



# The Impact of Risk-Based Premiums on FDIC-Insured Institutions

MARCIA MILLON CORNETT

*College of Business and Administration, Southern Illinois University, Carbondale, Illinois*

HAMID MEHRAN

*Kellogg Graduate School of Management, Northwestern University, Evanston, Illinois*

HASSAN TEHRANIAN

*Wallace E. Carroll School of Management, Boston College, Chestnut Hill, Massachusetts*

## *Abstract*

This paper examines the effect of a series of announcements leading to the approval of risk-based deposit insurance premiums on returns to stockholders of commercial banks. Utilizing risk-weighted capital ratios and measures of overall risk, we group banks according to one of the nine-tier insurance categories subsequently defined by the FDIC. During the period in which the new insurance system was considered and approved, we found that stockholders of “well-capitalized,” “healthy” banks experienced wealth changes significantly different from those experienced by less than well-capitalized, less than healthy banks. Although many argued the premium range in the initial insurance schedule was insufficient, the results show that this initial risk-basing marked an important change in the relative burdens imposed by FDIC insurance.

## **1. Introduction**

Under section 302 of the Federal Deposit Insurance Corporation Improvement Act of 1991 (FDICIA), the Federal Deposit Insurance Corporation (FDIC) was required to increase premium income and develop and implement a system of risk-related insurance assessments by January 1 1994. The higher premium income was intended to raise the reserves of the Bank Insurance Fund (BIF) and ensure the solvency of FSLIC’s successor fund, the Savings Association Insurance Fund (SAIF). Further, it was argued that a risk-based insurance premium schedule would be a positive step in removing the moral hazard problem in which the interests of bank owners and managers are not aligned with those of the insurance fund. Under the flat premium system, Timmer (1993) states, “there were several forms of moral hazard. Regulators couldn’t be tough; bankers didn’t have anything to lose . . .” The result was that low-risk banks effectively subsidized insurance premiums for high-risk banks. Under the risk-based system, moral hazard is reduced by diminishing the subsidy from safe to risky banks and encouraging weak institutions to improve their condition.

On Monday, September 14 1992, a nine-tier, risk-based premium schedule was established, in which banks would pay between 23¢ (the flat rate charged to all banks at the

time) and 31¢ per \$100 of deposits. While the 8¢ differential was argued as insufficient for pricing risk,<sup>1</sup> it marked an important step in removing a long-standing moral hazard opportunity available to bank managers. In fact, the schedule approved in September 1992 was transitional. The FDIC also at this time recommended that a permanent risk-based premium schedule be implemented by January 1 1994, which would widen premium increments across risk classes and incorporate annual or semiannual adjustments.<sup>2</sup> As pointed out by Carnell (1993), “proportioning premiums to risk would align the incentives of owners and managers with the interests of the insurance fund. Risky institutions would internalize the costs of their risk-taking. Even a system that only correlates premiums with risk will reduce moral hazard by diminishing the subsidy from safe to risky institutions.” Therefore, even though the risk-based insurance premiums instituted in September 1992 may not have perfectly priced the risk imposed on the FDIC by banks, it marked an important change in the relative burdens imposed by FDIC insurance. This first step in restructuring the insurance premium schedule, as well as future refinements in it, presents a situation in which values of insured banks would be affected. Values would be affected not only by the 8¢ differential in the transitional schedule but also by the capitalized value of expected future subsidies.

In this paper, we examine the impact of information events in legislating and adopting the new risk-based insurance premium schedule on the market value of commercial banks. We look at the individual and overall impact of announcements that advanced the implementation of risk-based capital standards on the stock prices of a sample of commercial banks, grouped by capital ratios and Veribanc Inc. risk ratings. As explained in more detail later, Veribanc seeks to assess the overall quality of individual banks in a manner similar to CAMEL ratings assigned by bank regulators. These two characteristics of the bank act as proxies for determinants of insurance premiums under the new regulations. Given the lack of public access to CAMEL ratings,<sup>3</sup> previous research in this area has been limited to measuring overall quality of banks using various accounting-based and capital-market measures (i.e., asset composition, liquidity, beta, etc.) of bank quality (e.g. Cornett and Tehranian, 1992). We believe this is the first paper that attempts to approximate the methods used by the FDIC to categorize banks into premium classes.

The results of this paper indicate that stock prices of well-capitalized and low-risk banks in our sample reacted significantly and positively to various events that signaled an increased probability of implementation of risk-based insurance. On the other hand, these banks experienced significant negative stock price reactions to various events that signaled a decreased probability of implementation of risk-based insurance. Stock prices of less well-capitalized banks and risky banks examined in this study reacted significantly and positively to announcements, both signaling a decreased probability of passage of risk-based insurance. These banks saw significant negative returns for many events, all of which signaled an increase in the probability of passage of risk-based insurance. Further, the overall economic impact of risk-based insurance on well-capitalized and otherwise healthy banks was significantly different than the impact on less than well-capitalized, less than healthy banks. Although it has been argued that the risk-based insurance premium schedule approved in 1992 was insufficient to properly price the risk imposed on the FDIC by banks, the market reacted to this initial action that reduced the moral hazard problem extant with a flat premium system. Accordingly, the new system, which charges higher

premiums to riskier banks (those more likely to cause an insurance loss), resulted in the decreased value of these banks relative to healthier ones.

The paper is organized as follows. Section 2 describes details of the risk-based insurance system approved by the FDIC and summarizes its legislative history. Section 3 presents the data, methodology and hypotheses, and section 4 lists the results. Finally, section 5 summarizes and concludes the paper.

## **2. A summary of risk-based insurance for commercial banks**

### *2.1. Details of risk-based insurance*

In August 1989, Congress enacted the Financial Institutions Reform, Recovery and Enforcement Act (FIRREA). Among other things, FIRREA called for the FDIC to increase premiums to recapitalize the Bank Insurance Fund to 1.25% of deposits within 15 years. At the time, the BIF was running at a deficit. In December 1991, the FDICIA was signed into law. The FDICIA required the FDIC to increase the net premium income and develop and implement a risk-related insurance assessment system by January 1 1994. Risk-based insurance was intended to make the deposit insurance system fairer to well-run institutions and to encourage weak institutions to improve their condition. Thus, FDICIA marked an important change in the relative burdens imposed by FDIC insurance.

