0.44	2.62	2.18 ^b	1.29	0.37	-0.92	1.15	0.29	-0.86	-3.10 ^b
(6) Deposits to total capital (X)	-2.33	1.93	4.26 ^b	-0.55	-1.18	-0.63	-0.69	-1.32	-0.63	-4.89 ^b
Asset quality indicators										
(7) Allowance for loan losses to loans (%)	0.09	0.06	-0.03	-0.27	2.36	2.63 ^b	-0.31	1.44	1.75 ^c	2.60 ^b
(8) Loan loss provision to loans (%)	0.41	0.34	-0.07	1.06	4.39	3.33 ^a	0.31	2.66	2.35 ^b	3.26 ^a
Operating efficiency indicators										
(9) Noninterest exp. to noninterest rev. (%)	-2.01	-2.32	-0.31	0.28	-0.32	-0.60	-1.13	-1.19	-0.06	-0.29
(10) Noninterest exp. to net operating inc. (%)	-0.22	-0.39	-0.17	0.06	-0.20	-0.26	-0.27	-0.46	-0.19	-0.09
(11) Noninterest exp. to total assets (%)	-0.27	-0.39	-0.12	0.35	0.12	-0.23	-0.41	-0.49	-0.08	0.11
(12) Interest and fees on loans to loans (%)	1.10	1.31	0.21	0.29	-3.92	-4.21 ^b	0.52	-2.16	-2.68 ^b	-4.42 ^b
(13) Personnel exp. to total assets (%)	0.15	0.25	0.10	0.13	-1.30	-1.43 ^b	0.18	-1.11	-1.29 ^c	-1.53 ^b
(14) Fixed assets to total assets (%)	0.28	0.32	0.04	0.18	0.35	0.17	0.21	0.39	0.18	0.13
(15) Total assets to employees (X)	27.24	31.31	4.07 ^b	0.24	-1.69	-1.93 ^b	1.42	0.73	-0.69	-6.00 ^b
(16) Net income to employees (X)	1.34	2.25	0.91	-0.28	-4.16	-3.88 ^b	0.64	-1.53	-2.17 ^c	-4.79 ^b
Liquidity risk indicators										
(17) Loans to assets (%)	0.86	3.79	2.93 ^b	0.28	-2.39	-2.67 ^b	0.38	-2.13	-2.51 ^b	-5.60 ^a
(18) Core deposits to total assets (%)	-0.13	1.70	1.83 ^b	-0.15	-1.97	-1.82 ^b	0.16	-1.63	-1.79 ^c	-3.65 ^b
(19) Loans to total deposits (%)	-0.23	1.28	1.51 ^b	0.26	-1.62	-1.36 ^b	-0.12	-1.15	-1.03 ^c	-2.87 ^b
(20) Liquidity ratio (%)	1.45	4.11	2.66 ^b	0.44	-2.27	-2.71 ^b	0.63	-1.64	-2.27 ^b	-5.37 ^a
Growth indicators										
(21) Asset growth rate (%)	0.85	5.89	5.04 ^b	1.27	-1.33	-2.60 ^c	0.91	-0.69	-1.60 ^c	-7.64 ^b
(22) Deposit growth rate (%)	1.04	14.44	13.40 ^a	1.09	-12.87	-13.96 ^a	0.89	1.81	0.92 ^c	-27.36 ^a

Industry adjusted values are computed for rival banks and year as the difference between the mean rival bank values in that year and the mean value for other banks in the industry.

^a Significantly different from zero at the 1% level.

^b Significantly different from zero at the 5% level.

^c Significantly different from zero at the 10% level.

4.2.1. Profitability indicators

For the rival banks in firm-specific bank failures all three profitability indicators increase significantly. For example, the mean industry match adjusted return on assets (ROA, Ratio 1) increases from 0.07% in the three years before the bank failure to 0.67% in the three years after the bank failure. The difference, 0.60%, is significant at the 10% level. Similarly, the increase in the mean industry adjusted return on equity (ROE, Ratio 2) and net interest margin (NIM, Ratio 3) before versus after the bank failure, 2.60 and 1.51%, respectively, are both significant at the 5% level.

In contrast, for rival banks in general bank failures and failures in which the reason for failure is unknown all three profitability ratios decrease significantly before versus after the bank failure. The decrease in the mean industry adjusted ROAs are 0.88 and 0.68%, respectively (significant at the 10% level), ROEs are 3.09 and 2.18%, respectively (significant at the 5% level), and NIMs are 1.63 and 1.02%, respectively (significant at the 5 and 10% levels, respectively).