In response to these mandates, the FDIC board, on September 14 1992, approved a transitional risk-related system to become effective on January 1 1993, projecting an increase in the average bank insurance premium to 25.4¢ per \$100 of domestic deposits. The risk-based system places each insured bank into one of nine risk classes based on its level of capital and the overall risk of the institution as determined by its regulator. The strongest banks would pay 23¢ per \$100 of domestic deposits; the weakest would pay 31¢. Until January 1 1993, all FDIC-insured institutions paid the same, flat-rate premium regardless of the riskiness of their operations: fixed at 23¢ per \$100 of domestic deposits since July 1 1991.

Table 1 presents the FDIC's premium structure and the number of banks in each risk class as reported by the FDIC in September 1992. As can be seen in table 1, each FDIC insured bank is assigned to one of three capital groups or "zones" (well-capitalized, adequately capitalized, or undercapitalized) as defined in the table. Within the capital groups, the FDIC subclassifies each bank into three groups based on its evaluation of the risk posed by the institution. The three supervisory subgroups have been defined as follows. "Healthy" banks (to be proxied here by Veribanc category green) consist of financially sound banks that, at worst, have few minor weaknesses. "Supervisory concern" banks (proxied by Veribanc category yellow) consist of institutions that demonstrate weaknesses that, if not corrected, could result in significant deterioration of the bank. "Substantial supervisory concern" banks (proxied by Veribanc category red) consist of banks for which there is a substantial probability that the FDIC will suffer a loss in connection with the bank unless effective action is taken to correct the areas of weakness.

The transitional risk-based premium schedule took effect on January 1 1993. The FDIC

Table 1. FDIC premium structure and number of banks in each category

Capitalization/overall risk	Healthy	Supervisory concern	Substantial supervisory concern
Well-capitalized	(1)	(2)	(3)
Premium	23¢	26¢	29¢
Number of banks	9,115	1,766	363
Adequately capitalized	(4)	(5)	(6)
Premium	26¢	29¢	30¢
Number of banks	192	164	174
Undercapitalized	(7)	(8)	(9)
Premium	29¢	30¢	31¢
Number of banks	18	26	222

Notes: Premiums are listed per \$100 of domestic deposits. Number of banks are as estimated by the FDIC and reported in the *Wall Street Journal* on September 16 1992, p. A4.

also recommended that a permanent risk-based premium system be implemented on January 1 1994, which would widen premium increments across risk classes and incorporate annual or semiannual adjustments. Thus, the initial premium schedule was just a first step in implementation of a risk-based system of assigning insurance premiums for banks. As argued by FDIC regulators, “such a system greatly improves the fairness of the deposit insurance system to strong institutions, while increases the incentive for weak institutions to improve safety and soundness.”

## 2.2. Events leading to the passage of risk-based insurance

The risk-based insurance assessment scheme was approved by the FDIC on September 16 1992. This transitional scheme is the culmination of a series of events that started with plans for an overhaul of the banking industry on January 4 1991. The period of consideration of this bill, which was signed into law as FDICIA on December 20 1991, brought forth several issues: nationwide branching, brokerage and insurance powers for banks, separation of banks from security firms, too big to fail concerns, prompt corrective action, new regulatory system for banks and thrifts, ownership of banks by industrial firms, recapitalization of the FDIC, and the implementation of risk-based deposit insurance premiums.<sup>4</sup> Not all of these issues were included in the final version of FDICIA, but one of the items preserved throughout the debate and passage of the bill was the mandate to implement risk-based deposit insurance.

With FDICIA signed into law the FDIC received its mandate to develop a risk-based deposit insurance scheme. Even before William Taylor was sworn in as the FDIC chairman in October 1991, he alluded to his determination to raise deposit insurance premiums.<sup>5</sup> Six months into his chairmanship, Taylor was strongly endorsing the risk-based insurance system that was mandated by FDICIA. True to his word, a proposed risk-based premium schedule was released for comment on May 12 1992. The proposed risk-based insurance premium schedule had called for a 22% increase in premiums to an

average of 28¢ for each \$100 of domestic deposits. Rates ranged from 25¢ (for category 1 banks) to 31¢ (for category 9 banks), with intermediate rates of 28¢ (for category 2 and 4 banks) and 30¢ (for category 3, 5, 6, 7 and 8 banks).<sup>6</sup>

This might have been the final event on the road to implementing the proposal if an unexpected turn of events had not deprived proponents of a large premium increase of their most powerful advocate. Taylor died unexpectedly on August 21 1992, before a final vote was taken. Taylor's death left the agency's board split 2–2 between the proposed 22% increase and the smaller rise. Within a month of Taylor's death, on September 14 1992, the remaining four-man board voted unanimously for a lighter premium schedule.<sup>7</sup> As stated in the *Wall Street Journal* (September 16 1992, p. A3), the FDIC "in a victory for banks voted a smaller-than-expected increase in insurance premium." The smaller increase meant that 76% of the nation's banks (those in the 23¢ category) saw no increase in their insurance premiums for 1993. Announcements of a relatively large proposed increase in the insurance premiums in May 1992, as well as events that marked the FDIC's progress to the reduced premium schedule, had a significant impact on the value of commercial banks insured by the FDIC.

Least directly affected by the risk-based insurance system are banks that would be classified into the FDIC's safest category (23¢ premiums). The scheme that was approved included no change in 1993 insurance premiums for these banks. As mentioned already, however, the safest banks benefit indirectly from the change in the relative burdens imposed by FDIC insurance through the reduction in the subsidy they had been providing to risky banks under the flat premium system, from the shift of customers from weaker to stronger banks, and from the increase in the promptness with which regulators react to low-rated banks. Therefore, if they react at all, we expect this group of banks to experience increased values as the risk-based insurance scheme was debated. Under the risk-based premium system, weaker institutions are subject directly to increased insurance premiums. Furthermore, the indirect benefits of a risk-based premium system received by low-risk institutions come at the expense of the high risk banks. Accordingly, we expect the value of these banks to decrease as events occurred that increased the probability of implementation of the risk-based premium schedule and to increase with events that decreased the probability of the implementation of the schedule. In the next sections of the paper, the effect of the risk-based insurance assessment on stock returns is examined.

### **3. Data, methodology and hypotheses**

#### *3.1. Data*

The data analyzed consist of daily stock returns for commercial banks that are listed on either the New York Stock Exchange (NYSE) or the American Stock Exchange (ASE) or traded in the NASDAQ market between January 4 1991 (when the details of regulations which evolved into the FDICIA were announced), and September 14 1992 (when the FDIC approved the risk-based insurance scheme). Usable price records are found for 117 banks. To be included in the final sample, a bank must trade during this entire period and also must be included in both Veribanc's database (for the risk rating) and the FDIC database

(for the capitalization ratios). Daily return data were collected from the Center for Research in Security Prices (CRSP) data tapes.

The tests performed on the sample require us to identify all dates on which important new information about the regulation became publicly available. News items pertaining to changes in regulation are compiled by examining the *Wall Street Journal Index*, *The American Banker*, *New York Times Index*, the *Washington Post Index*, the *Los Angeles Times Index*, and FDIC news releases. Many announcements pertaining to the FDICA and eventually the implementation of risk-based deposit insurance were found in the sources we examined. To select those announcements to study here, we developed an index of “newsworthiness” by examining the extent of coverage of each announcement. Specifically, the events selected for study had to have been given at least 20 column inches of coverage in the *Wall Street Journal* or *The American Banker* and be covered in either the *New York Times*, the *Washington Post*, or the *Los Angeles Times*.<sup>8</sup> Our search produced 13 events meeting the “newsworthy” criterion. Table 2 lists these 13 events and the dates on which they occurred.

Notice in table 2 that the first nine events pertain to the debate and passage of FDICIA. Risk-based deposit insurance premiums were only one part of the legislation involved in FDICIA. Other equally important changes (i.e., prompt corrective action and too big to fail concerns) were instituted as a result of FDICIA. The changes discussed as part of each of these nine announcements are noted in table 2. It should be stressed that any impact these announcements may have on the value of FDIC-insured institutions would be the result of the overall changes resulting from FDICIA, of which risk-based premiums is just a part. However, as pointed out by a reviewer, because risk-based premiums were a major part of FDICIA, value changes of banks associated with these announcements should be considered in the evaluation of risk-based premiums. Events 10 through 13 (in table 2), on the other hand, are associated specifically with the actual implementation of risk-based deposit insurance following the passage of FDICIA. Therefore, the impact these announcements may have on the value of the sample banks should be directly attributable to risk-based deposit insurance.<sup>9</sup> To isolate and highlight the impact of those events strictly associated with risk-based premiums versus those that are incorporating the other regulatory changes along with risk-based premiums, we divide the 13 events in table 2 into two groups: those pertaining to risk-based premiums alone (events 10 through 13) and those pertaining to risk-based premiums as one part of FDICIA (events 1 through 9).

To identify the effect of the risk-based insurance system on low-premium versus high-premium banks, sample banks are partitioned into subsets based on their FDIC capitalization category (well-capitalized, adequately capitalized, or undercapitalized) and their Veribanc risk category (green, yellow, or red). Information needed to calculate the capital ratios is obtained from the FDIC giving Tier 1 risk-weighted capital ratio and total risk-weighted capital ratio for the quarter ending June 30 1992. Using these ratios our sample banks are classified as well-capitalized, adequately capitalized, or undercapitalized as defined in section 2.1.

The risk classes used in this study are supplied by Veribanc Inc. of Wakefield, Massachusetts. Veribanc sorts banks into categories following the colors of a standard traffic light. Category green banks are healthy banks; category yellow banks merit supervisory concern; and category red banks present substantial supervisory concern. The

Table 2. Major announcements and announcement dates leading up to the approval of increased and risk-based insurance premiums

Event	Date	Description
A. Announcements Related to FDICIA		
1	1-4-91	Banking blueprint may propose diversified holding companies. <sup>a,b,c,d,e,f,g,h,i</sup>
2	2-6-91	Big banks would get vastly broader powers under Treasury's plan. <sup>a,b,c,d,e,f,g,h,i</sup>
3	4-11-91	Fed signals its support for major parts of Treasury plan to overhaul banking; Bush's bank overhaul plan faces delay in House panel. <sup>a,b,c,d,e,g,h,i</sup>
4	5-24-91	Banking bill clears House panel by 36 to 0 vote. <sup>b,c,d,g,h</sup>
5	6-12-91	Key lawmakers resisting quick passage of broad banking reforms sought by Bush. <sup>b,c,d,g,i</sup>
6	7-1-91	House panel approves bill to reform banking laws. <sup>b,c,d,e,f,g,h,i</sup>
7	10-24-91	FDIC Board decides against raising bank premiums in 1992. <sup>a,b,c,d,e,f,g,i</sup>
8	11-5-91	Banking bill is voted down in the House. <sup>b,c,d,e,f,g,i</sup>
9	11-20-91	House and Senate pass bill. <sup>a,c,e,f,g,i</sup>
B. Announcements Related to Implementation of Risk-Based Deposit Insurance		
10	4-7-92	Taylor insists on risk-based system, wants to accelerate its implementation.
11	5-12-92	FDIC proposes a risk-based schedule of fees for comment.
12	8-21-92	Sudden death of Taylor adds further strain over uncertain policy.
13	9-14-92	Risk-based insurance passed but proves weaker than originally planned.

<sup>a</sup>Event included significant discussion of risk-based deposit insurance.

<sup>b</sup>Event included significant discussion of nationwide branching.

<sup>c</sup>Event included significant discussion of brokerage and insurance powers for banks.

<sup>d</sup>Event included significant discussion of separation of banks from securities firms.

<sup>e</sup>Event included significant discussion of too big to fail concerns.

<sup>f</sup>Event included significant discussion of prompt corrective action.

<sup>g</sup>Event included significant discussion of a new regulatory system for depository institutions.

<sup>h</sup>Event included significant discussion of ownership of banks by industrial firms.

<sup>i</sup>Event included significant discussion of recapitalization of the FDIC.

categories established by Veribanc Inc. in rating bank riskiness are similar but not identical to those of the FDIC CAMEL ratings. In particular, Veribanc does not specifically evaluate "management quality." Kane (1993) examined the correspondence between Veribanc and FDIC ratings for 1991 and 1992. Kane reported that, at midyear, the 1,036 banks in Veribanc's red and yellow categories corresponded roughly in number and total assets with the 1,044 "problem banks" identified by the FDIC. At year-end 1992, the FDIC reported 11,361 banks as "healthy." This corresponds with the 11,374 banks that Kane reports as in Veribanc's green category.