The difference in the change in these three profitability indicators for rival banks around firm-specific versus general failures is reported in Panel D of Table 5. Specifically, the change in the mean industry adjusted ROA for rival banks is 1.48% larger (significant at the 10% level) in firm-specific bank failures than general bank failures, the change in ROE is 5.69% larger (significant at the 1% level), and the change in NIM is 3.14% larger (significant at the 5% level). Similar to the results for IAOPCFROA, traditional accounting measures of profitability also show that a bank-specific failure is associated with long-term performance improvements for rivals, while a general bank failure results in long-term performance decreases.

4.2.2. Capital adequacy indicators

Panel A of Table 5 reports no significant change in the mean industry adjusted capital ratio (Ratio 4) of rival banks around firm-specific failures. However, both the mean industry adjusted loans to total capital (Ratio 5) and deposits to total capital (Ratio 6) increase significantly (by 2.18× and 4.26×, respectively). Thus, compared to the industry each dollar of capital supports a greater number of both loans and deposits in rival banks after firm-specific bank failures. The ability of each dollar of equity to support more dollars of loans and deposits may explain the improvement in long-term performance, particularly for ROE. For rival banks in general bank failures (Panel B) and reason unknown bank failures (Panel C) none of the capital adequacy indicators change significantly around the bank failure. Thus, changes in capital adequacy do not appear to explain changes in long-term performance for rival banks. Finally, from Panel D the increase in the mean industry adjusted loans to capital and deposits to capital for rival banks in firm-specific bank failures is significantly greater than that for rival banks in general bank failures (by 3.10× and 4.89×, respectively).

4.2.3. Asset quality indicators

Panel A of Table 5 reports no significant change in the mean industry-adjusted allowance for loan losses to loans (Ratio 7) or loan loss provision to loans (Ratio 8) for rival banks around a firm-specific bank failure. Thus, while loans increase relative to equity for this group, they do so without an increase in nonperforming loans.

For rival banks in general bank failures (Panel B) and reason unknown bank failures (Panel C), however, both ratios increase significantly. The mean industry adjusted allowance for loan losses to loans increases 2.63 and 1.75%, respectively (significant at the 5 and 10% levels, respectively), while loan loss provision to loans increases 3.33 and 2.35%, respectively (significant at 1 and 5%, respectively). As discussed above, when a bank failure is due to a general economic decline (which is likely the reason for the failure of the banks in the reason for failure unknown group as well) a failure of one bank is more likely to be followed by performance deterioration in rival banks as the economic decline spreads. Here we see a decline in loan portfolio performance. For a bank failure due to a firm-specific reason we see no such decline in the quality of the loan portfolio.

For firm-specific bank failures the increase in loans combined with a lack of deterioration in the loan portfolio quality are likely factors that explain the improvement in long-term OPCFROA as well as accounting profitability measures. Further, the deterioration in loan portfolio quality is likely a factor in the drop in long-term OPCFROA and profitability for rival banks in general bank failures and failures in which the reason for the failure is unknown.

4.2.4. Operating efficiency indicators

For rival banks in firm-specific bank failures only one of the operating efficiency measures (Ratios 9 through 16) changes significantly before versus after the bank failure: total assets to employees increases by $4.07\times$ (significant at the 5% level). Thus, employees are managing significantly larger amounts of assets. For rival banks in general bank failures and reason unknown bank failures the mean industry adjusted interest and fees on loans to total assets (Ratio 12) decreases significantly (by 4.21 and 2.68%, respectively), as do personnel expenses to total assets (Ratio 13) (by 1.43 and 1.29%, respectively). The drop in interest and fees on loans to total loans again reflects the deterioration in the loan portfolio as the economic decline spreads to rival banks and is a factor explaining the drop in OPCFROA and other profitability measures. The decrease in personnel expenses to total assets would generally be a positive sign for a bank's profitability. However, if personnel expenses decrease because the better employees are leaving the deteriorating bank for jobs elsewhere, the decrease in this ratio does not bode well for the bank.