Employing the capital ratio and risk-rating proxies just described, the distribution of banks across risk classes is given in table 3. Notice that no publicly traded bank falls into the “substantial supervisory concern” (red) category and only two publicly traded banks are undercapitalized. Notice also that 74.4% (87 of 117) of our sample falls into premium category 1 and 13.7% falls into premium category 2. No more than 5.0% of the banks fall into the other seven insurance premium categories. These percentages compare with FDIC estimates given in table 1, in which 75.7% (9,115 of 12,040) of all banks are in premium category 1, 14.7% are in premium category 2, and no more than 3% of all banks are in the other seven premium categories. The distribution of our sample across the nine risk categories, in general, is consistent with the distribution for all banks listed in table 1. For our sample, only category 4, 5, and 8 banks have a (statistically significant) larger percentage of the sample than that for all banks. All other categories are statistically equal. Additionally, as discussed in the next section, we examine the sample based on the 87 banks in category 1 (74.4% of our sample) versus the 30 banks in categories 2 through 9 (25.6% of our sample). Comparing the proportions of these banks in our sample versus that for all banks (75.7% category 1 and 24.3% in categories 2 through 9), we find no difference. The event-study methodology described in the next section allows us to identify the impact of risk-based deposit insurance using subsets of these nine insurance premium categories.

### 3.2. Methodology

The stock price impact of regulatory reform is estimated by employing a multivariate regression model (MVRM) similar to that used in Schipper and Thompson (1983); Binder

Table 3. Capital ratio and Veribanc ratings for the nine risk-based insurance premium categories

	Veribanc rating green	Veribanc rating yellow	Veribanc rating red
<b>Well-Capitalized</b>			
Tier 1 Capital > 5%, or Total Capital > 10%	1 (23¢, 87) [74.4%, 75.7%]	2 (26¢ 16) [13.7%, 14.7%]	3 (29¢ 0) [0.0%, 3.0%]
<b>Adequately Capitalized</b>			
Tier 1 Capital between 4% and 5%, or Total Capital between 8% and 10%	4 (26¢, 6) [5.1%, 1.6%]*	5 (29¢, 6) [5.1%, 1.4%]*	6 (30¢ 0) [0.0%, 1.4%]
<b>Undercapitalized</b>			
Tier 1 Capital < 4%, or Total Capital < 8%	7 (29¢, 0) [0.0%, 0.2%]	8 (30¢, 2) [1.7%, 0.2%]*	9 (31¢, 0) [0.0%, 1.8%]

*Note:* The insurance premium per \$100 of domestic deposits and number of banks in our sample are listed in parentheses; the percentage each risk category represents from our sample and for all banks listed in table 1 are presented in brackets.

\*Percentages are significantly different at the 0.05 level.

(1985a, 1985b, 1988); Rose (1985); Smith, Bradley, and Jarrell (1986), and Cornett and Tehranian (1989, 1990). The MVRM model implies a system of portfolio return equations for two portfolios: (1) low-premium banks (the 87 category 1 banks in table 3); and (2) high-premium banks (the 30 category 2 through 9 banks). This split of the sample also isolates those banks that experienced no change in the deposit insurance premium assessed versus those banks whose insurance premiums increased under the new risk-based system.<sup>10</sup> Because the exact timing of the information release is unknown, a three-day event period is used corresponding to trading days  $t = -1$ ,  $t = 0$ , and  $t = +1$  relative to the announcement dates listed in table 2.<sup>11</sup> The system of equations are run separately for the nine events that pertain to risk-based premiums as part of FDICIA and the four events that pertain strictly to risk-based deposit insurance premiums as the details were implemented.<sup>12</sup>

$$\begin{aligned}\tilde{R}_{1t} &= \alpha_1 + \beta_{11}\tilde{R}m_{t-2} + \beta_{12}\tilde{R}m_{t-1} + \beta_{13}\tilde{R}m_t + \beta_{14}\tilde{R}m_{t+1} + \beta_{15}\tilde{R}m_{t+2} + \sum_{k=1}^K \gamma_{1k}D_{kt} + \tilde{e}_{1t} \\ \tilde{R}_{2t} &= \alpha_2 + \beta_{21}\tilde{R}m_{t-2} + \beta_{22}\tilde{R}m_{t-1} + \beta_{23}\tilde{R}m_t + \beta_{24}\tilde{R}m_{t+1} + \beta_{25}\tilde{R}m_{t+2} + \sum_{k=1}^K \gamma_{2k}D_{kt} + \tilde{e}_{2t}\end{aligned}\quad (1)$$

where

- $\tilde{R}_{jt}$  = the return on a portfolio,  $j$  ( $= 1$  and  $2$ ), of commercial banks on day  $t$ ;<sup>13</sup>  
returns for each portfolio are weighted based on the full estimated covariance matrix of residuals to increase the efficiency of parameter estimates;
- $\tilde{R}m_t$  = the return on the CRSP equally weighted index on day  $t$ ;
- $\alpha_j$  = an intercept coefficient for portfolio  $j$  ( $= 1$  and  $2$ );
- $\beta_{j1}-\beta_{j5}$  = risk coefficients for the  $j$ th portfolio ( $j = 1$  and  $2$ );<sup>14</sup>
- $\gamma_{jk}$  = the effect of the  $K$  regulatory changes on the  $j$ th portfolio ( $K = 9$  or  $4$  in this study);
- $D_{kt}$  = dummy variables that equal 1 during the period of the  $k$ th announcement and 0 otherwise;<sup>15</sup>
- $\tilde{e}_{jt}$  = random disturbances that are assumed to be normal and independent of the return on the market and the event announcement variable.

### 3.3. Testable hypotheses

Familiar hypotheses about average or cumulative average abnormal returns, as well as more general hypotheses, can be tested within the framework just discussed. Specifically, the following hypotheses are formulated and tested:

Hypothesis 1:  $\gamma_{jk} = 0 \forall j$ ; the abnormal returns for each portfolio equal zero on announcement day  $k$ .

Hypothesis 2:  $\gamma_{ik} - \gamma_{jk} = 0 \forall k$ ; the abnormal return for each portfolio is the same for each announcement  $k$ .

Hypothesis 3:  $\sum_{k=1}^K \gamma_{ik} - \sum_{k=1}^K \gamma_{jk} = 0 \forall_{ij} (i \neq j)$ ; the overall economic impact of the risk-based insurance assessment system is the same for each portfolio.

## 4. Results

*4.1. Tests of hypothesis 1 (the abnormal return for each portfolio equal zero on announcement day  $k$ ) and hypothesis 2 (the abnormal return for each portfolio is the same for each announcement  $k$ )*

Panel A of table 4 reports on the MVRM analysis for the four events that pertain strictly to risk-based deposit insurance premiums. Column 1 lists the events. Column 2 shows the portfolio abnormal returns, the  $t$ -statistics, and the percentage of the sample with positive abnormal returns for each of the nine events across the 87 well-capitalized and healthy banks. Column 3 reports these results for the 30 less than well-capitalized and less than healthy banks. These estimates are the coefficients of the dummy variables in eq. (3). Column 4 presents the differences in the portfolio abnormal returns and  $F$ -statistics.

As shown in column 2 of table 4, one event produces a positive and significant (at better than the 0.01 level) three-day cumulative average abnormal return to stockholders of well-capitalized and healthy banks: event 13 (risk-based insurance passed but proves weaker than originally planned). For the remaining three events, no significant investor reaction is identified. Abnormal portfolio returns for the less than well-capitalized and less than healthy banks (reported in column 3) are significant (at better than the 0.01 level) for events 10 (Taylor insists on risk-based system, wants to accelerate its implementation), 11 (FDIC proposes a risk-based schedule of fees for comment), and 12 (sudden death of Taylor adds further strain over uncertain policy). Abnormal returns for events 10 and 11 are negative, but positive for event 12. In addition, binomial tests on the number of positive and negative abnormal returns are run for the events reported in table 4. The results of the binomial tests (reported in parentheses as the percentage of positive abnormal returns) are significant at better than the 0.05 level for all four events found significant by parametric tests. Therefore, the parametric results do not appear to be driven by outliers.

These results allow us to reject the null hypothesis that the abnormal returns for each portfolio equal zero on every announcement day. Rather, some of the events that signaled an increased probability of passage of risk-based insurance appear to have created positive (negative) value changes for category 1 (category 2 through 9) banks, and some of the events that signaled a decreased probability of passage appear to have created negative (positive) value changes for category 1 (category 2 through 9) banks.

Column 4 of table 4 reports differences between portfolio abnormal returns and corresponding  $F$ -statistics for category 1 versus category 2 through 9 banks for each event (Hypothesis 2). The  $F$ -statistic is significant at better than the 0.05 level for each of the four events. These results suggest that well-capitalized, healthy banks reacted significantly more favorably to events that indicated an increased probability of passage and

Table 4. Test of hypotheses for major news items regarding the implementation of risk-based deposit insurance

Event <sup>a</sup>	Portfolio abnormal returns (in percent)		
	Veribanc category green, and FDIC well-capitalized segments  N = 87 (2)	Veribanc category for all others and FDIC adequately- capitalized & undercapitalized segments  N = 30 (3)	Difference in portfolio abnormal returns  (4)
Panel A. Test of Hypotheses 1 and 2			
10	0.74 (0.75, 56)	- 3.82 <sup>b</sup> (- 3.42, 27 <sup>c</sup> )	- 4.56 <sup>b</sup> (5.94)
11	1.21 (1.40, 59 <sup>c</sup> )	- 5.27 <sup>b</sup> (- 4.84, 23 <sup>c</sup> )	- 6.48 <sup>b</sup> (9.09)
12	- 0.29 (- 0.29, 46)	4.05 <sup>b</sup> (3.79, 73 <sup>c</sup> )	- 4.34 <sup>b</sup> (6.18)
13	1.91 <sup>d</sup> (1.94, 66 <sup>b</sup> )	- 0.94 (- 0.87, 43)	- 2.85 <sup>c</sup> (4.29)
		$\chi^2$ -statistic <sup>e</sup>	F-statistic <sup>f</sup>
Panel B. Test of Hypothesis 3			
	5.72	19.97 <sup>b</sup>	9.72 <sup>b</sup>

Notes: Panel A of this table reports tests of Hypotheses 1 and 2; panel B reports tests of Hypothesis 3. Columns 2 and 3 of panel A present portfolio abnormal returns with the *t*-statistics and the percentage of the sample with positive abnormal returns (in parentheses) for 87 banks in the FDIC well-capitalized segments and Veribanc category green and 30 banks in FDIC adequately capitalized and undercapitalized segments and Veribanc category in yellow and red around each of the four events, respectively. These estimates are from a regression of portfolio returns (weighted, based on the full estimated covariance matrix of residuals) and dummy variables corresponding to the four events. Each dummy variable equals 1 during the three-day period ( $t = -1$ ,  $t = 0$ , and  $t = 1$  relative to each announcement) and 0 otherwise. Column 4 presents the differences in the portfolio abnormal returns and *F*-statistics (in parentheses). Panel B reports the chi-square and *F*-statistic for the overall economic impact of the individual events reported in panel A.

<sup>a</sup>Events are described in table 2.

<sup>b</sup>Significant at the 0.01 level.

<sup>c</sup>Significant at the 0.05 level.

<sup>d</sup>Significant at the 0.10 level.

<sup>e</sup>The critical value  $\chi^2(4, 0.01) = 13.28$  and  $\chi^2(4, 0.05) = 9.49$ .

<sup>f</sup>The critical value  $F(3, 486, 0.01) = 3.78$ .

significantly less favorably to events that indicated a decreased probability of passage of risk-based insurance premiums.

As discussed in section 2, although the safest banks did not see an initial change in their insurance premiums, indirect benefits accrued from the new premium schedule (and from the impending increase in the differential premiums). Indeed, risk-basing signaled an important change in the FDIC's imposition of the relative burden for insurance coverage in favor of the safest banks (even though some argued the range in premiums was too small). Weaker banks, on the other hand, are subject to direct increases in insurance premiums under the risk-based scheme. Furthermore, the indirect benefits of a risk-based premium

system received by low-risk institutions should come at the expense of high-risk institutions.<sup>16</sup> Accordingly, the stronger banks reacted differently than the weaker group. The increase in premiums that would come from the new insurance system would be borne by the weaker banks. These banks now would be paying a larger share of the cost of deposit insurance. Our results reveal that mainly these weaker banks reacted to various events.