4.2.5. Liquidity ratios

For rival banks in firm-specific bank failures all liquidity ratios reported in Panel A of Table 5 (Ratios 17 through 20) increase significantly. The increase in the mean industry adjusted loans to assets (2.93%) is generally not a positive sign for a bank's liquidity (it signals that a significantly greater amount of assets are in the form of less liquid loans). However, along with the increase in loans we see an increase in mean industry adjusted core deposits to assets (by 1.83%). Thus, a significant portion of the financing of the additional loans comes from the stable (core) deposits. Further, the mean industry adjusted liquidity ratio increases significantly (by 2.66%) as well. Thus, even though liquidity is stretched with the increase in loans, the rival banks increase their holdings of cash and investment securities to offset this (and reduce liquidity risk). This may also be a factor explaining the improved

long-term OPCFROA and profitability indicators for rival banks around firm-specific bank failures.

The exact opposite trend is seen for rival banks in general economic decline and reason unknown bank failures. That is, all mean industry adjusted liquidity ratios decrease significantly for these groups. The decrease in liquidity (increase in liquidity risk) would be a factor driving the decrease in the long-term operating performance after a bank failure resulting from a general economic decline.

4.2.6. Growth indicators

Panel A of Table 5 reports significant increases in both the industry adjusted asset growth (Ratio 21) and deposit growth (Ratio 22) rates for rival banks in firm-specific bank failures (5.04 and 13.40%, respectively). Thus, as a bank fails for a firm-specific reason customers of the failing bank appear to move their business to rival banks. In contrast, in Panel B we see that industry adjusted asset growth and deposit growth rates are significantly negative (−2.60 and −13.96%, respectively) for rival banks in bank failures due to a general economic decline and as well as for rival banks in reason unknown bank failures (−1.60 and 0.92%, respectively). Despite the closure of the failed banks, rival banks in general economic decline and reason unknown bank failures do not experience an increase in business as the failed bank's customers move to new banks. Indeed, as the economic problems spread even rival banks lose business (loans and deposits) relative to the industry.

Summarizing Table 5, we find that around a firm-specific bank failure rival banks experience a significant increase in their industry adjusted accounting-based measures of profit (ROA, ROE, and NIM) as well as OPCFROA. Performance increases are associated with increases in both the loans and deposits (as customers of the failing bank transfer their business) without deterioration in loan quality, as well as to an increase in liquidity. For rival banks in bank failures due to a general economic decline and those in which the reason for the bank failure is unknown we find a significant decrease in industry adjusted accounting-based measures of performance as well as OPCFROA. Long-term performance decreases are associated with a loss of both industry adjusted loans and deposits in the rival banks after the bank failure, a deterioration in the quality of the remaining loans, and an increase in liquidity risk.

4.3. Regression results

The results so far show that long-term operating performance and other accounting measures of profitability increase for rival banks around a bank failure due to firm-specific reasons and decrease around a bank failure due to a general economic decline or when the reason for the failure is unknown. A final test of the change in long-term performance around bank failures examines the relation between the change in industry match adjusted OPCFROA and factors found significant in impacting short-term rival bank performance around a bank failure. Specifically, we test the following regression:

$$\Delta \text{IAOPCFROA}_i = a_0 + b_1 \ln(\text{SIZE}_i) + b_2 \text{RIVCAP}_i + b_3 \text{NUM}_i \\ + b_4 \text{MBHC}_i + b_5 \text{FIRREA}_i$$

where

Δ IAOPCFROA_{*i*} change in the mean industry match adjusted OPCFROA for rival banks in years -1 to -3 before to $+1$ to $+3$ after the *i*th bank failure

$\ln(\text{SIZE}_i)$ natural log of the book value of assets for the *i*th failed bank at year-end before the failure

RIVCAP_{*i*} mean core capital ratio for rival banks at year-end before the failure

NUM_{*i*} number of rival banks in the *i*th bank failure

MBHC_{*i*} 1 if the failed bank is a multiple bank holding company and 0 otherwise

FIRREA_{*i*} 1 if the bank failed after the passage of FIRREA (after 1988) and 0 otherwise

As mentioned in the introduction, previous research (e.g., Akhigbe & Madura, 2001) finds that the larger the failed or distressed bank the more the bank receives publicity and attention from current and potential customers. Thus, the impact (positive or negative) of a bank failure on rival banks' long-term performance should be greater the larger the asset size of the failed bank. Further, when rival banks have less capital they are less able to withstand financial distress. Thus, when a bank failure conveys bad news for rival banks (in our study when the failure is due to a general economic decline) rival banks with low capital levels should experience the greatest decline in long-term IAOPCFROA. When a bank failure conveys positive news for rival banks (the failure is due to a bank-specific problem) banks with low levels of capital should experience the smallest increase in long-term IAOPCFROA. Finally, the number of rivals to a failing bank may reflect the degree of market concentration and market structure. That is, when there are many rival banks to a bank failure that conveys positive news, the effects of the failure are dispersed among more competitors. Thus, the positive contagion effects on long-term IAOPCFROA should be smaller when they are spread among a greater number of rivals. It is unclear what will happen to changes in long-term IAOPCFROA when there are many rival banks to a bank failure that conveys bad news for rivals. While the effect of a single bank failure may be diminished when the number of rivals is large, the economic decline in the local area may cause IAOPCFROA to fall regardless of the number of rivals (i.e., IAOPCFROA may not change or even fall as the number of rivals increases).