Panel A of table 5 reports the portfolio abnormal returns around each of the nine events pertaining to risk-based deposit insurance as part of FDICIA. We reiterate that these nine events contain information about not only risk-based deposit insurance but other legislation introduced by FDICIA as well. Therefore, we can attribute these results partially but not entirely to risk-based premiums. The setup of table 5 is identical to that of table 4.

Looking at column 2 of table 5, event 2 produces a positive and significant announcement period abnormal return for the category 1 banks, whereas event 5 is negative and significant. Event 5 produces a positive and significant announcement period abnormal return for the category 2 through 9 banks, whereas events 1, 4, and 9 are negative and significant. The results appear not to be driven by outliers, as binomial tests also are significant at better than the 0.05 level for each of the significant parametric results. Additionally, the *F*-statistics reported in column 4 for the difference in portfolio abnormal returns are significant for events 1, 2, 4, 5, 8, and 9 (Hypothesis 2). Although risk-based deposit insurance is only one factor producing the results, we again find that events signaling an increased probability of implementation of risk-based premiums (via the increased probability of passage of FDICIA) result in positive (negative) value changes for category 1 (category 2 through 9) banks, but events that indicated a decreased probability of passage produce negative (positive) value changes for category 1 (category 2 through 9) banks.

#### *4.2. Test of hypothesis 3: the overall economic impact of the risk-based insurance assessment system is the same for each portfolio*

In addition to identification of the significance for each announcement day, of particular interest to this study is a test of the hypothesis that the overall economic impact of the risk-based deposit insurance was significant for the various portfolio groupings across the four- and nine-event announcement periods. Focusing attention on tests that measure abnormal returns on and around a series of announcements provides valuable information about the wealth impact of risk-based deposit insurance on different firms within the commercial banking industry.

We first test the overall impact of risk-based premiums using a chi-square statistic defined by Theil (1971, pp. 313–314). The results are reported in panel B of tables 4 and 5. For events 10 through 13 (events pertaining to risk-based deposit insurance solely), the chi-square statistic reported in table 4 is 5.72 for the 87 category 1 banks and 19.97 for the category 2 through 9 banks, which suggests that over all four events the less than well-capitalized, less than healthy banks reacted significantly to the implementation of risk-based deposit insurance premiums. For events pertaining to risk-based premiums as a part

Table 5. Test of hypotheses for major news items leading to the passage of FDICIA

Event <sup>a</sup>	Portfolio abnormal returns (in percent)		
	Veribanc category green, and FDIC well-capitalized segments  N = 87 (2)	Veribanc category for all others and FDIC adequately- capitalized & undercapitalized segments  N = 30 (3)	Difference in portfolio abnormal returns  (4)
Panel A. Test of Hypotheses 1 and 2			
1	0.71 (0.85, 54)	- 2.56 <sup>c</sup> (- 2.39, 27 <sup>b</sup> )	- 3.27 <sup>b</sup> (4.82)
2	2.35 <sup>b</sup> (2.91, 70 <sup>b</sup> )	- 1.27 (- 1.12, 43)	- 3.62 <sup>b</sup> (4.90)
3	0.83 (0.96, 57)	- 0.51 (- 0.44, 50)	- 1.34 (0.65)
4	0.74 (0.87, 55)	- 2.69 <sup>c</sup> (- 2.42, 23 <sup>b</sup> )	- 3.43 <sup>b</sup> (5.21)
5	- 1.57 <sup>d</sup> (- 1.82, 41 <sup>c</sup> )	2.38 <sup>c</sup> (2.25, 70 <sup>b</sup> )	3.95 <sup>b</sup> (5.40)
6	0.59 (0.69, 52)	- 0.63 (- 0.60, 40)	- 1.22 (0.69)
7	0.21 (0.20, 50)	0.62 (0.61, 57)	0.41 (0.49)
8	- 1.41 (- 1.59, 39 <sup>c</sup> )	1.60 (1.52, 65 <sup>c</sup> )	3.01 <sup>c</sup> (4.54)
9	1.05 (1.18, 60 <sup>c</sup> )	- 2.08 <sup>d</sup> (- 1.91, 33 <sup>c</sup> )	- 3.13 <sup>b</sup> (4.84)
		$\chi^2$ -statistic <sup>e</sup>	F-statistic <sup>f</sup>
Panel B. Test of Hypothesis 3			
	15.69	19.92 <sup>c</sup>	4.72 <sup>b</sup>

Notes: Panel A of this table reports tests of Hypotheses 1 and 2; panel B reports tests of Hypothesis 3. Columns 2 and 3 of panel A present portfolio abnormal returns with the *t*-statistics and the percentage of the sample with positive abnormal returns (in parentheses) for 87 banks in the FDIC well-capitalized segments and Veribanc category green and 30 banks in FDIC adequately capitalized and undercapitalized segments and Veribanc category in yellow and red around each of the nine events, respectively. These estimates are from a regression of portfolio returns (weighted, based on the full estimated covariance matrix of residuals) and dummy variables corresponding to the four events. Each dummy variable equals 1 during the three-day period ( $t = -1$ ,  $t = 0$ , and  $t = 1$  relative to each announcement) and 0 otherwise. Column 4 presents the differences in the portfolio abnormal returns and *F*-statistics (in parentheses). Panel B reports the chi-square and *F*-statistic for the overall economic impact of the individual events reported in panel A.

<sup>a</sup>Events are described in table 2.

<sup>b</sup>Significant at the 0.01 level.

<sup>c</sup>Significant at the 0.05 level.

<sup>d</sup>Significant at the 0.10 level.

<sup>e</sup>The critical value  $\chi^2(9, 0.01) = 21.67$  and  $\chi^2(9, 0.05) = 16.92$ .

<sup>f</sup>The critical value  $F(8, 602, 0.01) = 2.82$ .

of FDICIA (table 5), we see significant overall impact only at the 0.05 level for category 2 through 9 banks.

Additionally, Hypothesis 3 can be expressed in the form

$$L\beta = l$$

where  $L$  is a  $P \times N$  matrix of constants with rank  $P(P \leq K)$ ,  $\beta$  is the  $N \times 1$  vector of coefficients estimated from (eq. 1),  $l$  is a  $P \times 1$  vector of constants, and  $P$  is the number of restrictions tested in the system. As described in Theil (1971, pp. 314, 402) the statistic

$$\frac{JT - JN}{P} \frac{(l - L\hat{\beta})' \{L[X'(\hat{\Sigma}^{-1} \otimes I)X]^{-1}L\}^{-1} (l - L\hat{\beta})}{(\hat{R} - X\hat{\beta})' (\hat{\Sigma}^{-1} \otimes I) (\hat{R} - X\hat{\beta})}$$

where

$$\Sigma = [\sigma_{ij}], i, j = 1, 2, \dots, J,$$

$\otimes$  = the Kronecker product,

$T$  = the number of daily return observations (= 252 for the event period 10 through 13 and 315 for the event period 1 through 9) used for estimation parameter in eq. (1),

$J$  = the number of portfolios tested,

$P$  = the number of restrictions tested,

is asymptotically distributed as  $F(P, JT - JN)$ .

A joint test of the hypothesis that the overall economic impact of risk-based deposit insurance for well-capitalized and Veribanc category green banks versus all other banks can be expressed as

$$H_0 : \sum_{k=1}^K \gamma_{ik} - \sum_{k=1}^K \gamma_{jk} = 0 \forall_{i,j} (i \neq j)$$

The results are reported in panel B of tables 4 and 5, where the  $F$ -statistic is 9.72 for events 10 through 13 and 4.72 for events 1 through 9. Both sets of events produce significant results,<sup>17</sup> yet the events related solely to risk-based premiums is much more so.

The tests of Hypothesis 3 suggest that the overall economic impact of risk-based deposit insurance to stockholders of well-capitalized and otherwise healthy banks was significantly different from the impact to stockholders of less than well-capitalized and otherwise risky banks. Specifically, the overall impact of risk-based deposit insurance does not appear to affect the category 1 banks, but the approval of risk-based insurance resulted in significantly larger abnormal returns to stockholders of these well-capitalized and Veribanc category green banks than all others. The lack of an increase in the deposit insurance premium for the safest banks and the fairer distribution of premiums between the low-risk and high-risk banks caused the value of the high-risk banks to decrease during the period of consideration and passage of the new insurance systems without affecting the value of the healthier banks.

## 5. Conclusion

This paper examines the effect of a series of announcements leading up to the approval of risk-based deposit insurance premiums on returns to stockholders of commercial banks. The new system, mandated by the FDICIA, assesses deposit insurance on the basis of the bank's capital adequacy and overall risk. After a period of debate, the safest institutions saw no increase in insurance premiums but the riskiest banks' insurance premiums increased from 23 to 31¢ per \$100 of domestic deposits.

The empirical results lead to the conclusion that the well-capitalized, healthy banks experienced value increases as a result of some of the specific announcements. Those banks that were not well-capitalized or healthy experienced wealth decreases when events occurred that signaled an increased probability of passage and wealth increases when events occurred that signaled a decreased probability of passage of risk-based insurance. Further, the overall economic impact of the risk-based insurance system was significantly different for the two groups of banks. The shifting of deposit insurance premiums from those banks that were least likely to need the coverage to those that had a higher probability of needing the coverage produced a wealth distribution within the commercial banking industry. Although many argued that the 8¢ range in the initial premium schedule was insufficient, the differential stock price reactions for the two samples of banks leads us to conclude that risk-basing marked an important change in the relative burdens imposed by FDIC insurance.

## Acknowledgments

We thank Allen N. Berger, Christina Blair, Rebel Cole, Warren Veller (Véribanc Inc.), Edward J. Kane, John O'Keefe, Robert Taggart, Robert A. Eisenbeis (the editor), and two anonymous reviewers for helpful comments and to Sharon Rose and Patty Doolin who prepared the manuscript. An earlier version of the paper was presented at the Financial Management Association 1993 Annual Meetings, Miami University, and at Wharton's 1994 Conference of Accounting Issues in Risk and Capital Management in Financial Institutions. We also thank the seminar participants for their comments.

## Notes

1. For example, the Shadow Financial Regulatory Committee (1992) stated that the "proposed premium schedule misconceives, mismeasures and misprices risk."
2. At this writing, the FDIC has voted to reduce insurance premiums for the best rated banks to 0¢ per \$100 of deposits, while decreasing the premiums for the weakest banks to 27¢ per \$100 of deposits. This change increases the premium differential between the safest and riskiest banks from 8¢ to 27¢ per \$100 of deposits.
3. As pointed out by Ed Kane, outside observers may now be able to back out the value of a bank's CAMEL rating by observing capital ratios and FDIC insurance premiums paid. Ascertaining this rating might help analysts to better value bank stock and might tighten incentives for regulators to discipline firms more appropriately.