Several papers (e.g., Akhigbe & Madura, 2001) find that bank holding company status of a distressed bank affects the announcement period performance of rival banks. Specifically, multiple bank holding companies (MBHC) have banks spread throughout the area. Thus, the failure of a MBHC should be more widespread and create a greater impact on rival bank long-term IAOPCFROA compared to the failure of a one bank holding company (OBHC) or a unit bank.¹³ Finally, Akhigbe and Madura (2001) find that bank failures that occurred following the passage of the Financial Institutions Reform, Recovery, and Enforcement Act of 1989 (FIRREA) produced smaller announcement period performance changes for

¹³ We also collect data on whether the banks are publicly or privately owned. Since the MBHC versus OBHC/unit bank and public versus private failed banks in the sample match identically (i.e., the correlation between these two variables is 1) we include only MBHC versus OBHC/unit bank in the regression analysis. Further, we collect data on whether the failed banks are money center banks or not. Since our sample includes only one money center bank failure, we do not include this variable in the regression.

Table 6

Regression results for rival banks around a bank failure between 1980 and 2000

	Firm-specific failure (<i>n</i> = 49)		General failure (<i>n</i> = 62)		Reason for failure unknown (<i>n</i> = 53)	
	Coefficient	<i>t</i> -statistic	Coefficient	<i>t</i> -statistic	Coefficient	<i>t</i> -statistic
Intercept	0.109	0.99	0.087	0.75	0.079	0.83
ln(SIZE)	0.169	3.09 ^a	-0.092	-2.89 ^a	-0.089	-2.79 ^a
RIVCAP	1.208	2.96 ^a	1.037	3.07 ^a	0.952	2.93 ^a
NUM	-0.089	-2.30 ^b	-0.060	-2.79 ^a	-0.051	-2.53 ^b
MBHC	0.248	3.37 ^a	-0.193	-2.69 ^a	-0.141	-2.62 ^b
FIRREA	-0.129	-2.22 ^b	-0.121	-2.49 ^b	-0.103	-2.23 ^b
Adjusted <i>R</i> -squared	0.41		0.37		0.33	
<i>F</i> -value	12.42 ^a		11.35 ^a		9.96 ^a	

$\Delta\text{IAOPCFROA}_i = a_0 + b_1 \ln(\text{SIZE}_i) + b_2 \text{RIVCAP}_i + b_3 \text{NUM}_i + b_4 \text{MBHC}_i + b_5 \text{FIRREA}_i$, where $\Delta\text{IAOPCFROA}$ = change in mean industry adjusted OPCFROA for rival banks in years -1 to -3 before to years 1-3 after the *i*th bank failure, $\ln(\text{SIZE})$ = natural log of the book value of assets for the *i*th bank failure, RIVCAP = mean total capital ratio for rival banks in the *i*th bank failure, NUM = number of rival banks in the *i*th bank failure, MBHC = dummy variable equal to 1 if the failed bank is a multibank holding company and 0 otherwise, and FIRREA = dummy variable equal to 1 if the bank failed after the passage of FIRREA (after 1988) and 0 otherwise.

^a Significantly different from zero at the 1% level.

^b Significantly different from zero at the 5% level.

rival banks than those before FIRREA. Prior to FIRREA banks were allowed to invest in riskier assets and to continue to operate with lower levels of capital than after FIRREA. Thus, banks were allowed to deteriorate to extreme levels before regulators declared them insolvent. After FIRREA the degree of risk in the asset portfolio of banks was limited and capital levels were increased. Thus, after FIRREA banks were not allowed to deteriorate to as bad a financial position before they were closed as prior to FIRREA. Accordingly, contagion effects on announcement period performance have been found to be smaller after the passage of FIRREA compared to before.¹⁴

The results of our regression analysis are reported in Table 6. We report the results of three separate regressions: for the 49 bank failures due to a firm-specific event, for the 62 bank failures due to a general economic decline, and for the 53 bank failures in which the reason for failure is unknown. Notice first that the coefficients on $\ln(\text{SIZE})$ are significant and of opposite sign for firm-specific bank failures (0.169) versus failures due to general economic decline (-0.092) and those in which the reason for the failure is unknown (-0.089). Thus, the bigger the failing bank the greater the impact of the failure on its rivals. That is, a large firm-specific failure is associated with a greater increase in IAOPCFROA, but a large failure due to a general economic decline (or due to unknown reasons) is associated with a greater decrease in IAOPCFROA. The firm-specific failure of a big bank is better news for its rivals (than that of a small bank) who may see the many customers of the failing bank shift their

¹⁴ In 1997 and 1998 the banking world witnessed several crises such as the Mexican, Asian, and Russian bond crises. It is possible that the banking industry felt effects from these worldwide events. However, the sample includes only one bank failure during this period. Thus, we do not explicitly test for any impact. Further, given that many of the failed banks are small banks with no international exposure, we would not expect to see an impact from these worldwide events.

way. However, the failure of a large bank due to a general economic decline (or when the reason for the failure is unknown) is worse news for its rivals who foresee the spread of the economic decline to their banks.

Further, the coefficients on MBHC are significant and of opposite sign for firm-specific bank failures (0.248) versus failures due to general economic decline (-0.193) and reason unknown failures (-0.141). MBHCs have banks spread throughout an area. Thus, the failure of a MBHC is associated with a larger change in rival bank long-term performance: a greater positive impact in the case of firm-specific failures (as customers shift their business to rival banks) and a greater negative impact in the case of general economic decline failures and reason unknown failures (as the economic decline spreads).

The coefficients on RIVCAP, NUM, and FIRREA are significant and of the same size for all three subgroups of failing banks. The positive coefficients on RIVCAP (1.208, 1.037, and 0.952 for firm-specific failures, failures due to general economic decline, and reason unknown failures, respectively) suggest that the higher the rival bank's capital ratio the larger the increase in IAOPCFROA in firm-specific failures and the less negative the decrease in IAOPCFROA in failures due to general economic decline and failures in which the reason for the failure is unknown.

The negative coefficients on NUM (-0.089 , -0.060 , and -0.051 , respectively) suggest that the larger the number of rivals, the smaller the increase in IAOPCFROA for rival banks. For firm-specific failures, as customers of the failed bank shift their business from the failed bank, the greater the number of rivals the less new business is spread to any single rival bank. Thus, the change in IAOPCFROA is smaller. For failures due to a general economic decline or for reason unknown failures the greater the number of rival banks the larger the decrease in IAOPCFROA. The failure of a regional bank sends a red flag indicating rival banks may be problematic as well. The greater the number of rival banks the bigger the problem appears to be as the decrease in IAOPCFROA is larger.

Finally, the negative coefficients on FIRREA (-0.129 , -0.121 , and -0.103 , respectively) suggest that after the passage of FIRREA rival banks experienced smaller increases in IAOPCFROA. After the passage of FIRREA regulators clamped down on the degree to which a failing bank could deteriorate before it was closed, i.e., banks were closed quickly before they could deteriorate excessively. Accordingly, the effect for firm-specific bank failures (the increase in IAOPCFROA) after FIRREA is smaller than that before FIRREA. When failures are due to a general economic decline or when the reason for the failure is unknown, the delayed closure before FIRREA occurs later in the period of decline (when rival banks may also be feeling the effects of the decline). Thus, before FIRREA the decline in IAOPCFROA for rival banks is smaller. After FIRREA failed bank closures occur earlier in the period of decline. Accordingly, the decrease in IAOPCFROA of rival banks is larger.

5. Conclusion

This paper examines the impact of bank failures on the long-term performance of rival banks. We find that a bank failure is associated with changes in the long-term operating performance of rivals. However, the change in performance is not the same for all banks. Specifically, if the bank failure is a result of a problem that is unique to the failing bank,

rival bank operating performance increases after the failure. However, if the bank failure is due to a general economic decline, rival bank operating performance decreases after the bank failure. The failure of a bank due to a firm-specific problem creates an opportunity for a shift of customers from the failing bank to its healthy rivals. The result is an increase in the operating pretax cash flow return on assets of these rivals. However, the failure of a bank due to general economic decline does not result in the same opportunity for a shift in customers. In fact, the spread of the economic decline results in a decrease in industry adjusted operating pretax cash flow return on assets of rival banks. Other differences between the two subsamples are also identified.

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