4. As pointed out by Ed Kane, the start of risk-related explicit premiums is not separable from other parts of FDICIA: prompt corrective action and too big to fail concerns. He adds, however, the other elements (that would affect the risk of the bank) may be treated as adjusting the range of future implicit premiums.
5. See for example, *The American Banker's* front page article on Friday, October 18 1991, titled "Boost in FDIC's Premium Rate Moves to Top of Taylor's Agenda."
6. The FDIC proposed risk-related premium schedule announced on May 12 1992, was known to represent a compromise by a divided board. Taylor sought to increase the average premium to 30¢, but none of the other four board members would agree to such a large increase. Director C.C. Hope suggested 28¢, while vice chairman Skip Hove, acting comptroller of currency Steve Steinbrink, and office of thrift supervision director Tim Ryan all said they preferred keeping the average premium increase at 27¢. When Taylor agreed to go along with 28¢, Hove switched sides and voted with the chairman and Hope for a 3 to 2 vote for the 5¢ average increase and premiums ranging from 25 to 31¢. See *The American Banker*, Wednesday, May 13 1992, p. 1, for details of the last minute compromises that occurred prior to the proposal announcement.
7. Little information was available to explain why the committee members voted the way they did. However, the Bush administration had argued that, at a time when low interest rates were leading to a sharp decrease in the number of bank failures and increase in bank profits, insurance premium increases were unnecessary. It is possible that the administration's statements along with the death of Chairman Taylor (the most vocal advocate of risk-based insurance) led to the turnaround in the vote.
8. We are grateful to Ed Kane for suggesting this measure of "newsworthiness."
9. However, even these events saw some contemporaneous events that could affect stock prices. Specifically, on May 11 1992 (one day before event 11), a controversial regulation permitting federally chartered thrifts to branch across state lines took effect. Also, on September 15 1992 (the day after event 13), the Federal Reserve Board adopted a rule that spurred the seizure of about 50 critically undercapitalized banks. Finally, on November 6 1991 (the day after event 8), the Basel Committee amended risk-based capital guidelines to make it harder for banks to count loan-loss reserves as capital. Our search of the various news sources led us to no other major confounding event.
10. We also split the sample on the basis of just capital levels (well capitalized,  $n = 103$ , versus adequately and undercapitalized,  $n = 14$ ) and Veribanc risk ratings (Veribanc rating green,  $n = 93$ , versus Veribanc rating yellow and red,  $n = 24$ ). The results were similar to those reported in the paper.
11. Conclusions drawn using a shorter window (days  $t = -1, 0$ ) are identical.
12. The models used in previous studies are slightly different from eq. (1). We employ the market return at several leads and lags as an explanatory variable to overcome the possibility of the nonsynchronous trading in our sample (Scholes and Williams, 1977).
13. The  $t$  equals daily observations from October 1990 through December 1991 for the first nine events examined and from January 1992 through December 1992 for the other four events.
14. The pre (before 1-4-91) and post (after 9-14-92) risk-based FDIC insurance premium periods were examined for significant shifts in the risk parameters for both subgroups of banks. Specifically, a procedure introduced by Firth (1980) was employed. No significant change in beta was found for the subgroups during the period prior to the first announcement relating to the new insurance scheme (1-4-91) and a period after the scheme was approved (9-14-92).
15. Depending on what time during the trading day the announcement was made, either the publication day or the day before might be the relevant announcement day. Because the exact time of the announcement is unknown, the announcement period is the three trading days,  $t = -1$ ,  $t = 0$ , and  $t = +1$ , relative to the published announcement.
16. At the suggestion of an anonymous referee, we calculated equity-weighted abnormal returns (across the whole sample) for each event. In support of our statement that low-risk institutions benefitted indirectly from a risk-based premium system at the expense of high-risk institutions, we find that the equity-weighted abnormal return is not significantly different from zero for any of the 13 events examined.
17. The degrees of freedom reported in footnote f of table 4, 486, equal  $[2 \text{ (the number of portfolios)} \times 252 \text{ (the number of observations)}] - [2 \text{ (the number of portfolios)} \times 9 \text{ (the number of independent variables in the regression eq. (1))}]$ . The degrees of freedom reported in footnote f of table 5, 602, equal  $[2 \text{ (the number of portfolios)} \times 315 \text{ (the number of observations)}] - [2 \text{ (the number of portfolios)} \times 14 \text{ (the number of independent variables in the regression eq. (1))}]$ .

## References

- Binder, J.J., "Measuring the Effects of Regulation with Stock Price Data," *Rand Journal of Economics* 16 (1985a), 167–183.
- Binder, J.J., "On the Use of the Multivariate Regression Model in Event Studies," *Journal of Accounting Research* 23 (1985b), 370–383.
- Binder, J.J., "The Sherman Antitrust Act and the Railroad Cartels," *Journal of Law and Economics* 31 (1988), 443–467.
- Carnell, R.S., "The Culture of Ad Hoc Discretion." In: *Assessing Bank Reform: FDICIA One Year Later*, George G. Kaufman and Robert E. Litan, eds. Washington, DC: The Brookings Institution, 1993, pp. 113–121.
- Chamberlain, G., "Multivariate Regression Models for Panel Data," *Journal of Econometrics* 18 (1982), 5–46.
- Cornett, M.M., and H. Tehranian, "Stock Market Reactions to the Depository Institutions Deregulation and Monetary Control Act of 1980," *Journal of Banking and Finance* 13 (1989), 81–100.
- Cornett, M.M., and H. Tehranian, "An Examination of the Impact of the Garn-St. Germain Depository Institutions Act of 1982 on Commercial Banks and Savings and Loans," *Journal of Finance* 45 (1990), 95–111.
- Cornett, M.M., and H. Tehranian, "Changes in Corporate Performance Associated with Interstate and Intrastate Bank Acquisitions," *Journal of Financial Economics* 31 (1992), 211–234.
- Firth, M., "Takeovers, Shareholders' Returns and the Theory of the Firm," *Quarterly Journal of Economics* 94 (1980), 235–260.
- Kane, E.J., "Our Bifurcating Banking System," working paper, Boston College, 1993.
- Rao, C.R., *Linear Statistical Inferences and Its Applications*, 2nd ed. New York: Wiley, 1973.
- Rose, N.L., "The Incidence of Regulatory Rents in the Motor Carrier Industry," *Rand Journal of Economics* 16 (1985), 299–318.
- Scholes, M., and J. Williams, "Estimating Betas from Nonsynchronous Data," *Journal of Financial Economics* 5 (1977), 309–327.
- Schipper, K., and R. Thompson, "The Impact of Merger-Related Regulations on the Shareholders of Acquiring Firms," *Journal of Accounting Research* 21 (1983), 184–221.
- Shadow Financial Regulatory Committee, "The FDIC's Proposed Schedule of Risk Sensitive Premiums," Statement 83 (reprinted in *Journal of Financial Services Research* 7 [1992], 94–95).
- Smith, R.T., M. Bradley, and G. Jarrell, "Studying Firm-Specific Effects of Regulation with Stock Market Data: An Application to Oil Price Regulation," *Rand Journal of Economics* 17 (1986), 467–489.
- Theil, H., *Principles of Econometrics*. New York: Wiley, 1971.
- Timmer, B., "Deposit Insurance: Back to the Future." In: *Assessing Bank Reform: FDICIA One Year Later*, George G. Kaufman and Robert E. Litan, eds. Washington, DC: The Brookings Institution, 1993, pp. 135–140.
- White, H., "Instrumental Variables Regression with Independent Observations," *Econometrica* 50 (1982), 483–500.

Copyright of Journal of Financial Services Research is the property of Springer Science & Business Media B.V.. The copyright in an individual article may be maintained by the author in certain cases. Content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.